## 4.17 MA 17 – Kirtland's Warbler Management Area

### Summary of Use and Management

The Kirtland's Warbler management area (MA) consists of fifteen units of land that are managed for the federally endangered Kirtland's warbler. Kirtland's warbler management is guided by two documents: Kirtland's Warbler Breeding Range Conservation Plan and Operational Plan for Kirtland's Warbler Habitat Management on Michigan State Forests. Of the 148,017 acres of state forest land that make up the Kirtland's Warbler management area, approximately 90,000 acres, most of the jack pine in the management area, have been identified as essential habitat where management is done in accordance with the Kirtland's Warbler Conservation Plan and Operational Plan. Management on the portion that is not classified as essential habitat will emphasize balancing the age classes of aspen and red pine and regenerating the aging oak resource. Management activities may be constrained or modified based on management recommendations described in the Conservation Strategy Expected trends within this 10-year planning period are introduced pests and diseases and assuring jack pine regeneration on Kirtland's warbler sites.

Introduction

This scattered management area is located in the central high plateau of the Lower Peninsula and contains 148,017 acres of state forest (Figure 4.1). The primary attributes which identify the Kirtland's Warbler management area include:

- The Kirtland's Warbler management area consists of identified areas of essential habitat large enough to manage Kirtland's warbler habitat, occurring mostly within Albert's Grayling Highplains sub-region (Albert, 1995). The Kirtland's warbler requires large tracts of young, even-aged jack pine as suitable nesting sites.
- Early observers of the Kirtland's warbler found the birds in what was then described as the "jack pine plains" of northern Lower Michigan. While jack pine is found throughout Canada and from mid-Michigan and Wisconsin to the continental tree line, Kirtland's warblers occupy only a small portion of the extreme southern range. Almost all nesting has occurred on Grayling sands.
- Historically fires were very frequent in this management area and were important in determining species composition. Jack pine, red pine, northern pin oak and barrens dominated the management area. Currently, in addition to jack pine, other mesic and dry-mesic forest types are intermixed.
- The Kirtland's Warbler management area is a popular destination for bird watchers who come from all over the world to see the rare Kirtland's warbler. This management area contributes social and economic values to the area including providing timber resources that result from warbler habitat management and from eco-tourism.
- Department of Natural Resources (DNR) recreation facilities in or near this management area include nearby Clear Lake State Park and several state forest campgrounds.
- The Crawford/Dyer Red Pine Natural Area, which has its own management plan to guide specific management of old growth red pine, is in the management area.
- Various snowmobile trails and the North Country Trail cross the area
- Much of the topography in this management area was sculpted by melting glaciers that left outwash plains of deep well-drained sand.

