4.15 MA 15 – Camp Grayling Management Area

Summary of Use and Management

The Camp Grayling management area management area (MA) is the Michigan National Guard training grounds used primarily for military exercises while allowing varying degrees of Department of Natural Resources (DNR) management on certain portions depending on classification of ownership. The department will coordinate all prescribed activities with the National Guard to ensure they are compatible with military training needs. On these lands military training has precedence over resource management activities. Management in the Camp Grayling management area will emphasize continued balancing the age-class of aspen on suitable sites and regenerating the aging oak resource. Management will strive to sustainably produce various forest products, enhance game and non-game wildlife habitat and protect areas of unique character while accommodating military training. Management activities will be constrained or modified based on military training needs. Expected trends within this 10-year planning period are introduced pests and diseases and the difficulty in regenerating oak.

Introduction

This management area is located in the central northern Lower Peninsula in Kalkaska and Crawford counties and contains 100,619 acres of state forest (Figure 4.15.1). The primary attributes which identify the Camp Graying management area include:

- The management area falls within Albert's Grayling Outwash Plain sub-region (Albert, 1995).
- This management area, which lies in the central part of the Large Grayling Outwash Plain sub-region, is made up of ice-contact formed end-moraine ridges, separated by outwash areas.
- Historically, fires were very frequent in this management area and were important in determining species composition. Jack pine and northern pin oak dominated the outwash plains, while vegetation varied on the ridges – some dominated by northern hardwoods and others dominated by red oak, hemlock and white pine. Currently areas of aspen, red pine and northern hardwoods with isolated pockets of lowland types cover the majority of the state forest land.
- Hanson Grant lands are managed jointly by the Michigan DNR and Department of Military and Veterans Affairs. As per deed restrictions, Hanson lands are to be used foremost for military training while the DNR manages fish, game and forestry interests on these lands.
- The Camp Grayling Cantonment Area is restricted.
- The Camp Grayling management area includes various military shooting and artillery ranges and other specialized training areas, where approximately 20,000 acres are off-limits to most natural resource management activities.
- The 3,500 acre all-season Hanson Hills recreation area is located with this management area and is managed by the Grayling Recreation Authority. Management needs to consider intense recreational use in this area and needs to coordinate with the Grayling Recreation Authority and Camp Grayling.
- The state manages the natural resources on these lands and some of the Military Board lands as long as management does not interfere with military training or military management objectives.
- The Camp Grayling Pine Barrens special management area (approximately 5,100 acres) is located in the Camp Grayling management area. A specific management plan, developed in conjunction with Camp Grayling, has the goal of improving the quality of the pine barrens area while allowing for the continuation of military training in the area.
- Portions of the Camp Grayling management area are popular destinations for game hunting, hiking, mushroom hunting, etc. for the nearby communities of Grayling and Kalkaska. Due to the proximity of this management area to these towns, the forest resources contribute social and economic values to the area.
- Department of Natural Resources recreation facilities in this management area include the Lake Margrethe, Civilian Conservation Corp Bridge, Manistee River Bridge, Shupac Lake and Jones Lake state forest campgrounds. It should be noted that some campgrounds are located on military lands and others on non-military lands within compartments that are primarily military ownership. Shupac Lake and the Manistee River Bridge are outside military areas. Margrethe campground is leased from the military. Jones Lake is on and surrounded by military lands. For sites on military lands the military has ultimate jurisdiction. Snowmobile trails and an equestrian trail cross the management area. Recreational authority on Military Board lands and Hanson Grant lands reside with the military.

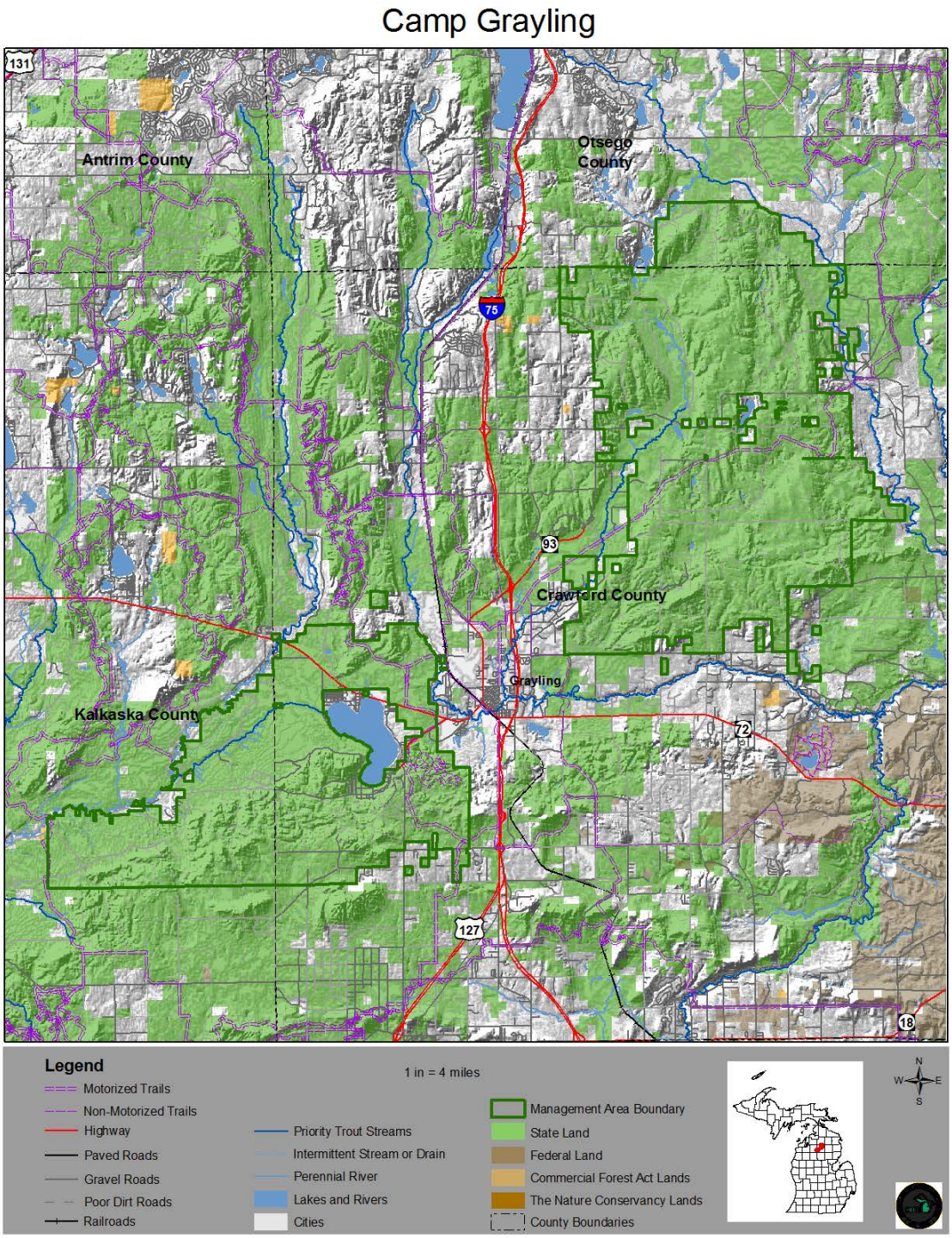

Figure 4.15.1. A map of the Camp Grayling management area (dark green boundary) in relation to surrounding state forest and other lands in Kalkaska and Crawford counties, Michigan.

