4.29 MA 29 – Lake County Outwash Management Area

Summary of Use and Management

Vegetation management in the Lake County Outwash management area (MA) (Figure 4.29.1) will provide forest products; maintain or enhance wildlife habitat; protect areas of unique threatened, endangered and special concern species; and provide for forest-based recreational uses. Timber management for this 10-year planning period will focus on harvesting older jack pine and balancing the age-class distribution of aspen. Wildlife habitat management objectives include perpetuating early-successional communities for species adapted to young forests for hunting and other wildlife-related recreation; maintaining soft and hard mast sources including oak; and preserving related recreational opportunity.

Expected trends within this 10-year planning period are the need to minimize jack pine budworm damage by reducing the amount of more susceptible older jack pine; the need to regenerate oak and red pine; the need to target some accessible aspen in older age-classes for harvest; and increased recreational pressure.

Introduction

The Lake County Outwash management area contains 38,787 acres of state forest land and is located in Central Lake County just west of the town of Luther, Michigan and northeast of Baldwin. Primary attributes which identify the Lake County Outwash management area include:

- A predominance of outwash plains which accounts for 80% of the landforms.
- The management area falls almost entirely within the Newaygo Outwash Plain sub-region (Albert, 1995).
- Due to the proximity of this management area to more populated areas of Southern Michigan and the popularity of this area for dispersed recreation and the quantity and availability of wood fiber the forest resources contribute significant social and economic values to the area.
- The Baldwin River, South Branch of Cole Creek and the North Branch of Cole Creek originate in the management area and are tributaries of the Pere Marquette River, a designated natural river.
- The Baldwin-Luther Swamp covers a large portion of the management area.
- In addition to dispersed recreation in the form of hunting and mushroom picking, the Pine Forest Pathway and Little Manistee Route which are used for off-road vehicles and snowmobiles as well as the Bray Creek, Leverentz Lake Rustic and Carrieville Campgrounds which are located in the management area.
- Surveys have located rare, threatened, or species of special concern including eastern massasauga rattlesnake, dusted skipper, common loon, a great blue heron colony, wood turtle, eastern box turtle and the Great Plains spittlebug.

Currently, jack pine, oak, swamp hardwoods and aspen cover the majority of the area. The predominant cover types and acreages in the management area are shown in Table 4.29.1. Relative to other cover types in the management area, the jack pine areas have historically been impacted by frequent fire.

The current predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.29.1.

