

4.23 MA 23 – Munuscong Bay Management Area

Summary of Use and Management

Management in the Munuscong Bay management area (MA) (Figure 4.23.1) will maintain or enhance fish and waterfowl habitat, provide a variety of timber products and provide for forest-based recreational uses. Munuscong Bay is noted for a high-quality fishery and excellent waterfowl habitat. Timber management will emphasize balancing age classes of aspen, lowland poplar and mixed swamp conifers. Expected issues in this 10-year planning period are introduced pests and diseases and the difficulty of regenerating cedar stands.

Introduction

The Munuscong Bay management area is located in the far eastern end of the eastern Upper Peninsula in Chippewa County. It has 14,775 acres of state-owned land. The primary attributes are the extensive fish and wildlife resources. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of clay soils on flat lake plain near Munuscong Bay on the St. Mary's River. The soils in this area are very erodible.
- Recreational opportunities including: fishing, camping, snowmobiling and hunting.
- There are special conservation area deer wintering areas, including the Keldon deer yard and Great Lakes marsh and poor fen ecological reference areas within the management area.
- There are several known archeological sites within the management area including old homesteads and a fossil bed.

This management area is within the Munuscong River Watershed, which is primarily a warm and cool water system. It has historically supported a strong walleye run, but is currently adversely affected by agricultural runoff. Munuscong Bay supports an outstanding walleye fishery.

This management area is also the Munuscong State Wildlife Management Area. Waterfowl management has been a priority both along Munuscong Bay and in interior grassland habitat where a number of man-made pot holes were constructed in the low areas. DNR and volunteer crews worked together to create these ponds. Some ponds have also been created on private property through cooperative agreements. Much of this management area is a wildlife flooding dependent upon natural water level fluctuations. The wetland and grassland habitats in the management area provide habitat for waterfowl and grassland species alike.

The state land in this management area is fairly concentrated with some private land throughout. The Munuscong Bay management area is within the Sault Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.23.1.