# Kirtlands Warbler

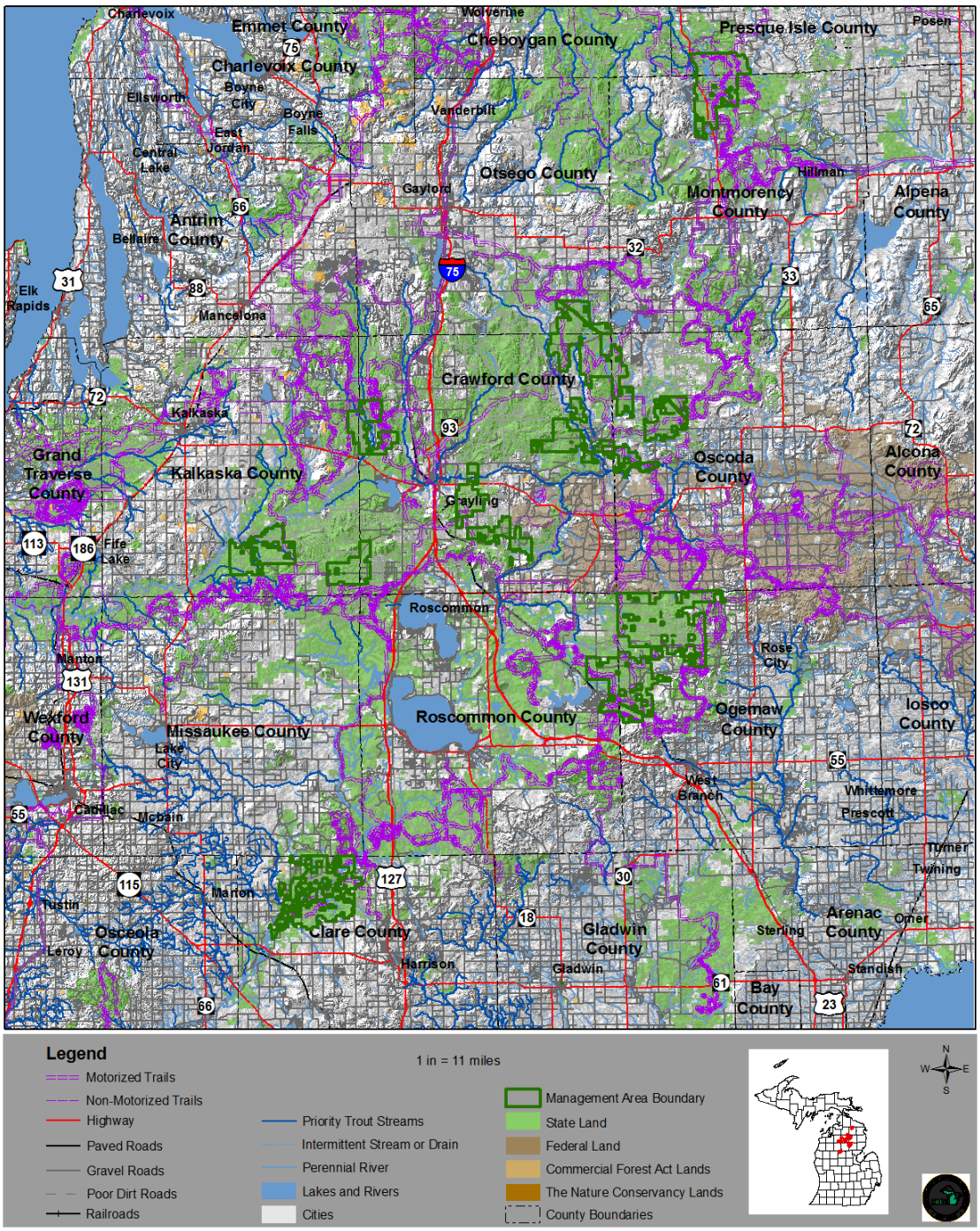


Figure 4.17.1. A map of the Kirtland's Warbler management area (dark green boundary) located in the central high plateau of the Lower Peninsula.

Table 4.17.1. Current cover types, acreages, projected harvests and projected acreages at the end of this ten-year planning period for the Kirtland's Warbler 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 |
| Jack Pine | 58% | 86,172 | 2,194 | 83,978 | 15,600 | | 86,172 | 13,997 | |
| Aspen | 9% | 13,524 | 589 | 12935 | 2,690 | | 13,524 | 2,156 | |
| Red Pine | 6% | 9,485 | 586 | 8899 | 2,191 | 2,391 | 9,485 | 1,000 | 3,883 |
| Oak | 6% | 9,071 | 2,521 | 6550 | 156 | 1,142 | 9,071 | 819 | 1,181 |
| Mixed Upland Deciduous | 2% | 3,143 | 20 | 3123 | 105 | 501 | 3,143 | 446 | 501 |
| Lowland Conifers | 2% | 2,968 | 2,370 | 598 | 67 | | 2,968 | 67 | |
| Lowland Deciduous | 2% | 2,700 | 1,942 | 758 | 89 | | 2,700 | 89 | |
| Upland Open/Semi-Open Lands | 3% | 4,535 | | 4535 | | | 4,535 | | |
| Lowland Open/Semi-Open Lands | 3% | 4,730 | | 4730 | | | 4,730 | | |
| Misc Other (Water, Local, Urban) | 1% | 1,786 | 14 | 1772 | | | 1,786 | | |
| Others | 7% | 9,903 | 3,499 | 6404 | 831 | 1,631 | 9,903 | 629 | 1,794 |
| Total | | 148,017 | 13,736 | 134,281 | 21,729 | 5,665 | 148,017 | 19,203 | 7,359 |

### 4.17.1 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, they are classified by the predominant species.

#### 4.17.1.1 Forest Cover Type Management – Jack Pine

Current Condition

Jack pine acres total 86,172 or 58% of the management area (Table 4.17.1) and the majority of this is "essential habitat" for the Kirtland's warbler. While many stands are of fire-origin, the majority of younger stands are plantation origin. However, large fires have created jack pine regeneration throughout the management area. Through the 1970s and 80s, planted stands were managed as near monocultures, where post-harvest oak and red pine removal was a common practice. In recent years, managers have incorporated more retention.

The current age-class structure may change based on the cutting schedule outlined in the Operational Plan for Kirtland's Warbler Habitat Management on Michigan State Forests. There are 8,193 acres that have final harvest pending and these acres are included in the regeneration prescription class. Figure 4.17.2 includes the projected number of acres converted to jack pine as a result of treatments that remove an overstory and planting with jack pine. These acres are included in the regeneration prescription class.

Desired Future Condition

According to the Operational Plan for Kirtland's Warbler Habitat Management, essential habitat in Kirtland's Warbler management area is regulated for sustained yield of warbler nesting habitat and for commercial timber production. Where possible, 15-25 percent of each management block is developed into nesting habitat every decade on a 50-year rotation. Rotations may vary due to the variety of stand conditions within each area because of site productivity, previous habitat development and wildfire. Some essential habitat may be managed on a shorter rotation. Efforts will continue to replicate natural disturbance and to create unfragmented interior habitat.

