

## 4.11 MA 11 – Fox River Complex MA

### Summary of Use and Management

Vegetative management in the Fox River Complex management area (MA) (Figure 4.11.1) will produce various timber products, maintain or enhance wildlife habitat, protect special conservation areas and high conservation value areas and provide for forest based recreational uses. The Fox River and the East Branch Fox River and their tributaries are natural rivers and have management plans associated with them. Management activities in some portions of this management area may be constrained by poor access due to the low, wet character of the landscape. Expected issues in this 10-year planning period include introduced pests, diseases and invasive species.

#### Introduction

The Fox River Complex management area is located in the west part of the eastern Upper Peninsula in Schoolcraft and Luce Counties. The Seney National Wildlife Refuge borders the southwest of the management area. It has 27,623 acres of state-owned land. Primary attributes include the low, wet forest cover types and the natural rivers and their associated high conservation value areas. Additional attributes which were important in identifying this management area include:

- The majority of the management area falls within the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995) with a very small portion extending into the Niagaran Escarpment and Lake Plain subsection 8.1.
- Landforms of lacustrine origin. Broad, poorly drained embayments contain beach ridges and depressions (swales), sand spits, transverse sand dunes and sand bars. Deltaic deposits occur along the northern margins of the embayments, where glacial meltwater streams carried massive amounts of sand into the shallow waters.
- Recreational opportunities include: snowmobiling, off-road vehicle (ORV) riding, boating, hiking, hunting and fishing.

The famous author, Ernest Hemmingway, fished the Fox River and wrote about his experiences in the story titled “*Big Two-Hearted River*”. The town of Seney, at the intersection of highways M-28 and M-77, was at one time a large logging community.

The state land in this management area is concentrated into large blocks with private holdings scattered throughout. The majority of this management area falls within the Shingleton Forest Management Unit with the east portion in the Newberry Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.11.1.

Table 4.11.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Fox River Complex management area, eastern Upper 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
Lowland Open/Semi-Open Lands	26%	7,234	0	7,234	0	0	7,234	0	0
Lowland Conifers	20%	5,545	396	5,149	572	0	5,545	572	0
Lowland Spruce/Fir	9%	2,575	412	2,163	437	0	2,575	240	0
Cedar	7%	1,865	0	1,865	117	0	1,865	117	0
Aspen	6%	1,728	23	1,705	76	0	1,728	284	0
Northern Hardwood	6%	1,699	46	1,653	0	530	1,699	0	801
Red Pine	5%	1,477	167	1,310	145	381	1,477	145	541
Lowland Deciduous	4%	1,066	326	740	251	0	1,066	82	0
Upland Open/Semi-Open Lands	3%	801	0	801	0	0	801	0	0
Jack Pine	3%	792	56	736	8	0	792	105	0
Tamarack	3%	732	448	284	139	0	732	41	0
Misc Other (Water, Local, Urban)	0%	136	0	136	0	0	136	0	0
Others	7%	1,973	694	1,279	163	108	1,973	137	221
<b>Total</b>	<b>100%</b>	<b>27,623</b>	<b>2,568</b>	<b>25,055</b>	<b>1,908</b>	<b>1,019</b>	<b>27,623</b>	<b>1,723</b>	<b>1,563</b>

Others include: paper birch, natural mixed pines, lowland mixed forest, lowland aspen/balsam poplar, upland mixed forest, white pine, hemlock, upland conifers, upland spruce/fir, mixed upland deciduous and planted mixed pines.