Table 4.15.1. Current cover types, acreages, projected harvests and projected acreages at the end of this ten-year planning period for the Camp Grayling management area, northern Lower Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Oak	27%	26,711	16,376	10,335	897	2,297	26,711	1,387	2,297
Aspen	20%	20,456	12,061	8395			20,456	1,564	
Jack Pine	17%	16,647	8,197	8450			16,647	1,436	
Red Pine	5%	5,023	1,526	3497		655	5,023	350	1,209
Northern Hardwood	3%	2,872	2,583	289	18		2,872		
Mixed Upland Deciduous	2%	2,311	1,904	407		0	2,311	92	51
Lowland Conifers	2%	1,652	1,487	165	18		1,652	18	
Upland Open/Semi-Open Lands	16%	16,145	12,200	3945			16,145		
Lowland Open/Semi-Open Lands	2%	1,862	1,165	697			1,862		
Misc Other (Water, Local, Urban)	2%	1,636	3,032	-1396			1,636		
Others	5%	5,304	3,805	1499	87	319	5,304	166	326
Total		100,619	64,335	36,284	1,019	3,271	100,619	5,013	3,883

4.15.1 Forest Cover Type Management Direction

- The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting or mowing) will be conducted. In other portions of the state forest, natural succession will achieve ecological objectives. While most stands have a variety of trees species and other vegetation, stands or communities are classified by the species which has the dominant canopy coverage. A significant portion of the management area has been assigned a hard factor limit due to military restrictions per deed restrictions or otherwise in areas where active management conflicts with military use and limitations to management in the Hanson Hills Recreation Area.

4.15.1.1 Forest Cover Type Management – Oak

Current Condition

Oak acres total 26,711 acres or 27% of the management area (Table 4.15.1). Most stands are moderate to well-stocked stands of almost pure oak is located on PArVHa/PArVVb, PArVHa and PVCd/PArVHa habitat classes (see Appendix E).

The oak resource is aged (Figure 4.25.2) and is difficult to regenerate from stump sprouts.

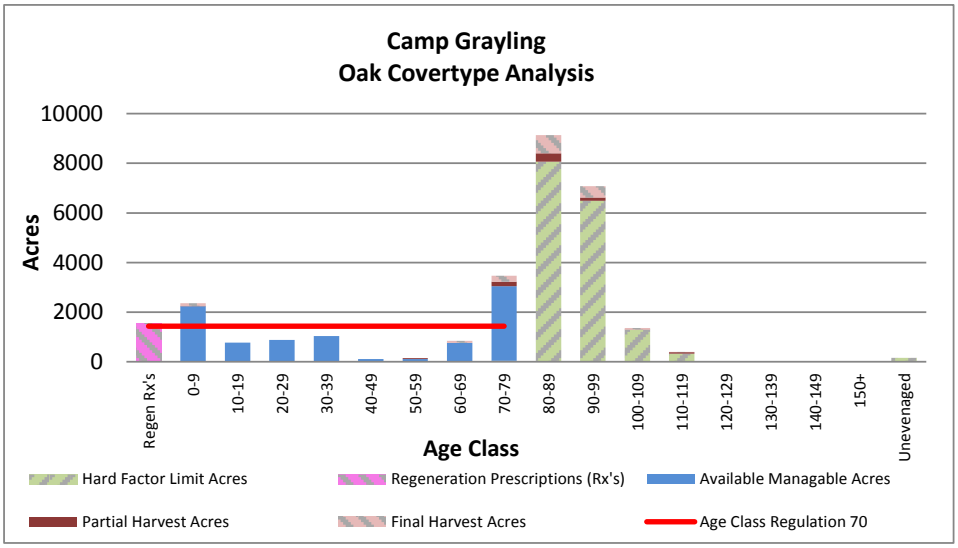

Figure 4.15.2. Age-class distribution for oak in the Camp Grayling management area (2012 Department of Natural Resources inventory data).

There are 16,376 acres of oak have met harvest criteria, but have site conditions that limit harvest (hard factor limited acres). There are 1,546 acres of stands that have a final harvest pending and these acres are included in the regeneration prescription class.

There are 762 acres with a partial harvest pending and these acres are included in their current age class. Figure 4.15.2 includes the projected number of acres converted to the cover type as a result of treatments that remove an overstory species resulting in release of oak. These acres are included in the regeneration prescription class.

Oak is desirable as it provides valuable habitat for many wildlife species, including ruffed grouse, white-tailed deer and wild turkey, which are featured species in this management area. Oak also provides valuable timber products.

Conditions that existed around the turn of the last century that created the extensive oak stands (large clearcuts that minimized frost pockets, intense fires that minimized competition and a smaller deer population) cannot be replicated. Therefore, the oak resource in this management area is extremely skewed towards the older age classes due to a minimal amount of regeneration for the last 70 years (Figure 4.15.2). The oak in the 90+ age classes is approaching the end of the normal lifespan on outwash plains and is becoming increasingly susceptible to insects and diseases such as oak wilt and oak decline. Older oak also does not sprout as vigorously from stump sprouts.

Due to the advanced age of the oak and the challenges to regenerating oak, management should concentrate on maintaining oak in mixed stands. The current understory of white pine and red maple below oak will be released through partial oak harvests. Where oak is in the understory, such as under jack pine or other pine types, treatments to reduce the pine overstory will release oak. Considerations should also be given to planting pine in oak stands, which can help to shelter young oak from late spring freezes. Oak can be a component of other cover types, but will require management techniques to ensure regeneration.

Desired Future Condition

- Oak will be maintained as a mixed cover type and as a component in stands throughout the management area through management to provide for timber products, wildlife habitat and recreational opportunities; and
- Some oak sites will be allowed to become mixed with white pine or red maple.

10-Year Management Objectives

- Conduct final harvests on a projected 897 acres;
- Conduct partial harvests on a projected 2,297 acres;
- Consider competition control through methods such as prescribed burning or herbicide use to improve the chances for successful natural regeneration;
- Maintain or expand oak as a component in stands throughout the management area through retention and management to promote natural regeneration in other cover types;
- Consider opportunities to re-establish and maintain oak/pine barrens on poorer quality sites (primarily low-end PArVVb and PVCd). This will provide habitat for species, including wild turkey, that prefer openings; and
- Where site conditions allow, consider introduction of red pine in young oak stands to shelter oak from late spring freezes.