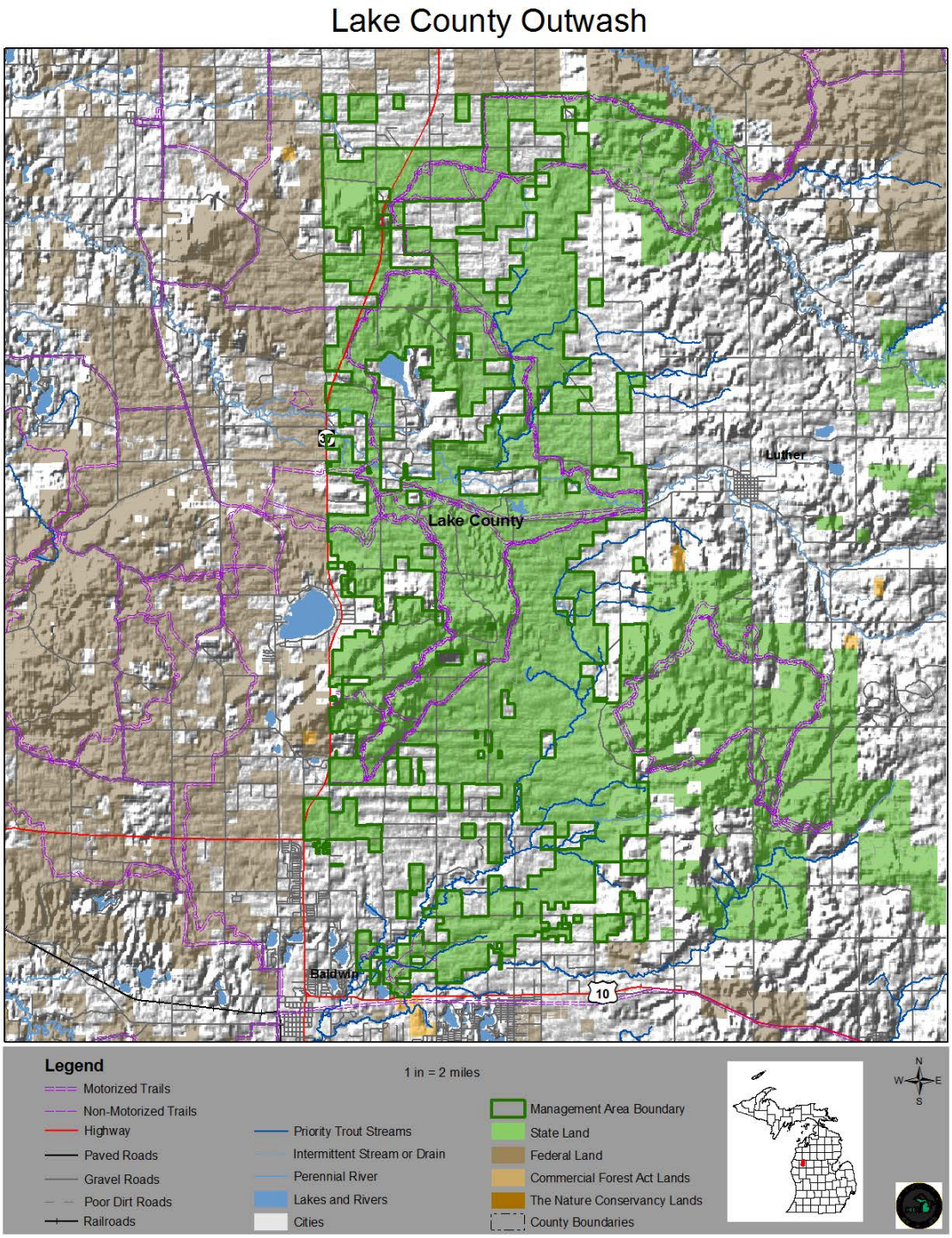

Figure 4.29.1. Location of the Lake County Outwash management area (dark green boundary) in relation to surrounding state forest and other lands in Lake County, MI.

Table 4.29.1. Current cover types, acreages, projected harvests and projected acreages at the end of this ten-year planning period for the Lake County Outwash 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	22%	8,554	1,167	7,387	651	1,541	8,554	821	1,541
Jack Pine	22%	8,406	155	8251			8,406	1,179	
Aspen	11%	4,102	30	4072	1,055		4,102	679	
Lowland Deciduous	9%	3,389	515	2874	319		3,389	319	
Mixed Upland Deciduous	5%	1,830		1830	97	446	1,830	261	446
Lowland Conifers	4%	1,687	2	1685	187		1,687	187	
White Pine	4%	1,425	32	1393	62	486	1,425	127	486
Red Pine	4%	1,374		1374	337	660	1,374	153	660
Natural Mixed Pines	3%	1,147		1147		221	1,147	104	221
Upland Open/Semi-Open Lands	3%	1,294		1294			1,294		
Lowland Open/Semi-Open Lands	8%	2,925		2925			2,925		
Misc Other (Water, Local, Urban)	0%	100	0	100			100		
Others	7%	2,554	55	2499	639	307	2,554	241	317
Total		38,787	1,956	36,831	3,347	3,661	38,787	4,071	3,671

4.29.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of **Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives** for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting 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.

4.29.1.1 Forest Cover Type Management – Oak

Current Condition

Oak acres total 8,554 or 22% of the management area (Table 4.29.1) on PArVHA and PArVVb habitat classification sites. Although oak is evenly distributed across most age classes, there are very few acres in the 10-69 year-old age classes. There are 1,167 acres of oak that have met harvest criteria (Figure 4.29.2), but have site conditions that limit harvest (hard factor limit acres). There are 1,319 acres that have regeneration harvest pending and these acres are included in the regeneration prescription class.

There are 166 acres with a partial harvest pending and these acres are included in their current age-class. The graph includes the projected number of acres converted to oak as a result of treatments that remove an overstory species resulting in the release of oak. These acres are included in the regeneration prescription class.

Desired Future Condition

- Oak dominated stands will be located on suitable sites through even- and uneven-aged management, while providing for sustainable harvest, wildlife habitat and recreation opportunity.

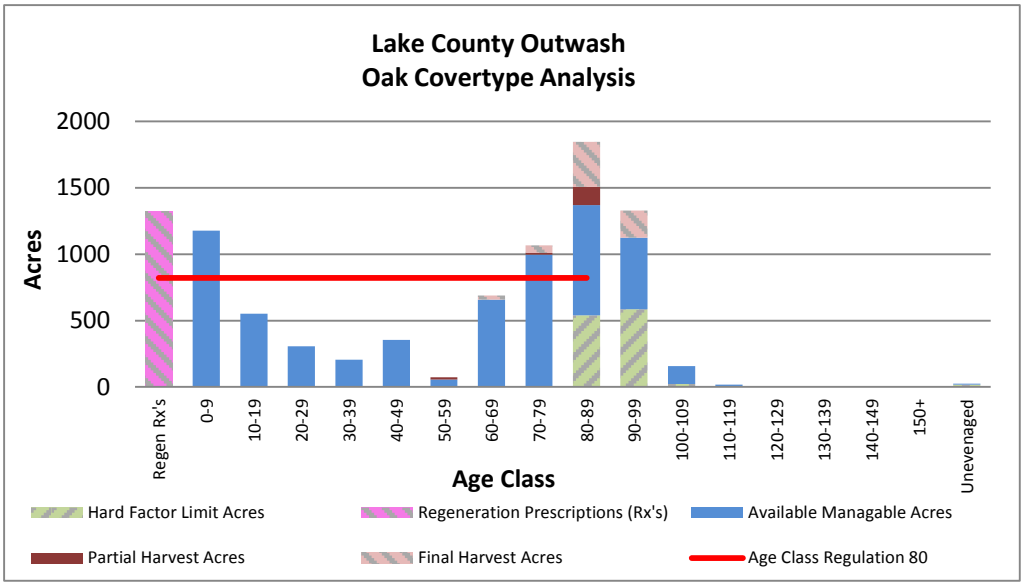

Figure 4.29.2. Age-class distribution for oak in the Lake County Outwash management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- Conduct partial harvests on a projected 1,541 acres concentrating on stands that have not been previously harvested or those stands that have a sufficient basal area for a partial harvest;
- Conduct regeneration harvests on a projected 651 acres to begin balancing the age-class distribution; and
- Maintain or expand oak as a component in stands throughout the management area through retention and management for natural regeneration on other cover types.

