4.16 Groveland Management Area

Summary of Use and Management

Vegetative management in the Groveland management area (MA) (Figure 4.16.1) 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; maintaining the conifer component in northern hardwood stands; maintaining the presence of minor cover types on the landscape; and maintaining non-forest vegetation types and develop its recreational characteristics while preserving and enhancing the native biodiversity. Wildlife management objectives include addressing the habitat requirements identified for the following featured species: black bear, blackburnian warbler, northern goshawk and white-tailed deer. Management activities may be constrained by site conditions and the skewed age-class distributions. Balancing age classes; habitat fragmentation; mast (hard and soft); within-stand diversity; mesic conifer; mature forest; coarse woody debris; and deer wintering complexes will be issues for this 10-year planning period.

Introduction

The Groveland management area is on a bedrock-controlled ground moraine in Southern Dickinson County. The state forest covers about 30,000 acres and is mostly contiguous. State forest lands are the major ownership in this vicinity. The management area is dominated by aspen, northern hardwood and lowland conifer cover types. Other attributes that played a role in the definition of this management area include:

- Dominated by three natural communities: dry mesic northern forest, mesic northern forest and poor conifer swamp;
- Mid-range in site quality;
- The Groveland Iron Mine which provides:
    - Recreational opportunities related to camping and fishing.

The Groveland Iron Mine was closed in the early 1980's and acquired by the State of Michigan in the mid-1990s. Some of the old impoundments are now used for fishing and camping sites. The north half of this management area has high recreational interest and has many opportunities to enhance biodiversity.

The management priorities for this area are to develop its recreational characteristics while preserving and enhancing the native biodiversity. The predominant cover types, composition and projected harvest areas for the Groveland management area are shown in Table 4.16.1.

Table 4.16.1. Summary of cover types, composition, limiting factor area, manageable area and projected harvest area for the Groveland management area (2012 Department of Natural Resources inventory data).

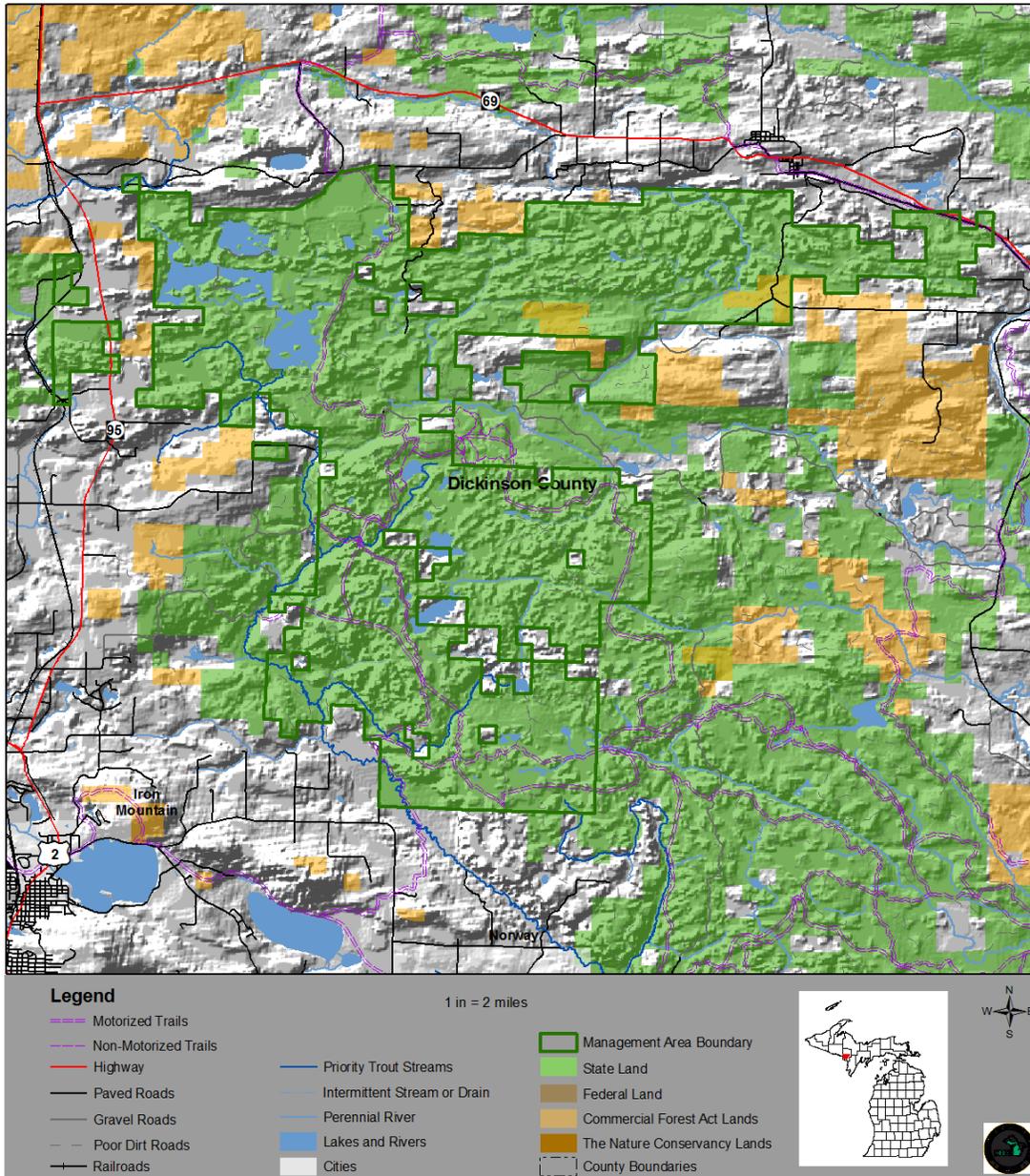| Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	39%	11,786	1,766	10,020	1,340	0	11,786	1,670	0
Northern Hardwood	12%	3,667	104	3563	0	1,072	3,667	0	1,587
Lowland Conifers	10%	3,018	2,456	562	106	0	3,018	43	0
Red Pine	7%	1,994	992	1002	217	441	1,994	63	533
White Pine	5%	1,562	108	1454	179	681	1,562	69	681
Cedar	5%	1,465	0	1465	0	0	1,465	92	0
Upland Open/Semi-Open Lands	3%	906	0	906	0	0	906	0	0
Lowland Open/Semi-Open Lands	5%	1,388	0	1388	0	0	1,388	0	0
Misc Other (Water, Local, Urban)	4%	1,365	0	1365	0	0	1,365	0	0
Others	11%	3,289	839	2450	665	817	3,289	275	817
Total		30,440	6,265	24,175	2,506	3,011	30,440	2,212	3,618