# Fox River Complex

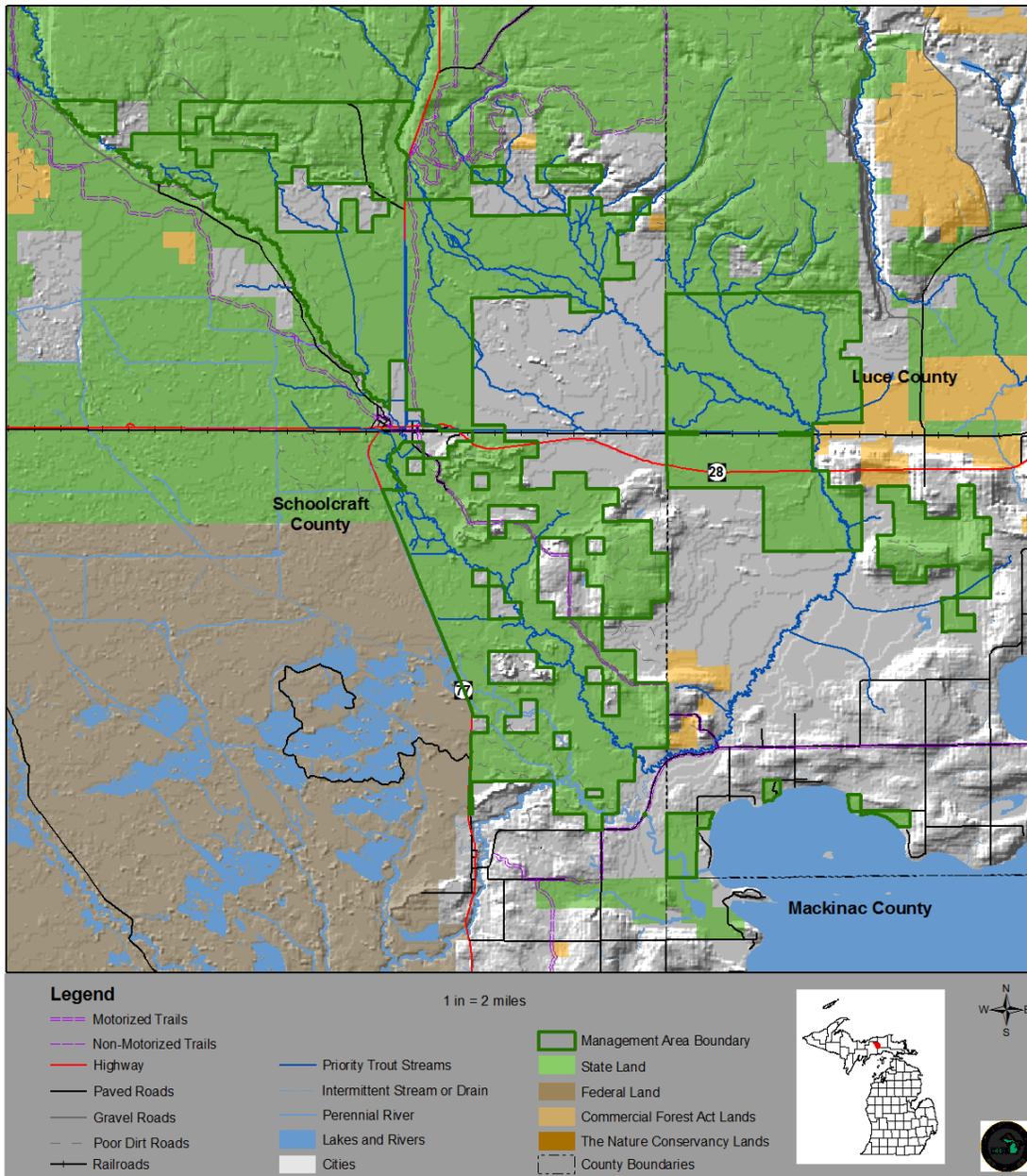


Figure 4.11.1. Location of the Fox River Complex management area (dark green boundary) in relation to surrounding state forest land other ownerships and the town of Seney.

## 4.11.1 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 and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### **Section 4.11.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

##### Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling approximately 7,234 acres (26%). This category is a combination of lowland shrub (3,598 acres), bog (1,704 acres), marsh (1,554 acres) and treed bog (378 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. The lowland shrub and marsh stands contain many ridges and islands of pine. These large wet cover types contribute to the access issues in the management area.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

##### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values; and
- Lowland shrub stands may be managed for wildlife habitat and/or for biomass, if markets materialize.

#### **Section 4.11.1.2 Forest Cover Type Management – Lowland Conifers**

##### Current Condition

Lowland conifer occurs on 5,545 acres (20%) of the management area (Table 4.11.1). Lowland conifer stands in the management area have been successfully harvested and regenerated resulting in stands in all age classes (Figure 4.11.2). Access throughout most of this cover type is limited due to the wet sites. Approximately 14% of the stands have been classified as uneven-aged stands and have trees of all sizes and ages.

Currently, there are 171 acres with a final harvest prescribed. Approximately 32 acres that are prescribed for harvest in other cover types are expected to convert to lowland conifers after harvest. These acres are shown in Figure 4.11.2 in the regeneration prescriptions column. There are 396 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Conifer stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in the formation of a broad range of successional stages.