Munuscong Bay

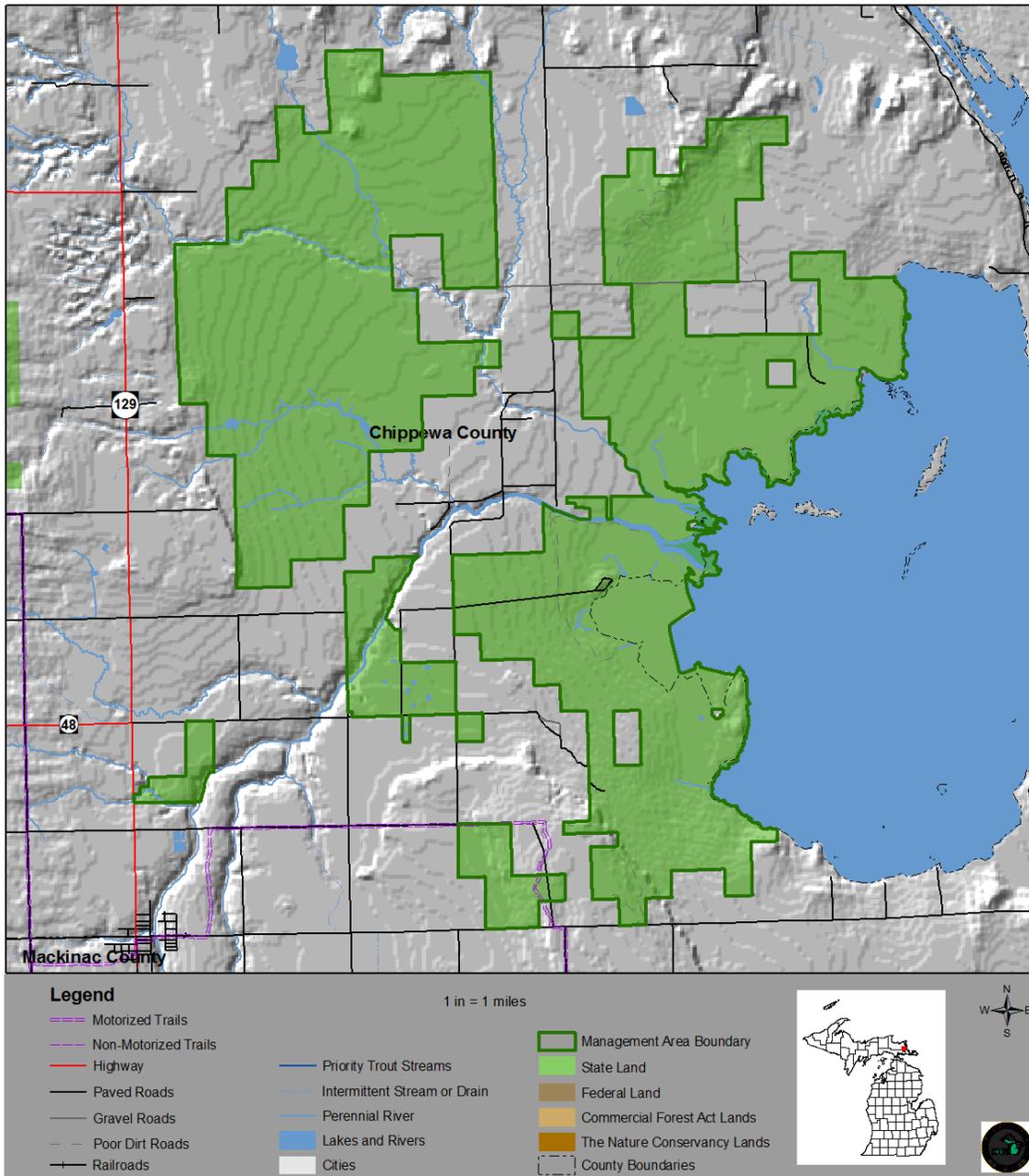


Figure 4.23.1. Location of the Munuscong Bay management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Munuscong Bay.

Table 4.23.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Munuscong Bay management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Deciduous	22%	3,216	510	2,706	149	0	3,216	301	0
Lowland Open/Semi-Open Lands	20%	2,890	0	2,890	0	0	2,890	0	0
Cedar	16%	2,371	26	2,345	20	0	2,371	147	0
Lowland Aspen/Balsam Poplar	9%	1,345	463	882	159	0	1,345	159	0
Upland Open/Semi-Open Lands	7%	987	0	987	0	0	987	0	0
Lowland Conifers	6%	830	73	757	84	0	830	84	0
Aspen	5%	806	56	750	109	0	806	125	0
Tamarack	5%	746	212	534	148	0	746	76	0
Misc Other (Water, Local, Urban)	5%	698	0	698	0	0	698	0	0
Others	6%	886	68	818	63	154	886	45	228
Total	100%	14,775	1,408	13,367	732	154	14,775	937	228

Others include: northern hardwood, lowland spruce/fir, red pine, upland spruce/fir, lowland mixed forest, paper birch, mixed upland deciduous and oak.

4.23.1 Forest Cover Type Management Direction

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

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

Section 4.23.1.1 Forest Cover Type Management – Lowland Deciduous

Current Condition

Lowland deciduous stands occur on 3,216 acres (22%) of the management area (Table 4.23.1). Lowland deciduous stands in this management area are often found in association with the creeks and drainages making access difficult. Almost 20% of the lowland deciduous stands in this management area have been listed as uneven-aged (Figure 4.23.2). This is generally due to natural processes resulting in a range of size and age classes within the inaccessible stands. Natural regeneration has been effective after past harvesting. Many of the stands in this area contain ash trees. Follow the emerald ash borer management guidelines to salvage ash.

Currently there are no acres of lowland deciduous with a final harvest prescribed. There are 71 acres of other cover types that are expected to convert to lowland deciduous after harvest. These acres are shown in Figure 4.23.2 in the regeneration prescriptions column. There are 510 acres of lowland deciduous that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland deciduous stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a range of successional stages.

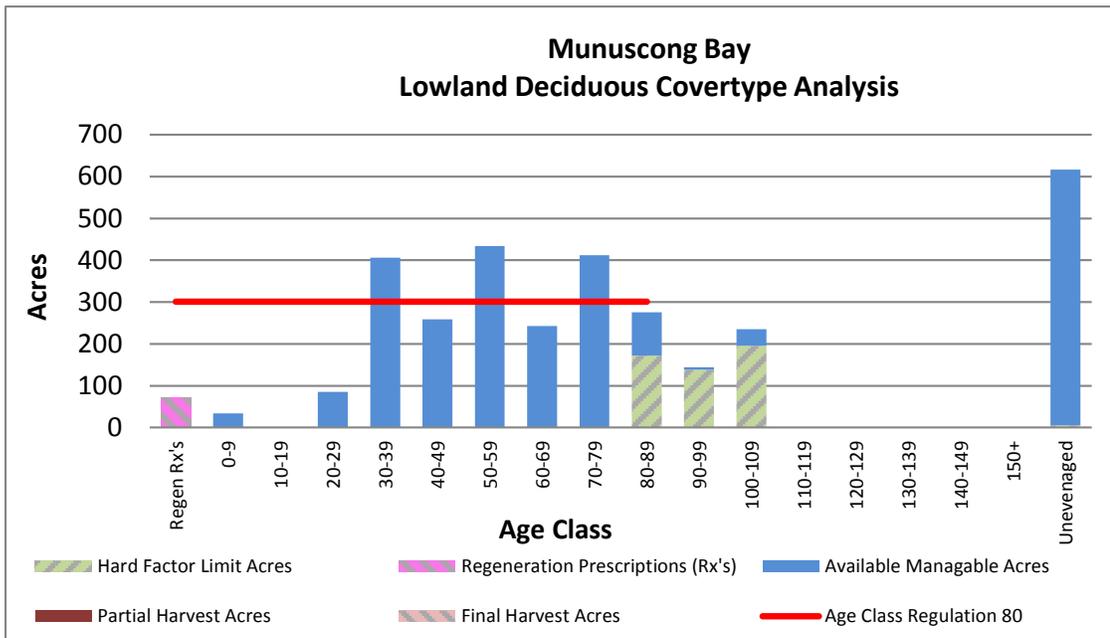


Figure 4.23.2. Age-class distribution of lowland deciduous in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

