

4.8 Chain Lakes Moraine Management Area

Summary of Use and Management

Vegetative management in the Chain Lake management area (MA) (Figure 4.8.1) 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, lowland conifer and lowland spruce/fir; 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 increasing diversity and long-term oak sustainability through under planting white and red pine; and to maintain or increase wildlife corridors especially along riparian areas. Management activities may be constrained by site conditions and the skewed age-class distributions. Balancing age classes and oak regeneration will be priority issues in this 10-year planning period.

Introduction

The Chain Lakes Moraine management area is located in Southwestern Marquette County on a disintegration moraine. The management area covers 84,724 acres, is mostly contiguous and is surrounded by private industrial forest land. The management area is dominated by the aspen, lowland conifer and jack pine cover types. Other attributes that played a role in the definition of this management area include:

- Dominated by two natural communities: dry-mesic northern forest and poor conifer swamp;
- Mid-range in site quality;
- Two designated off-road vehicle trail systems are within this management area – Porterfield Lake and Bass Lake;
- Provides multiple benefits including forest products dispersed recreational activities; and
- Provides a variety of fish and wildlife habitats.
- This management area contains one of the western Upper Peninsula Grouse Enhanced Management Systems areas. This area plan will emphasize balanced age classes of aspen for timber production which will have habitat benefits for ruffed grouse. The boundaries of Grouse Enhanced Management Systems areas will be delineated and an operational plan will be developed during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager and integrated into the plan through the revision process.

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 Chain Lakes Moraine management area are shown in Table 4.8.1.

Table 4.8.1. Summary of cover types, composition, limited factor area, manageable area and projected harvest area for the Chain Lakes Moraine management area (2012 Department of Natural Resources inventory data).

| Cover Type | Cover % | Current Acreage | Hard Factor Limited | Manageable Acres | 10 Year Projected Harvest (Acres) | | Projected Acreage in 10 | Desired Future Harvest (Acres) | |
|----------------------------------|---------|-----------------|---------------------|------------------|-----------------------------------|-----------------|-------------------------|--------------------------------|-----------------|
| | | | | | Final Harvest | Partial Harvest | | Final Harvest | Partial Harvest |
| Aspen | 37% | 31,576 | 1,258 | 30,318 | 6,282 | 0 | 31,576 | 5,053 | 0 |
| Lowland Conifers | 11% | 9,226 | 5,640 | 3586 | 399 | 0 | 9,226 | 399 | 0 |
| Lowland Spruce/Fir | 6% | 5,451 | 2,749 | 2702 | 300 | 0 | 5,451 | 300 | 0 |
| Jack Pine | 6% | 4,900 | 152 | 4748 | 150 | 0 | 4,900 | 678 | 0 |
| Red Pine | 5% | 4,544 | 325 | 4219 | 469 | 1,337 | 4,544 | 469 | 1,660 |
| Northern Hardwood | 5% | 4,171 | 98 | 4073 | 0 | 1,911 | 4,171 | 0 | 1,911 |
| Upland Open/Semi-Open Lands | 4% | 3,217 | 0 | 3217 | 0 | 0 | 3,217 | 0 | 0 |
| Lowland Open/Semi-Open Lands | 8% | 6,875 | 0 | 6875 | 0 | 0 | 6,875 | 0 | 0 |
| Misc Other (Water, Local, Urban) | 1% | 816 | 0 | 816 | 0 | 0 | 816 | 0 | 0 |
| Others | 16% | 13,948 | 3,294 | 10654 | 1,159 | 1,008 | 13,948 | 1,127 | 1,447 |
| Total | | 84,724 | 13,516 | 71,208 | 8,759 | 4,256 | 84,724 | 8,026 | 5,018 |