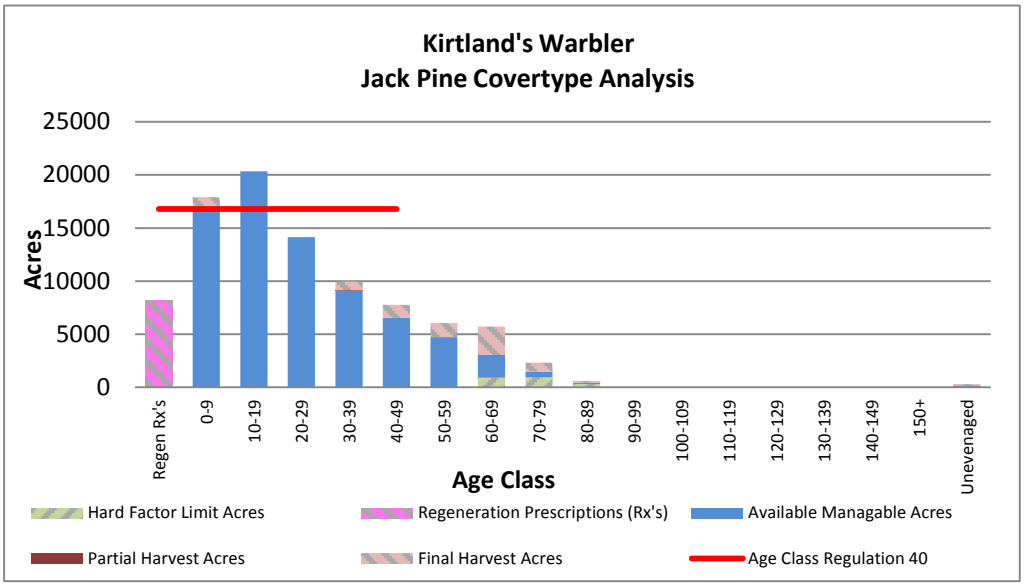

Figure 4.17.2. Age-class distribution for jack pine in the Kirtland's Warbler management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- Conduct stand replacement harvests on a projected 15,600 acres of stands currently age 50-70;
- Where necessary and feasible, consider harvesting stands below the rotation age to ensure the necessary amount of habitat for the Kirtland's warbler; and
- Desired future harvest levels will be determined by habitat needed for the Kirtland's warbler.

Long-Term Management Objectives

- Seek opportunities to enhance the visual appeal of large area treatments; and
- Consider long-term strategies to use leave strips that replicate horizontal roll vortices, retaining super-canopy red pine, barrens areas and sustaining an oak and red pine component in these areas.

### 4.17.1.2 Forest Cover Type Management – Aspen

Current Condition

Aspen acres total 13,524 acres or 9% of the management area (Table 4.17.1). 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, often on ridges along outwash plains. There are 589 acres of aspen that have met harvest criteria (Figure 4.17.3), but have site conditions that limit harvest (hard factor limited acres). There are 1,602 acres that have a final harvest pending and these acres are included in the regeneration prescription class. There are 54 acres with a partial harvest pending and these acres are included in their current age class.

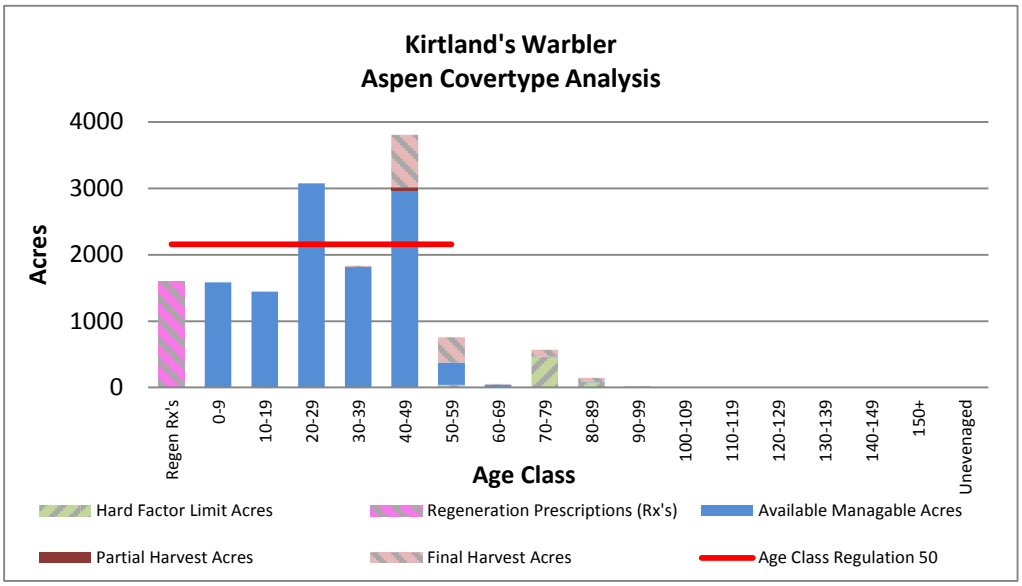

Figure 4.17.3. Age-class distribution for aspen in the Kirtland's Warbler management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen-dominated forest communities will be maintained on operable sites through even-aged management with acres balanced between 0 and 59 years of age to provide for regulated harvest, wildlife habitat and recreation opportunity.