Groveland

Figure 4.16.1. A map of the Groveland management area (dark green boundary) in relation to surrounding state forest lands and other ownerships.

4.16.1 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 Groveland 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.

Aspen Cover Type

Current Condition

The aspen cover type covers 11,786 acres (39%) of state forest land in this management area (Table 4.16.1). Aspen is in all age classes in this management area, but it is not well distributed across them (Figure 4.16.2). Many acres of aspen are greater than 70 years of age. There are 1,766 acres of aspen that currently have hard limiting factors on them. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.
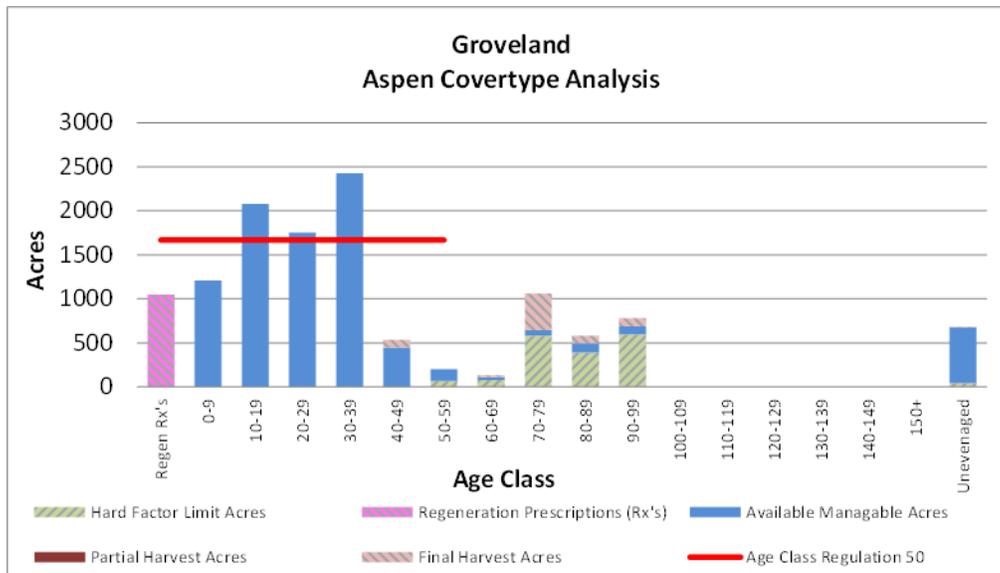

Figure 4.16.2. Graph of the age-class structure for the aspen cover type on the Groveland management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Balanced acres in each age class up to 50 years; and
- Provide an even supply of forest products and a balanced mix of habitat conditions for a variety of wildlife as well as a range hunting opportunities.