Chain Lakes Moraine

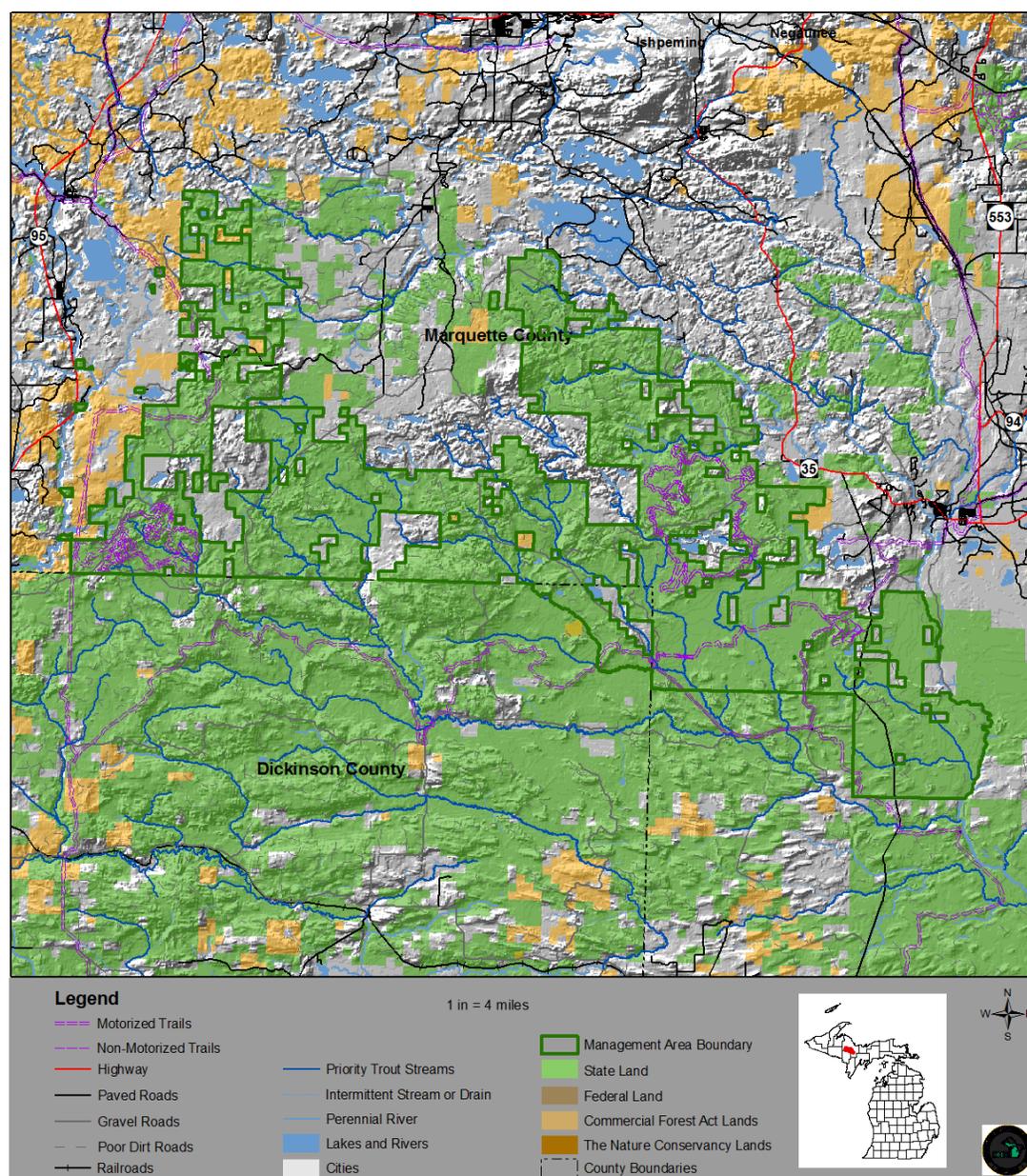


Figure 4.8.1. A map of the Chain Lakes management area (dark green boundary) in relation to surrounding state forest and other lands in Marquette County, Michigan

4.8.1 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 Chain Lake Moraine 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 31,576 acres (37%) of the management area (Table 4.8.1) and is poorly distributed across age classes (Figure 4.8.2). Aspen is growing on dry-mesic to dry sandy soils, which are productive sites for the species. Aspen will be managed on a 60 year rotation to a balanced age-class structure indicated by the red line in Figure 4.8.2. Most of the age classes over the rotation age of 60 years (60-69 years on Table 4.8.1) are in the hard factor limited category, partial harvest category or are part of a regeneration harvest. With a pronounced deficit of aspen in the 40 plus age classes, early entry into younger age classes with surplus acres above the regulation line, is possible, but unlikely during the next 10-year period. Aspen in these age classes are not of merchantable size and have not reached economic maturity.

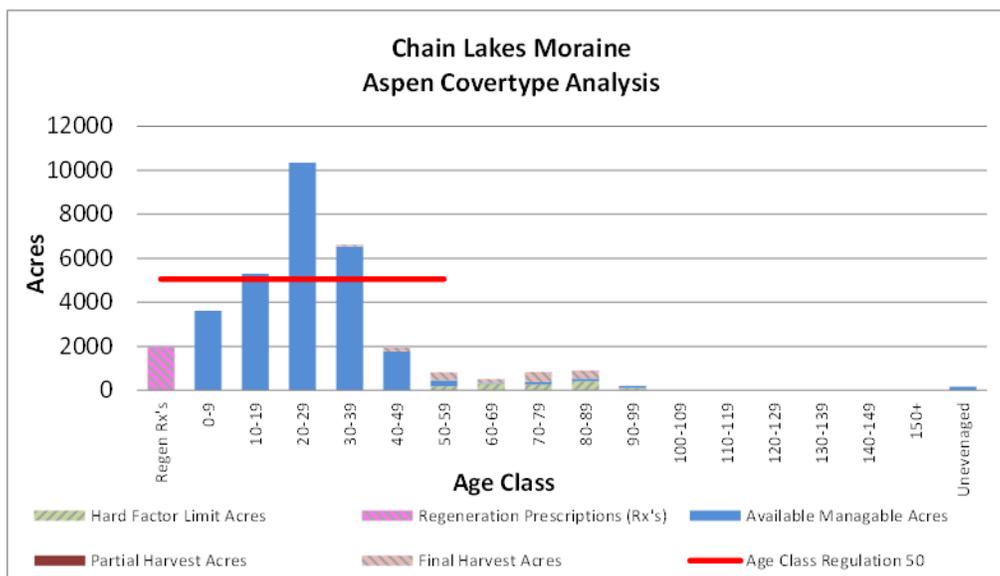


Figure 4.8.2. Graph of the age-class structure for the aspen cover type on the Chain Lakes Moraine management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Balanced acres in each age class up to 50 years (indicated by the red line in Figure 4.8.2);
- Provide an even supply of forest products;
- Provide a balanced mix of habitat conditions for a variety of wildlife; and
- Provide a variety of hunting-type opportunities.

Long-Term Management Objectives

- Harvest and regenerate aspen stands using a 50-year rotation length;
- Once age classes are closer to balanced, harvest and regenerate 5,053 acres each decade;
- Identify low quality off-site aspen stands for conversion to more ecologically appropriate cover types;
- Favor regeneration of large-tooth aspen where practical as this species is well suited to the drier, sandy soils of this management area; and
- Mitigate any resulting loss of aspen acreage during this planning period through identification of replacement acreage prior to conversion.

