

4.24 North Menominee Moraines Management Area

Summary of Use and Management

Vegetative management in the Northern Menominee Moraines management area (MA) (Figure 4.24.1) will provide a variety of forest products; maintain or enhance wildlife habitat; protect areas with unique characteristics; and provide for forest based recreational uses. Timber management objectives for the 10-year planning period include improving the age-class distribution of aspen and lowland conifer; maintaining the conifer component in northern hardwood stands; maintaining the presence of minor cover types on the landscape; and maintaining non-forest vegetation types. Wildlife management objectives include addressing the habitat requirements identified for the following featured species: snowshoe hare and white-tailed deer. Management activities may be constrained by site conditions and the skewed age-class distributions. Balancing age classes and potential insect (spruce budworm) outbreaks will be issues for this 10-year planning period.

Introduction

The North Menominee Moraines management area is on a drumlinized ground moraine in north Menominee and south Marquette Counties. The state forest covers 20,240 acres and is in scattered blocks. The major ownership in this vicinity is forest industry. The management area is dominated by the cedar, aspen and lowland conifer cover types. Other attributes that played a role in the definition of this management area include:

- Dominated by two natural communities: poor conifer swamp and mesic northern forest;
- Mid-range in site quality;
- Provides multiple benefits including forest products and dispersed recreational activities; and
- Provides a variety of fish and wildlife habitats.

The management priority in this area is to continue to provide these multiple benefits while minimizing user conflicts.

The predominant cover types, composition and projected harvest areas for the North Menominee Moraines management area are shown in Table 4.24.1.

Table 4.24.1. Summary of cover types, composition, limited factor area, manageable area and projected harvest area for the North Menominee Moraines management area (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Cedar	34%	6,903	48	6,855	0	0	6,903	428	0
Aspen	23%	4,730	545	4,185	804	0	4,730	698	0
Lowland Conifers	9%	1,866	942	924	0	0	1,866	103	0
Northern Hardwood	8%	1,657	51	1,606	0	730	1,657	0	739
Tamarack	6%	1,211	541	670	97	0	1,211	96	0
Lowland Spruce/Fir	4%	882	190	692	187	0	882	77	0
Upland Open/Semi-Open Lands	2%	313	0	313	0	0	313	0	0
Lowland Open/Semi-Open Lands	5%	1,103	0	1,103	0	0	1,103	0	0
Misc Other (Water, Local, Urban)	1%	132	0	132	0	0	132	0	0
Others	7%	1,443	180	1,263	211	92	1,443	163	109
Total		20,240	2,497	17,743	1,299	822	20,240	1,565	848