10-Year Management Objectives

- Conduct stand regeneration harvests on a projected 2,690 acres;
- Concentrate harvests on the oldest age-classes 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 management through regeneration harvests to balance the age-class distribution; and
- Desired future harvest levels are projected at 2,156 acres for final harvest per 10-year period.

### 4.17.1.3 Forest Cover Type Management – Oak

Current Condition

Oak acres total 9,071 acres or 6% of the management area (Table 4.17.1). Approximately one half of the oak stands are moderate to well-stocked stands of almost pure oak, though trending toward mixed communities. The distribution of oak in the younger age classes (Figure 4.17.4) reflects aggressive stand replacement management of the past 40 years.

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. Areas with poor regeneration may be inter-planted with red pine. There are 2,521 acres of oak that have met harvest criteria (Figure 4.17.4), but have site conditions that limit harvest (hard factor limit acres). There are 834 acres that have a final harvest pending and these acres are included in the regeneration prescription class. There are 335 acres with a partial harvest pending and these acres are included in their current age-class. Figure 4.17.4 includes the projected number of acres converted to oak as a result of treatments that remove an overstory species resulting in release of oak. These acres are included in the regeneration prescription class.

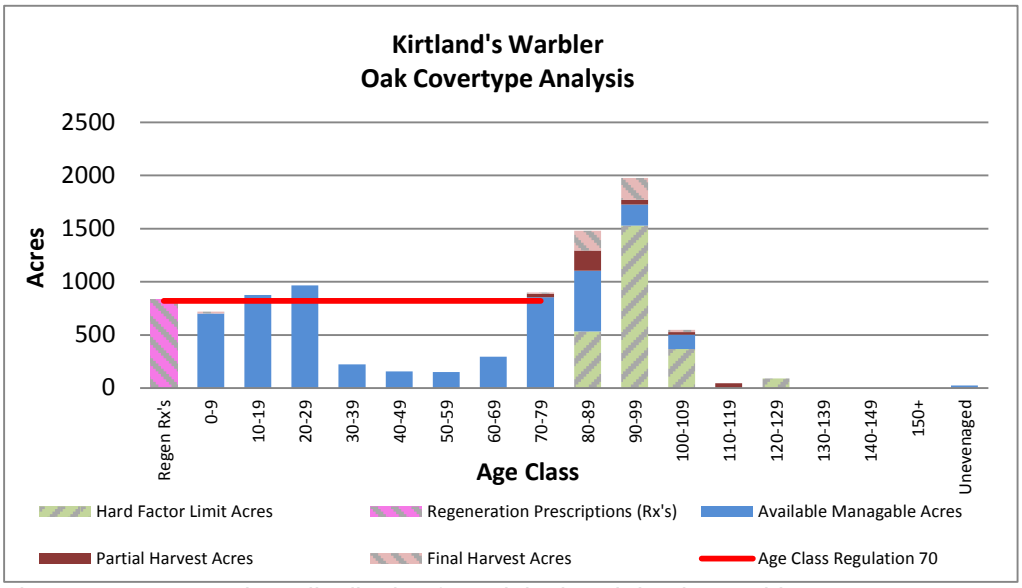

Figure 4.17.4. Age-class distribution for oak in the Kirtland's Warbler management area (2012 Department of Natural Resources inventory data).

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. Although there has been successful regeneration of oak in this management area there are still a considerable number of acres in the older age classes (Figure 4.17.4). 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. 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 stands with other species.

10-Year Management Objectives

- Conduct partial harvests on a projected 1,142 acres;
- Conduct final harvests on a projected 156 acres; 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 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; and
- Desired future harvest levels are projected at 819 acres for final harvest and 1,181 for partial harvest per 10-year period.

### 4.17.1.4 Forest Cover Type Management – Red Pine

Current Condition

Red pine acres total 9,485 or 6% of the management area (Table 4.17.1), with most being 40-79 years old. Nearly all of the pine is of planted origin. The acreage of red pine on very dry sites may decrease because of conversion to jack pine. Red pine in this management area is commercially valued for pulp, saw logs and utility poles. Various regeneration techniques have been prescribed in this landscape. There are 586 acres of red pine that have met harvest criteria (Figure 4.17.5), but have site conditions that limit harvest (hard factor limit acres).