10-Year Management Objectives

- Regenerate 6,282 acres over the 10-year planning period;
- Regenerate stands of 70 - 90 year old aspen that are in decline;
- Two-aged stands with mature aspen over younger stands should be identified and scheduled for harvest;

- Evaluate younger age classes with surplus acres (acres above the red line in Figure 4.8.2) for early harvest potential as they increase in size and age;
- Aspen within the identified Grouse Enhanced Management Systems area may be managed differently than the rest of the aspen within the management area, with a shorter rotation age, small patch cuts and carefully considered stand adjacency; and
- Maintain mature large-tooth aspen if present as retention.

Lowland Conifers Cover Type

Current Condition

The lowland conifer cover type covers 9,226 acres (11%) of the management area (Table 4.8.1). Lowland conifers are poorly distributed across age classes, over-represented in the older age classes and underrepresented in the younger classes (Figure 4.8.3). This type is found primarily on poorly drained sites supporting mixed stands of cedar, black spruce, tamarack, balsam fir, white birch and balsam poplar. Most of these stands have a hard factor limit associated with them which typically makes them unavailable for harvesting. Stands that are available for harvest will be managed on an 80-year rotation (indicated by the red line in Figure 4.8.3) with the goal of approaching a more balanced age-class distribution over multiple rotations. Little harvesting has been done in this cover type over the past 60 years.

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 an 80-year rotation harvesting 399 acres without hard limiting factors per decade;
- Regenerate stands to species mixes similar to the pre-harvest conditions preferring cedar, hemlock, black spruce and balsam fir; Harvesting will be done using small clearcuts or strips with clumped retention; and
- Monitor for insect and disease susceptibility and regenerate before widespread mortality occurs.

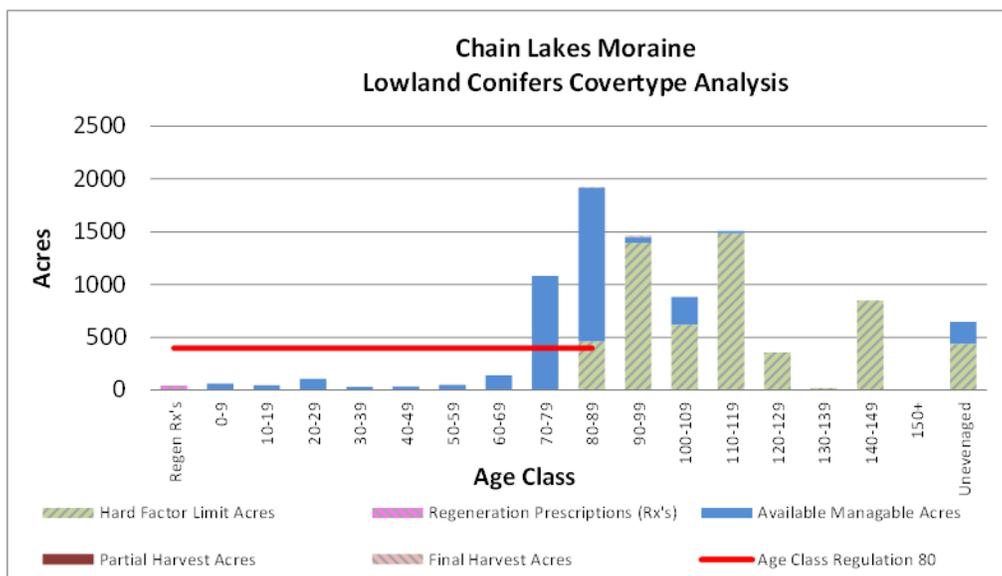


Figure 4.8.3. Graph of the age-class structure for the lowland conifer cover type on the Chain Lakes Moraine management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- Harvest 399 acres over the next decade focusing on the use of “low impact” harvesting systems and successful regeneration techniques;
- Use appropriate silvicultural techniques to assure adequate regeneration; and
- Monitor harvested sites.

Lowland Spruce/fir Cover Type

Current Condition

The lowland spruce/fir cover type covers 5,451 acres (6%) of the management area (Table 4.8.1). Lowland spruce/fir is poorly distributed across age classes, over-represented in the older age classes and underrepresented in the younger classes (Figure 4.8.4). Lowland spruce-fir is often found in association with lowland conifer, cedar and tamarack cover types. Most stands have a hard factor limit associated with them which typically makes them unavailable for harvesting. Stands that are available for harvest will be managed on an 80-year rotation (indicated by the red line in Figure 4.8.4) with the goal of approaching a more balanced age-class distribution over multiple rotations.

Desired Future Condition

- Maintain approximately the current level of lowland spruce-fir cover type with stands with better representation across all age classes.

Long-Term Management Objectives

- Harvest and regenerate 300 acres per decade on an 80-year rotation; and
- Monitor for insect and disease susceptibility and regenerate before widespread mortality occurs.

10-Year Management Objectives

- Harvest about 300 acres in the next decade;
- Use appropriate silvicultural techniques to assure adequate regeneration;
- Monitor harvested sites.