Long-Term Management Objectives

- Continue to aggressively regenerate oak as the predominant species in selected stands through restarting harvests;
- It is acceptable that some oak stands may become mixed stands through partial removal of an oak over story, planting pine in oak stands or through natural regeneration of other species;
- Continue to seek opportunities to maintain or expand oak as a component of stands throughout the management area; and
- A desired future harvest level is projected at 821 acres for final harvest and 1,541 acres for partial harvest per 10-year period.

4.29.1.2 Forest Cover Type Management – Jack Pine

Current Condition

Jack pine acres total 8,406 or 22% of the management area (Table 4.29.1) on ridges and outwash areas (habitat classes: PVCd, PArVHA and PArVVb). With the exception of a large spike in acres in the age classes from 10-19 years of age, jack pine age classes are well balanced. There are 74 acres of jack pine that have met harvest criteria (Figure 4.29.3), but have site conditions that limit harvest (hard factor limit acres).

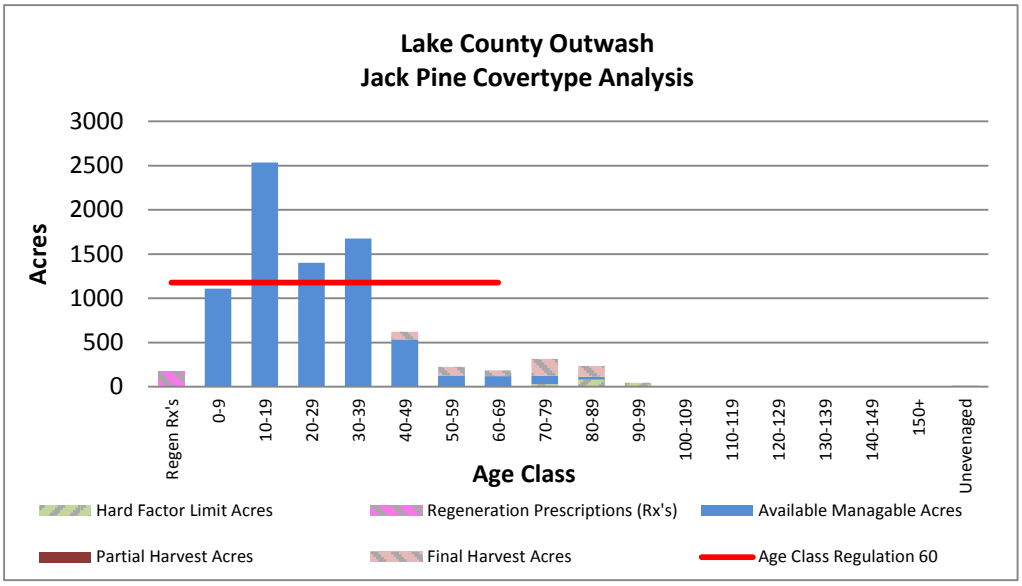

Figure 4.29.3. Age-class distribution for jack pine in the Lake County Outwash management area (2012 Department of Natural Resources inventory data).

There are 172 acres that have regeneration harvest pending and these acres are included in the regeneration prescription class. The graph includes the projected number of acres converted to the cover type as a result of treatments that remove an overstory and planting jack pine. These acres are included in the regeneration prescription class.

Desired Future Condition

- Jack pine will be evenly distributed in age-classes between 0-69 years on suitable sites; and
- Jack pine will be managed to minimize mortality due to jack pine budworm and the associated wildfire risks due to an increase in fuel loads.

10-Year Management Objectives

- There are no projected harvests in this 10-year planning period; and
- Where necessary and feasible, consider harvesting stands below the rotation age to expedite balancing of age-class distributions.

Long-Term Management Objectives

- Continue management of jack pine on appropriate sites with an emphasis on reducing over mature stands to minimize losses from jack pine budworm and associated fire risks due to increased fuel loads;
- As the age classes currently in the 0-9 and 10-19 year age classes reach rotation age, these acres will be harvested with the younger age classes to help fill the current shortage in the regeneration prescription class; and
- A desired future harvest level is projected at 1,179 acres for final harvest per 10-year period.

4.29.1.3 Forest Cover Type Management – Aspen

Current Condition

Aspen acres total 4,102 or 11% of the management area (Table 4.29.1). Aspen is distributed throughout the management area including the ridges and outwash areas on habitat class PArVHa, PArVVb and AFO sites.