North Menominee Moraines

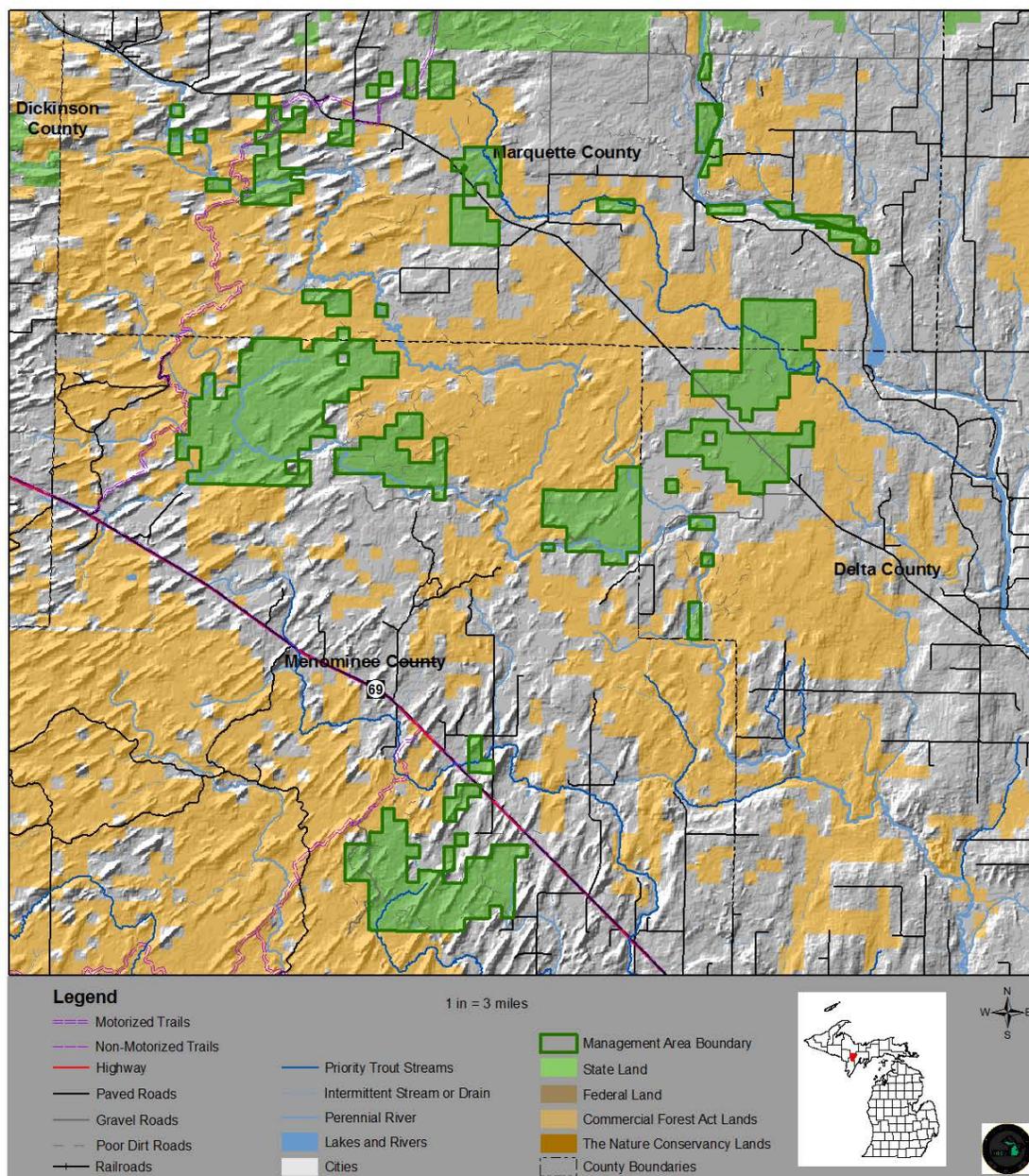


Figure 4.24.1. A map of the North Menominee Moraines management area (dark green boundary) in relation to surrounding state forest and other land in Menominee and Marquette Counties, Michigan.

4.24.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management for each of the major cover types, a grouping of minor cover types and important non-forested vegetation types for the North Menominee Moraines management area in the form of Desired Future Condition, 10-Year Management Objectives and Long-Term Management Objectives. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting or mowing) will be conducted. In other portions of the state forest, the natural processes of succession and disturbance will provide ecological benefits. While most stands have a variety of tree species and other vegetation, they are classified by the species with dominant canopy coverage.

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

Cedar Cover Type

Current Condition

The cedar cover type covers 8,222 acres (34%) of the management area (Table 4.24.1). Cedar historically does not regenerate reliably especially in high deer population areas such as the North Menominee Moraines management area and this is well illustrated in Figure 4.24.2. The absence of any age-classes below 80-89 years indicates little harvesting has occurred in this type; largely due to regeneration challenges.

Although there will be no harvesting of cedar within deer wintering complexes, there is a need to address future cedar cover. Limited cedar harvests will occur outside the wintering complexes recognizing that cedar takes many years to regenerate and escape deer browsing. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives