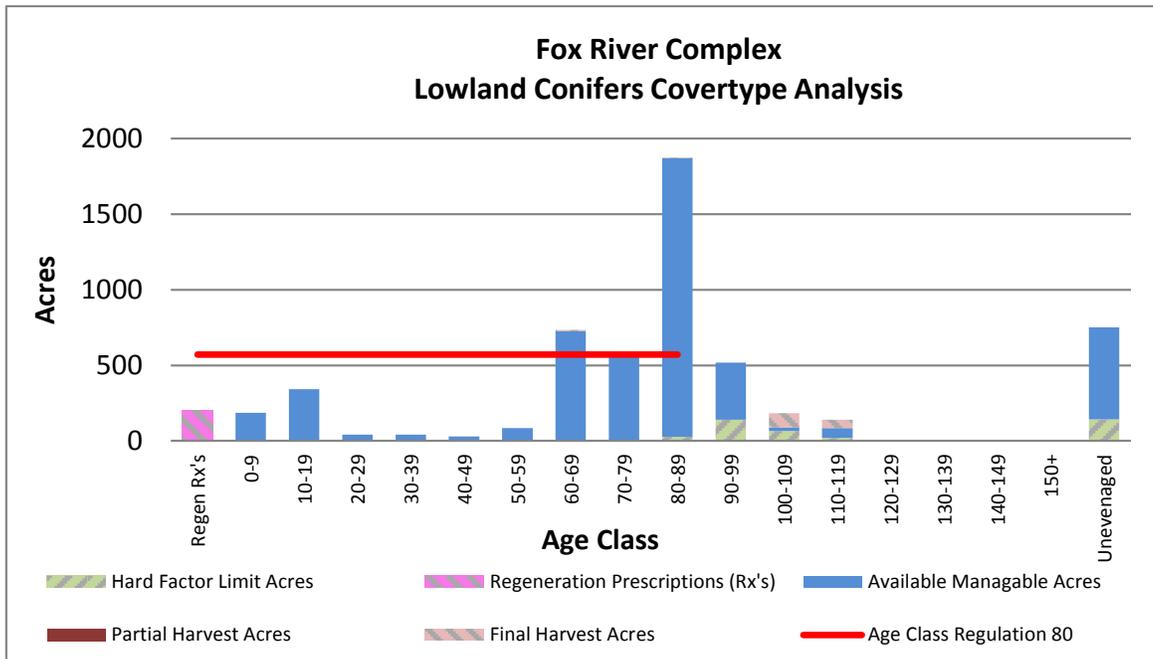


Figure 4.11.2. Age-class distribution of lowland conifers in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest is 572 acres of lowland conifers to work toward balancing age classes with natural regeneration of species currently on site expected.

Long-Term Management Objectives

- Balance the age-class distribution of accessible lowland conifers providing a regulated harvest of approximately 572 acres of lowland conifers per decade (red line in Figure 4.11.2).

**Section 4.11.1.3 Forest Cover Type Management – Lowland Spruce/Fir**

Current Condition

Lowland spruce/fir occurs on 2,575 acres (9%) of the management area (Table 4.11.1). Lowland spruce/fir stands have been successfully harvested and regenerated in this management area in the past (Figure 4.11.3). Many of these stands are a combination of black spruce and jack pine. Lowland spruce/fir stands are often found adjacent to lowland shrub and marsh stands and access is often difficult.

Currently, there are 245 acres with a final harvest prescribed. There are 412 acres of lowland spruce/fir that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where harvest opportunities are limited by access issues, stands will be subject to natural succession.

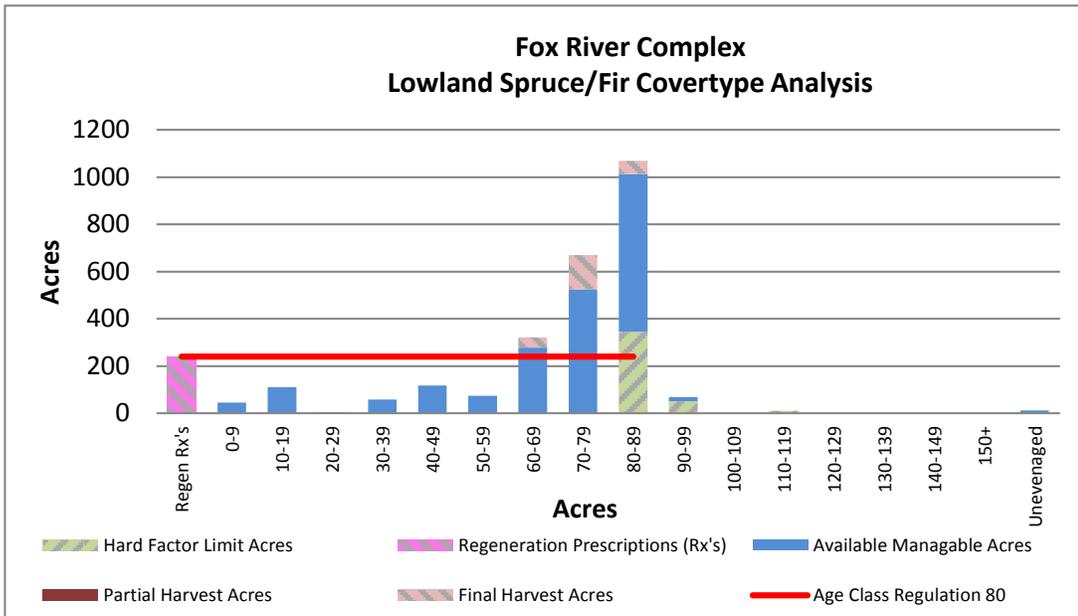


Figure 4.11.3. Age-class distribution of lowland spruce/fir in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland spruce/fir will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest is 437 acres of lowland spruce/fir. The increase from the regulated amount is due to the current age class structure where there are a large number of mature stands. Natural regeneration of species currently onsite is expected after harvest.

Long-Term Management Objectives

- Balance the age-class structure of available lowland spruce/fir providing a regulated harvest of approximately 240 acres each decade.

**Section 4.11.1.4 Forest Cover Type Management – Northern White Cedar**

Current Condition

Cedar stands occur on 1,865 acres (7%) of the management area (Table 4.11.1). Cedar stands within the deer wintering special conservation areas will be managed for closed canopy winter habitat for deer. A small amount of cedar harvest and regeneration has successfully occurred in this management area in recent years (Figure 4.11.5). There is a need to address future cedar cover within the deer wintering complexes. Limited cedar harvests will occur outside the wintering complexes recognizing that cedar may take many years to regenerate. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently, there are 50 acres of cedar with a final harvest prescribed. At this time, there are no stands with site conditions limiting harvest.