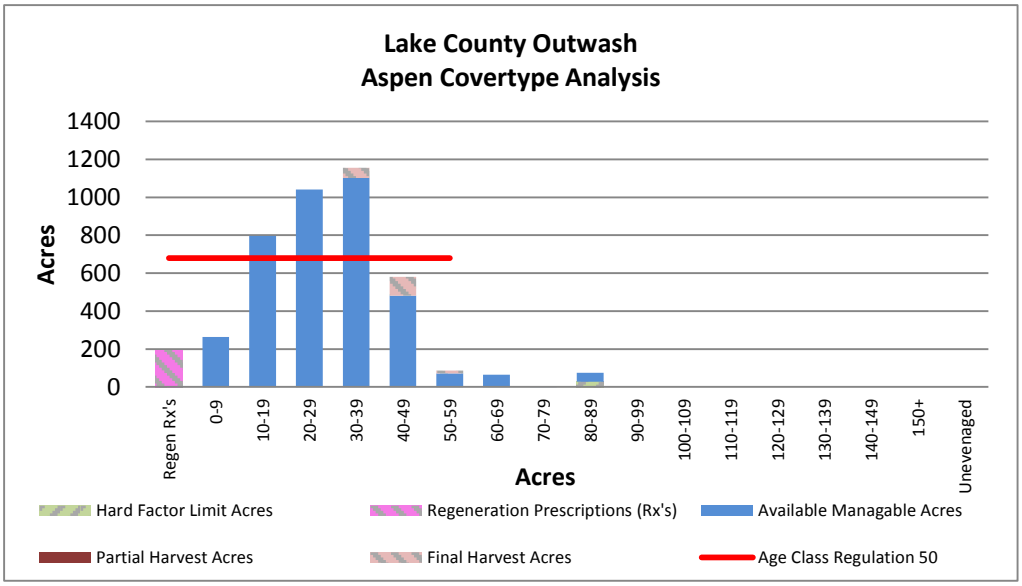

Figure 4.29.4. Age-class distribution for aspen in the Lake County Outwash management area (2012 Department of Natural Resources inventory data).

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. There are 30 acres of aspen that have met harvest criteria (Figure 4.29.4), but have site conditions that limit harvest (hard factor limit acres). There are 192 acres of stands that have regeneration harvest pending and these acres are included in the regeneration prescription class.

Desired Future Condition

- Aspen will be located on suitable sites with acres balanced within the 0-59 year age-class rotation; and
- Aspen acres will be maintained on currently operable sites to provide early successional habitat for species viability, recreation and a sustainable level of wood fiber.

10-Year Management Objectives

- Conduct stand regeneration harvests on a projected 1,055 acres;
- Concentrate harvests on the oldest age classes above 60 years of age first; and
- Where necessary and feasible, consider harvesting stands below the rotation age to expedite the balancing of age-class distributions.

Long-Term Management Objectives

- Continue work through restarting harvests to achieve a balanced age-class structure; and
- A desired future harvest level is projected at 679 acres for final harvest per 10-year period.

4.29.1.4 Forest Cover Type Management – Lowland Deciduous

Current Condition

Lowland deciduous acres total 3,389 or 12% of the management area (Table 4.29.1) and are predominantly located in the Baldwin-Luther Swamp. There are 515 acres of lowland deciduous have met harvest criteria (Figure 4.29.5), but have site conditions that limit harvest (hard factor limit acres).

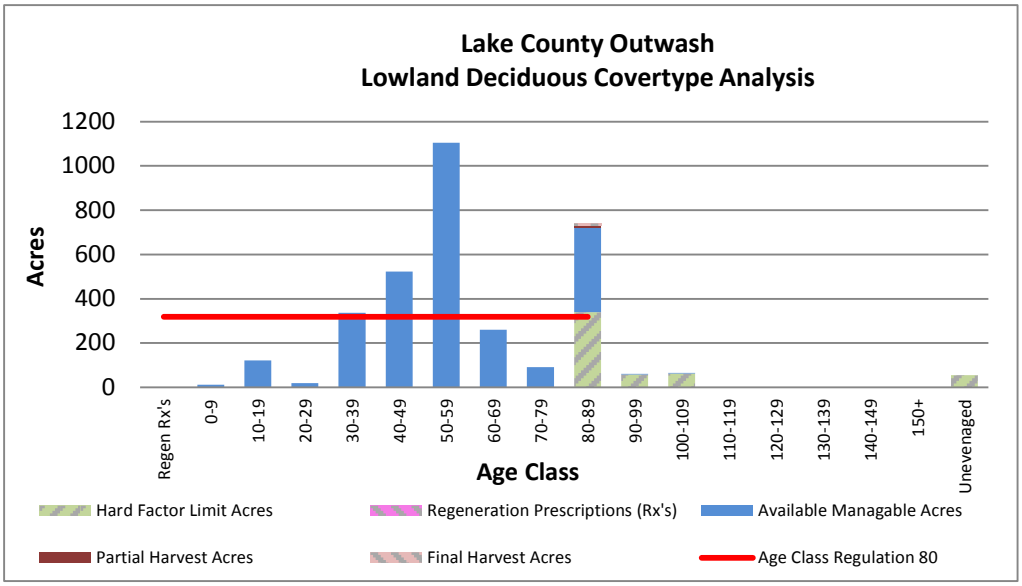

Figure 4.29.5. Age-class distribution for lowland deciduous in the Lake County Outwash management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland deciduous stands will be mixed species in uneven-aged stands to provide habitat and forest products.

10-Year Management Objectives

- Conduct final (regeneration) harvests on a projected 679 acres using selective harvests primarily from the age-classes above 80 and from the more accessible areas; and
- Due to high water tables, harvests should leave a residual canopy sufficient to prevent a loss of evapotranspiration which will result in an increase in surface water and cover type conversion to types more tolerant of extremely wet areas.

Long-Term Management Objectives

- Where feasible, continue to conduct partial harvests of lowland deciduous types where opportunities exist for management; and
- A desired future harvest level is projected at 679 acres for final harvest per 10-year period.

4.29.1.5 Forest Cover Type Management – Mixed Upland Deciduous

Current Condition

Mixed upland deciduous (primarily aspen, oak and red maple) total 1,830 acres or 5% of the management area (Table 4.29.1 and Figure 4.29.6). Due to the age classes of this type, it would appear that these stands are oak stands (older ages) mixed with larger amounts of aspen and red maple (younger ages). The community is distributed throughout the management area on habitat class PArVHa sites.