Long-Term Management Objectives

- Harvest and regenerate aspen stands using a 50-year rotation length; and
- Regenerate approximately 1,670 acres each decade.

10-Year Management Objectives

- Two-aged stands with mature aspen over younger stands should be identified and scheduled for harvest;
- The projected 10-year harvest is 1,340 acres; and
- Identify some of the younger aspen on better sites that could be available for early harvest.

Northern Hardwood Cover Type

Current Condition

Northern hardwood stands make up 3,667 acres (12%) of state forest land in this management area (Table 4.16.1). They occur on fair-quality sugar maple sites. Most stands have been managed on a selection harvest basis. Many stands have sedge understory with little tree regeneration, shrub or herbaceous plant communities. There are 104 acres that have limiting factors. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.
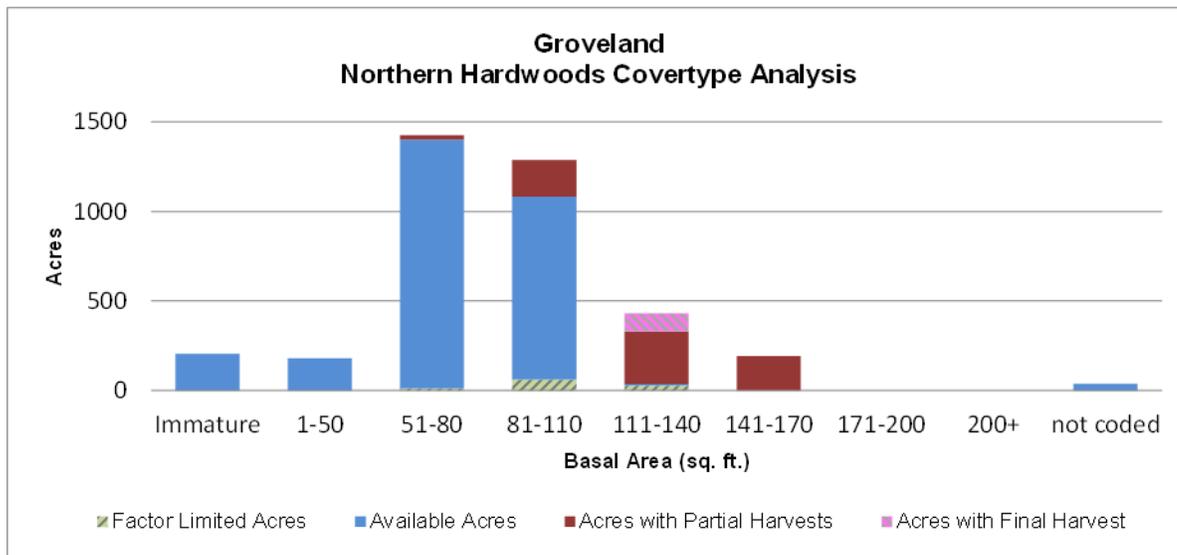

Figure 4.16.3. Graph of the basal area classes for the northern hardwood cover type on the Groveland management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

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

Long-Term Management Objectives

- Selective harvest northern hardwood stands on a 20-year cycle; and
- Work to increase hardwood regeneration and reduce the sedge component.

10-Year Management Objectives

- Approximately 1,072 acres will be select cut in this 10-year planning period;
- Maintain 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;
- Work to regenerate hemlock and white pine components in stands lacking that species; and
- Identify low quality hardwood to manage on an even-aged regime.

Lowland Conifers Cover Type

Current Condition

Lowland conifers occur on 3,018 acres (10%) of the management area (Table 4.16.1). These are poorly drained sites supporting mixed stands of cedar, black spruce, tamarack, balsam fir, white birch and balsam poplar characterize the mixed lowland conifer type. There are 2,456 acres that have factor limits due to wet conditions or for riparian corridors. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