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

10-Year Management Objectives

- The 10-year projected final harvest of lowland deciduous is 149 acres. Natural regeneration consisting of species currently on site is expected. The decrease from the regulated amount is due to the current age-class structure, where most of the stands over rotation age have site conditions limiting harvest at this time.

Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of approximately 301 acres per decade (red line in Figure 4.23.2).

Section 4.23.1.2 Forest Cover Type Management – Lowland Open/Semi-Open Lands

Current Condition

Lowland open/semi-open lands occur on 2,890 acres (20%) (Table 4.23.1). This category is a combination of lowland shrub (1,785 acres), marsh (1,085 acres), bog (15 acres) and treed bog (five acres). Many of these stands lie along the St. Mary’s River corridor and are subject to water level fluctuations. These cover types are valued ecologically as sources of habitat for numerous species of wildlife. Most of these stands are found in association with streams and rivers and contribute to access issues. Without intervention natural succession toward woody vegetation may decrease the size of the openings. Some of these stands contain man-made potholes constructed for waterfowl habitat.

Desired Future Condition

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

10-Year Management Objectives

- Maintain "emergent-marsh" wetlands to enhance grasslands for species dependent on grassland-wetland complexes; and
- Outside the waterfowl management areas, lowland shrub and marsh stands will generally be maintained without active management.

Long-Term Management Objectives

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

Section 4.23.1.3 Forest Cover Type Management - Cedar

Current Condition

Cedar occurs on 2,371 acres (16%) of the management area (Table 4.23.1). There has been some harvesting and regeneration of cedar in the past, but none in recent years (Figure 4.23.3). Many of the cedar stands in this management area are found within the Keldon deer yard which is a special conservation area deer wintering area. Within the deer wintering area, cedar stands will be managed to maintain winter habitat for deer and to retain this forest type in the landscape. Maintaining a closed canopy structure provides important cover for deer and reduces snow depth within the stands. Outside of the deer wintering area harvesting may occur where winter deer habitat is not impacted and cedar regeneration is expected.

Currently there are 47 acres of cedar with a final harvest prescribed. There are 26 acres of cedar that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

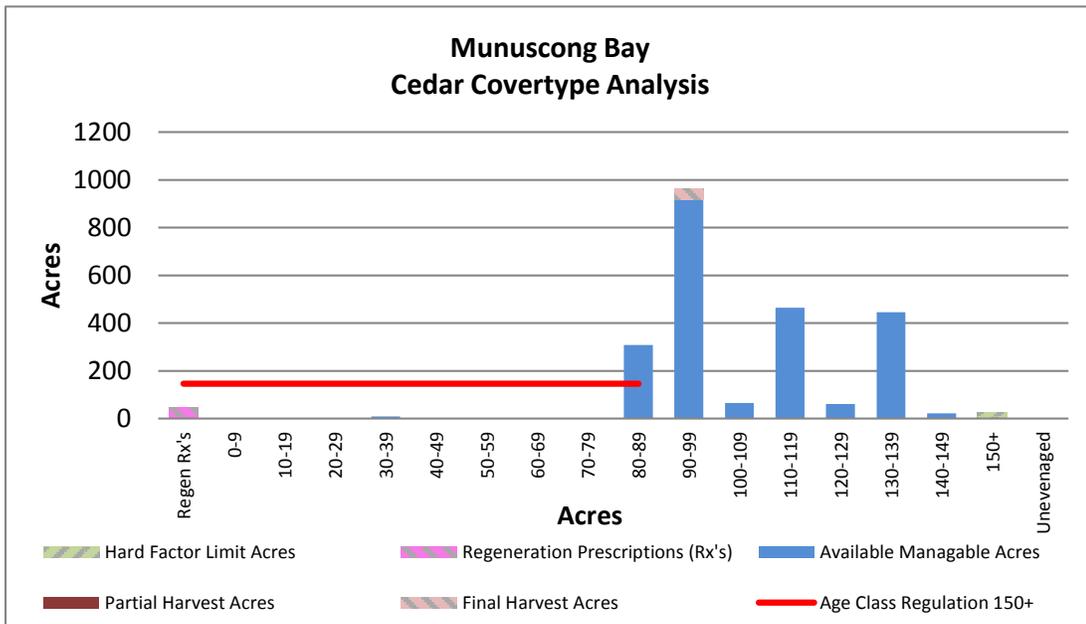


Figure 4.23.3. Age-class distribution of cedar in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- In areas where deer browse is a concern, these stands may not be actively harvested at this time.