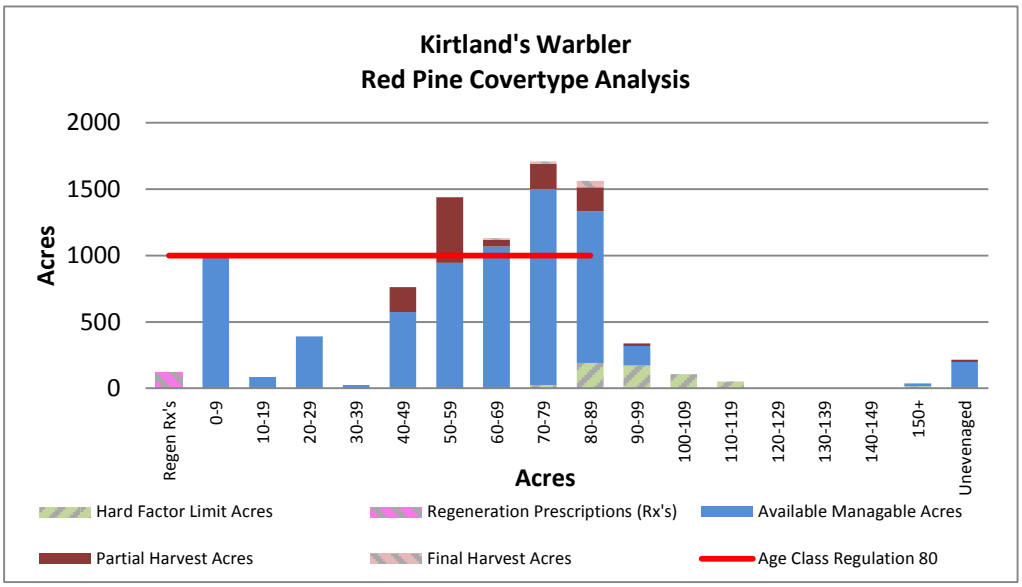


Figure 4.17.5. Age-class distribution for red pine in the Kirtland's Warbler management area (2012 Department of Natural Resources inventory data).

There are 120 acres that have a final harvest pending. However, these acres are being converted to another cover type, most likely jack pine. The acres that will remain in red pine are shown on Figure 4.17.5 as regeneration prescription acres. There are 1,141 acres with a partial harvest pending and these acres are included in their current age class. Figure 4.17.5 includes the projected number of acres converted to red pine as a result of treatments that remove an overstory and replanting with red pine. These acres are included in the regeneration prescription class.

Desired Future Condition

- Where red pine does not conflict with critical habitat for Kirtland's warbler, maintain red pine on dry-mesic sites with a thinning regime until stand replacement harvest at economic maturity with acres balanced between 0 and 89 years of age to provide for continual harvest, wildlife habitat and recreational opportunity; and
- Where red pine is located on Kirtland's warbler critical habitat site, conduct thinning operations until stand replacement harvest and replant to jack pine.

10-Year Management Objectives

- Conduct partial harvests on a projected 2,391 acres, concentrating on stands of better-quality red pine that has the potential for a higher product value in larger size classes; and
- Conduct regeneration harvests on a projected 2,191 acres of red pine beginning with the oldest age classes and with a concentration on stands with less potential for a higher product value.

Long-Term Management Objectives

- In identified special conservation areas, especially those with natural red pine on dry-mesic sites, consider management of red pine to a biological rotation of 200+ years;
- Continue management through regeneration harvests to balance the age-class distribution;
- It is acceptable that some acreage may convert to jack pine on dry sites; and

- Desired future harvest levels are projected at 1,000 acres for final harvest and 3,883 acres for partial harvest per 10-year period.

**4.19.1.7 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 lands acres total 4,730 or 3% of the management area (Table 4.17.1).

Desired Future Condition

- Lowland open/semi-open lands sites will be maintained at or above 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 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.

**4.19.1.8 Forest Cover Type Management – Upland Open/Semi-Open Lands**

Current Condition

Upland open/semi-open acres total 4,535 acres or 3% of the management area (Table 4.17.1). 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 and to serve as fuel breaks.

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;
- Protect stands from illegal off-road vehicle use; and
- If necessary and feasible, consider control of invasive non-native species.

**4.17.1.9 Forest Cover Type Management – Other Types**

Individual cover types which may cover less than 5% of the management area include: mixed upland deciduous, 3,143 acres (2% of the management area), lowland conifers, 2,968 acres (2%) and lowland deciduous, 2,700 acres (2%). Other forest and non-forested acres total 9,903 acres (7%) 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.

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;
- The following species are projected for restarting or regeneration harvests: 105 acres of mixed upland deciduous, 328 acres of natural mixed pines, 277 acres of white pine, 21 acres of planted mixed pines, 15 acres of lowland spruce/fir, 43 acres of lowland aspen/balsam poplar, 49 acres of upland spruce/fir and 97 acres of upland conifers;
- Conduct regeneration harvests on a projected 89 acres of lowland deciduous and 67 acres of lowland conifer;
- Consider methods to ensure adequate 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; and
- Partial harvests are projected for 780 acres of natural mixed pines, 501 acres of mixed upland deciduous, 297 acres of white pine, 258 acres of upland mixed forest, 297 acres of white pine, 189 acres of planted mixed pines and 107 acres of northern hardwood.

Long-Term Management Objectives

- Continue management of these types to provide forest products, wildlife habitat and recreational opportunities; and
- Desired future harvest levels for final harvest are; lowland deciduous 89 acres and lowland conifer 67 acres per 10-year period.