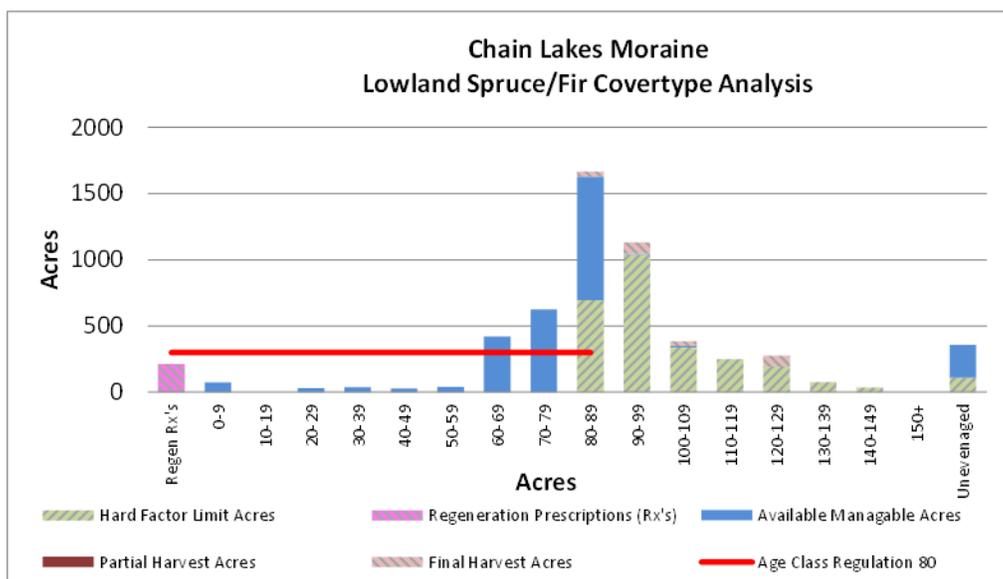


Figure 4.8.4. Graph of the age-class structure for the lowland spruce-fir cover type on the Chain Lakes Moraine management area (2012 Department of Natural Resources inventory data).

Jack Pine Cover Type

Current Condition

The jack pine cover type covers 4,900 acres (6%) of the management area (Table 4.8.1) and is poorly distributed across age classes (Figure 4.8.5). Jack pine is growing on dry-mesic to dry-sandy soils, which are productive sites for the species. Jack pine will be managed on a 60-year rotation (indicated by the red line in Figure 4.8.5). Jack pine acres are unevenly distributed across age classes.

Desired Future Condition

- Balanced acres in each age class up to 60 years (indicated by the red line in Figure 4.8.5);
- Provide an even supply of forest products;
- Provide a balanced mix of habitat conditions for a variety of wildlife; and
- Provide a variety of hunting-type opportunities.

Long-Term Management Objectives

- Harvest and regenerate jack pine using a 60-year rotation length; and
- Regenerate approximately 678 acres each decade.

10-Year Management Objectives

- While the harvest model suggests harvesting 150 acres over the next decade, this will be challenging due to the lack of older age classes shown in Figure 4.8.5;
- Opportunities to harvest in the age classes with surplus acres (above the red line) presently in the 0-9, 10-19 and 20-29 year age classes will be explored as these classes grow older and reach merchantable size;
- Biomass harvesting may facilitate the opportunities needed to harvest in these age classes early and
- Monitor for jack pine budworm and other insect or disease problems.

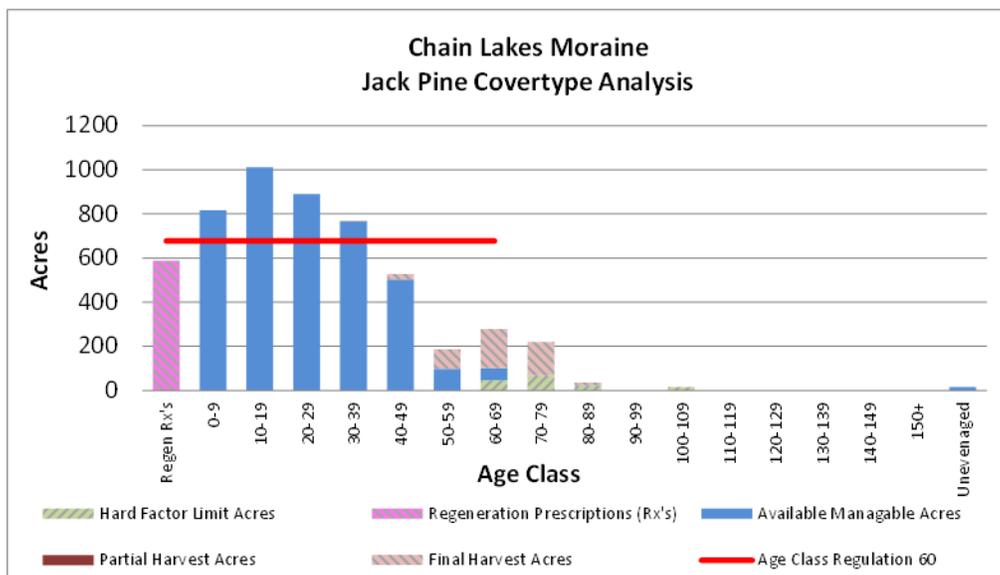


Figure 4.8.5. Graph of the age-class structure for the jack pine cover type on the Chain Lakes Moraine management area (2012 Department of Natural Resources inventory data).

Red Pine Cover Type

Current Condition

The red pine cover type covers 4,544 acres (5%) of the management area (Table 4.8.1) and is poorly distributed across age-classes (Figure 4.8.6). This cover type will be managed on an 80-year rotation with a balanced age-class structure of 150 acres in each age class (indicated by the red line in Figure 4.8.6). Red pine stands occur on dry-mesic, sandy soils similar to the aspen stands in this management area. Nearly 60% of the red pine in this management area is of plantation origin. The spike in the 50-59 year-old age class on Figure 4.8.6 is indicative of the planting efforts of the 1950s that established many of these stands.