10-Year Management Objectives

- The 10-year projected final harvest of cedar is 20 acres. The reduction from the regulated amount is due to the deer wintering area. However, harvest of this type, if it occurs, may vary widely from the projected harvest in order to meet the long term management objectives.
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

Long-Term Management Objectives

- Within the deer wintering areas, focus cedar management on winter habitat for deer; and
- Outside the deer wintering areas, conduct regeneration harvests to diversify the age classes of cedar providing for a regulated harvest, balancing the acres from 0-159 years of age, allowing approximately 147 acres to be harvested each decade.

Section 4.23.1.4 Forest Cover Type Management – Lowland Aspen/Balsam Poplar

Current Condition

Lowland aspen/balsam poplar occurs on 1,345 acres (9%) of the management area (Table 4.23.1). Many of these stands are inaccessible due to creeks and their associated wetland soils. Accessible stands have been harvested and successfully regenerated with natural regeneration (Figure 4.23.4).

Currently there are no acres of lowland aspen/balsam poplar with a stand replacement harvest prescribed. There are 463 acres of lowland aspen/balsam poplar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of lowland aspen/balsam poplar will eventually succeed to late successional species.

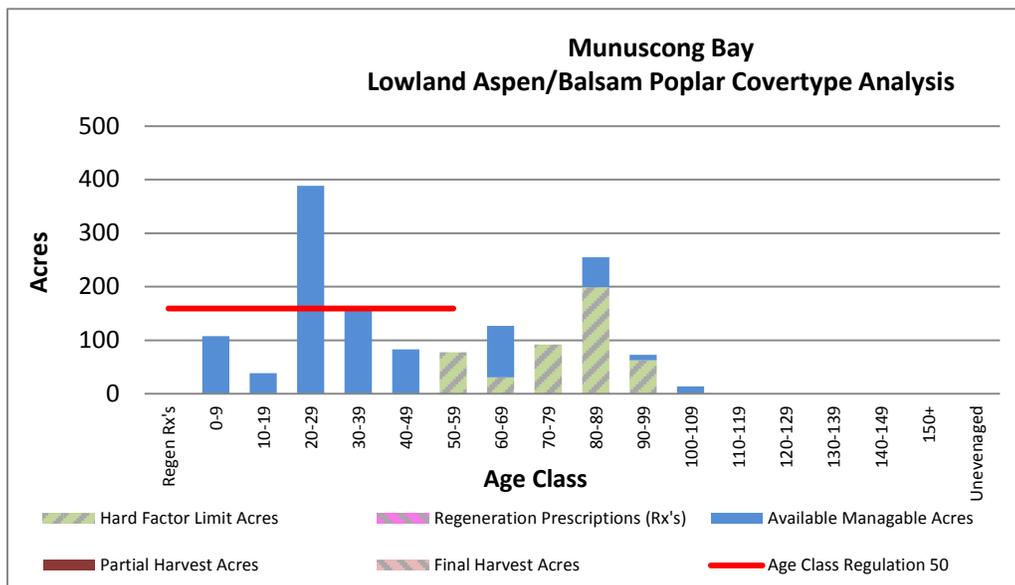


Figure 4.23.4. Age-class distribution of lowland aspen/balsam poplar in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

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

10-Year Management Objectives

- The 10-year projected final harvest of lowland aspen/balsam poplar is 159 acres.

Long-Term Management Objectives

- Balance the age class of accessible lowland aspen/balsam poplar providing for a regulated harvest of approximately 159 acres per decade.

Section 4.23.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands

Current Condition

Upland open/semi-open lands occur on 987 acres (7%) of the management area (Table 4.23.1). This category is a combination of the following non-forested land cover types: herbaceous open land (967 acres), upland shrub (four acres), low-density trees (zero acres) and bare/sparsely vegetated (16 acres). These cover types are valued ecologically as sources of open land habitat for numerous species of wildlife.

Desired Future Condition

- Upland open/semi-open lands will be retained to ensure an adequate level of wildlife habitat and recreational opportunity.

Long-Term Management Objectives

- Herbaceous openland communities may be maintained through timber sales and forest treatment proposals using mechanical means or prescribed fire.

Section 4.23.1.6 Forest Cover Type Management – Lowland Conifers

Current Condition

Lowland conifers occur on 830 (6%) of the management area (Table 4.23.1). Many of these stands are in low, wet areas with limited access. Lowland conifer stands have been successfully harvested and regenerated using natural regeneration (Figure 4.23.5).