Due to the wet site conditions, they are more susceptible to rutting damage from logging equipment and present difficult operating conditions for harvesting. Lowland conifers are poorly distributed across the age-class distribution, with the majority of the stands over 80 years of age (Figure 4.16.4). Little harvesting has been done in this type over the past 60 years.
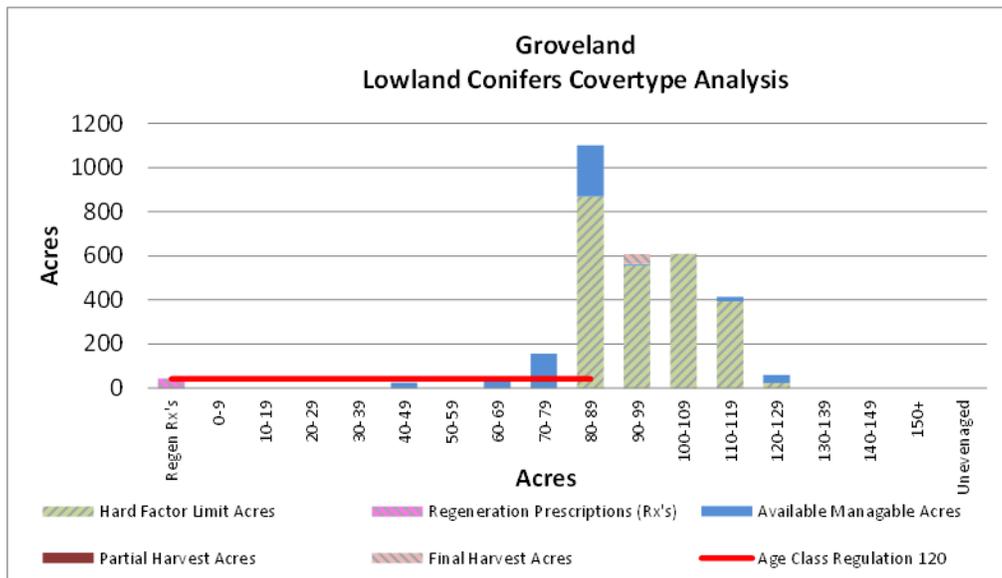

Figure 4.16.4. Graph of the age-class structure for the lowland conifer cover type on the Groveland management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Closed canopy stands interspersed with patches of all age classes;
- Sustainable regeneration and recruitment of seedlings and saplings;
- Maintain the closed canopy structure to provide important winter deer habitat; and
- Plan to harvest the oldest available stands to regenerate them before widespread mortality occurs.

Long-Term Management Objectives

- Manage stands on a 120-year rotation, allowing for 43 acres to be harvested per decade.
- Regenerate stands to species-mix similar to the pre-harvest conditions favoring cedar, hemlock, black spruce and balsam fir; and
- Harvesting will be done using small clearcuts or strips with clumped retention.

10-Year Management Objectives

- Harvest 106 acres over this planning period focusing on the use of "low impact" harvesting systems and successful, reliable regeneration techniques.

Red Pine Cover Type

Current Condition

Over 1,994 acres (7%) of the state forest in this management area is red pine (Table 4.16.1). While red pine occurs in most age classes, it is poorly distributed across them (Figure 4.16.5). Red pine stands occur on the same sites and soil conditions as aspen in this management area - dry-mesic sandy soils. Red pine is ideally suited for these kinds of sites. There are 992 acres of red pine that have factors limiting harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.
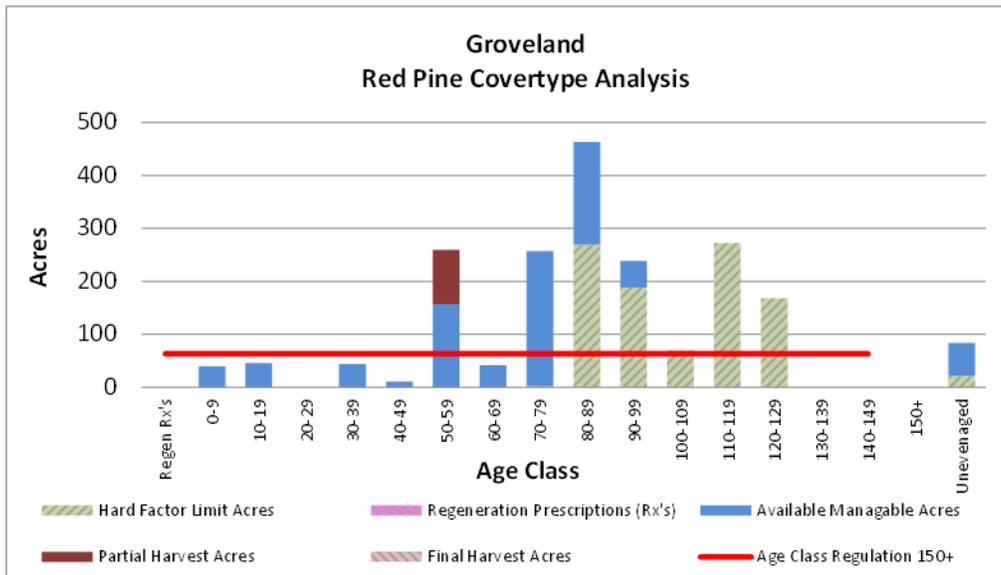
Figure 4.16.5. Graph of the age-class structure for the red pine cover type on the Groveland management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Maintain natural origin red pine in this management area.