Desired Future Condition

- Maintain the same number of acres of red pine in the management area and at approximately the same ratio of plantation-pine to natural origin pine (approximately 60% plantation origin);
- Balance age classes of the plantation origin red pine to lessen the spike in the 50-59 year-old age class and
- Where possible along recreation trails, convert plantation red pine to natural origin red pine.

Long-Term Management Objectives

- Harvest and regenerate 469 acres and thin 1,660 acres each decade;
- Plantation stands will be managed on an 80-year rotation with intermediate harvests (thinning) as basal area guidelines are met;
- Maintain stands of natural origin on about 40% of the red pine acreage;
- Manage natural origin stands on an average 150-year rotation using natural regeneration techniques and scarification as needed; and
- Both natural origin and plantation stands will be thinned as necessary.

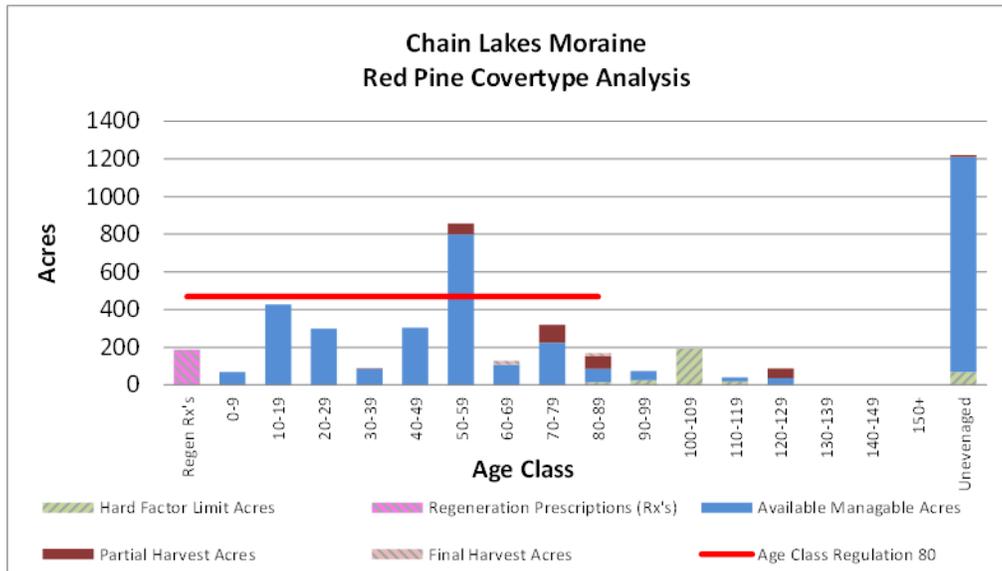


Figure 4.8.6. Graph of the age-class structure for the red pine cover type on the Chain Lakes Moraine management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- Regenerate 469 acres of red pine in the next decade;
- Thin about 1,337 acres of red pine during the next 10-year planning period; and
- Thinning should add natural regeneration gaps to promote stand species diversity.

Northern Hardwood Cover Type

Current Condition

Northern hardwood stands make up about 4,171 acres (5%) of this management area (Table 4.8.1). Stands occur mostly on mesic sites producing medium to high-quality hardwoods. Most stands have been managed on a selection harvest basis and are in good condition. Due to low deer numbers in this area, there are few problems with seedling herbivory and most areas regenerate successfully. Northern hardwood is typically managed using an uneven-aged harvest system based on basal area rather than age (Figure 4.8.7).

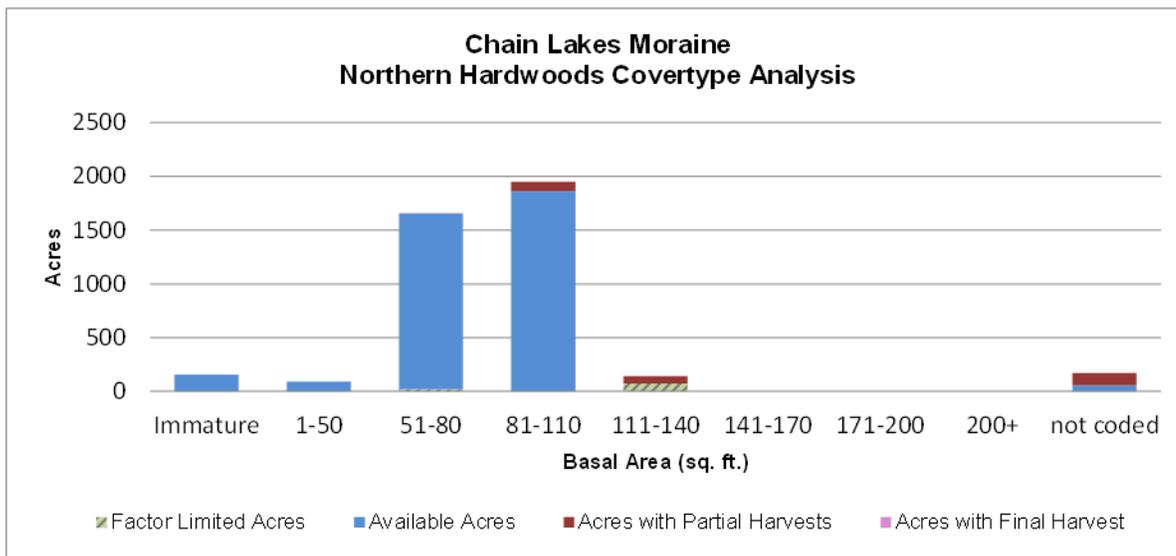


Figure 4.8.7. Graph of the basal area distribution for the northern hardwood cover type on the Chain Lakes Moraine management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Sustainable regeneration and recruitment of northern hardwood species leading to an all-age structure with high-value sugar maple sawlogs;
- A full complement of tree seedlings recruiting into the overstory; and
- A 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 cycle;
- Harvest an estimated 1,911 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

- Harvest 1,911 acres in this planning period; and
- Maintain oak, hemlock, white pine and upland cedar where possible in stands that are harvested.