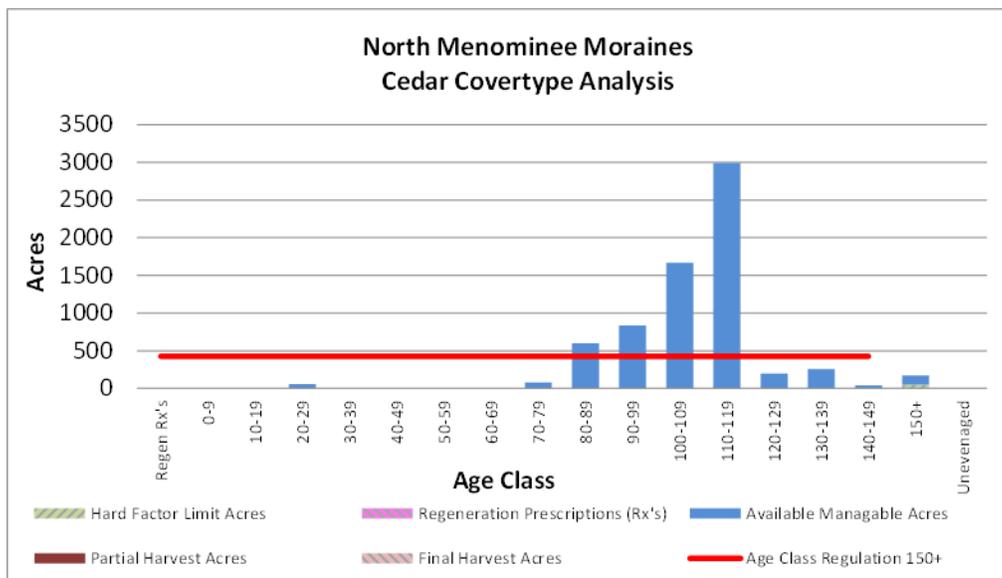


Figure 4.24.2. Graph of the age-class distribution for cedar on the North Menominee Moraines management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Maintain the cedar cover type at the current acreage level.

Long-Term Management Objective

- Explore techniques for regenerating the cedar cover type under high browsing pressure, ideally leading to harvesting 428 acres per decade.

10-Year Management Objective

- No harvests are planned for this area in the next decade; and
- While no active management activities are planned in this type during this 10-year planning period, limited harvesting may occur to test methods of cedar regeneration.

Aspen Cover Type

Current Condition

The aspen cover type covers 4730 acres (23%) of the management area (Table 4.24.1) and is poorly distributed across age classes (Figure 4.24.4). Most of the age classes over the rotation age of 50 years (50-59 years on the graph) are in the hard factor limited category, partial harvest category or are part of a regeneration harvest. With an absence of aspen in the 40-49 year to 60-69 year old age classes, early entry into those age classes above the age-class regulation line is possible, but unlikely during the next 10-year period because aspen in these age classes in this management area are not of merchantable size.

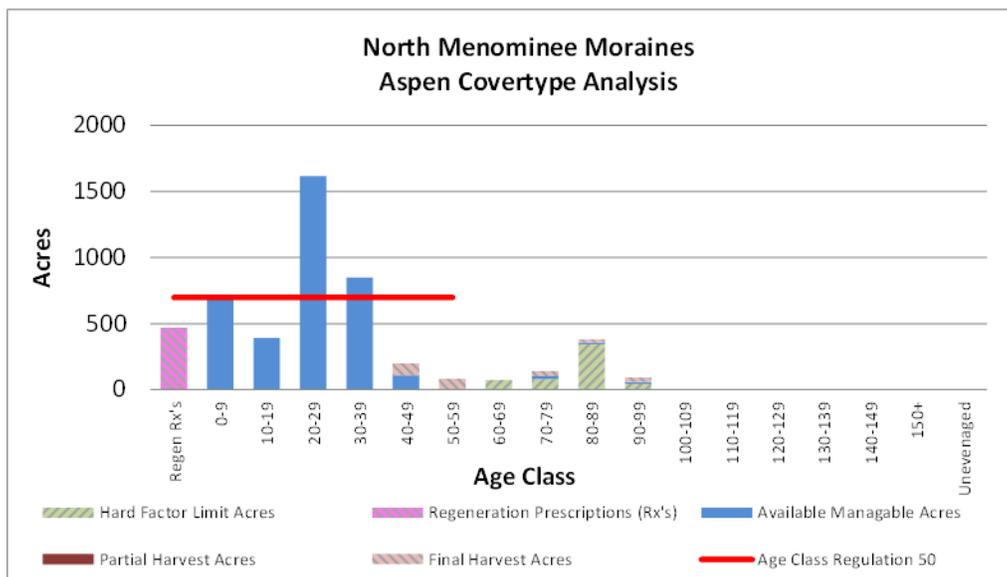


Figure 4.24.3. Graph of the age-class distribution for aspen on the North Menominee Moraines management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Balanced acres in each age class over a 50-year rotation (indicated by the red line in Figure 4.3.2);
- Provide a balanced mix of habitat conditions for a variety of wildlife; and
- Provide for a variety of hunting-type opportunities.

Long-Term Management Objectives

- Once age classes are closer to balanced, harvest and regenerate approximately 698 acres each decade.