Long-Term Management Objectives

- Manage natural origin stands on a 150-year rotation using natural regeneration techniques; allowing for approximately 63 acres for final harvested and regenerated per decade. Thin as needed.

10-Year Management Objectives

- Thin about 441 acres in the next decade; and
- Harvest and regenerate 217 acres of natural origin stands within the next decade.

White Pine Cover Type

Current Condition

Over 1,562 acres (5%) of the state forest in this management area is white pine (Table 4.16.1). White pine acres are poorly distributed across age-classes spiking in the 80-99 year age classes (Figure 4.16.6). Most of the white pine in this area is of natural origin, and is found on alluvial sands in the Mitchell Valley and on the rocky knobs on the management area. There are 108 acres of white pine that have factors limiting harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.
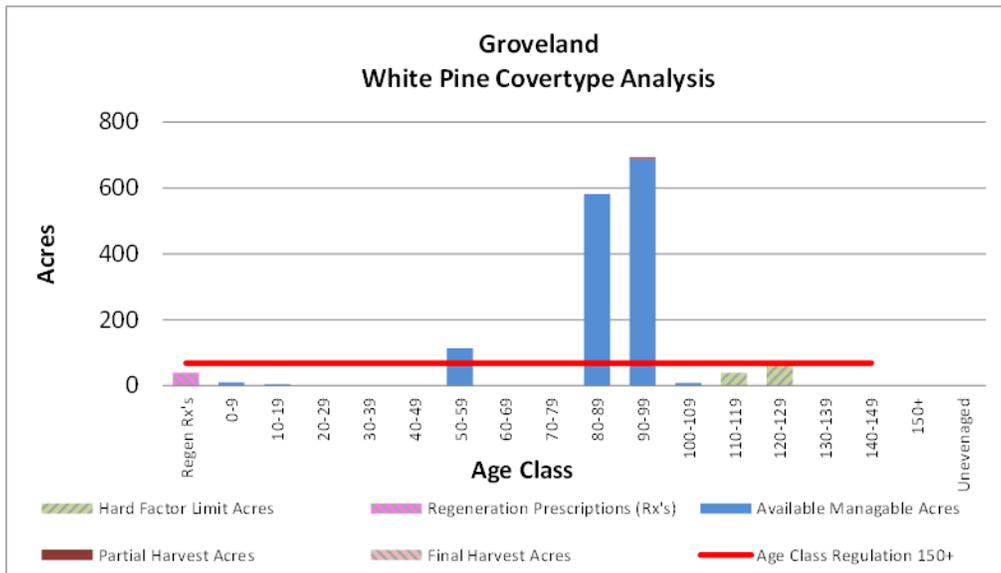
Figure 4.16.6. Graph of the age-class structure for the white pine cover type on the Groveland management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Maintain natural origin white pine in this management area.

Long-Term Management Objectives

- Manage natural origin stands on a 200-year rotation using natural regeneration techniques with shelterwood or patch clearcuts and scarification as needed allowing for 69 acres to be final harvested per decade.
- Thin stands as necessary.

10-Year Management Objectives

- Regenerate 179 acres of natural origin stands within the next decade using shelterwood and small patch cuts; and
- Thin about 681 acres in this 10-year planning period.

Cedar Cover Type

Current Condition

Cedar occurs on 1,465 acres (5%) of the management area (Table 4.16.1). Poorly drained sites supporting stands of mostly cedar mixed with black spruce, tamarack, balsam fir, characterize the cedar type. Due to the wet site conditions, they are more susceptible to rutting damage from logging equipment and present difficult operating conditions for harvesting. Cedar types are poorly distributed across the age-class distribution (Figure 4.16.7). Most of the stands are over 80 years of age. Little harvesting has been done in this type over the past 60 years.