Currently there are no acres of lowland conifers with a final harvest prescribed. There are 73 acres of lowland conifers that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a broad range of successional stages.

Desired Future Condition

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

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 84 acres.

Long-Term Management Objectives

- Balance the age-class distribution of lowland conifers providing for a regulated harvest of approximately 84 acres per decade.

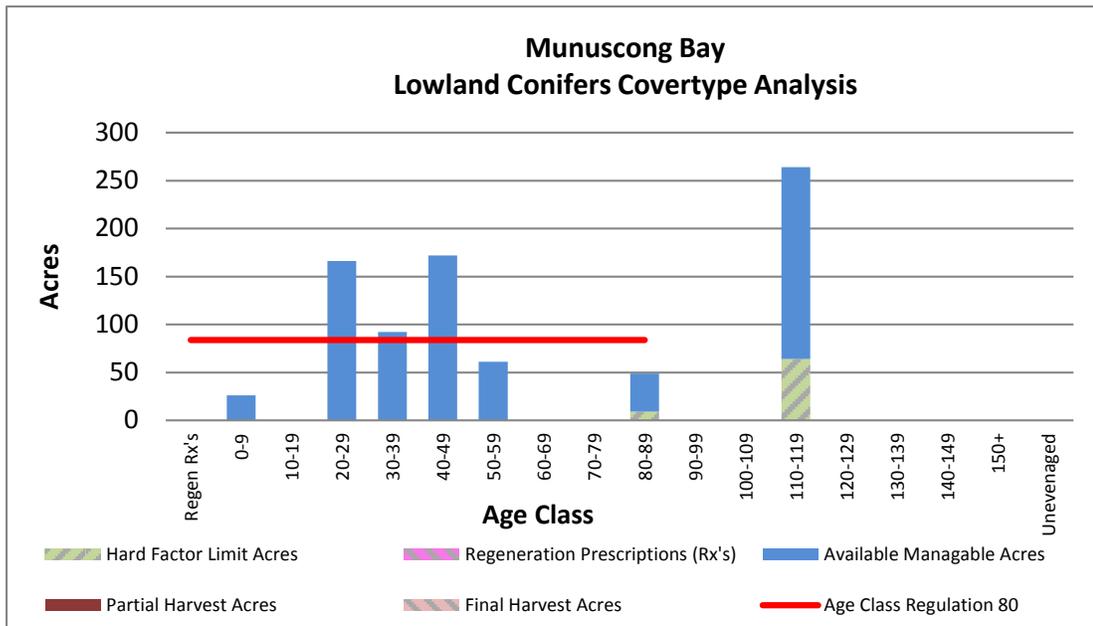


Figure 4.23.5. Age class distribution of lowland conifer in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Section 4.23.1.7 Forest Cover Type Management – Aspen

Current Condition

Aspen occurs on 806 acres (5%) of the management area (Table 4.23.1). Aspen stands in this management area are found on sandy or loamy soils with Kotar habitat types of PARv, PARVAa, ATFD and AFPo (see appendix E). Aspen stands have been successfully harvested and regenerated in this management area (Figure 4.23.6).

Currently, 58 acres of aspen have a final harvest prescription. There are 23 acres of other cover types are expected to convert to aspen after harvest. These acres are shown in Figure 4.23.6 in the regeneration prescriptions column. There are 56 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen will eventually succeed to late successional species.