10-Year Management Objectives

- Due to the current age-class structure it will be challenging to harvest and regenerate 804 acres over this 10-year planning period;
- Opportunities to harvest in the spikes (above the red line in Figure 4.24.3) presently in the 20-29 and 30-39 year-old age classes will be explored as these classes grow older; and
- As biomass markets improve opportunities to harvest from the 30-39 year-old age class will be explored.

Lowland Conifers Cover Type

Current Condition

The lowland conifer cover type covers 1866 acres (9%) of the management area. These stands occur on poorly drained sites supporting mixed stands of cedar, black spruce, tamarack, balsam fir, white birch and balsam poplar. Mixed lowland conifers have poor age-class distribution, with most of the stands ranging between 80 and 119 years old (Figure 4.24.4). Most of these stands have a hard factor limit associated with them which makes them unavailable for harvesting this entry period. A significant amount harvesting has been done in this type over the past 10 years.

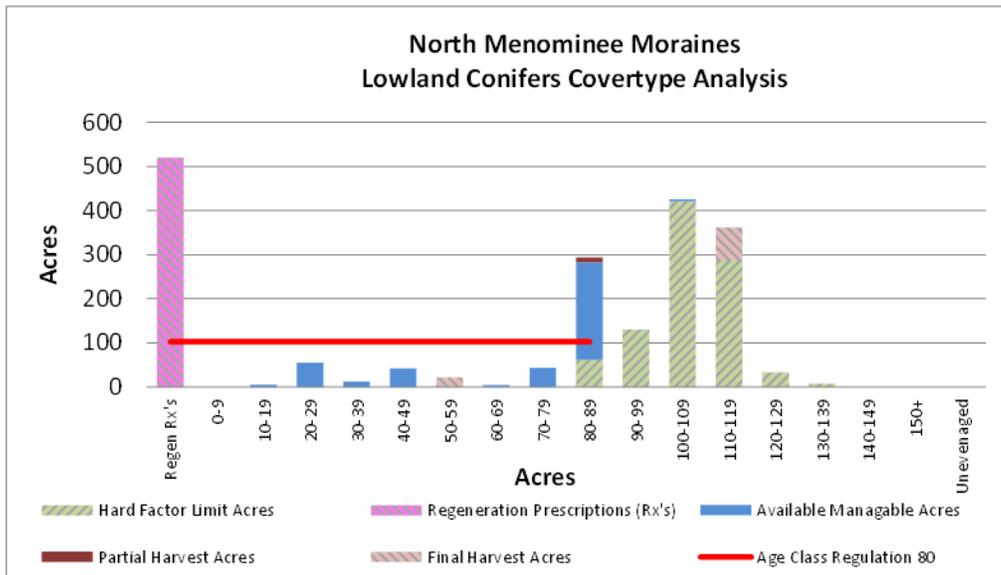


Figure 4.24.4. Graph of the age-class distribution for lowland conifer on the North Menominee Moraines management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Closed canopy stands interspersed with patches of all age classes;
- Sustainable regeneration and recruitment of seedlings and saplings;
- Mixed lowland conifer stands provide important winter habitat for deer and it is necessary to maintain the closed canopy (>70%) structure in many stands for that purpose; and
- Harvesting will be planned to regenerate stands before widespread mortality occurs.

Long-Term Management Objectives

- Once age classes are balanced, manage this cover type on an 80-year rotation, leading to harvesting 103 acres per decade in those stands without hard factor limits; and
- Regenerate stands to a species-mix similar to the pre-harvest conditions favoring cedar, black spruce and balsam fir.

10-Year Management Objectives

- Harvest 103 acres during this 10-year planning period focusing on the use of “low impact” harvesting systems and successful, reliable regeneration techniques.
- Most of the stands harvested should come from the 80 year-old age class and older.
- Use appropriate silvicultural techniques to assure adequate regeneration; and
- Monitor harvested sites.

Northern Hardwoods Cover Type

Current Condition

Northern hardwood stands make up about 1,657 acres (8%) of state forest land in this area. They occur on medium-quality sugar maple sites. Some stands have well-established sedge understories with little tree regeneration, shrub or herbaceous plant communities. Northern hardwood is typically managed using an uneven-aged harvest system based on basal area rather than age.