Other Forested Cover Types

Current Condition

Other forested types make up 13,948 acres. These are made up of cedar (3,239 acres), upland spruce-fir (2,557 acres), white pine (2,069 acres), oak (2,036 acres), paper birch (1,077 acres), tamarack (596 acres), natural mixed pine (549 acres), mixed upland deciduous (523 acres), lowland poplar (389 acres), upland mixed forest (304 acres), upland conifer (261 acres), lowland deciduous (114 acres), planted mixed pine (108 acres), lowland mixed forest (77 acres) and hemlock (49 acres). Together these types make up about 16% of the management area (“Others” in Table 4.8.1).

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;
- Use appropriate silvicultural techniques to assure adequate regeneration;
- Monitor harvested sites;
- 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 cover types will be less than 2,167 acres total.

Other Non-forested Cover Types

Current Condition

Non-forested cover types found on this management area include: upland open/semi-open lands (3,217 acres – 4%), lowland open/semi-open lands (6,875 acres – 8%) and other (water, local, urban) (816 acres – 1%) (Table 4.8.1).

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.

4.8.2 – Featured Wildlife Species Management

The Chain Lakes Moraine management area offers opportunities to increase diversity and perhaps long-term oak sustainability through under planting white and red pine. Another priority is to maintain or increase wildlife corridors especially along riparian area. The primary focus of wildlife habitat management in the Chain Lakes Moraine management area will be to address the habitat requirements identified for the following featured species: American woodcock, black bear, gray jay, pileated woodpecker, northern goshawk, ruffed grouse and red crossbill. Some of the most significant wildlife management issues in the management area are mast (hard and soft); habitat fragmentation; mature forest conditions; mesic conifer; coarse woody debris; and retention or development of large living and dead standing trees (for cavities). Focus on increasing the oak resource with the management area and to optimize acorn production. This management area represents approximately 25% of the oak resource in the western Upper Peninsula. During this 10-year planning period, additional analyses to better define the spatial extent of priority areas (e.g., identify large contiguous blocks of potential habitat for northern goshawk) for featured species will be performed.

This management area will include one of the western Upper Peninsula Grouse Enhanced Management System areas. The boundaries will be delineated during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager. Aspen stands that fall within the boundary may be managed to enhance habitat and hunting opportunities for ruffed grouse. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes.

American Woodcock

The western Upper Peninsula goal for woodcock is to maintain or increase woodcock habitat. In priority areas, management should focus on balancing the age-class distribution and provision of display, feeding, nesting and brood-rearing habitat via upland brush, opening and poorly stocked stand management.

Wildlife habitat specifications:

- Maintain aspen cover types within the management area, especially where associated with alder, riparian zones, or forested wetlands;
- 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; and
- Maintain or create rough openings associated with alder, riparian zones, regenerating aspen or forested wetlands within the management area.

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.

Wildlife habitat specifications:

- 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 to provide escape cover for cubs (e.g., white pine and hemlock).

Gray Jay

The goal for gray jay in the western Upper Peninsula is to maintain or increase suitable habitat. Management for gray jay should focus on maintaining boreal forest cover types in a variety of age classes, and ensure that older age classes of boreal forest are maintained. Important considerations in timber harvests are retention of scattered individual spruce and fir trees for food caching within sale boundaries and maintaining spruce and fir buffers along bog edges.

Wildlife habitat specifications:

- Maintain appropriate forest types (birch, lowland deciduous, fir, lowland conifer, lowland spruce/fir, tamarack and bogs) in the management area in a variety of age classes. Fifteen percent of the total acres in the relevant cover types (as stated above) within the management area should be maintained in older age classes (those at least 20 years beyond “normal” rotation length for the cover type). In this management area, older age classes (greater than 100 years) for gray jay habitat are being met by the large number of stands with site conditions that limit harvesting.
- Retain patches within timber harvest sale boundaries; patches are preferred over single trees within timber harvest sale boundaries though it is beneficial to have both.
- Offset salvage harvests deemed necessary due to insect or disease, or fire within the same cover type and age class (within the compartment, management area or WUP ecoregion), to minimize impacts on gray jay habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

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 and addressing fragmentation. Landscape scale management should provide mature and old aspen stands in the 60-69 year-old age class.

Wildlife habitat specifications:

- 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 resource 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 those comments. 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.

Pileated Woodpecker

The western Upper Peninsula goal for pileated woodpeckers is to maintain or improve habitat. State forest management for the species should address mature forest and retention or development of large living and dead standing trees (for cavities) in this management area. Focusing such efforts on riparian and animal movement corridors will benefit additional species.