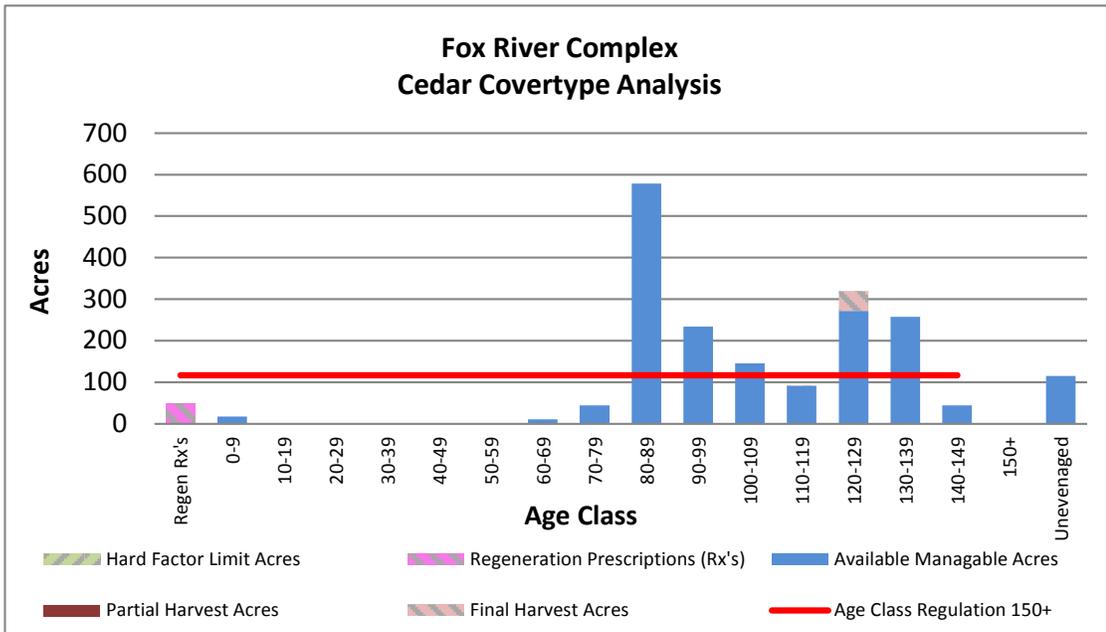


Figure 4.11.5. Age-class distribution of cedar in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Where deer wintering activities are not a concern cedar will be maintained on operable sites through even-aged management with acres balanced between 0-159 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest is 117 acres of cedar. However, harvest of this type, if it occurs, may vary widely from the projected harvest, in order to meet the long-term management objectives; and
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable where harvesting in this cover type occurs.

#### Long-Term Management Objectives

- Within deer wintering special conservation areas, focus cedar management on winter habitat for deer; and
- Outside deer wintering areas, look for opportunities to regenerate cedar providing a regulated harvest of approximately 117 acres of cedar per decade.

### **Section 4.11.1.5 Forest Cover Type Management – Aspen**

#### Current Condition

Aspen occurs on 1,728 acres (6%) of the management area (Table 4.11.1). Aspen stands are distributed on lake plains, outwash plains and moraines on a range of sites with Kotar habitat types of PARVAa, ATFD, AFPO and AFOAs (see Appendix E). Aspen has been consistently harvested and regenerated over the last 40 years, resulting in the majority of the aspen acreage now occurring in the younger age classes (Figure 4.11.6).

There are 36 acres that have a final harvest prescribed. There are some other cover types that are expected to convert to aspen after harvest and some aspen stands that are expected to convert to other cover types after harvest. These acres are shown in the regeneration prescriptions column of Figure 4.11.6. The total aspen acreage is expected to remain similar. There are 23 acres of aspen that have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen areas will eventually succeed to late successional species.