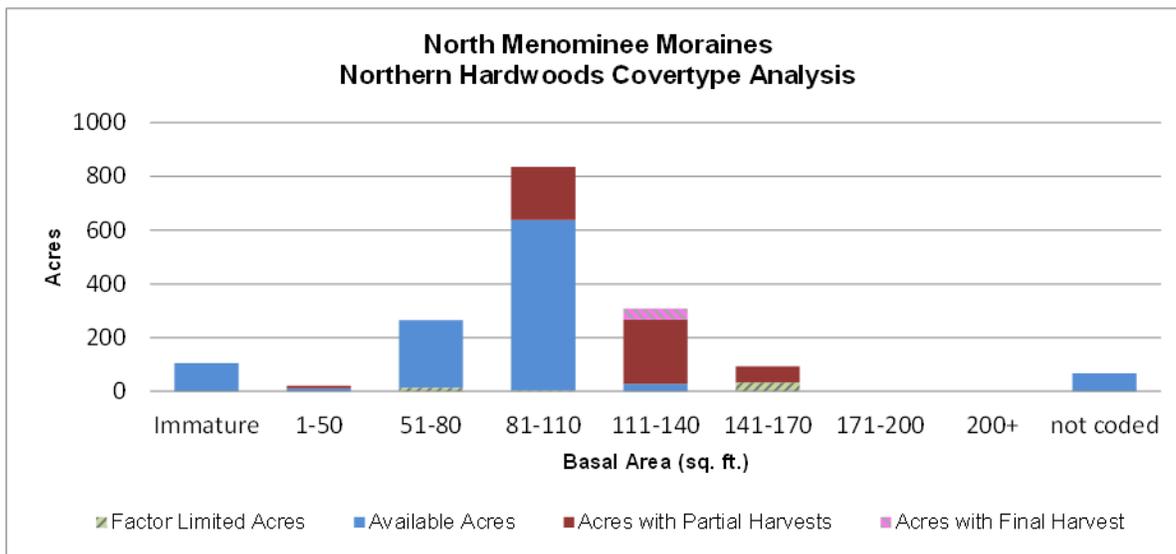


Figure 4.24.5. Graph of the basal area distribution for northern hardwood on the North Menominee Moraines management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Uneven-aged northern hardwood stand structure promoting high-value sugar maple sawlogs;
- Provide for a full complement of tree seedlings recruiting into the overstory; and
- Provide for well-developed shrub and herbaceous layers.

Long-Term Management Objectives

- Using an uneven-aged system, selectively harvest high-quality northern hardwood stands on a 20-year resulting in estimated harvest of 739 acres each decade; and
- Low quality hardwood stands will be managed on an even-aged system with an 80-year rotation.

10-Year Management Objectives

- Selectively harvest 730 acres during this 10-year planning period;
- Maintain and promote white pine, hemlock, oak and upland cedar where they occur in stands that are cut;
- Experiment with mechanical and chemical treatments of the sedge understory to establish northern hardwood tree regeneration and improve understory diversity where appropriate; and
- Monitor hardwood regeneration.

Tamarack Cover Type

Current Condition

Currently there are 1,211 acres (6%) of the tamarack type in the management area. Tamarack is often found in association with mixed lowland conifer, cedar and lowland spruce/fir types. Tamarack in this management area has a better balanced age-class distribution than most in the region.