**4.17.2 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 10-year planning period:

- Kirtland's warbler
- Mallard (Beaver Creek State Game Area)
- Pileated woodpecker
- Ruffed grouse
- Snowshoe hare
- Wild turkey
- White-tailed deer

The primary focus of wildlife habitat management in the Kirtland's Warbler 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.

Additional detail on the featured species approach can be found in Section 3.

**Kirtland's Warbler**

The goal for Kirtland’s warbler is to maintain a population of at least 1000 breeding pairs as observed in the annual spring census. Kirtland’s warbler breeding habitat is most closely associated with dense stands (>1450 stems per acre) of 5-15-foot tall jack pine (5-18 years old) growing on well-drained sandy soils, interspersed with small openings and ground cover of low-growing shrubs and grass. Blocks >300 acres provide the best Kirtland’s warbler habitat because they offer the

best chance for colonization, are occupied for longer periods and support denser Kirtland's warbler colonies. State forest management should focus on maintaining breeding habitat on dedicated lands at planned levels in accordance with the Conservation Strategy for Kirtland's Warbler Breeding Habitat.

Wildlife Habitat Specifications

- Maintain 38,000 acres of 5-18 year-old jack pine for 10-year duration by a 40-year age rotation on 190,000 acres of dedicated DNR, U.S. Forest Service and U.S. Fish and Wildlife Service lands.

**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 >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 about 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 plans for Dingman Marsh, French Farm Flooding, and O'Neil Lake state wildlife management areas 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.

**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.
- 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.

**4.17.3 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 eighteen listed species as well as five natural communities of note occurring in the management area as listed in Table 4.17.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.17.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Kirtland's Warbler 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 |
| Dry sand prairie | | S2/G3 | Confirmed | | | | Upland open/semi-open | N/A |
| Oak-Pine barrens | | S2/G3 | Confirmed | | | | Oak | Mid |
| Pine barrens | | S2/G3 | Confirmed | | | | Jack Pine | Early |
| **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 |
| Prairie warbler | *Dendroica discolor* | E/G5/S1 | Confirmed | IL | Very High | Open dunes | Upland open/semi-open | N/A |
| | | | | | | Pine barrens | Jack Pine | Early |
| | | | | | | Oak-pine barrens | Oak | Mid |
| | | | | | | Great Lakes barrens | Upland open/semi-open | N/A |
| Kirtland's warbler | *Dendroica kirtlandii* | LE/E/G1/S1 | Confirmed | PS | Very High | Pine barrens | Jack Pine | Early |
| | | | | | | Dry northern forest | Jack Pine, Red Pine | Early |
| Common loon | *Gavia immer* | T/G5/S3-4 | Confirmed | HV | Very High | Emergent Marsh | Lowland open/semi-open | N/A |
| | | | | | | Bog | Lowland open/semi-open | N/A |
| Bald eagle | *Haliaeetus leucocephalus* | SC/G5/S4 | Confirmed | IL | Moderate | Bog | Lowland open/semi-open | N/A |
| | | | | | | Hardwood-conifer swamp | Lowland Mixed | Mid |
| | | | | | | Northern hardwood swamp | Black Ash | Late |
| | | | | | | Poor conifer swamp | Tamarack | Late |
| | | | | | | Floodplain forest | Lowland mixed | Mid |
| | | | | | | Dry northern forest | Jack Pine, Red Pine | Early |
| | | | | | | Dry-mesic northern forest | White Pine | Late |
| | | | | | | Mesic northern Forest | Northern Hardwood | Late |
| **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 |
| Henry's elfin | *Callophrys henrici* | T/G4/S1S2 | Confirmed | PS | Moderate | Oak-pine barrens | Oak | Mid |
| | | | | | | Hardwood-conifer swamp | Lowland Mixed | Mid |
| | | | | | | Northern hardwood swamp | Black Ash | Late |
| Grizzled skipper | *Pyrgus Wyandot* | SC/G1G2Q/S1S2 | Confirmed | ? | ? | Oak-pine barrens | Oak | Mid |
| | | | | | | Alvar | Upland open/semi-open | N/A |
| | | | | | | Pine barrens | Jack Pine | Early |
| **Insect** | | | | | | | | |
| 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 |
| **Mullusk** | | | | | | | | |
| Round pigtoe | *Pleurobema sintoxia* | SC/G4G5/S2S3 | Confirmed | HV | Low | Mainstem streams | Aquatic | N/A |
| | | | | | | Rivers | Aquatic | N/A |
| **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/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 |