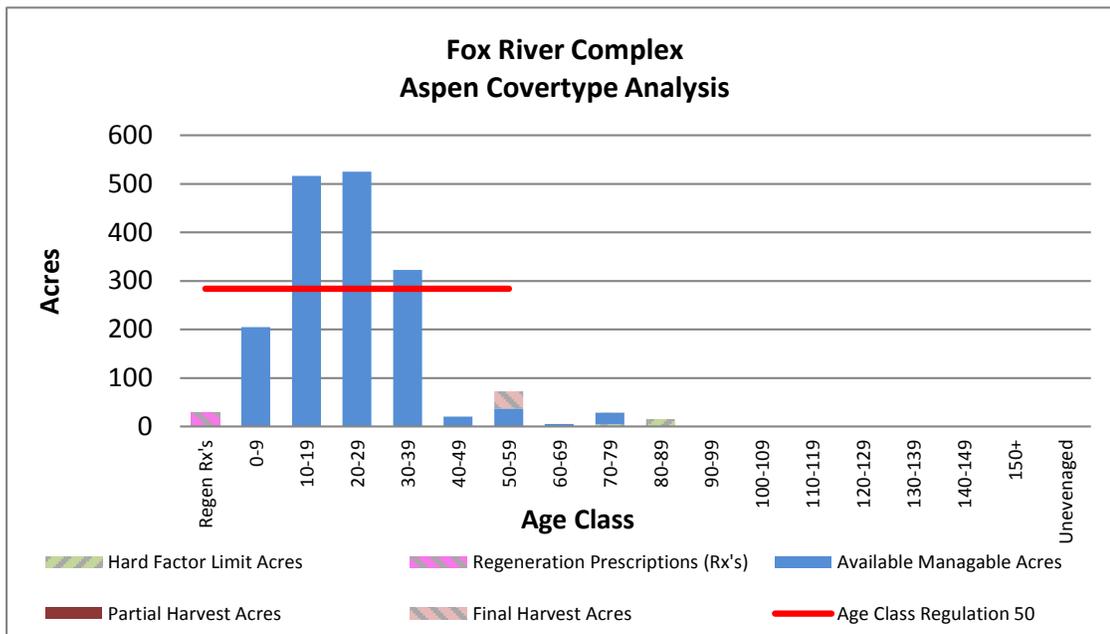


Figure 4.11.6. Age-class distribution of aspen in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest of aspen is 76 acres which is less than the regulated amount due to the current age-class structure where the majority of stands are less than 40 years old.

#### Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing for a regulated final harvest of approximately 284 acres per decade.

### **Section 4.11.1.6 Forest Cover Type Management – Northern Hardwoods**

#### Current Condition

Northern hardwood stands occur on 1,699 acres (6%) of the management area (Table 4.11.1). Northern hardwoods are distributed throughout the management area on ground moraines, moraines and outwash plains with Kotar habitat types of ATFD, AFPO and AFOAs (see Appendix E). These mesic medium to rich sites have high potential to grow quality trees. The northern hardwood stands are composed of sugar maple and red maple in combination with beech, yellow birch, hemlock and black cherry in lesser amounts. In an effort to maximize tree quality the majority of the stands have been managed using single tree selection, generally every 20 years, maintaining structural and species diversity to work towards an uneven-aged state

Beech bark disease is found throughout the management area resulting in high beech mortality. Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently, 32 acres have a partial harvest or selection assigned (Figure 4.11.7). There are 46 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

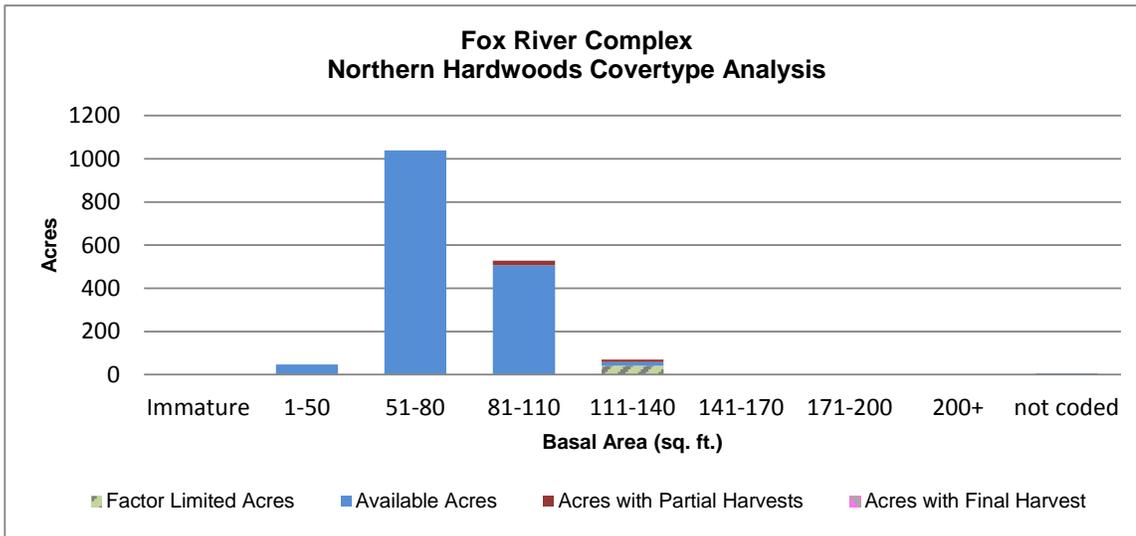


Figure 4.11.7. Basal area distribution of northern hardwoods in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwoods will be maintained on operable sites using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands while providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected partial or selection harvest is 530 acres of northern hardwood;
- Evaluate beech dominated forests to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.11.1.7 Forest Cover Type Management – Red Pine**

Current Condition

Red pine occurs on 1,477 acres (5%) of the management area (Table 4.11.1). Red pine is distributed throughout the management area on outwash plains, dunes, and moraines with Kotar habitat types of PVE, PARv and PARVAa (see Appendix E). While most of the stands in the 40-59 year age classes (Figure 4.11.8) are planted red pine stands, the majority of the total red pine acres are in natural stands. Many of the natural red pine stands have had shelterwood or seed tree harvests, followed by natural regeneration, which has resulted in some two-aged and uneven-aged stands. For accessible stands over rotation age, conduct stand-replacement harvests using shelterwood/seed tree systems when possible to encourage natural regeneration. Where necessary, planting will be used to regenerate the stands. Natural red pine stands in older age classes may be found on small islands within marshes and are often difficult to access.