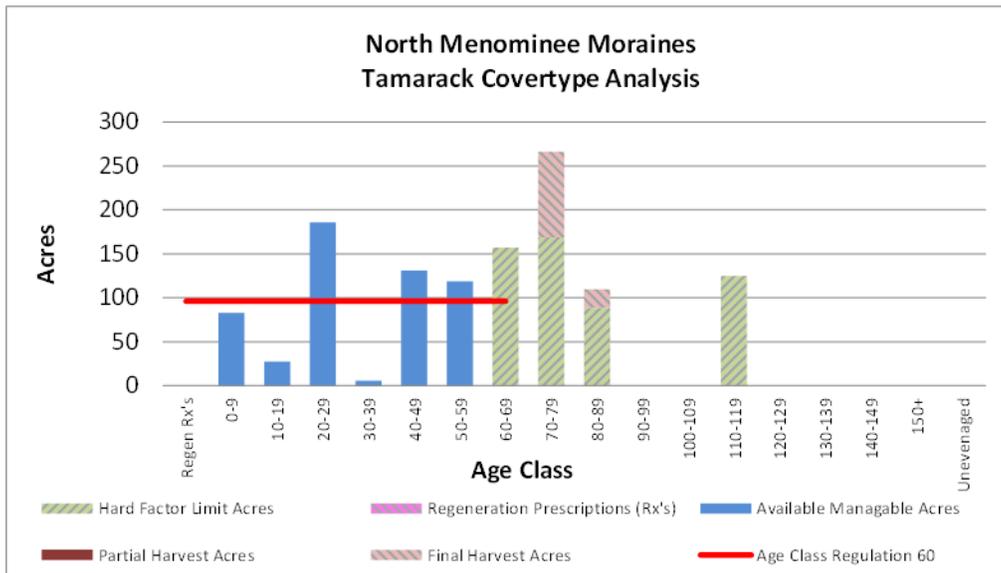


Figure 4.24.6. Graph of the age-class distribution for tamarack on the North Menominee Moraines management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Maintain approximately the current level of tamarack-type with stands representing a variety of age classes.

Long-Term Management Objective

- Continue to work on age-class distribution, ultimately harvesting and regenerating the mature tamarack-type on a 60-year rotation resulting in 96 acres harvested each decade.

10-Year Management Objectives

- Harvest about 97 acres in this 10-year planning period; and
- More aggressive harvesting in this type maybe needed during this 10-year planning period to reduce mortality losses in the older stands.

Other Forested Cover Types

Current Condition

Other forested types make up 2,325 acres and are made up of lowland spruce/fir (882 acres), upland spruce/fir (307 acres), lowland poplar (259 acres), upland mixed deciduous (228 acres), paper birch (114 acres), upland conifers (108 acres), lowland deciduous (94 acres), lowland mixed forest (92 acres), hemlock (74 acres), upland mixed forest (73 acres), white pine (52 acres) and red pine (42 acres). Together these types make up about 11% of the management area.

Desired Future Condition

- Maintain the presence of the minor cover types within the management area.

Long-Term Management Objectives

- Manage minor cover types to maintain representation using appropriate silvicultural methods;
- Featured species habitat requirements will be taken in to consideration; and
- Maintain hemlock as it occurs.

10-Year Management Objectives

- Harvest those stands without harvest limitations adjacent to other planned harvest activities and where stand and habitat conditions indicate that harvesting is appropriate; and
- Expected harvests in these types will be less than 490 acres during this 10-year planning period.

Other Non-forested Cover Types

Current Condition

The following non-forested cover types are found on this management area: upland open/semi- open lands (313 acres – 2%), lowland open/semi-open lands (1,103 acres – 5%) and miscellaneous other (water, local, urban) (132 acres – 1%).

Desired Future Condition

- These areas will be maintained in the current condition.

Long-Term Management Objective

- Grass will be burned or mowed to prevent forest encroachment.

10-Year Management Objective

- Grass-types will be treated for opening maintenance as needed.

4.2423 – Featured Wildlife Species Management

The North Menominee management area is comprised of scattered state holdings in a landscape dominated largely by corporate forest. Over half of the forest in the area is lowland conifer cover type (cedar, spruce, tamarack) interspersed with uplands of aspen and northern hardwoods. Historically this management area has been important deer winter range. Due to difficulties in regenerating cedar, most of this cover type will be protected, except for purposeful regeneration experiments. The primary focus of wildlife habitat management in the North Menominee management area will be to address the habitat requirements identified for the following featured species: snowshoe hare and white-tailed deer. Based on the selected featured species, some of the most significant wildlife management issues in the management area are: habitat fragmentation; mesic conifer (in a broad array of age-classes); mature forest; early successional forest (jack pine, mixed swamp conifer, tag alder and aspen); and deer wintering habitat. During this 10-year planning period, additional analyses to better define the spatial extent of priority areas (e.g., large suitable patches of contiguous habitat and dispersal corridors for marten) for featured species will be performed.

Snowshoe Hare

The goal for snowshoe hare in the western Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining early successional forest (jack pine, mixed swamp conifer, tag alder and aspen), especially in areas adjacent to lowlands, promotion of the mesic conifer within stands and leaving coarse woody debris following harvest.