Long-Term Management Objectives

- Continue work towards maintaining oak on the landscape in mixed stands and as a component in other cover types;
- Continue management for mixed oak/pine stands through partial harvests to release understory species into the overstory or planting pine in young oak stands;
- Future management decisions will need to take into consideration the impact of oak wilt and oak decline as the cumulative impacts will likely increase over time;
- Continue aggressive management of the aging oak resource to promote regeneration; and
- Desired future harvest levels are projected at 1,387 acres for final harvest and 2,297 acres for partial harvest per 10-year period.

4.15.1.2 Forest Cover Type Management – Aspen

Current Condition

Aspen acres total 20,456 acres or 20%of the management area (Table 4.15.1) on PVCd/PArVHa habitat classes. Forest communities dominated primarily by aspen in this management area are valued ecologically as sources of habitat for numerous species of wildlife including ruffed grouse, hare, woodcock, bear, white-tailed deer and various song birds; commercially for pulp and saw logs and for a wide range of forest recreation. Aspen occurs throughout the area. Accessible aspen has been consistently harvested over the last 40 years. There are 12,061 acres of aspen (Figure 4.15.3) that have site conditions that limit harvest (hard factor limit acres).

There are 1,910 acres of stands that have a final harvest pending and these acres are included in the regeneration prescription class.

Desired Future Condition

- Aspen-dominated forest communities will be maintained on operable sites through even-aged management with acres balanced between zero and 59 years of age to provide for regulated harvest, wildlife habitat and recreation opportunity.

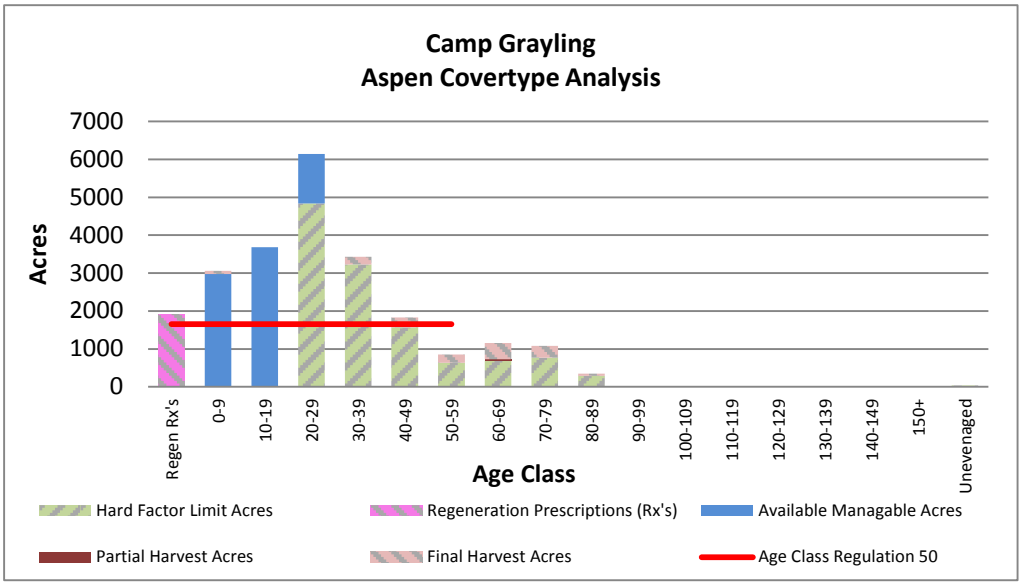

Figure 4.15.3. Age-class distribution for aspen in the Camp Grayling management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- There are very few acres available in the older age classes and the model does not project any harvests in the current planning period; and
- However, managers should consider harvesting stands below the rotation age to regenerate aspen.

Long-Term Management Objectives

- Continue management through regeneration harvests to balance the age-class distribution; and
- Desired future harvest levels are projected at 1,564 acres for final harvest per 10-year period.

4.15.1.3 Forest Cover Type Management – Jack Pine

Current Condition

Jack pine acres total 16,647 or 17% of the management area (Table 4.15.1) on PArVHa/PArVVb, PArVHa and PVCd/PArVHa habitat classes. Forest communities dominated primarily by jack pine in this management area are valued ecologically as sources of habitat for numerous species of wildlife including bear, white-tailed deer and various song birds;

commercially for pulp and saw logs and for a wide range of forest recreation. Accessible jack pine has been consistently harvested over the last 40 years. There are 8,197 acres of jack pine that have site conditions that limit harvest (hard factor limit acres). There are 657 acres that have a final harvest pending and these acres are included in the regeneration prescription class.

Desired Future Condition

- Jack pine-dominated forest communities will be maintained on operable sites through even-aged management with acres balanced between 0 and 69 years of age to provide for regulated harvest, wildlife habitat and recreational opportunity.

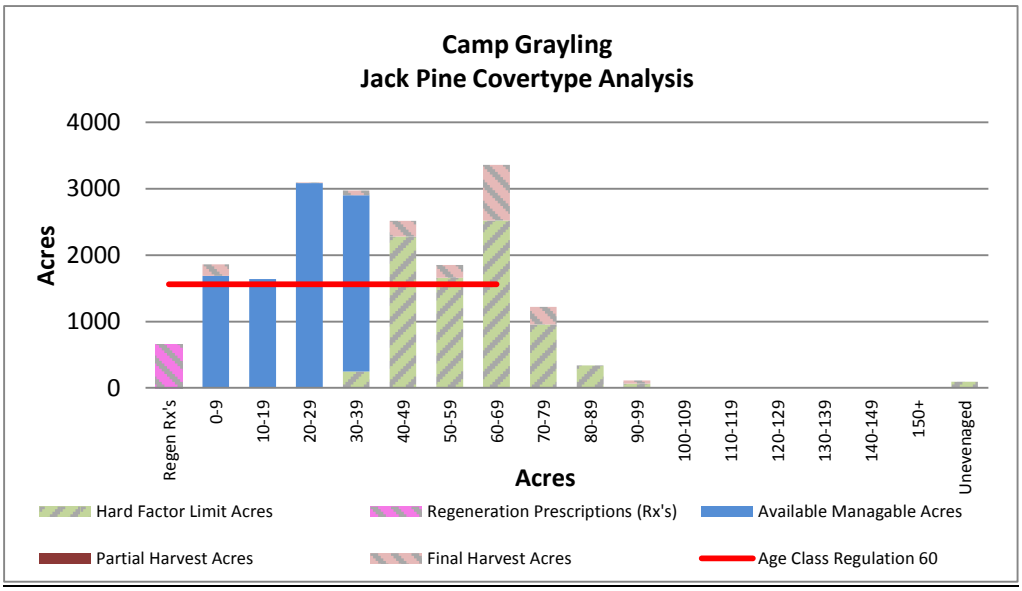

Figure 4.15.4. Age-class distribution for jack pine in the Camp Grayling management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- Throughout the management area, consideration should be given to fire implications as well as potential restrictions on military use before reestablishment of jack pine; and
- There are few acres available for management from the older age classes and the model has no acres projected for harvest in the current planning period. On military lands, management prescriptions are subject to military approval. Primary emphasis will be on natural regeneration as these areas are subject to future military use that could impact an investment in planting. The only areas to consider for planting would be where there are visual concerns or areas that are of low risk for future military training.