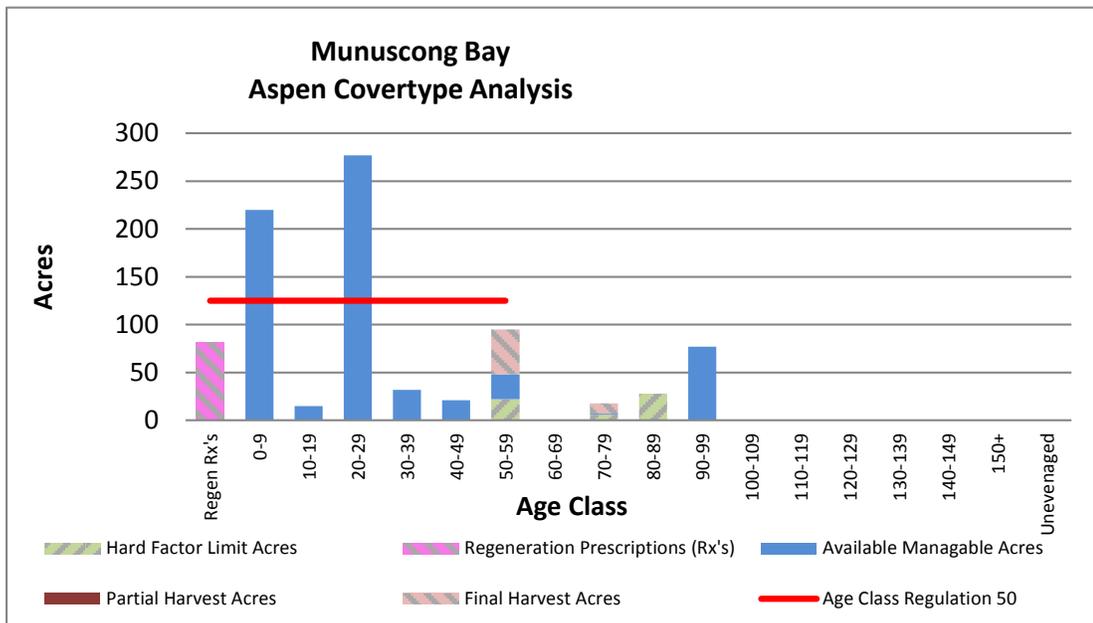


Figure 4.23.6. Age-class distribution of aspen in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

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

10-Year Management Objectives

- The projected 10-year final harvest of aspen is 109 acres. The decrease from the regulated amount is due to the large number of acres in the 0-9 age class.

Long-Term Management Objectives

- Balance the age-class structure of available aspen providing for a regulated harvest of approximately 125 acres per decade.

Section 4.23.1.8 Forest Cover Type Management – Tamarack

Current Condition

Tamarack stands occur on 746 acres (5%) of the management area (Table 4.23.1). Many of these stands are inaccessible due to creeks and their associated wetland soils. Accessible stands have been harvested and successfully regenerated with natural regeneration providing some variety in the age classes (Figure 4.23.7).

Currently there are no acres of tamarack that have a harvest prescription. There are 212 acres of tamarack that have site conditions limiting their harvest this entry. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Tamarack stands that are inaccessible will be subject to natural processes, resulting in a range of successional stages.

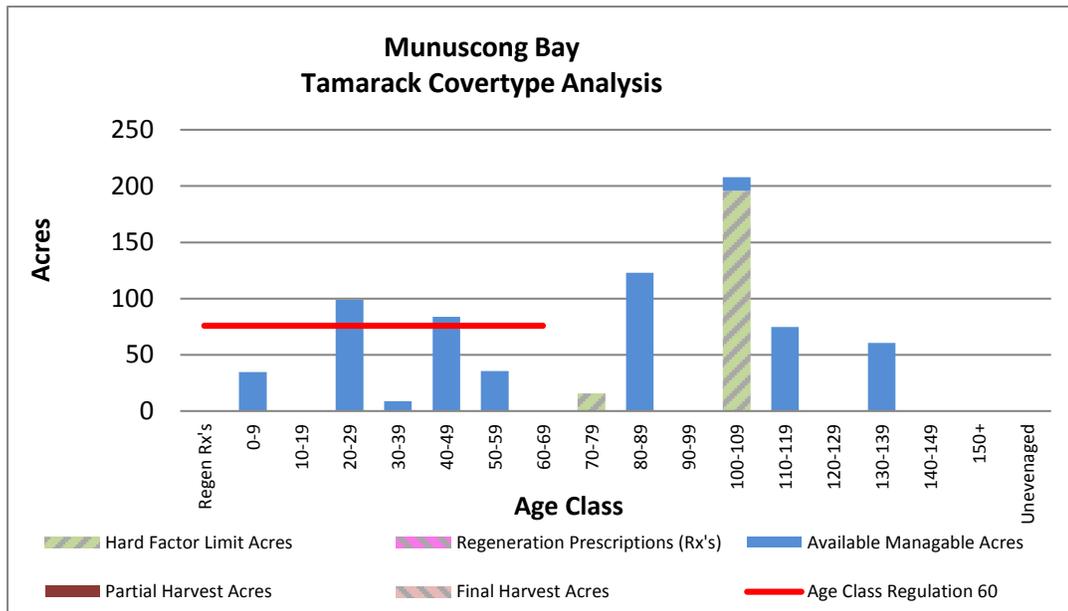


Figure 4.23.7. Age-class distribution of tamarack in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

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

10-Year Management Objectives

- The 10-year projected final harvest of tamarack is 148 acres. The increase from the regulated amount is due to the current age-class structure with a low number of acres in the 0-9 and 10-19 year-old age classes.

Long-Term Management Objectives

- Balance the age classes of tamarack in accessible stands providing for a regulated harvest of approximately 76 acres per decade.

Section 4.23.1.9 Forest Cover Type Management – Other Types

Current Condition

There are a number of other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.23.1). Other types totals 886 acres (6%) and includes: northern hardwood (427 acres), lowland spruce/fir (138 acres), red pine (42 acres), upland spruce/fir (39 acres), paper birch (29 acres), mixed upland deciduous (25 acres) and oak (19 acres). Miscellaneous other stands (698 acres or 5%) include water, roads and sand/soil.