Wildlife habitat specifications:

- Encourage a conifer component in young aspen and lowland shrub communities (e.g., alder or willow) that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands, leaving conifers under four inches diameter breast height.
- Small gap (<1/2-acre) selection in lowland conifer types may more closely mimic natural wind throw disturbance and provide young conifer regeneration and recruitment.
- Promote conifer:
 - Regenerate lowland spruce/fir stands to young, dense stocking adjacent to uplands; and
 - Young forests with an abundant conifer understory component should be encouraged.
- In snowshoe hare habitat, limit biomass harvesting and chipping operations within the management area.

- Retain down coarse woody debris slash already present and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- Avoid extensive stands of even-aged management.

White-tailed Deer

The western 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.

4.24.3 – Rare Species and Special Resource Area Management

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

Past surveys have noted and confirmed six listed species as well as two natural communities of note occurring in the management area as listed in Table 4.24.2. 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 4.24.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the North Menominee 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
Natural Communities								
Alvar		S1/G2?	Confirmed				Upland open/semi-open	N/A
Poor conifer swamp		S4/G4	Confirmed				Tamarack	Late
Birds								
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
Mammal								
Moose	<i>Alces alces americana</i>	SC/G5/S4	Confirmed	HV	Very High	Bog	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Muskeg	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Poor fen	Lowland open/semi-open	N/A
						Poor conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Northern shrub thicket	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Mesic northern forest	Northern Hardwood	Late
						Dry-mesic northern forest	White Pine	Late
Plants								
Wild chives	<i>Allium schoenoprasum</i>	T/G5/S2	Confirmed			Alvar	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Granite bedrock lakeshore	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Wild oat-grass	<i>Danthonia spicata</i>	SC/G5/S1S2	Confirmed			Alvar	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A
New England violet	<i>Viola novae-angliae</i>	T/G4Q/S2	Confirmed			Alvar	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A

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

Approximately 687.6 acres of potential old growth have been identified within the North Menominee Moraines management area (Figure 4.24.7). These stands were identified for a broad range of reasons and were coded in the Operations Inventory database as Stand Condition 8. These stands area also special conservation areas until they are evaluated.

Although there are no high conservation value areas, there is one ecological reference area, the Escanaba River North Alvar (112 acres) representing the alvar natural community, as shown in Figure 4.24.7.