Long-Term Management Objectives

- Future management decisions should consider the potential impact of jack pine budworm on older jack pine stands; and
- Desired future harvest levels are projected at 1,436 acres for final harvest per 10-year period.

4.15.1.4 Forest Cover Type Management – Red Pine

Red pine acres total 5,023 or 5% of the management area (Table 4.15.1). The largest spikes are in the regeneration prescription class and 70-79 year age classes. Red pine in this management area is commercially valued for pulp, saw logs and utility poles. There are 1,526 acres of red pine that (Figure 4.15.5) have site conditions that limit harvest (hard factor limit acres).

There are 937 acres that have a final harvest pending and these acres are included in the regeneration prescription class. There are 798 acres with a partial harvest pending and these acres are included in their current age class. Figure 4.15.5 includes the projected number of acres converted to the cover type as a result of treatments and planting to red pine. These acres are included in the regeneration prescription class.

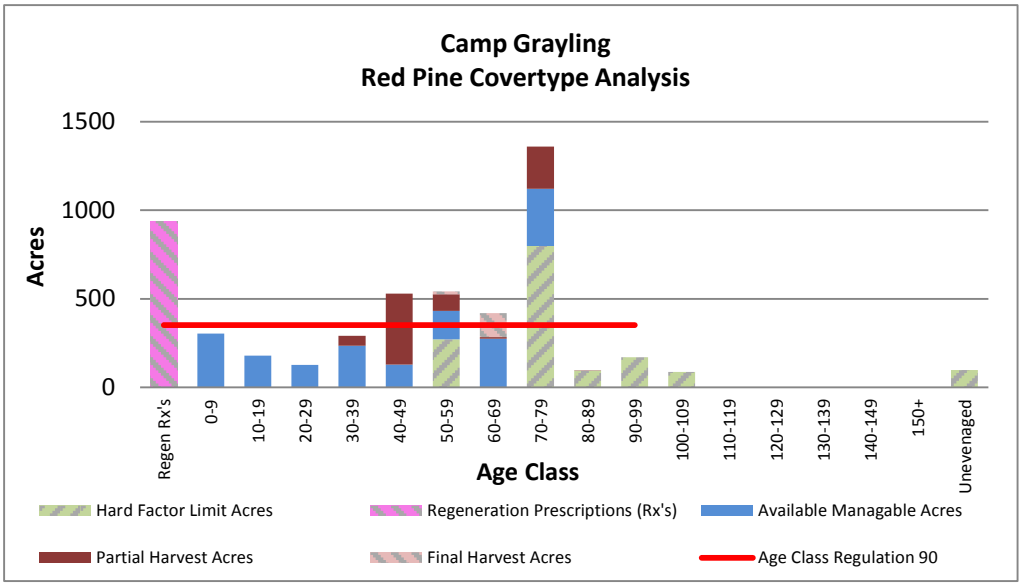

Figure 4.15.5. Age-class distribution for red pine in the Camp Grayling management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Red pine on dry-mesic sites (PArVVb/AFO and PArVVb) will be maintained and managed with a thinning regime until stand replacement harvest at economic maturity with acres balanced between 0 and 99 years of age to provide for continual harvest, wildlife habitat and recreational opportunity.

10-Year Management Objectives

- Throughout the management area, consideration should be given to potential management restrictions due to military use before reestablishment of red pine;
- Follow the Red Pine Management Guidelines, which recommends growing red pine on suitable sites and balancing the age-class distribution; and
- Conduct partial harvests on a projected 655 acres concentrating on stands of better-quality red pine that have the potential for a higher product value in larger size classes.

Long-Term Management Objectives

- Continue management of younger red pine stands with partial harvests with final harvests occurring near economic maturity (90 years). Primary emphasis will be on natural regeneration as these areas are subject to future military use that could impact an investment in planting; and
- Desired future harvest levels are projected at 350 acres for final harvest and 1,209 acres for partial harvest per 10-year period.

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

Current Condition

Upland open/semi-open acres total 16,145 acres or 16% of the management area (Table 4.15.1). This category is a combination of the following non-forested land cover types: herbaceous open land, upland shrub, low-density trees and bare/sparsely vegetated. These non-forested areas are a result of natural processes of fire, frost or other disturbances which create openings in the forest canopy along with the past management practices to maintain these areas. These communities are valued ecologically as sources of open land habitat for numerous species of wildlife.

Desired Future Condition

- Upland open/semi-open lands will be maintained at or above the current level to provide habitat for species which use openings. On military lands, management prescriptions to achieve these objectives are subject to military approval.

10-Year Management Objectives

- Continue management to maintain upland open/semi-open lands; and
- It is expected that jack pine and red pine areas will be converted to open lands as a result of military activities.

Long-Term Management Objectives

- Continue management to maintain upland open/semi-open lands; and
- Protect stands from illegal off-road vehicle use and invasive non-native species.

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

Current Condition

Lowland open/semi-open lands (lowland shrub, marsh, treed bog and bog) communities in this management area are valued ecologically as sources of habitat for numerous species of wildlife. Lowland open/semi-open acres total 1,862 acres or 2% of the management area (Table 4.15.1).

Desired Future Condition

- Lowland open/semi-open lands sites will be maintained at or above current levels to provide wildlife habitat. On military lands, management prescriptions to achieve these objectives are subject to military approval.

10-Year Management Objectives

- Management in lowland open/semi-open lands will be minimal. What little maintenance that will be done will be to maintain the hydrology and open characteristics with support of the military.

Long-Term Management Objectives

- Continue management to maintain upland open/semi-open lands at or above current level;
- Continue to protect stands from illegal off-road vehicle use; and
- Where feasible and necessary, use control methods on invasive non-native species.

4.15.1.5 Forest Cover Type Management – Other Types

Individual cover types which may cover less than 5% of the management area include: northern hardwood, 2,872 acres (3% of the management area), mixed upland deciduous, 2,311 acres (2%) and lowland conifers, 1,652 (2%). Other forest communities total approximately 5,304 acres (5%) and are spread across the management area. All of the timbered and non-timbered communities have important ecological values and are important habitat for numerous wildlife species.