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.
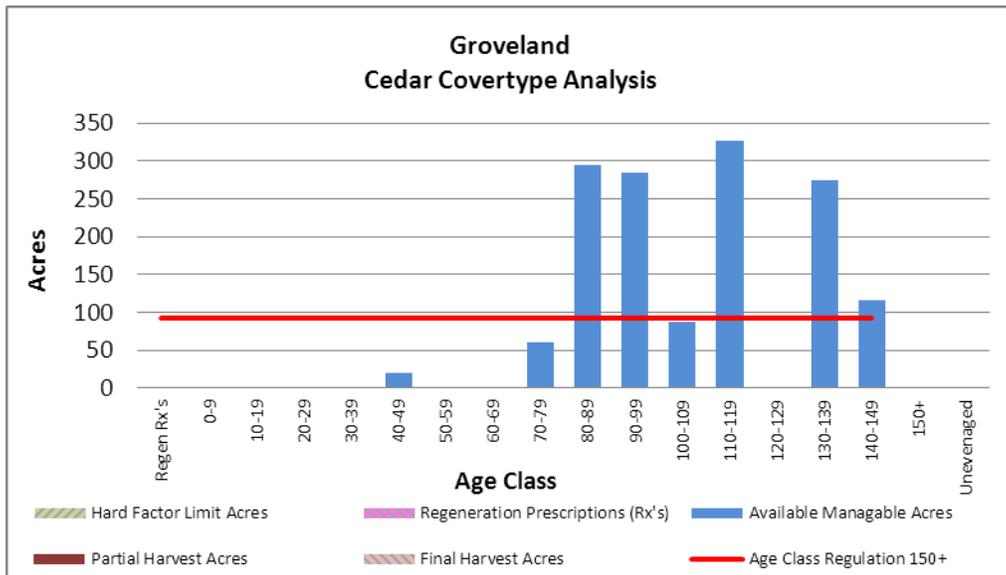
Groveland Cedar Covertype Analysis

Figure 4.16.7. Graph of the age-class structure for the cedar cover type on the Groveland management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Closed canopy stands interspersed with patches of all age classes; and
- Sustainable regeneration and recruitment of seedlings and saplings.

Long-Term Management Objectives

- Maintain cedar cover type on the landscape; and
- Regenerate stands to species mixes similar to the pre-harvest conditions.

10-Year Management Objectives

- No harvests are planned for this area in this 10-year planning period; and
- Allow limited experimental cedar regeneration and thinning trials coordinated at the district level with an adaptive management component.

Other Forested Cover Types

Current Condition

Other forested types make up 3,289 acres and are made up of natural mixed pines (750 acres), upland conifers (529 acres), lowland deciduous (379 acres), upland spruce/fir (353 acres), mixed upland deciduous (311 acres), paper birch (213 acres), lowland poplar (201 acres), upland mixed forest (161 acres), oak (150 acres), lowland mixed forests (99 acres), lowland spruce/fir (76 acres), hemlock (36 acres) and tamarack (31 acres). Together these types make up about 11% of the management area (Table 4.16.1).

Approximately 839 acres of these other minor cover types have site conditions limiting their harvest this decade. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

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; and
- Featured species habitat requirements will be taken in to consideration.

<u>10-Year Management Objectives</u>

- Harvest those stands without harvest limitations adjacent to other planned harvest activities and where stand and habitat conditions indicate that harvesting is appropriate; and
- The projected ten-year final harvest in these types is 665 acres and the projected partial harvest is 817 acres.

Other Non-forested Cover Types

<u>Current Condition</u>

The following non-forested cover types are found on this management area: upland open/semi- open lands (906 acres – 3%), lowland open/semi-open lands (1,388 acres – 5%) and misc. other (water, local, urban) (1,365 acres – 4%) (Table 4.16.1).

<u>Desired Future Condition</u>

- These areas will be maintained in the current condition.

<u>Long-Term Management Objective</u>

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

<u>10-Year Management Objective</u>

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

4.16.2 – Featured Wildlife Species Management

The Groveland management area has great potential to support wintering deer in the mixed complex of lowland conifer and upland pine. White pine is still found throughout this complex and should be encouraged as a major component in the uplands. The primary focus of wildlife habitat management in the Groveland management area will be to address the habitat requirements identified for the following featured species: black bear, blackburnian warbler, northern goshawk 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; mast (hard and soft); within-stand diversity; mesic conifer; mature forest; coarse woody debris; and deer wintering complexes. During this 10-year planning period, additional analyses to better define the spatial extent of priority areas for featured species will be performed.

Black Bear

The western Upper Peninsula black bear goal is to maintain or improve habitat. Management for bear should focus on improving existing habitat (e.g., maintaining corridors, mast and refuge trees) in this management area.

<u>Wildlife habitat specifications:</u>

- Maintain or increase the oak cover type and within stand oak component of hardwood forests within the management area;
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry;
- Minimize herbicide use that would be detrimental to mast production;
- Maintain lowland conifer and hardwoods along and around drainages, vernal pools and forested wetlands; and
- Maintain refuge tree species with rough bark for cubs to escape (e.g., white pine and hemlock).