With the exception of northern hardwoods and red pine, most of these cover types will be managed as even-aged stands using natural regeneration after harvest. Following general timber management guidelines, perform regeneration harvests in even-aged forested cover types attempting to balance age classes where possible. Schedule selection harvests in northern hardwoods and red pine as needed.

While beech trees are a minor component of northern hardwood stands in this area, beech bark disease is abundant. Salvage of affected beech is ongoing using Beech Bark Disease Management Guidelines. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

There are 68 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to successional processes.

Desired Future Condition

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

10-Year Management Objectives

- The projected 10-year final harvest of other types is 63 acres; and
- The projected 10-year partial harvest of other types is 154 acres.

Long-Term Management Objectives

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

4.23.2- Featured Wildlife Species

Within this management area is the Munuscong Wildlife Management Area. The primary management goals are for this area are waterfowl and marsh bird management. A significant amount of wildlife based recreation occurs here including waterfowl and deer hunting and bird watching. Other wildlife habitat priorities include managing the aspen resource for aspen dependent species and maintaining the open grassland features in the management area.

American Bittern

The state wide goal for American bittern is to meet the Upper Mississippi Region Great Lakes Region Joint Venture population level as observed by the North American Breeding Bird Survey for Michigan. The eastern Upper Peninsula goal is to provide and maintain suitable habitat for American bittern. Management should focus on priority management areas with suitable shallow water marsh (hemi-marsh).

Wildlife habitat specifications:

- Manage priority wetlands in a hemi-marsh condition, with open water surrounded by emergent vegetation. Optimal hemi-marsh sites for bittern are > 10 acres with the emergent vegetation portions having average water depths of four inches and a 4:1 ratio of adjacent grassland to hemi-marsh.
- Maintain wetland/upland complexes of > 50 acres.
- Buffer management activities at the edges of wetlands to protect marsh hydrology and limit the spread of invasive plant species.

American Woodcock

The goal for woodcock in the eastern Upper Peninsula is to maintain or increase habitat. Management should address the maintenance of adequate early successional habitat to provide feeding, nesting, brood-rearing habitat and opportunity for hunting.

Wildlife habitat specifications:

- Balance aspen age-class distribution within the management area.
- Use silvicultural practices that encourage the aspen component in mixed stands associated with alder, riparian zones or forested wetlands.
- Maintain or increase the aspen cover type within the management area where associated with alder, riparian zones or forested wetlands.
- Maintain rough openings associated with alder, riparian zones or forested wetlands.

Mallard

The goal is to maintain 420,000 breeding mallards in Michigan when Great Lakes water levels are near their long-term average. The eastern Upper Peninsula goal is to provide and maintain suitable habitat in the ecoregion. Management should focus on priority management areas with suitable shallow marsh (hemi-marsh).

Wildlife habitat specifications:

- Maintain priority wetlands in hemi-marsh condition, seeking 50/50 open water to emergent marsh for both breeding and non-breeding habitat.
- Buffer small wetlands.

Sharp-tailed Grouse

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

Wildlife habitat specifications:

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

White-tailed Deer

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and

hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

Wildlife habitat specifications for deer wintering complexes:

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

4.23.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed ten listed species and two natural communities of note occurring in the management area as listed in Table 4.23.2. A colony of great blue herons has also been identified. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas include cold water streams, potential old growth, deer wintering areas and the Munuscong Bay State Wildlife Management Area that covers the whole management area (Figure 4.23.8). Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.23.6 below.

High conservation value areas include a coastal environmental area along the St. Mary’s River, and the Munuscong State Wildlife Management Area (15,030 acres), which is a dedicated management area (Figure 4.23.8).

The Munuscong Bay management area contains a Great Lakes marsh (923 acres on state forest land) and a poor fen (94 acres) ecological reference area (Figure 4.23.8). Both ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by an ecological reference area-specific management plan.

Management goals during this planning period are:

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

Table 4.23.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Munuscong Bay management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
Natural Communities								
Great Lakes marsh		S3/G2	Confirmed				Lowland open/semi-open	N/A
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
Birds								
Grasshopper sparrow	<i>Ammodramus saviannarum</i>	SC/G5/S3S4		PS	Moderate	Dry sand prairie	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Hillside prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Marsh wren	<i>Cistothorus palustris</i>	SC/G5/S3S4	Confirmed	PS	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
Yellow rail	<i>Coturnicops noveboracensis</i>	T/G4/S1S2	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Least bittern	<i>Ixobrychus exilis</i>	T/G5/S2	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
Plant								
Ashy whitlow grass	<i>Draba cava</i>	T/G5/S1	Confirmed			Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A