North Menominee Moraines

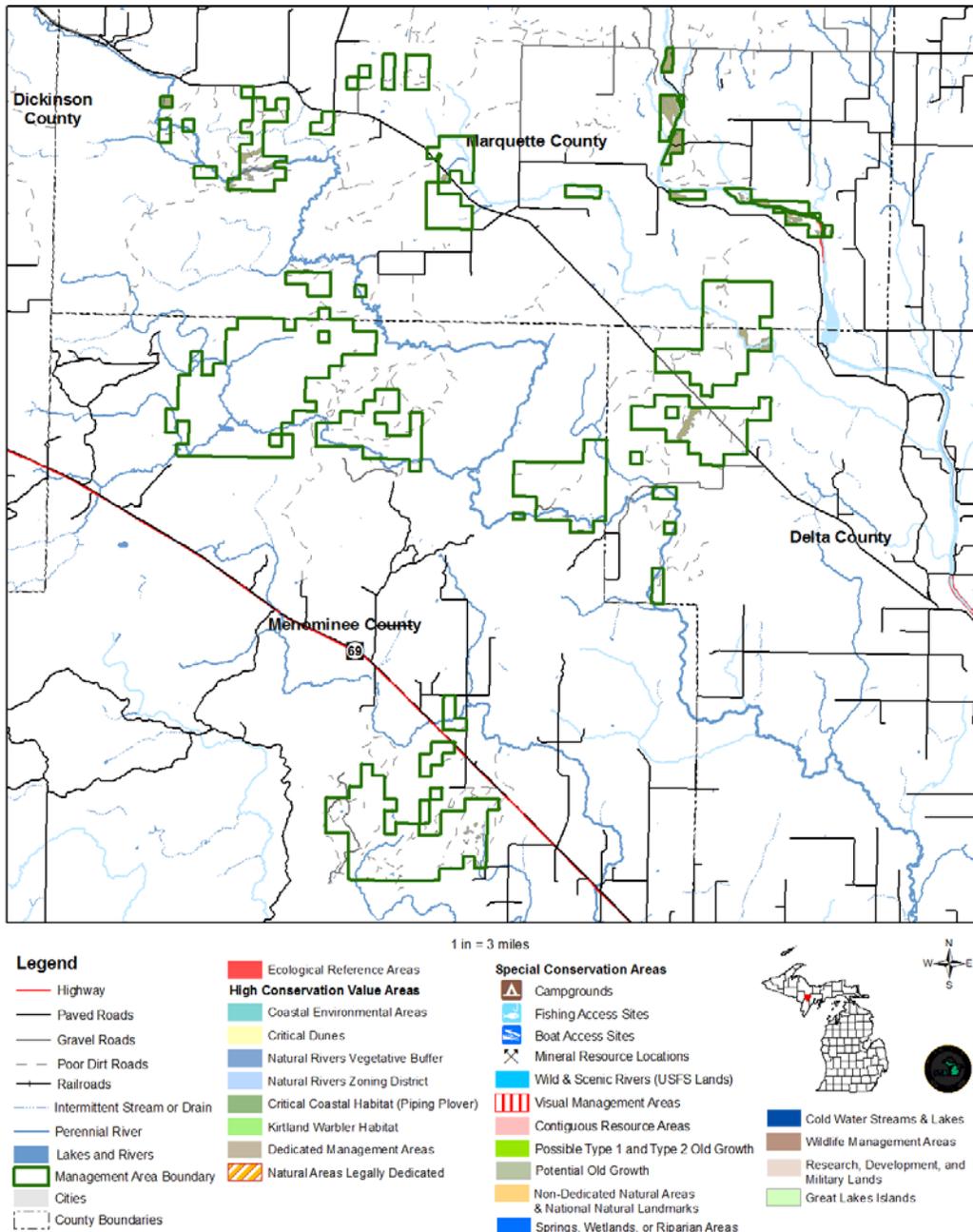


Figure 4.24.7. A map of the North Menominee Moraines management area showing the special resource areas.

Management goals during this planning period:

Goal 1: To develop and maintain a list of rare, threatened, endangered and special concern species and natural communities for the management area through a continuous inventory and through opportunistic focused inventory surveys.

Objective 1-1: Field staff should be trained and aware of the identification characteristics and natural history of rare, threatened, endangered and special concern species.

Objective 1-2: Occurrences of rare, threatened, endangered and special concern species noted during the inventory process by inventory staff should be verified and added to the body of knowledge for the management area.

Goal 2: To evaluate the potential old growth areas by the end of this 10-year planning period.

Goal 3: To develop and maintain management plans for ecological reference areas on state forest land.

Objective 3-1: Complete ecological reference area planning by the end of this 10-year planning period.

4.24.4 – Forest Health Management

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

- White trunk rot of aspen
- *Hypoxylon* canker
- Spruce budworm
- Emerald ash borer
- Eastern larch beetle.

When forest pests are detected, they are to be reported to the forest health specialist for treatment recommendations. The treatment of large outbreaks of forest pests will be coordinated on a state and regional level.

Several invasive exotic species of plants are thought to be located in the vicinity. When invasive species are detected, they will be reported to the forest health specialist and treatment options will be reviewed. Priority for treatment should be given to those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled. There are no known species of concern that been documented in or near this management area.

4.24.5 – 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. Designated high priority trout streams are identified in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. Remove or discourage beaver populations on designated high priority trout streams.

High priority trout streams in this management area are shown in Figure 4.24.1.

4.24.6 – Fire Management

This area is dominated by mesic northern forests interspersed with conifer lowlands. Relatively slow fire spread overall kept fire from burning significant areas for the most part resulting in very long fire return intervals.

- All wildfires within the management area will be subject to appropriate initial attack response.

4.24.7 – Public Access and Recreation

This area has fair public and management access. The Felch Grade Off-Road Vehicle Route crosses this area, as do several snowmobile trails as shown in Figure 4.24.1. No other recreational facilities are located in this area.

- Work to expand public access and recreation facilities as opportunities arise.

4.24.8 – Oil, Gas and Mineral Resources

Exploration and development for oil and gas has been limited to a few wells drilled in the eastern Upper Peninsula. No economic oil and gas production has been found in the Upper Peninsula.

Surface sediments consist of an end moraine of medium-textured till, medium-textured till with minor peat and muck and glacial outwash sand and gravel and postglacial alluvium. The glacial drift thickness varies between 10 and 50 feet. Sand and gravel pits are located in the management area and there is good potential on the uplands for additional pits.

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

Metallic mineral exploration has not occurred in the management area in the past, but there could be some potential.