Wildlife habitat specifications:

- Identify and retain as many existing large (>15 inches in diameter at breast height) snags and cavity trees, coarse woody debris and reserve green trees, as possible to ensure a sustainable supply of future cavity/foraging trees and associated coarse woody debris. Poorly formed trees and those damaged by natural disturbance or earlier harvests, particularly deciduous trees, are good candidates for future snags and cavity trees. Large diameter aspen and other soft hardwoods are preferred.
- Even-aged managed stands: Leave scattered retention patches around some 18 inches in diameter at breast height or greater (if unavailable, identify future potential 18 inch secure trees) to be recruited as a nucleus, using the upper end of the retention guidelines.
- Uneven-aged managed stands: retain a minimum of three secure cavity or snags per acre with one exceeding 18 inches in diameter at breast height. If snags or cavity trees are lacking, leave trees with defects of the maximum available size that will likely develop and be recruited as cavity trees.
- Offset salvage harvests deemed necessary due to insect or disease, or fire within the same cover type and age-class (within the compartment, management area or WUP ecoregion), to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

Red Crossbill

In the western Upper Peninsula, the goal for the red crossbill is to maintain or increase suitable habitat. State forest management should focus on maintaining mature and over mature seed producing trees in priority areas. Declines in crossbill have been associated with declines in the amount of available conifer seeds which are correlated with age of trees (see species account in Section 3); mostly a result of decreases in conifer across the landscape and a shortening of rotation periods for remaining conifer stands. Mature mesic conifer forests (white/red pine, spruce, hemlock) will be the primary habitat issue addressed for red crossbill in this management area.

Wildlife habitat specifications:

- Maintain a minimum of 15% of the total acres of appropriate forest types (upland spruce/fir, upland conifers, natural mixed pine and natural red and white pine) in the management area for red crossbill in a mature forest condition. Mature being defined as greater than 150 years for red pine, greater than 130 years for white pine and greater than 80 years for white spruce. This can be accomplished with existing factor-limited stands or alternatively by extending the rotation length of these types to 150, 130 and 180 years respectively. In this management area, older age classes for red crossbill habitat are being met by the large number of stands with site conditions that limit harvesting.
- Retain large mature and over mature red pine, white pine and spruce in shelter-wood and seed-tree cuts.
- Increase the mesic conifer (e.g., hemlock, white pine, natural red pine and upland spruce-fir) component on state forests by: a) Retain 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.

Ruffed Grouse

The western Upper Peninsula goal for ruffed grouse is to maintain or improve habitat. Management during this planning period will focus on early successional forest in priority landscapes, balancing age-class distribution and provision of soft browse.

Wildlife habitat specifications:

- Maintain aspen acres in the management area and balance the age-class distribution of aspen cover types.
- Stand size for grouse: Ideal aspen stands will be irregularly shaped 10-40 acres to maximize juxtaposition or edge avoiding extensive single age final harvests. Larger harvest units should have irregular boundaries, provide one 1-3 acre unharvested clumped inclusion for every 40 acres harvested.
- Manage the aspen cover type for smaller patch size, a shorter rotation and a more deliberate habitat configuration within the designated Grouse Enhanced Management Systems areas where appropriate.
- Hold or increase the conifer component in aspen stands. Leave conifers under four-inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast and oak component in stands with oak and emphasize areas with a hazel understory.

4.8.3 – 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 seven listed species and two natural communities of note occurring in the management area as listed in Table 4.8.2. 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.

Approximately 5,803.2 acres of potential old growth have been identified within the Chain Lakes Moraine management area (Figure 4.8.8). 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.

There are no high conservation value areas or ecological reference areas identified in this management area as illustrated in Figure 4.8.8.

Table 4.8.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Chain Lakes Moraine 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 Community | | | | | | | | |
| Poor conifer swamp | | S4/G4 | Confirmed | | | | Tamarack | Late |
| Rich conifer swamp | | S3/G4 | Confirmed | | | | Tamarack | Late |
| Birds | | | | | | | | |
| Common loon | <i>Gavia immer</i> | 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 | <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 | | | | | | | | |
| Tri-colored bat (Eastern pipistrelle) | <i>Perimyotis subflavus</i> | SC/G5/S2S3 | Confirmed | PS | Very High | Caves | Caves | N/A |
| Plants | | | | | | | | |
| Purple clematis | <i>Clematis occidentalis</i> | SC/G5/S3 | Confirmed | | | Volcanic bedrock lakeshore | Upland open/semi-open | N/A |
| | | | | | | Dry-mesic northern forest | White Pine | Late |
| | | | | | | Volcanic cliff | Upland open/semi-open | N/A |
| | | | | | | Floodplain forest | Lowland mixed | Mid |
| | | | | | | Boreal forest | Upland & Lowland Sp/F | Mid |
| | | | | | | Granite bedrock glade | Upland open/semi-open | N/A |
| | | | | | | Granite cliff | Upland open/semi-open | N/A |
| | | | | | | Mesic northern forest | Northern Hardwood | Late |
| | | | | | | Northern bald | Upland open/semi-open | N/A |
| | | | | | | Volcanic bedrock glade | Upland open/semi-open | N/A |
| | | | | | | Volcanic lakeshore cliff | Upland open/semi-open | N/A |
| Canada rice grass | <i>Oryzopsis canadensis</i> | T/G5/S2 | Confirmed | | | Pine barrens | Jack Pine | Early |
| Pearlwort | <i>Sagina procumbens</i> | T/G5/S2 | Confirmed | | | Volcanic bedrock lakeshore | 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.

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.