Blackburnian Warbler

The goal for blackburnian warbler is to maintain suitable breeding habitat. Management efforts for blackburnian warblers should focus on within stand diversity, discouraging habitat fragmentation and maintaining mature forest with a conifer component in priority landscapes. Specifically, increase mesic conifer cover types (i.e., hemlock, white pine, red pine, upland spruce-fir) and allow some to mature beyond standard rotation ages, retain a larger percentage of mesic conifer during harvests, employ silvicultural practices that encourage the regeneration of mesic conifers and where feasible, under plant hemlock, white pine and white spruce in hardwood-dominated stands.

<u>Wildlife habitat specifications:</u>

- Increase the mesic conifer (e.g., hemlock, white pine, natural red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, under planting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
- Provide for late successional mesic conifer-dominated, particularly hemlock, stands in the management area by extending the normal rotation length for white spruce and balsam fir cover types by 20 years in upland areas.

Northern Goshawk

The goal for northern goshawk is to maintain suitable habitat. Management at the stand scale should focus on protection of nest trees, the provision of coarse woody debris, addressing fragmentation. Landscape scale management should provide mature and old aspen stands in the 60-69 year-old age class.

<u>Wildlife habitat specifications:</u>

- Maintain a minimum of 15% of the state forest aspen resource above age of 60 in this management area (this can be accomplished using factor limited stands, special conservation areas, etc…). All known woodland raptor nests should be reported to local wildlife staff and documented in the Integrated Forest Monitoring Assessment and Prescription comments. If the species is known, the common name should be included in the comments. For northern goshawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidance for Red-Shouldered Hawks and Northern Goshawk on State Forest lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

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.

<u>Wildlife habitat specifications for deer wintering complexes:</u>

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas, and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.

- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

4.16.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in "*DNR's Approach to the Protection of Rare Species on State Forest Lands*" (IC4172). This is especially important when listed species are present, 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 five listed species and five natural communities of note occurring in the management area as listed in Table 4.16.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

The Groveland Mine Flooding and the Hancock Creek Flooding are state wildlife management areas and special conservation areas within this management area as shown in Figure 4.16.8.

Approximately 946.5 acres of potential old growth have been identified within the Groveland management area. 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.

Table 4.16.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Groveland 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								
Granite Bedrock Glade		S2/G4G5	Confirmed				Upland open/semi-open	N/A
Granite Cliff		S2/G4G5	Confirmed				Upland open/semi-open	N/A
Northern hardwood swamp		S3?/G4	Confirmed				Black Ash	Late
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
Submergent Marsh		S4/GU	Confirmed				Lowland open/semi-open	N/A
Birds								
Common loon	*Gavia immer*	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Bald eagle	*Haliaeetus leucocephalus*	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	*Pandion haliaetus*	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
Reptile								
Wood turtle	*Glyptemys insculpta*	SC/G4/S2S3	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern shrub thicket	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
Plant								
Fragrant cliff woodfern	*Dryopteris fragrans*	SC/G5/S3	Confirmed			Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Granite cliff	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Volcanic lakeshore 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.

Although there are no high conservation value areas, there is one ecological reference area in the management area (Figure 4.16.8) representing the granite bedrock glade natural community (88.5 acres).