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

Munuscong Bay

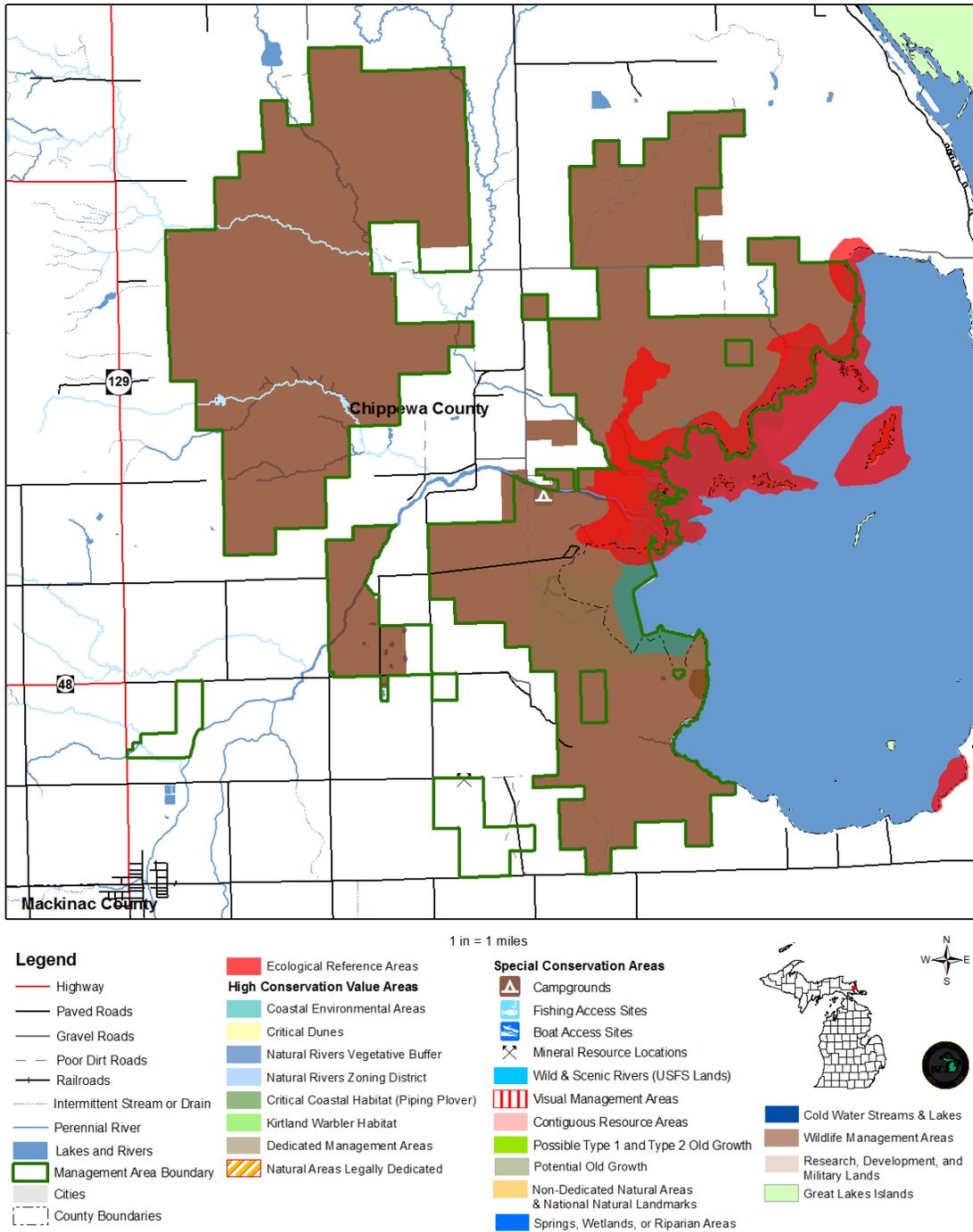


Figure 4.23.8. A map of the Munuscong Bay management area showing the special resource areas.

4.23.4 – Forest Health Management

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

- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker;
- Lowland deciduous: emerald ash borer; and
- Lowland conifers: spruce budworm.

For further information on forest health refer to Section 3.

Invasive Species

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

4.23.5 – Fire Management

Fire would have been a periodic disturbance in these coastal areas during periods of low water.

- Prescribed fire may be used to maintain the open nature of these natural communities.
- Fire suppression tactics should take into account the sensitive nature of some of the natural communities in this management area.

4.23.6 – Public Access and Recreation

Access for management and recreation is good where county roads are adjacent to state lands; however, some portions of the management area can only be accessed through private lands.

Recreational facilities are limited to the Munuscong River State Forest Campground and boat access site and a snowmobile trail (Figure 4.23.1).

Fishing and hunting are popular activities, especially waterfowl hunting. Bird watching is an increasingly popular pursuit.

4.23.7 - Aquatic Resource Management

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

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

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

4.23.8 – Minerals

Surface sediments consist of coarse-textured till, lacustrine (lake) sand, gravel, clay and silt, peat and muck and coarse-textured till. The glacial drift thickness varies between 100 and 200 feet. Sand and gravel pits are located in the general area and there is potential for additional pits on the uplands.

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

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

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