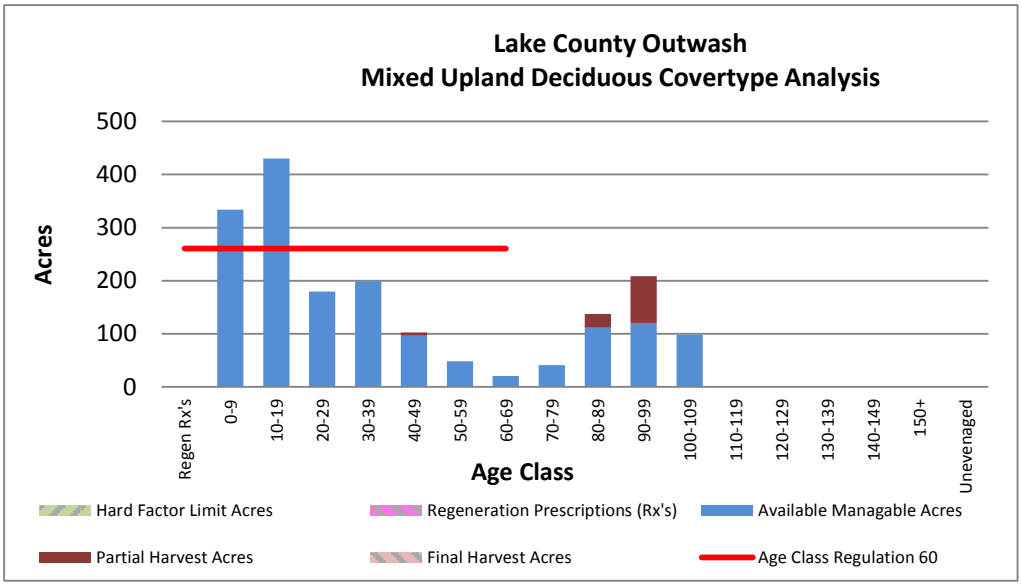

Figure 4.29.6. Age-class distribution for mixed upland deciduous in the Lake County Outwash management area (2012 Department of Natural Resources inventory data).

Forest communities classed as mixed upland deciduous in this management area are valued ecologically as sources of habitat and mast for numerous species of wildlife including bear, white-tailed deer, squirrels and various birds and commercially for firewood and industrial lumber.

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.

10-Year Management Objectives

- These areas will be managed primarily through selection harvests that may select an individual species for harvest;
- Conduct regeneration harvests on a projected 97 acres to regenerate those species which meet silvicultural criteria; and
- Conduct partial harvests, primarily in oak, on a projected 446 acres.

Long-Term Management Objectives

- Maintain these mixed types through continued management to provide a diverse cover type that provides habitat and forest products on a sustainable basis; and
- A desired future harvest level is projected at 261 acres for final harvest and 446 acres for partial harvest per 10-year period.

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

Current Condition

Lowland open/semi-open land acres total 2,925 acres (8%) of the management area. 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.

Desired Future Condition

- Lowland open/semi-open lands sites will be maintained at current levels to provide wildlife habitat.

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.

Long-Term Management Objectives

- Continue preventative measures against illegal off-road vehicle use on these sites; and
- If necessary and feasible, consider control methods for invasive exotic species which may degrade the quality of openings.

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

Current Condition

Upland open/semi-open lands acres total 1,294 acres or 3% of the management area (Table 4.29.1). 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

- Maintain upland open/semi-open lands at or above the current level to provide habitat for species which use openings.

10-Year Management Objectives

- Consider management to maintain upland open/semi-open lands.

Long-Term Management Objectives

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

4.29.1.8 Forest Cover Type Management – Other Types

Current Condition

Individual cover types which may cover less than 5% of the management area include: lowland conifers 1,687 acres or 4% of the management area, white pine 1,425 acres (4%), red pine 1,374 acres (4%) and natural mixed pines 1,147 acres (3%). Other forested and non-forested acres total 2,554 or 7% of the management area 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.

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;
- Conduct regeneration harvests on a projected 14 acres of cedar and 187 acres of lowland conifer where feasible;
- Consider methods to ensure adequate cedar and lowland conifer regeneration;
- 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;
- Conduct final (regeneration) harvests on a projected 62 acres of white pine, 337 acres of red pine, 313 acres of lowland mixed forest, 177 acres of upland mixed forest, 71 acres of planted mixed pines, 49 acres of cedar and 65 acres of lowland aspen/balsam poplar; and
- Conduct partial harvests on a projected 486 acres of white pine, 660 acres of red pine, 221 acres of natural mixed pines, 117 acres of planted mixed pines and 190 acres of upland mixed forest.

Long-Term Management Objectives

- Desired future harvest levels for final harvest are projected at 14 for cedar and 187 acres of lowland conifer.

4.29.2 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 area during this cycle of state forest planning:

- American marten
- American woodcock
- Beaver
- Black bear
- Eastern massasauga rattlesnake
- Golden-winged warbler
- Mallard (Widewaters Flooding State Wildlife Management Area)
- Pileated woodpecker
- Red-headed woodpecker
- Ruffed grouse
- Snowshoe hare
- Wild turkey
- White-tailed deer
- Wood duck (Widewaters Flooding State Wildlife Management Area)

The primary focus of wildlife habitat management in the Lake County Outwash 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; large open grassland complexes and marsh/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 Marten

The goal for American marten in the northern Lower Peninsula is to increase available habitat. American marten needs mature mixed forest stands or old conifer-dominated stands, with dead and down material for maintaining a stable and sufficient supply of small mammals as prey. American marten are rarely found outside the forest canopy. This species depends upon live-tree dens, snags and coarse woody debris for loafing (resting) and denning sites. State forest management should address the maintenance and improvement of extensive and mature forest tracts, corridors, dead wood and conifer components in priority landscapes.