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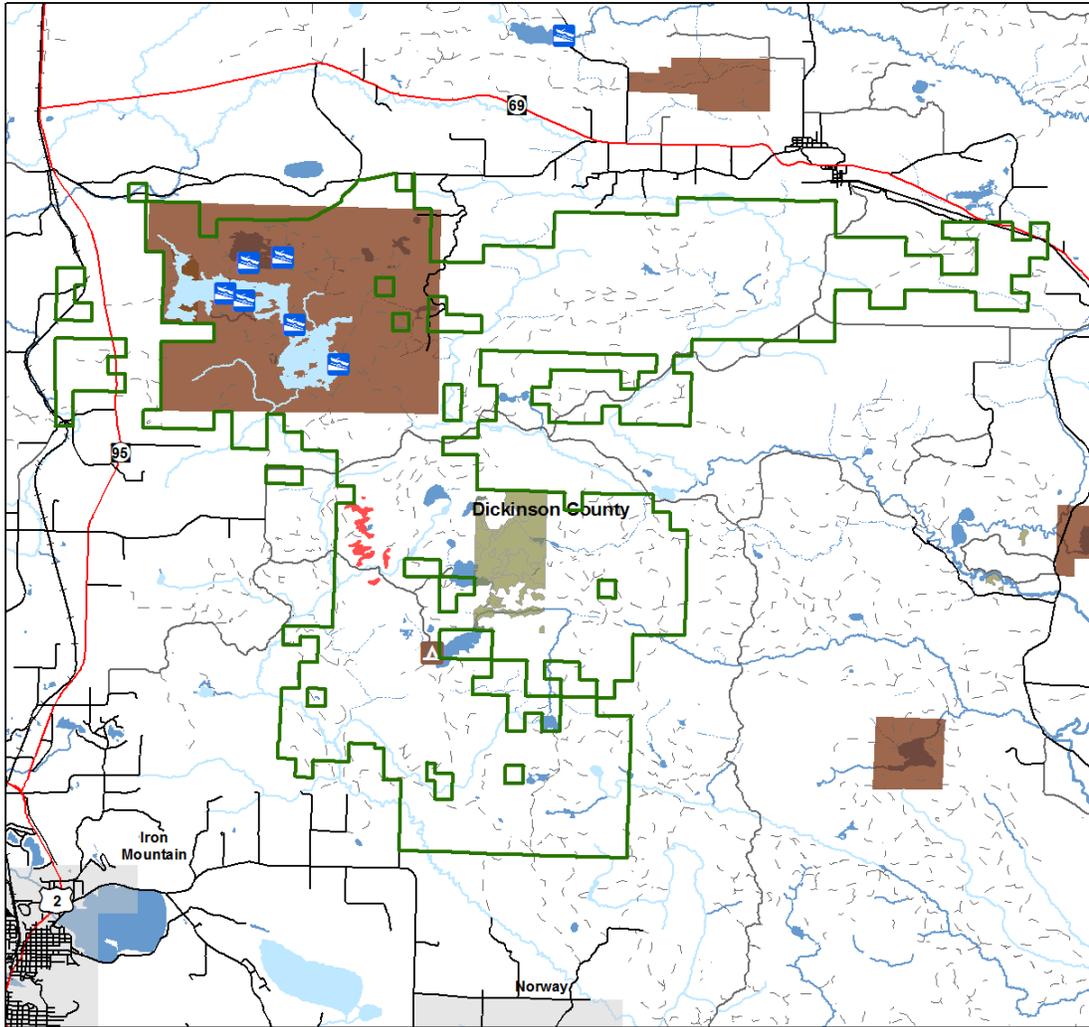
Objective 1-2: Occurrences of rare, threatened, endangered and special concern species noted during the inventory process by inventory staff should be verified and added to the body of knowledge for the management area.

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.

Groveland

Figure 4.16.8. A map of the Groveland management area showing the special resource areas.

4.16.4 – Forest Health Management

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

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

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. Following is a list of species of concern that been documented in or near this management area.

- Common buckthorn
- Garlic mustard
- Glossy buckthorn
- Japanese barberry
- Japanese knotweed.

4.16.5 – 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 4.16.1.

4.16.6 – Fire Management

This area was probably subject to high intensity stand-replacement fires on an infrequent basis. Fire rotation intervals may have been as long as 250 years, promoting white pine and hemlock among other fire tolerant hardwoods and conifers.

- All wildfires within the management area should be subject to appropriate initial attack response.
- Depending on anticipated fire potential and identified treatment needs in a given area, it may be possible to use prescription firing to contain wildfires using agreed to wetland and road boundaries.
- Boundaries of harvesting treatments should be aligned with defensible features, such as wetlands and roads, to accommodate prescribed fire and containment suppression tactics.
- The Carney Lake State Forest Campground provides opportunity for targeted prevention information for recreation users.

4.16.7 – Public Access and Recreation

This area has good public and management access. Snowmobile trails cross this area from north to south and the Felch Off-Road Vehicle route crosses the northeast corner on the area (Figure 4.16.1). The Merriman Ski Trail is located in this area as shown in Figure 4.16.1. Three new boating access sites have been built on the Groveland Mine Ponds bringing the total to six (Figure 4.16.8). Additional boating access is located on Carney Lake near the Carney Lake State Forest Campground and at Rock Lake (Figure 4.16.8).

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

4.16.8 – 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 thin to discontinuous glacial sediments over bedrock. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the management area and there is some potential for additional pits.

The Cambrian Munising Group and Precambrian Michigamme and Chocolay Formations and Archean Granite/Gneiss subcrop below the glacial drift. These rocks do not have a current economic use. A new nonmetallic mineral lease is in process just south of the abandoned Groveland Mine. The tailings deposits are being researched as a potential soil nutrient.

Old iron mines are located to the north and southwest of the management area. Metallic mineral exploration has occurred in the management area in the past and there is metallic mineral potential.