Currently, there are 309 acres with a final harvest and 155 acres with a partial harvest or thinning prescribed. There are 167 acres of red pine that have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Small islands of red pine within the large marsh complexes may never have access for harvesting and will remain until natural senescence.

## Desired Future Condition

- Red pine will be maintained and managed on operable sites through thinning until stand replacement harvest at economic maturity with acres balanced between 0-89 years of age. This will provide for continual harvest, wildlife habitat and recreational opportunities. Inaccessible stands of red pine may be allowed to reach biological maturity (over 200 years).

## 10-Year Management Objectives

- The 10-year projected red pine final harvest is 145 acres to work toward balancing of age classes; and
- The 10-year projected red pine partial harvest (thinning) is 381 acres.

## Long-Term Management Objectives

- Balance the age-class structure of red pine providing for a regulated final harvest of approximately 145 acres per decade; and
- Stands will be periodically thinned until they meet silvicultural criteria.

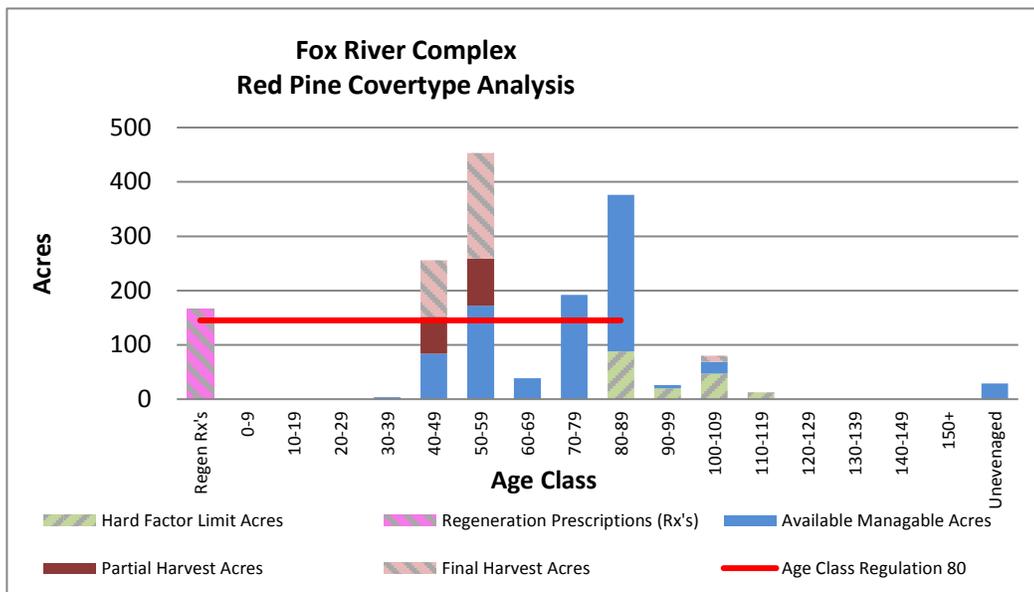


Figure 4.11.8. Age-class distribution of red pine in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

## Section 4.11.1.8 Forest Cover Type Management – Other Types

### Current Condition

There are many other cover types that have less than 5% of the total management area acres (Table 4.11.1) including: lowland deciduous (1,066 acres or 4%), upland open/semi-open lands (801 acres or 3%), jack pine (792 acres or 3%) and tamarack (732 acres or 3%).

The “other types” category (1,973 acres or 7%) is a combination of forested types that have 2% or less of the total acres and includes: paper birch, natural mixed pines, lowland mixed forest, lowland aspen/balsam poplar, upland mixed forest, white pine, hemlock, upland conifers, upland spruce/fir, mixed upland deciduous and planted mixed pines. The majority of these cover types have been managed as even-aged stands. White pine and mixed cover types with high basal area may be thinned prior to final harvest. Following general timber management guidelines, perform regeneration harvests in even-aged forested cover types, attempting to balance the age classes where possible. Natural regeneration of species currently on site is expected.

Currently, there are 1,524 acres of these other minor cover types that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunity.

### 10-Year Management Objectives

- The projected 10-year final harvest is 251 acres of lowland deciduous, 139 acres of tamarack and 163 acres of other types; and
- The projected 10-year partial harvest is 108 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.11.2 – Featured Wildlife Species Management**

The primary wildlife management desire in this area is to maintain diversity in managed forest types, retain within stand diversity and structure and connectivity between forest types.

### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land use.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions, use and management activities that facilitate fragmenting state lands within the management area.

### **Northern Goshawk**

The goal for northern goshawk in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on maintaining contiguous blocks of suitable habitat, providing structural diversity within stands and limiting disturbance to nesting birds in priority areas.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For northern goshawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under 4 inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Regenerate jack pine to dense, fully stocked stands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting), and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance and retain the maximum residual.

#### **Spruce Grouse**

The goal for spruce grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on retention of mixed conifers on riparian/lowland edges, the increase of in stand species diversity and landscape level planning to ensure populations are not isolated.