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

Table 4.17.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Kirtland's Warbler 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** | | | | | | | | |
| Pale Agoseris | *Agoseris glauca* | T/G5/S2 | Confirmed | | | Pine barrens | Jack Pine | Early |
| | | | | | | Dry northern forest | Jack Pine, Red Pine | Late |
| 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 |
| Rough fescue | *Festuca scabrella* | T/G5/S2S3 | Confirmed | | | Oak-pine barrens | Oak | Mid |
| | | | | | | Pine barrens | Jack Pine | Early |
| Fragile prickly pear | *Opuntia fragilis* | E/G4G5/S1 | Confirmed | | | Granite bedrock glade | Upland open/semi-open | N/A |
| Ginseng | *Panax quinquefolius* | T/G3G4/S2S3 | Confirmed | | | Southern hardwood swamp | Upland open/semi-open | N/A |
| | | | | | | Floodplain forest | Lowland mixed | Mid |
| | | | | | | Mesic southern forest | Upland open/semi-open | N/A |
| | | | | | | Mesic northern forest | Northern Hardwood | Late |
| Allegheny plum | *Prunus allighaiensis davisii* | SC/G4T3Q/S3 | Confirmed | | | Dry sand prairie | Upland open/semi-open | N/A |
| | | | | | | Oak-pine barrens | Oak | Mid |

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

As shown in Figure 4.17.6, there are three special conservation areas. There is one non-dedicated natural area that is shared with the AuSable Outwash management area. There is also one potential Type 1 old growth area that is also at the Crawford/Dyer Red Pine site and consists of 19 acres of the dry northern forest natural community type (Figure 4.17.6). This entire management area also forms part of a contiguous resource area special conservation areas with adjacent land belonging to the U.S. Forest Service (Huron-Manistee National Forest) and the U.S. Fish and Wildlife Service.

Also shown in Figure 4.17.6 is the Roscommon Natural Area, a 159 acre high conservation value area.

There are also three ecological reference areas (Figure 4.17.3) that are partially or mostly on state land. The ecological reference areas represent the following natural communities: dry sand prairie (62.53 acres), dry northern forest (8.86 acres) and bog (25.53 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.

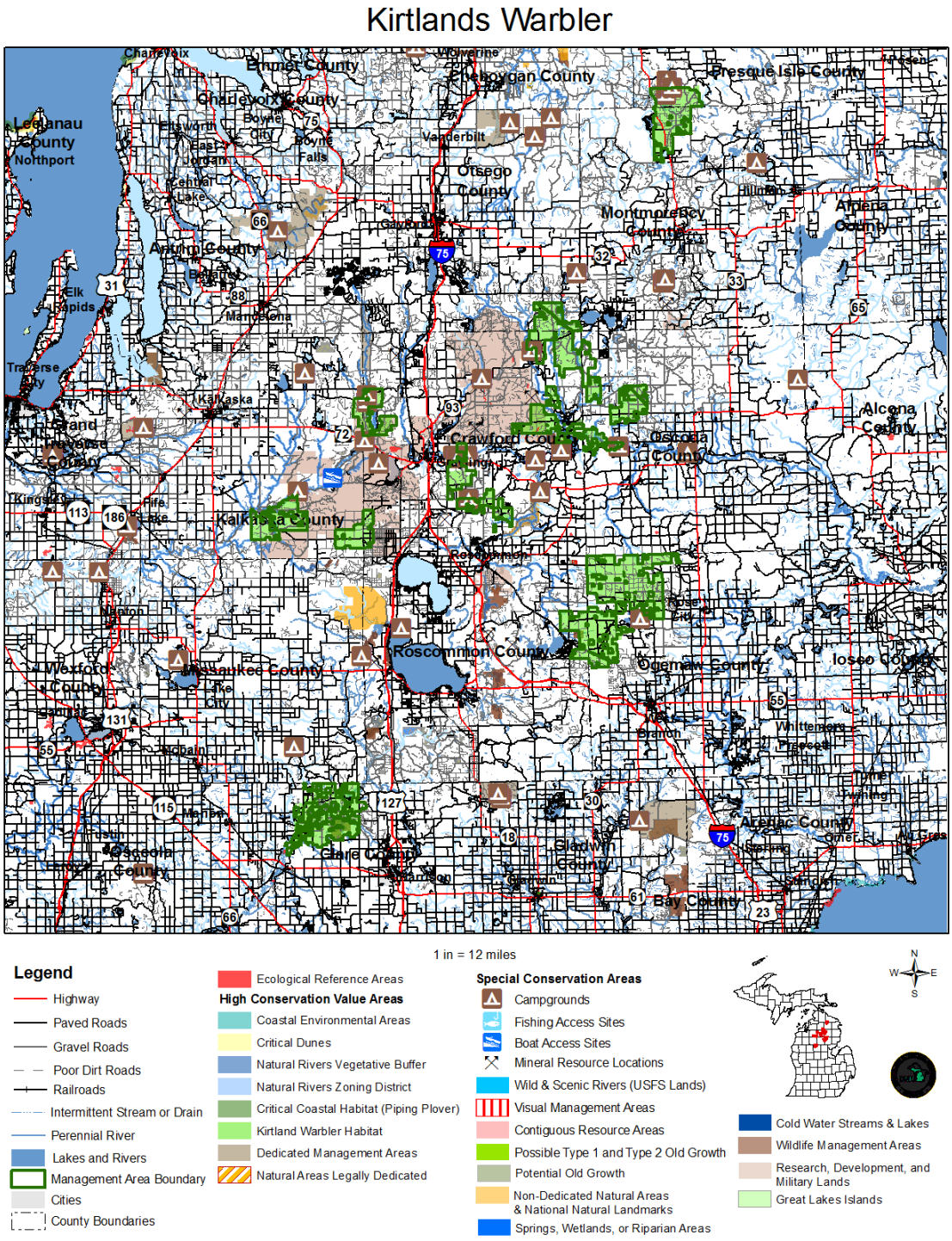


Figure 4.17.6. A map of the Kirtland's Warbler management area showing the special resource areas.