Desired Future Condition

- These communities will be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest and to contribute to the preservation of regional biodiversity by providing habitat for a unique suite of plants and wide variety of animal species. On military lands, management prescriptions to achieve these objectives are subject to military approval.

10-Year Management Objectives

- Seek opportunities to harvest, where appropriate, the scattered acreages of upland and lowland minor types where access and operability will not adversely impact sensitive areas in cooperation with the military;

- The following species are projected for final harvests: mixed upland deciduous 206 acres, lowland conifers 18 acres, natural mixed pines 100 acres, upland mixed forest 71 acres, and white pine 98 acres;
- Additional opportunities to increase harvest prescriptions in lowland forest types will be assessed, both in and outside (due to forest health issue) of normal years of entry;
- Consider methods to ensure adequate regeneration of lowland types; and
- Partial harvests are projected for 959 acres of northern hardwood, 227 acres of mixed upland deciduous, 284 acres of natural mixed pines, 49 acres of upland mixed forest 184 acres of white pine and 30 acres of planted mixed pines.

Long-Term Management Objectives

- Continue management of other types to provide forest products, wildlife habitat and recreational opportunities; and
- Continue to seek opportunities to regenerate lowland types.

4.15.2 Featured Wildlife Species

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

The following have been identified as featured species for this management are during this cycle of state forest planning:

- American woodcock
- Eastern Massasauga
- Pileated woodpecker
- Red-headed woodpecker
- Ruffed grouse
- Snowshoe hare
- Wild turkey
- White-tailed deer

The primary focus of wildlife habitat management in the Camp Grayling management area will be to address the habitat requirements identified for the listed featured species. Based on the selected featured species, some of the most significant wildlife management issues in the management area are the maintenance of young forest and large open grassland complexes, the retention of large, over-mature trees and snags and the maintenance and expansion of hard mast and mesic conifer components.

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

American Woodcock

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

Wildlife Habitat Specifications:

- Maintain the aspen cover type and the aspen component in mixed stands within the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this American woodcock habitat specification.
- Move to balance the age-class distribution of aspen and continue management to regenerate oak to maintain young forests across the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this American woodcock habitat specification.
- Identify commercial and non-commercial treatment opportunities in aspen and alder stands associated with non-high priority trout stream riparian zones or forested wetlands.

Eastern Massasauga Rattlesnake

The goal for eastern massasauga rattlesnake in the management area is to maintain available habitat and provide for the long-term persistence of the rattlesnake population. Eastern massasauga rattlesnakes inhabit open wetlands for over-wintering as well as adjacent upland open cover types that support gestation and parturition. Populations in northern Michigan will often use lowland coniferous forests, such as cedar swamps, as well as open wetlands. Upland sites may range from forest openings to old fields, agricultural lands and prairies. State forest management for the species should focus on maintaining suitable habitat on dedicated managed lands in accordance with the approved Candidate Conservation Agreement with Assurances. As of August 2013, the Candidate Conservation Agreement is in the initial stages of approval and as a result is subject to change. Refer to approved Candidate Conservation Agreement for final managed land boundaries and habitat management guidelines. Approximately 6,300 acres of state forest land in the Rattlesnake Hills management area are proposed for designated as eastern massasauga rattlesnake managed lands per the raft Candidate Conservation Agreement.

Wildlife Habitat Specifications:

- At occupied sites maintain ≤50% canopy from trees and shrubs in wetland and upland vegetation types, maintain patches of suitable habitat at greater than 250 acres, restrict mowing and burning to November to March when eastern massasauga rattlesnake are in hibernation, and refrain from manipulating water levels between November and March at sites where eastern massasauga rattlesnake are known to occur.
    - Implementation of eastern massasauga rattlesnake Candidate Conservation Agreement in appropriate management areas will be sufficient to meet eastern massasauga rattlesnake wildlife habitat specifications in this management area.

Pileated Woodpecker

The goal for pileated woodpecker in the northern Lower Peninsula is to maintain available habitat. Pileated woodpeckers prefer stands greater than 40 years old for foraging and greater than 70 years old for nesting and roosting and abundance is positively related to the density of trees greater than12 inches in diameter at breast height. State forest management should focus on the maintenance of a component of large diameter trees (greater than12 inches in diameter at breast height) at the landscape scale.

Wildlife Habitat Specifications:

- Maintain a component of large diameter trees greater than 12 inches in diameter at breast height.
    - Implementation of Within-Stand Retention Guidance, factor-limited acres, uneven-aged management in the northern hardwoods type, special conservation areas with objectives for big tree management and continued mortality from insect and disease will be sufficient to meet the pileated woodpecker habitat specifications for large trees in this management area.

Red-headed Woodpecker

The goal for red-headed woodpecker in the northern Lower Peninsula is to maintain or increase available habitat. Red-headed woodpecker are limited by the availability of snags for nesting, roosting and feeding and prefer areas with groupings of snags caused by beaver girdling, flooding, fire, disease or insect outbreaks. Preferred sites are greater than five acres in size with a savannah-like dispersion of large trees (<50% canopy cover) with open understory and include tall trees or snags of large (greater than 12 inches) diameter at breast height. State forest management for the species should focus on the maintenance of snags in timber sales and salvage in priority landscapes.

Wildlife Habitat Specifications:

- Retain patches of dead wood left by beaver floodings, fire, disease and insect outbreaks by minimizing salvage cuts within the management area with preference for snags greater than12 inches in diameter at breast height.
    - Implementation of beaver wildlife habitat specifications, Within-Stand Retention Guidance, factor-limited acres and continued mortality from insect and disease will be sufficient to meet the red-headed woodpecker habitat specifications for snags in this management area.

Ruffed Grouse

The goal for grouse in the northern Lower Peninsula is maintain available habitat. Ruffed grouse prefer young (6-15 year-old), even-aged deciduous stands that typically support 8,000-10,000 woody stems/acre. Although ruffed grouse use many different forest types (aspen, birch, oak-hickory), aspen can support higher densities than those attained in other forest types. The juxtaposition of different age classes allows for different life history requirements to be met within a small area and promotes higher grouse densities. Ideal aspen stands will be of 40-160 acres under a 40-year rotation with staggered harvests of 25% every 10 years in 10-40-acre harvest units. Larger harvest units should have irregular boundaries and include one or two, 1:3 acre unharvested inclusions. State forest management should focus on maintaining and balancing the age-class distribution for aspen and oak cover types in priority landscapes.

Wildlife Habitat Specifications:

- Maintain the aspen cover type and the aspen component in mixed stands within the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this ruffed grouse habitat specification.
- Move to balance the age-class distribution of aspen and continue management to regenerate oak to maintain young forests across the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen, lowland deciduous and oak will be sufficient to meet this ruffed grouse habitat specification.
- Maintain the upland shrub cover type specifically juneberry, hawthorn, cherry and other mast producing shrub components.
  - Implementation of 10-year management direction for upland brush will be sufficient to meet this grouse habitat specification.