#### Wildlife habitat specifications:

- In jack pine harvests leave mixed conifer and/or jack pine retention strips of mature trees along riparian corridors and lowland margins as well as along upland edges.
- Maintain spruce seed trees through retention, especially at lowland margins.
- Maintain or increase diversity of conifer stands especially along lowland edges.
- Large clearcuts may isolate populations of spruce grouse so landscape level planning must take into account this species' need for low-density mixed-conifer travel corridors to connect suitable stands.
- Ensure black spruce recruitment/regeneration is reliable where harvested.

#### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance, available summer and winter habitat, timber management and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the Department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.

- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.11.3 – 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, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed seven listed species occurring in the management area as listed in Table 4.11.2. 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 4.11.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Fox River Complex 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
<b>Birds</b>								
Northern goshawk	<i>Accipiter gentilis</i>	SC/G5/S3	Confirmed	PS	Very High	Mesic northern Forest	Northern Hardwood	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
						Pine barrens	Jack Pine	Early
						Dry northern forest	Jack Pine, Red Pine	Early
						Emergent Marsh	Lowland open/semi-open	N/A
Kirtland’s warbler	<i>Dendroica kirtlandii</i>	LE/E/G1/S1	Confirmed	PS	Very High	Bog	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Open dunes	Upland open/semi-open	N/A
						Intermittent wetland	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Open dunes	Upland open/semi-open	N/A
						Intermittent wetland	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
<b>Butterfly</b>								
Frigga fritillary	<i>Boloria frigga</i>	SC/G5/S3S4			Low	Bog	Lowland open/semi-open	N/A
<b>Plants</b>								
Fir clubmoss	<i>Huperzia selago</i>	SC/G5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Intermittent wetland	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.

Special conservation areas in this management area are potential old growth areas, cold water streams, high priority trout streams (Fox River) and a deer wintering complex in the southeast. Concentrated recreational area special conservation areas (boat access sites) are described in the recreation section 4.11.6 below. In addition, approximately 2,500 acres were identified as potential old growth and these stands are also special conservation areas until they are evaluated.

The Fox River system is a state designated natural river and along with its corridor is a high conservation value area. The Fox River Natural River Plan (DNR, Nov. 3, 1988) contains specific requirements for management in this area (Figure 4.11.9).

There have been no ecological reference areas identified in the Fox River Complex management area.