Wildlife Habitat Specifications:

- Identify, maintain, develop or restore large forested tracts and forested corridors.
- In even-aged management systems, within-stand retention should focus on large diameter (>15 inches diameter at breast-height) trees, known cavity trees and/or mesic conifers to maintain/increase denning and loafing sites.
- Where possible, increase both standing-dead and downed-dead wood by:
  - Applying at least the minimum level of within-stand retention to all stands in management area;
  - Writing harvest specifications to leave slash at the stump or to minimize the removal of slash; and
  - Limiting or prohibiting firewood permits at marten-occupied sites.

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 per 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 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 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.

Beaver

The goal for beaver in the northern Lower Peninsula is to maintain available habitat. Consideration will be given to best management practices, trout stream management and trends in beaver nuisance permits issued. State forest management for the species should focus on providing favorable food within 100 feet of streams that are not designated high priority trout streams.

Wildlife Habitat Specifications:

- Maintain or promote alder, aspen, birch, maple or willow cover types within 100 feet of non-high priority trout streams with gradients of less that 15% and other inland bodies of water.
  - Implementation of the 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this habitat specification.

Black Bear

The goal for black bear in the northern Lower Peninsula is to maintain or improve habitat. Black bears have large home ranges and require large contiguous tracts of diverse forests with a mixture of cover types. They tend to use forested riparian corridors in their movements (which can be extensive). Hard mast is critical in the fall for bears to achieve adequate weight gains before denning. State forest management for the species should focus on improving existing habitat by minimizing forest fragmentation and maintaining oak to offset potential population declines due to changes in land-use.

Wildlife Habitat Specifications:

- Identify, maintain, develop or restore forested corridors that connect larger forested tracts, paying particular attention to riparian zones.
  - Implementation of riparian guidance (best management practices) will be sufficient to meet the black bear habitat specifications related to preventing fragmentation and maintaining corridors.
- Conduct silvicultural practices that maintain or increase oak-dominated stands and the oak component of mixed stands.
  - Implementation of the 10-year management direction for oak will be sufficient to meet black bear habitat specifications.

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.

Golden-winged Warbler

The goal for golden-winged warbler in the northern Lower Peninsula is to maintain or increase available habitat. Golden-winged warbler nest in a variety of shrubby and early-successional forest sites including moist woodlands, willow and alder thickets and young forests of sapling aspen and fire cherry. Habitat tracts of 25-125 acres can support several pairs and are preferred over both smaller and larger areas. State forest management should focus on the maintenance of young aspen (0-10 years old) in association with lowland shrub and grasslands in priority landscapes.

Wildlife Habitat Specifications:

- Identify commercial and non-commercial treatment opportunities in aspen and alder adjacent to or within lowland shrub and grassland. Treatment areas 25-125 acres are preferred.
    - Implementation of 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this golden-winged warbler habitat specification.
- Within management area, maintain 20% of aspen associated with lowland shrub and grasslands in the 0-10 year age class.

Mallard

Mallards prefer complexes of grassland and shallow seasonal or semi-permanent marshes in association with permanent hemi-marshes for pair bonding, nesting and brood rearing. Mallard pair-bonding wetlands are typically 0.25-20 acres in size and brood rearing wetlands are typically 1.2-30 acres in size. Optimal hemi-marsh sites are greater than 2.5 acres with open water portions having extensive portions less than three feet deep and 4:1 area of adjacent grasslands to hemi-marsh. Mallards nest on upland sites, normally within ~200 yards from water.

Wildlife Habitat Specifications:

- Maintain priority wetlands in hemi-marsh condition, with 50/50 open water to emergent marsh, for both breeding and non-breeding habitat.
    - Implementation of the wildlife management area master plan for Widewaters Flooding State Wildlife Management Area and application of the beaver wildlife habitat specifications will be sufficient to meet this mallard habitat specification.
- Maintain stable water levels at managed floodings from April through August.

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 than 12 inches in diameter at breast height. State forest management should focus on the maintenance of a component of large diameter trees (>12 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 5 acres in size with a savannah-like dispersion of large trees (< 50% canopy cover) with open under story and include tall trees or snags of large (> 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 than 12 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 per 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 ten 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 and oak will be sufficient to meet this 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 and oak will be sufficient to meet this 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.
- In snowshoe hare habitat, limit biomass harvesting and whole-tree chipping operations, retain slash and create brush piles.

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.

Wood Duck

The goal for wood duck in the northern Lower Peninsula is to maintain or increase available habitat. Wood ducks are most limited by available nesting and brood rearing habitat. Wood duck nest in tree cavities near rivers, streams, swamps, beaver ponds and marshes. Nests require mature hardwood trees with 10 inches in diameter at breast height or larger. Brood rearing habitat is composed of wetland areas such as forested wetlands, shrub-scrub wetlands and emergent marshes that maintain adequate water through the brood rearing period. Hemi-marshes with nearby shrub-scrub or forest are important, where marshes are typically within 100 yards of woody cover. Optimal breeding habitat includes 1.25 acres or larger hemi-marsh and/or swamp (forested and shrub-scrub wetlands) located within 1,100 yards of mature hardwood forest. State forest management should focus on the protection of forest wetlands and adjacent snags and the management of priority wildlife management areas with suitable habitat.