Snowshoe Hare

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

Wildlife Habitat Specifications:

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

Wild Turkey

The goal for turkey in the northern Lower Peninsula is maintain available habitat. In northern Lower Peninsula, snow depth is the primary limiting factor that restricts turkey population expansion as deep snow limits access to winter food. The availability of acorns can help mediate the impacts of deep snow. A secondary limiting factor throughout their range is good brood cover. Openings with grasses and forbs and little or no overstory trees are preferred. State forest management should focus on providing natural winter food, maintaining and regenerating oak, and maintaining brood-rearing openings to improve brood-production and winter survival.

Wildlife Habitat Specifications:

- Maintain and increase the number of brood-rearing openings (forest openings, savannas, barrens, hayfields, etc.).
  - Implementation of 10-year management direction for upland open land will be sufficient to meet this turkey habitat specification.

- Through opening maintenance, planting and pruning, provide sources of winter food that are accessible above the snow (food plots, annual grains, fruit-bearing trees or shrubs).
  - Implementation of 10-year management direction for upland open land will be sufficient to meet this turkey habitat specification.
- Conduct silvicultural practices that conserve the oak component in forest stands and promote oak regeneration.
  - Implementation of 10-year management direction for oak will be sufficient to meet this turkey habitat specification.

White-tailed Deer

The goals for white-tailed deer habitat in the northern Lower Peninsula are to: 1) Maintain spring and summer forage and improve recreational access through openings management; 2) Maintain the overall proportion of potential woody browse such as aspen; 3) Maintain or increase the oak component in forest stands and promote oak regeneration; and 4) Maintain and promote functional shelter in wintering complexes.

Wildlife Habitat Specifications:

- Annual manage at least 3,000 acres of forest openings across the ecoregion to provide spring and summer forage and recreational opportunities.
  - Implementation of 10-year management direction for upland open land and upland shrub will be sufficient to meet this deer habitat specification.
- Maintain the aspen cover type and the aspen component in mixed stands within the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this deer habitat specification.
- Move to balance the age-class distribution of aspen and continue management to regenerate oak to maintain young forests across the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen, lowland deciduous and oak will be sufficient to meet this deer habitat specification.
- Conduct silvicultural practices that conserve the oak component in forest stands and promote oak regeneration.
  - Implementation of 10-year management direction for oak will be sufficient to meet this deer habitat specification.
- Manage cedar and hemlock with the main objectives of regeneration and providing future functional cover.
  - Implementation of 10-year management direction for cedar and lowland conifer will be sufficient to meet this deer habitat specification.
- Promote hemlock on appropriate sites using silviculture to increase within-stand hemlock components.

4.15.3 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 or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed seventeen listed species as well as five natural communities of note occurring in the management area as listed in Table 4.15.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

As shown in Figure 4.15.6, there are three special conservation areas. These are the Camp Grayling military area, the Hanson Hills recreation area (3500 acres) and the Camp Grayling Pine Barrens special resource area (5100 acres).

The Upper Manistee River and its tributaries have been identified as a natural river and along with its corridor are also designated as a high conservation value area as shown in Figure 4.15.6.

Table 4.15.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Camp Grayling 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								
Bog		S4/G3G5	Confirmed				Lowland open/semi-open	N/A
Dry northern forest		S3/G3?	Confirmed				Jack Pine, Red Pine	Late
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
Wet-mesic sand prairie		S2/G2G3	Confirmed				Lowland open/semi-open	N/A
Birds								
Red-shouldered hawk	*Buteo lineatus*	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
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
Insect								
Red-legged spittlebug	*Prosapia ignipectus*	SC/G4/S2S3	Confirmed	EV	Moderate	Alvar	Upland open/semi-open	N/A
						Prairie fen	Upland open/semi-open	N/A
						Pine barrens	Jack Pine	Early
						Mesic sand prairie	Upland open/semi-open	N/A
Secretive locust	*Appalachia arcane*	SC/S2S3/G2G3	Confirmed	MV	Very High	Bog	Lowland open/semi-open	N/A
						Pine barrens	Jack Pine	Early
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Intermittent wetland	Lowland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late
Butterfly								
Dusted skipper	*Atrytonopsis hianna*	Sc/G4G5/S2S3	Confirmed	MV	Low	Dry sand prairie	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Dry-mesic prairie	Upland open/semi-open	N/A
						Oak-pine barrens	Oak	Mid
						Pine barrens	Jack Pine	Early
Reptile								
Blanding's turtle	*Emydoidea blandingii*	SC/G4/S3	Confirmed	HV	Very High	Mesic prairie	Upland open/semi-open	N/A
						Dry-mesic prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Northern fen	Lowland open/semi-open	N/A
						Submergent marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Great Lakes marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Southern hardwood swamp		
						Floodplain forest	Lowland mixed	Mid
						Inundated shrub swamp	Lowland open/semi-open	N/A
Eastern Massassauga rattlesnake	*Sistrurus catenatus catenatus*	C/SC/G3G4T3T4Q/S3S4	Confirmed	HV	High	Coastal fen	Lowland open/semi-open	N/A
						Dry-mesic prairie	Upland open/semi-open	N/A
						Dry sand prairie	Upland open/semi-open	N/A
						Poor conifer swamp	Tamarack	Late
						Bog	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Intermittent wetland	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland mixed	Mid
						Northern shrub thicket	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Dry northern forest	Jack Pine, Red Pine	Early
						Oak-pine barrens	Oak	Mid
						Pine barrens	Jack Pine	Early
						Mesic prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
Plants								
Pale Agoseris	*Agoseris glauca*	T/G5/S2	Confirmed			Pine barrens	Jack Pine	Early
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry sand prairie	Upland open/semi-open	N/A
Hill's thistle	*Cirsium hillii*	SC/G3/S3	Confirmed			Alvar	Upland open/semi-open	N/A
						Oak-pine barrens	Oak	Mid
						Pine barrens	Jack Pine	Early
						Boreal forest	Upland open/semi-open	N/A
						Dry northern forest	Upland open/semi-open	N/A
						Dry sand prairie	Upland open/semi-open	N/A
						Dry-mesic northern forest	Upland open/semi-open	N/A
						Dry-mesic prairie	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Open dunes	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.

Table 4.15.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Camp Grayling management area (Continued).