## Fox River Complex

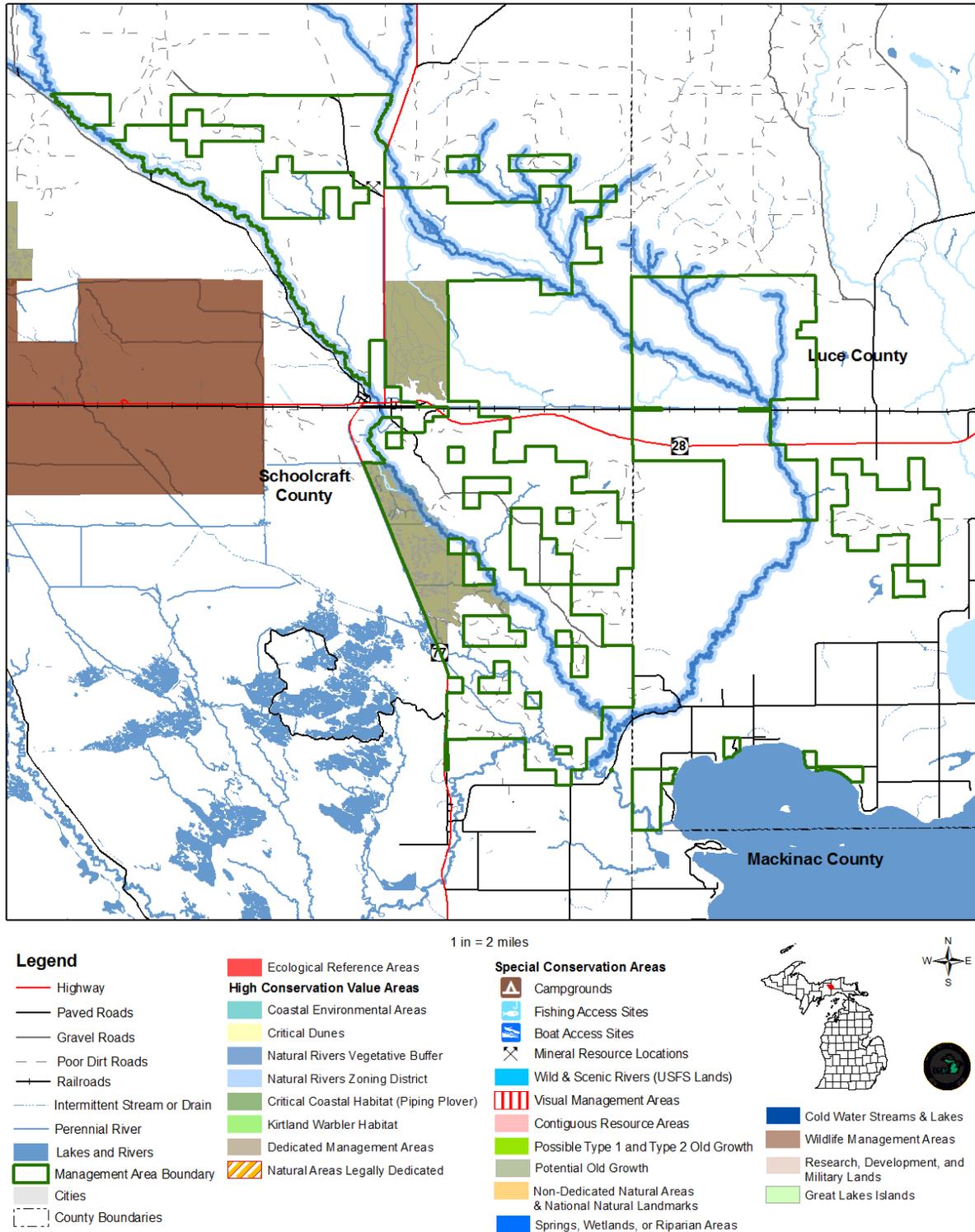


Figure 4.11.9. A map of the Fox River Complex management area showing the special resource areas.

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.

#### 4.11.4 – 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 by major cover type include:

- Northern hardwoods: beech bark disease;
- Aspen: white trunk rot and *Hypoxylon* canker;
- Lowland conifers and spruce: spruce budworm, eastern larch beetle and larch casebearer; and
- Red pine: red-headed pine, pine engraver and *Scleroderris*.

For further information on forest health refer to section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. Glossy buckthorn has been documented within the management area. Glossy buckthorn, leafy spurge, purple loosestrife, reed canary grass and wild parsnip have been documented within a five-mile buffer of the management area (Table 4.11.3). Monitoring efforts should specifically look for new populations of these species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species 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.

A cooperative program between the DNR and the Seney National Wildlife Refuge has reduced the amount of glossy buckthorn in this area through cutting, herbicide and burning. Continue with efforts to remove of glossy buckthorn in the area.

Table 4.11.3. Invasive plant species within or near the Fox River Complex management area (Data from the Michigan Invasive Plant Identification Network database).

<b>Fox River Complex - FRD MAs</b>	<b>Cases within FRD Areas</b>	<b>Cases within 5 Mile Buffer</b>	<b>Total number of cases</b>	<b>Total number of different Invasive Species</b>
	8	9	17	5
<b>Invasive Species within FRD Areas</b>	<b>Occurrences</b>	<b>Invasive Species within 5 Mile Buffer</b>	<b>Occurrences</b>	
Glossy Buckthorn <i>Rhamnus frangula</i>	8	Glossy Buckthorn <i>Rhamnus frangula</i>	4	
-	-	Leafy Spurge <i>Euphorbia esula</i>	2	
-	-	Purple Loosestrife <i>Lythrum salicaria</i>	1	
-	-	Reed Canary Grass <i>Phalaris arundinacea</i>	1	
-	-	Wild Parsnip <i>Pastinaca sativa</i>	1	

#### **4.11.5 – Fire Management**

Dominated by lowland soils, this area may have been subject to a higher fire frequency than normally expected. There is evidence that lightning ignitions in these areas under summer drought could support large fire growth. Adjacent barrens and dry forests to the north also are sources of ignitions that may have brought fire into the management area.

- Though no prescribed burns have been planned or conducted within the management area, natural regeneration to maintain pine types may include burn prescriptions to discourage competing hardwoods and prepare seedbed.
- With fishing access sites for both Manistique Lake and the Fox River and the town of Seney centrally located, prevention messages concerning campfires and smoking source fires would be appropriate.
- The Fox River Zone Dispatch plan falls within the management area and calls for aggressive suppression response based on current fire danger.
- A large portion of the management area has limited access for firefighting equipment.

#### **4.11.6 – Public Access and Recreation**

Although M-28 and M-77 are in this management area, access for management is limited throughout much of this management area due to lack of trail roads because of rivers, creeks and low, wet ground.

Recreational facilities found here include snowmobile trails (Figure 4.11.1) and boat access sites on Manistique Lake and the Fox River.

Fishing and hunting are very popular forms of recreation in this management area. Dispersed camping is popular in certain areas along the Fox River.

#### **4.11.7 – Aquatic Resource Management**

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

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

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. A part of the Manistique River system has been designated as high priority trout stream in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescriptions Geographic Decision Support System and in Figure 4.11.1.

#### **4.11.8 – Minerals**

Surface sediments consist of primarily peat and muck with minor lacustrine (lake) sand and gravel. There is insufficient data to determine the glacial drift thickness. Potential for sand and gravel pits in the general area appears to be limited.

The Ordovician Queenston Shale, Big Hill Dolomite, Stonington Formation, Utica and Collingwood Shales and Trenton Formation subcrop below the glacial drift. The Trenton is quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two in Luce and five in Schoolcraft). No economic oil and gas production has been found in the Upper Peninsula.

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

There is a mineral lease for a sand pit on state owned land north of Seney.