Wildlife Habitat Specifications:

- Maintain priority wetlands in hemi-marsh condition, with 50/50 open water to emergent marsh, for both breeding and non-breeding habitat.
  - Implementation of the wildlife management area master plan for Widewaters Flooding State Wildlife Management Area and application of the beaver wildlife habitat specifications will be sufficient to meet this wood duck habitat specification.
- Maintain stable water levels at managed floodings from April through August.

4.29.3 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 six listed species and no natural communities of note occurring in the management area as listed in Table 4.29.2. A colony of great blue herons has also been identified. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

As shown in Figure 4.29.7, the Baldwin-Luther Swamp is the only special conservation area that has been identified in the Lake County Outwash management area.

The Pere Marquette River and its tributaries have been identified as a natural river and along with their corridors it has also been designated as high conservation value areas. Although the Pere Marquette River does not flow through this management area, the Baldwin River and the North and South Branches of Cole Creek are its tributaries and do flowing through the management are as shown in Figure 4.29.7 and hence are high conservation value areas.

There are no ecological reference areas identified for the Lake County Outwash management area.

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.

Future development and recreational pressure associated with expected population growth in the vicinity of this management area will be primary challenge to successful management for rare fish, wildlife and plants.

Table 4.29.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Lake County Outwash 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
Birds								
Common loon	*Gavia immer*	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
Common tern	*Stema hirundo*	T/G5/S2	Confirmed	MV	Moderate	Sand & gravel beach	Upland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
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								
Wood turtle	*Glyptemys insculpta*	SC/G4/S2S3	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern shrub thicket	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
Eastern Massassauga rattlesnake	*Sistrurus catenatus catenatus*	C/SC/G3G4T3T4Q/S2S3	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
Eastern box turtle	*Terrapene carolina carolina*	SC/S2S3/G5T5	Confirmed	HV	Moderate	Northern hardwood swamp	Black Ash	Late
						Great Lakes marsh	Lowland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Inundated shrub swamp	Lowland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Prairie fen	Upland open/semi-open	N/A
						Oak-pine barrens	Oak	Mid
						Coastal fen	Lowland open/semi-open	N/A

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

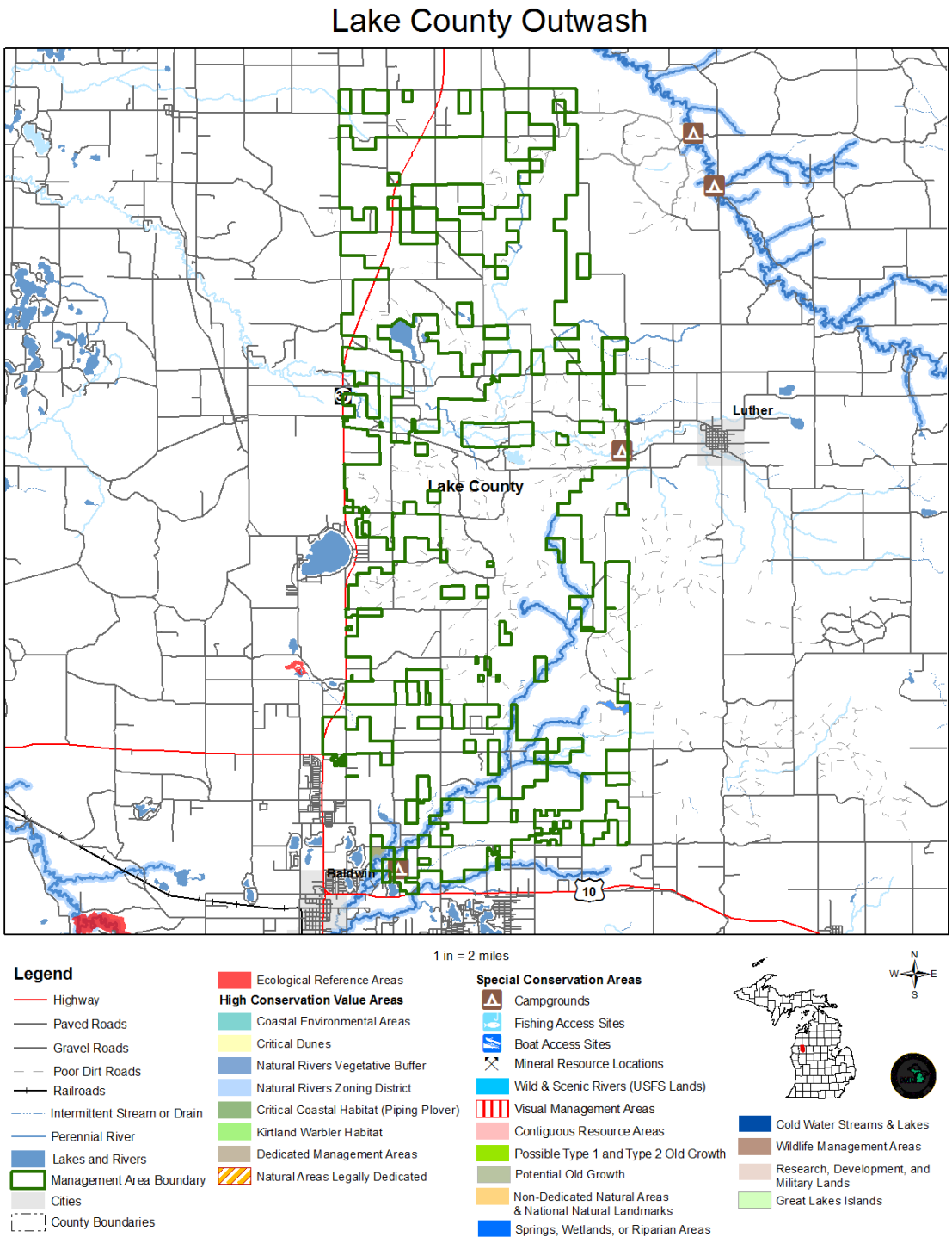

Figure 4.29.7. A map of the Lake County Outwash MA showing the special resource areas.