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
Plants (Cont'd)								
False violet	*Dalibarda repens*	T/G5/S1S2	Confirmed			Dry-mesic northern forest	White Pine	Late
						Mesic northern forest	Northern Hardwood	Late
Rough fescue	*Festuca scabrella*	T/G5/S2S3	Confirmed			Oak-pine barrens	Oak	Mid
						Pine barrens	Jack Pine	Early
Vasey's rush	*Juncus vaseyi*	T/G5?/S1S2	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
Canada rice grass	*Oryzopsis canadensis*	T/G5/S2	Confirmed			Pine barrens	Jack Pine	Early
Allegheny plum	*Prunus alligahaiensis davisii*	SC/G4T3Q/S3	Confirmed			Dry sand prairie	Upland open/semi-open	N/A
						Oak-pine barrens	Oak	Mid
						Pine barrens	Jack Pine	Early
Houghton's goldenrod	*Solidago houghtonii*	LT/T/G3/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
Prairie dropseed	*Sporobolus heterolepis*	SC/G5/S3	Confirmed			Alvar	Upland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
Fleshy stitchwort	*Stellaria crassifolia*	E/G5/S1	Confirmed			Rich conifer swamp	Tamarack	Late
						Northern shrub thicket	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.

There are also four ecological reference areas (Figure 4.15.6) that are partially or mostly on state land. The ecological reference areas represent the following natural communities: poor fen (14.0 acres), two intermittent wetlands (237.11 acres and 17.16 acres) and bog (42.08 acres). These ecological reference areas will be managed to enhance and protect their natural vegetative and associated wildlife communities as directed by an ecological reference area-specific management plan. These individual management plans will be developed over the life of this planning period.

Management goals during this planning period:

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

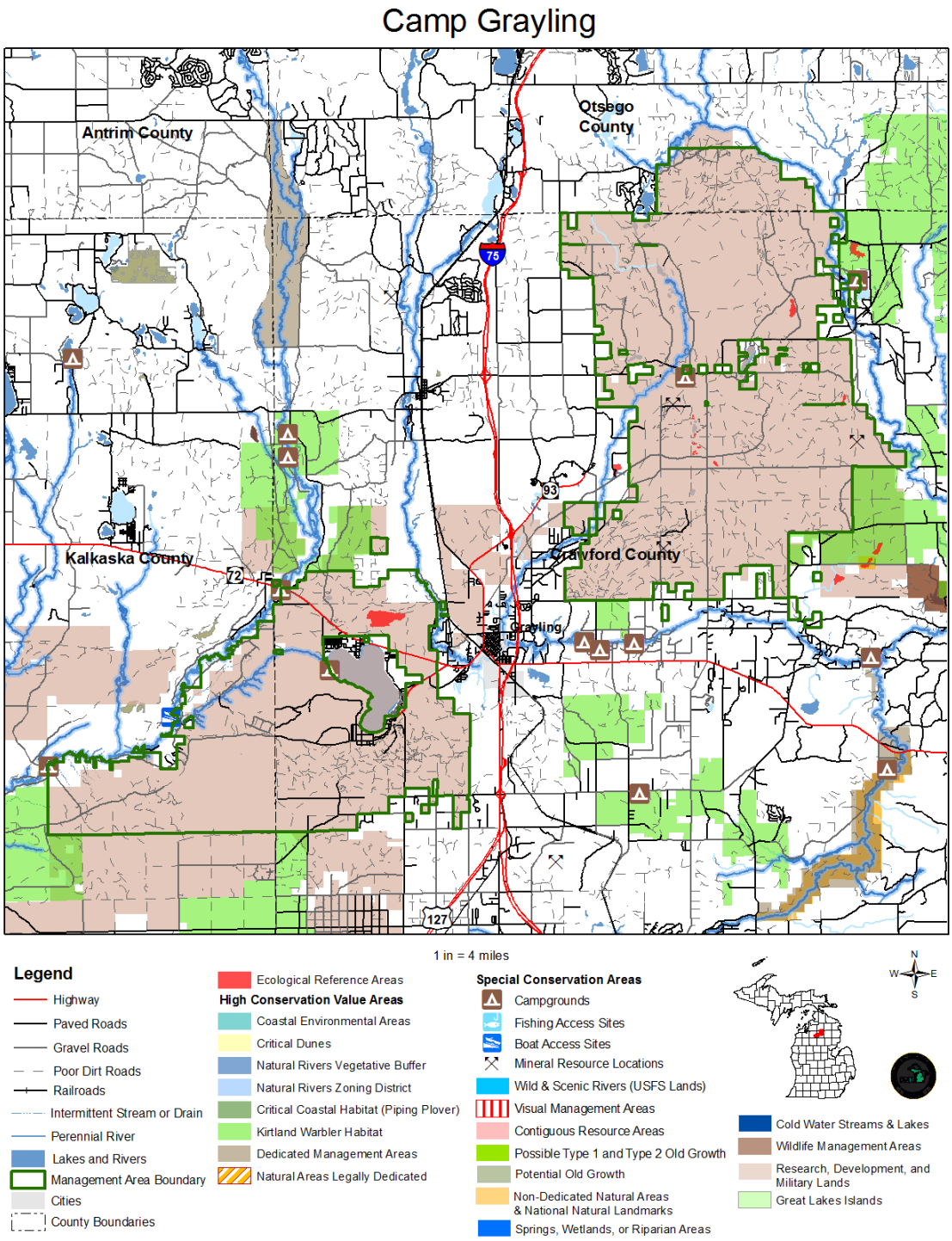

Figure 4.15.6. A map of the Camp Grayling management area showing the special resource areas.

4.15.4 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. It has been noted that there is a high risk of oak wilt in the management area due to the age and condition of the oak resource. Some of the more important forest health pests in this management area include oak decline and branch mortality of seedling and sapling white pine and management should be adapted as follows:

- Oak decline is most prevalent on frost-prone, nutrient poor outwash plains. Old age and drought predispose areas to two-lined chestnut borer and *Armillaria* root rot. Shorter rotations will reduce risk of decline.

- Monitor for branch mortality of seedling and sapling white pine along and adjacent to river corridors. Causal agent(s) responsible for this problem may include pine spittlebug feeding and various fungal pathogens.
- Until management guidelines can be developed, continue reporting incidence of this problem to the forest health specialist (Form 4029-3).

Invasive Species

Invasive species pose a major threat to forest resources. They impact timber production, wildlife habitat and recreational access. Locations of invasive species mapped in and within a five-mile buffer of the management area are summarized in the Table 4.15.3. This information was compiled from the Midwest Invasive Species Information Network database, but it should not be considered complete. Local staff have noted additional invasive species that are not on this list, and the Camp Grayling Environmental Office assists with funding, monitoring and treatment of invasive species as well as forest health issues. This information and other sources that show the extent and location of invasives will be used to inform the potential for additional sightings that should be documented. Invasives that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.15.3. Locations of invasive species mapped in and within a five-mile buffer of the management area (Midwest Invasive Species Information Network database).

Camp Grayling - FMD MA	Cases within FMD Areas	Cases within 5-Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	1	1	1

Invasive Species within FMD Areas	Occurrences	Invasive Species within 5-Mile Buffer	Occurrences
-	-	Common Buckthorn *Rhamnus cathartica*	1

4.15.5 Aquatic Resources

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

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

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Designated high priority trout streams for this management area are shown in Figure 4.15.1 and listed in Appendix F.