4.8.4 – 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
- Jack pine budworm
- *Diplodia* shoot blight of pine
- *Sirococcus* shoot blight
- Spruce budworm

Chain Lakes Moraine

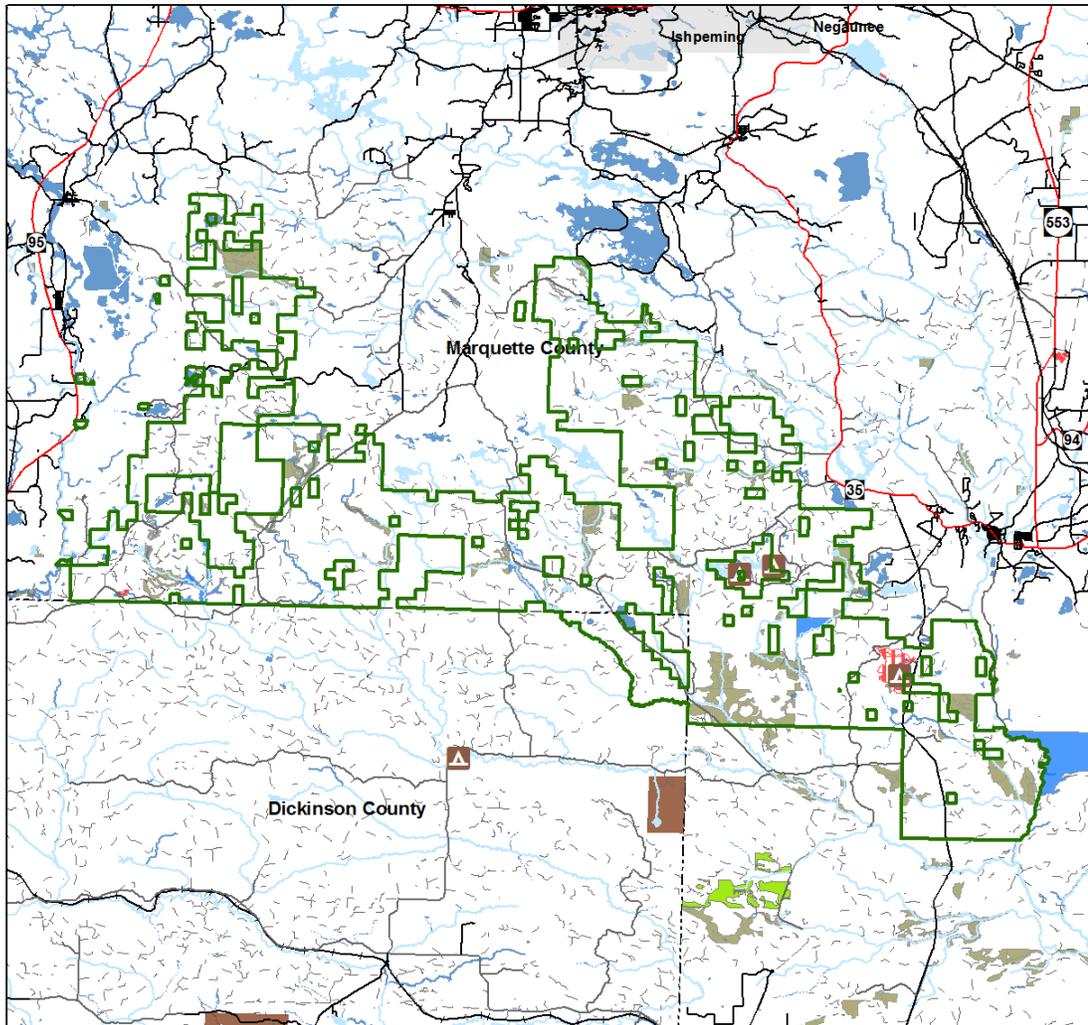


Figure 4.8.8. A map of the Chain Lakes District management area showing the special resource areas.

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 occurrences of species of concern documented in or near this management area.

4.8.5 – 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 4.8.1.

4.8.6 – Fire Management

With the exception of wetlands associated with the Miller Creek and Chandler Brook on the east side and the Bass Lake drainage on the west, much of this land area overlays dry, sandy soils that once supported a mix of barrens and dry to dry-mesic northern forests. These systems were probably maintained by periodic high-intensity stand replacement fires, perhaps as often as every 75 - 100 years.

- All wildfires within the management area should be subject to appropriate initial attack response; and
- Off-road vehicle trailheads for the Bass Lake and Porterfield Lake Trails, as well as campgrounds provide good opportunities for fire prevention messages.

4.8.7 – Public Access and Recreation

This area has good public and management access. Two motorcycle trails are located in this area, the Porterfield motorcycle trail and the Bass Lake motorcycle trail (Figure 4.7.1). Four state forest campgrounds (Figure 4.8.8) are located in this area, at Bass Lake, Little Lake, Anderson Lake and Pike Lake. Each has a boating access site associated with it. The Anderson Lake Pathway (Figure 4.8.1) is located in this area adjacent to the Anderson Lake State Forest Campground.

Specific hunting recreation improvements such as parking lots, gates, trail planting and trail establishment, as well as the preparation and dissemination of specific promotional material, may be made as a result of Grouse Enhanced Management Systems areas planning in this management area.

- Work to expand public access as opportunities arise.

4.8.8 – 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 and no economic oil and gas production has been found anywhere in the Upper Peninsula.

Surface sediments consist of coarse and medium-textured tills, an end moraine of coarse-textured till, glacial outwash sand and gravel and postglacial alluvium and peat and muck. The glacial drift thickness varies up to 100 feet. Sand and gravel pits are located in the management area and there is potential.

The Precambrian Archean Granite/Gneiss and the Cambrian Munising Group and Trempealeau Formation subcrop below the glacial drift. Some of the Granite/Gneiss could be used as dimension stone.

Old iron mines are located just to the east of the management area. Metallic mineral exploration has occurred in the management area in the past, and there could be potential. A couple metallic mineral leases in this management area are still active.