### 4.17.4 Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area may include branch mortality of seedling and sapling white pine and management should be adapted as follows:

- 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 4.17.3. 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.

Table 4.17.3. Locations of invasive species mapped in and within a five-mile buffer of the management area (Midwest Invasive Species Information Network database).

| Kirtland's Warbler - 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 |

### 4.17.5 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 4.17.1 and listed in Appendix F.

### 4.17.6 Fire Management

Disturbance through fire has played an important role in the initial propagation and maintenance of pine, oak and natural oak/pine types and small inclusions of aspen or grass/upland brush types. Efforts are currently being made to combine fuel-break maintenance with efforts to establish barrens that serve as fuel breaks and are beneficial to wildlife.

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:

- When feasible, re-introduce 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
- Consider creation of fire breaks to mitigate fire hazards.

**4.17.7 Public Access and Recreation**

Where access is limited on state forest land, the department will continue to seek access across adjacent private property. Occupied habitat will continue to be closed to public entry during the breeding and nesting season, except through guided tours. Areas with high and increasing concentrations of singing males will be closed from May 1 through September 10. Areas with low and declining concentrations will be closed from May 1 through August 15. Closure areas are posted along roads at 0.1-mile intervals. Generally, two-track roads not on the county road system will be closed permanently or at least during the posted closure period.

Recreational opportunities that co-exist with the primary objective of managing for the federally protected Kirtland's warbler are available within this management area. Goose Creek trail camp provides a vital resting site for equestrian users travelling the Shore-to-Shore Trail (Figure 4.17.1). Similarly, the Upper Manistee River State Forest Campground (Figure 4.17.3) provides recreational watercraft users with a safe overnight camping experience before paddling downstream on the Manistee River. Off-road vehicle trails (Figure 4.17.1) are common, providing marked designated riding opportunities which reduce unwanted cross-country riding within this critical habitat. Recreation activities can co-exist; however, any future recreational facilities will necessitate forethought and planning to insure adherence to the Kirtland's Warbler Recovery Plan. Existing recreational facilities within this management area are listed below:

- Guided tours attract bird watchers who come from all over the world to see the rare Kirtland's warbler.
- Trails, parking lots and campgrounds for off-road vehicle users, horseback riders or hikers will not be constructed in Kirtland's warbler essential habitat.
- Snowmobile trails are permitted in essential habitat. Snowmobile trails in essential habitat should be gated during the closure period if the habitat is inhabitable by the Kirtland's warbler.
- Snowmobile parking lots should not be constructed in essential habitat.
- Consideration will be given to relocating or buffering off-road vehicle, equestrian and hiking trails to prevent adverse effects to breeding Kirtland's warblers by trail users. Trails in existing and proposed additional essential habitat will be relocated to areas outside of essential habitat where possible. New trails will not be constructed in Kirtland's warbler essential habitat. Existing designated trails will remain in essential habitat only if they cannot be relocated outside of essential habitat without loss of recreational opportunity or experience. Kirtland's warbler nesting habitat will not be developed within 100 feet of trails that cannot be relocated. The Kirtland's Warbler Recovery Plan provides guidance on trails, parking lots, campgrounds and special events.

Campgrounds (Figure 4.17.6)

- Goose Creek Trail Camp
- Upper Manistee River State Forest Campground
- Tomahawk Creek Flooding State Forest Campground

Boating Access Sites (BASs) (Figure 4.17.6)

- Goose Creek Trail Camp BAS
- Upper Manistee River BAS
- Three Mile Bend BAS
- 612 BAS

Off Road Vehicle Trails (Figure 4.17.1)

- St. Helen to Geels Missaukee & Michigan Cycle Conservation Club Trail
- Ambrose Lake to Rose City Missaukee and Michigan Cycle Conservation Club Trail
- Rose City Trail
- Kalkaska Trail and Route
- Frederic Trail and Route
- Atlanta Trail and Route
- Red Bridge to Atlanta Missaukee & Michigan Cycle Conservation Club Trail

Snowmobile Trails (Figure 4.17.1)

- Various

Non-Motorized Trails (Figure 4.17.1)

- Shore-to-Shore Trail
- High Country Pathway
- Midland to Mackinaw Hiking Trail

**4.17.8 Oil, Gas and Mineral Development**

The Kirtland's Warbler management area has a relatively high density of gas and oil development with a total of 418 wells. For all essential habitats where the state of Michigan owns the mineral rights, leasing of these rights for oil and gas shall be for non-development only. Extraction of all other minerals, including sand and gravel, shall not be allowed in essential habitat.

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.