4.15.6 Fire Management

This area is a high risk for wildfire due to the timber types being dominated by jack pine, well-drained soils and a high incidence of ignition. Disturbance through fire has played an important role in the initial propagation and maintenance of oak and natural oak/pine types and small inclusions of aspen or grass/upland brush types.

The Michigan DNR has a prescribed fire program and maintains a well-trained staff to conduct prescribed burns for silviculture, habitat maintenance or habitat restoration. Each year, all burns prescribed on state forests, parks and wildlife game lands are evaluated and ranked, with funding allocated to the highest priority burns. The ability to fund prescribed burns is based on available funding, the total acres prescribed for burning and the prioritized ranking of individual burns. The demand for prescribed burning money frequently exceeds the amount of funding and some recommended burns may not be funded for that fiscal year. Once funded, the ability to implement a burn is dependant on suitable prescribed burning weather, a suitable fuel (vegetation) condition, local staffing and other resources.

The following fire management concepts should be applied in the management area:

- When feasible, reintroduce fire in the oak/pine areas to encourage pine and oak regeneration and to discourage competition;
- When feasible, incorporate fire as a tool to restore or maintain managed openings; and
- Develop a comprehensive fire break program to minimize the risk of fire spread in areas of high-potential ignition (e.g., military ranges).

4.15.7 Public Access and Recreation

Access is limited in this management area due to permanent closures of Camp Grayling ranges and seasonally on other lands that are used for training and military maneuvers by Camp Grayling. Where access is limited on state forest land, the DNR will continue to seek access across adjacent private property. In accordance with the DNR's *Sustainable Soil and Water Quality Practices on Forest Land*, upon completion of harvesting, temporary spur and seasonal roads will be closed and stabilized.

Campgrounds (Figure 4.15.6)

- Jones Lake State Forest Campground
- CCC Bridge State Forest Campground
- Manistee River Bridge State Forest Campground
- Lake Margrethe State Forest Campground
- Shupac Lake State Forest Campground

Boating Access Sites (BSAs) (Figure 4.15.6)

- Jones Lake BAS
- Shupac Lake BAS
- Guthrie Lake BAS
- Section One Lake BAS
- KP Lake BAS
- Camp Grayling BAS (Not open to the public, located within Cantonment).
- CCC Bridge BAS
- Lake Margrethe BAS

Off-Road Vehicle Trails (Figure 4.15.1)

- Frederic Route
- Kalkaska Route

Snowmobile Trails (Figure 4.15.1)

- Various

Non-Motorized Trails (Figure 4.15.1)

- Hanson Hills Recreation Area XC Ski and Mountain Bike trails.

Development, expansion or any change to recreational trails and facilities will require military approval including Military Board and Hanson Grant lands. Recreational activities on leased lands are managed by Parks and Recreation Division and Forest Resources Division staff.

Although managing of most recreational opportunities is the primary responsibility of Parks and Recreation Division, timber management activities may impact the quality of recreational opportunities and management modifications will be considered to minimize these impacts.

Management modifications that may minimize possible recreational trail and other infrastructure impacts are agreed upon by recreation staff in Parks and Recreation Division, military staff and Forest Resources Division staff through the compartment review process. Public input received through meetings, including the compartment review process and other forums, will also be considered. Trail protection specifications can be applied through the vegetative management

system in the design and administration of timber management activities. Guidance for within-stand retention may also be used along trails to minimize impacts which may include modifications to management such as maintaining conifers to shade winter snow trails or retaining trees along single-track of-road vehicle trails to maintain the integrity of narrow trails. Where modifications to management may not be compatible with timber management objectives, opportunities to educate the public on the department's timber management policies may be considered. Specifications and guidance for management around trails may include, but is not limited to: vegetative management system Sections 5.2.39, 5.2.40, 5.2.41 and 5.2.42 and the Department of Natural Resources Within Stand Retention Guidance.

4.15.8 Oil, Gas and Mineral Development

Surface sediments consist of glacial outwash sand and gravel and postglacial alluvium and ice-contact outwash sand and gravel. The glacial drift thickness varies between 200 and 1,000 feet. Sand and gravel pits are located in this management area and there is good potential for additional pits. The Department of Military and Veterans Affairs has two sand and gravel leases within the management area.

The Mississippian Michigan Formation, Marshall Sandstone and Coldwater Shale subcrop below the glacial drift. The Mississippian Michigan is quarried for gypsum and the Marshall was previously used as a building stone elsewhere in the state.

Generally, lands owned by the Department of Military and Veterans Affairs or under long-term lease to the military for training are classified as non-leasable for oil and gas development. The northern part of this management area has been developed for gas production from the Antrim Shale. Well spacing is currently 80 acres and most of the area of Antrim potential has already been drilled. Along the south edge of the management area, the Devonian Richfield and Detroit River Formations are producing oil on 40-acre spacing and the deeper Prairie du Chien producing gas on 320 to 640 acre units. Surface use in the management area is not allowed by the Department of Military and Veterans Affairs, but an agreement does allow for directional drilling under a one-mile border. The Collingwood Formation may also have oil and gas potential in this area and probably will have a well spacing of 320 to 640 acres per well (or possibly larger). Only portions of the management area, primarily within the one mile border area are leased. If drilling for the Collingwood Formation is sucessful a wider border may be requested.

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

Administration of oil and gas development on state forest land is provided by both the DNR and Department of Environmental Quality to ensure that minerals shall be developed in an orderly manner to optimize revenue consistent with other public interest and natural resource values.

Lease classification of state lands is guided by DNR Oil and Gas Lease Classification Procedure No. 27.23-15. Contained within each DNR Oil and Gas Lease Agreement are environmental terms which detail requirements for permits to drill issued by the Department of Environmental Quality, supervisor of wells pursuant to Part 615 of 1994 PA 451, as amended. No operations are to take place in a wetland (as defined in Part 303 of 1994 PA 451, as amended), habitat critical to the survival of an endangered species and designated under provisions of Part 365 of 1994 PA 451, as amended or a site designated by the secretary of state to be of historical or archeological significance, unless a plan to eliminate negative impacts to archeological or historical resources is agreed upon. Areas identified as having special wildlife, environmental, recreational significance and/or state surface require a development plan which will minimize negative impacts and will minimize surface waste while remaining consistent with the spacing requirements established by the supervisor of wells. All pipelines from the well site are required to follow existing well roads or utility corridors and all pipelines are to be buried below plow depth. Forest operations (including harvest and planting trees, prescribed fire, and wildfire response) in the management area may require modification to accommodate the presence of pre-existing oil and gas pipelines located at or near the ground surface. Abandoned well sites should be incorporated back into state forest stands as either forest openings or re-forested areas, as determined by the vegetation plan contained in the lease agreement or as subsequently decided in compartment review.