4.29.4 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 issues in this management area include oak decline and oak wilt and management should be adapted as follows:

- Oak decline on frost-prone, nutrient poor outwash plains is always a risk due to the cyclic nature of drought and insect defoliation (e.g., gypsy moth and forest tent caterpillar). Economic losses can be reduced by managing these sites on a shorter rotation.
- Oak wilt is prevalent in this area. Epicenters need to be identified and treated. Timber sale restrictions which prevent wounding of oaks from April 15 to July 15 need to be enforced. Other management activities that can lead to damage of residual red oak trees (oil and gas development, recreational trail improvement, etc.) should be not be conducted during this high-risk period.
- Emerald ash borer in black ash on lowland sites will be difficult to control due to access issues. It is expected that other species will replace ash on lowland sites.

Invasive Species

Invasive species pose a major threat to forest resources. They impact timber production, wildlife habitat and recreational access. Currently there are no invasive species mapped in the management area or within a five-mile buffer of the management area. This information was compiled from the Midwest Invasive Species Information Network database, but it should not be considered complete. This information and other sources that show the extent and location of invasives should be used to inform of 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.

4.29.5 Fire Management

Disturbance through fire has played an important role in the initial propagation and maintenance of oak and natural oak/pine types, small inclusions of aspen or grass/upland brush types. Wildfire risk and fuel loading is increased in young dense conifer plantations and mature jack pine affected by jack pine budworm.

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 dependent 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:

- Consider re-introducing fire in the oak/pine areas to encourage pine and oak regeneration and to discourage competition;
- Reduce fuel loading and therefore the risk of wildfire in jack pine stands by harvesting at maturity;
- Recognize that increased urbanization in close proximity to the management area will present more wildland/urban interface challenges to wildfire suppression.

4.29.6 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 4.29.1 and listed in Appendix F.

4.29.7 Public Access and Recreation

Access for management and/or recreation with the exception of the Baldwin-Luther Swamp is very good as there is a well-developed road/trail system. 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.

The types of recreational opportunities within this management area vary, providing experiences for most all that frequent the area. This management area encompasses the heart of Lake County, where the economy is dependent upon recreation and the tourism industry provided in part by recreation opportunities on the state forest. Rustic camping with direct access to the Little Manistee off-road vehicle trail system (Figure 4.29.1) is provided at Carrieville State Forest Campground (Figure 4.29.7). Carrieville State Forest Campground (Figure 4.29.7) is unique, in that it was designed and constructed with the off-road vehicle enthusiast in mind. Both Leverentz Lake and Bray Creek State Forest Campgrounds (Figure 4.29.7) are situated near Baldwin-providing a quality rustic camping experience yet close enough to town to obtain urban amenities. Off-road vehicle trails (Figure 4.29.1) provide a unique experience winding through forests dominated by jack pine and oak cover types. Two new bridges servicing both the off-road vehicle and snowmobile programs were constructed in 2009. Snowmobiling is popular as trails (Figure 4.29.1) pass through both state and federal lands. For the non-motorized users, both Sheep Ranch and Pine Forest pathways (Figure 4.29.1) provide a quiet opportunity to see the various wildlife species associated within this management area. Due to the economic importance of recreation in this management area increased use is likely and the potential to expand all recreation amenities is plausible.

The recreation features provided in this management area are listed below.

Campgrounds
- Carrieville State Forest Campground
- Leverentz Lake State Forest Campground
- Bray Creek State Forest Campground

Boating Access Sites
- Leverentz Lake Boating Access Sites
- Rocky Boating Access Sites

Off-Road Vehicle Trails
- Little Manistee Trail and Route
- Tincup Trail and Route
- Lincoln Hills Trail and Route

Snowmobile Trails
- Various

Non-Motorized Trails
- Sheep Ranch Pathway
- Pine Forest Pathway

Although managing 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 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 off-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.

4.29.8 Oil, Gas and Mineral Development

Surface sediments consist of glacial outwash sand and gravel and postglacial alluvium and an end moraine of coarse-textured till. The glacial drift thickness varies between 400 and 800 feet. Sand and gravel pits are located in this management area, including state leased pits and there is good potential for additional pits.

The Pennsylvanian Saginaw Formation, Mississippian Bayport limestone and Michigan Formation subcrop below the glacial drift. The Saginaw is quarried for clay in brick making, the Bayport for Limestone and the Michigan for gypsum elsewhere in the state.

Exploration and development for oil and gas has been sparse in this management area. There is potential for several formations to be developed with well spacing ranging from 40 acres up to 640 acres for the deeper formations. The Collingwood Formation does not appear to have potential in this management area and very little of the state lands are currently leased.

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, 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. In 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 that all pipelines are to be buried below plow depth. 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.