

4.8 MA 8 – Danaher Kingston Outwash Management Area

Summary of Use and Management

The Kingston Plains and the Danaher Plains are large openings that are managed for a suite of open-land species including sharp-tailed grouse, merlin and upland sandpiper. Vegetative management in the Danaher Kingston Outwash management area (MA) (Figure 4.1.1) will emphasize maintaining these large opening complexes; providing timber products; protecting unique areas and threatened, endangered and special concern species; and providing for forest based recreational uses. Wildlife habitat management objectives include enhancing the large opening complexes and providing opportunities for hunting and other wildlife related recreation. Timber management objectives include improving the age-class distribution of jack pine and red pine; and consolidating smaller plantations and openings into larger stands to better suit management objectives. Expected issues in this 10-year planning period include illegal use of off-road vehicles, introduced pests and diseases such as jack pine budworm and beech bark disease, and introduction and spread of invasive species.

Introduction

The Danaher Kingston Outwash management area is located in the northwest part of the eastern Upper Peninsula in Alger, Luce and Schoolcraft counties. It has 58,804 acres of state-owned land. Production of pine for timber and management of open-lands for wildlife are the primary attributes of this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce subsection (8.2) of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of sandy outwash plains, with corridors associated with streams.
- Recreational opportunities include: hiking, camping, fishing, berry picking and hunting, and motorized recreation.
- Special features include the Stanley Lake Wildlife Flooding, natural rivers and a pine barrens natural community.

The original forests of hemlock, northern hardwoods and mixed pine were altered by 1800s logging, and subsequent forest fires. Many of the large openings that were created by the historic logging and fires are maintained as habitat for open-land dependent wildlife species. During the 1950s, it was decided to divide the Kingston plains area into three sections where the west portion along the Adam's Trail would emphasize timber production, the center part would be a control area and the east portion would emphasize wildlife management.

In the 1960s, throughout the management area, some of the large openings were planted to jack pine and red pine in a checker board fashion with grassy openings in between planted stands. The current vegetative cover for this management area is mainly grass, red pine, jack pine and white pine, with smaller amounts of aspen and hardwoods.

Remains of old railroad grades and pine camps can still be found. The Kingston Plains is a well-known large opening with pine stumps from the historic logging days; as it is relatively close to Pictured Rocks National Lakeshore, many people stop to view the large fields of stumps. The Danaher Plains and other old logging openings are also found within this management area. A Civilian Conservation Corps camp was located north of Seney near M-77.

State-owned land in this management area is concentrated, with very few private parcels. The majority of the 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 4.8.1.

Table 4.8.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Danaher Kingston 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
Upland Open/Semi-Open Lands	24%	14,104	0	14,104	0	0	14,104	0	0
Red Pine	20%	11,655	73	11,582	436	3,856	11,655	1,287	5,809
Jack Pine	16%	9,397	0	9,397	425	0	9,397	1,342	0
White Pine	11%	6,737	336	6,401	1,383	536	6,737	582	1,430
Aspen	10%	5,960	121	5,839	413	0	5,960	973	0
Northern Hardwood	7%	4,085	19	4,066	0	1,461	4,085	0	1,512
Lowland Open/Semi-Open Lands	3%	2,042	0	2,042	0	0	2,042	0	0
Lowland Spruce/Fir	2%	1,137	103	1,034	165	0	1,137	115	0
Misc Other (Water, Local, Urban)	1%	518	0	518	0	0	518	0	0
Others	5%	3,169	239	2,930	537	440	3,169	309	527
Total	100%	58,804	892	57,912	3,359	6,293	58,804	4,608	9,278

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

4.8.1 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 forest products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide.

Section 4.8.1.1 Forest Cover Type Management – Upland Open/Semi-Open Lands

Current Condition

Upland open/semi-open lands occur on 14,104 acres (24%) of the management area (Table 4.8.1). This category is a combination of the following non-forested land cover types: herbaceous open land (11,764 acres), upland shrub (1,119 acres), low-density trees (1,080 acres) and bare/sparsely vegetated (141 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife. A large portion of these non-forested areas are a result of turn of the century logging and subsequent fires; the most well-known are the historical stump fields of the Kingston Plains. The majority of these open areas are on Kalkaska and Rubicon sands with low productivity. Herbaceous open land is a general term and in this area represents the low vegetation consisting of bracken fern, blueberry, reindeer moss, blue *Cladonia* and black huckleberry. Grasses and sedges have very little ground coverage in most of these openings. While opening maintenance occurs in the Kingston Plains, prescribed burning has not been used, as it would eliminate the historic stumps for which the area is known.

Danaher Kingston Outwash

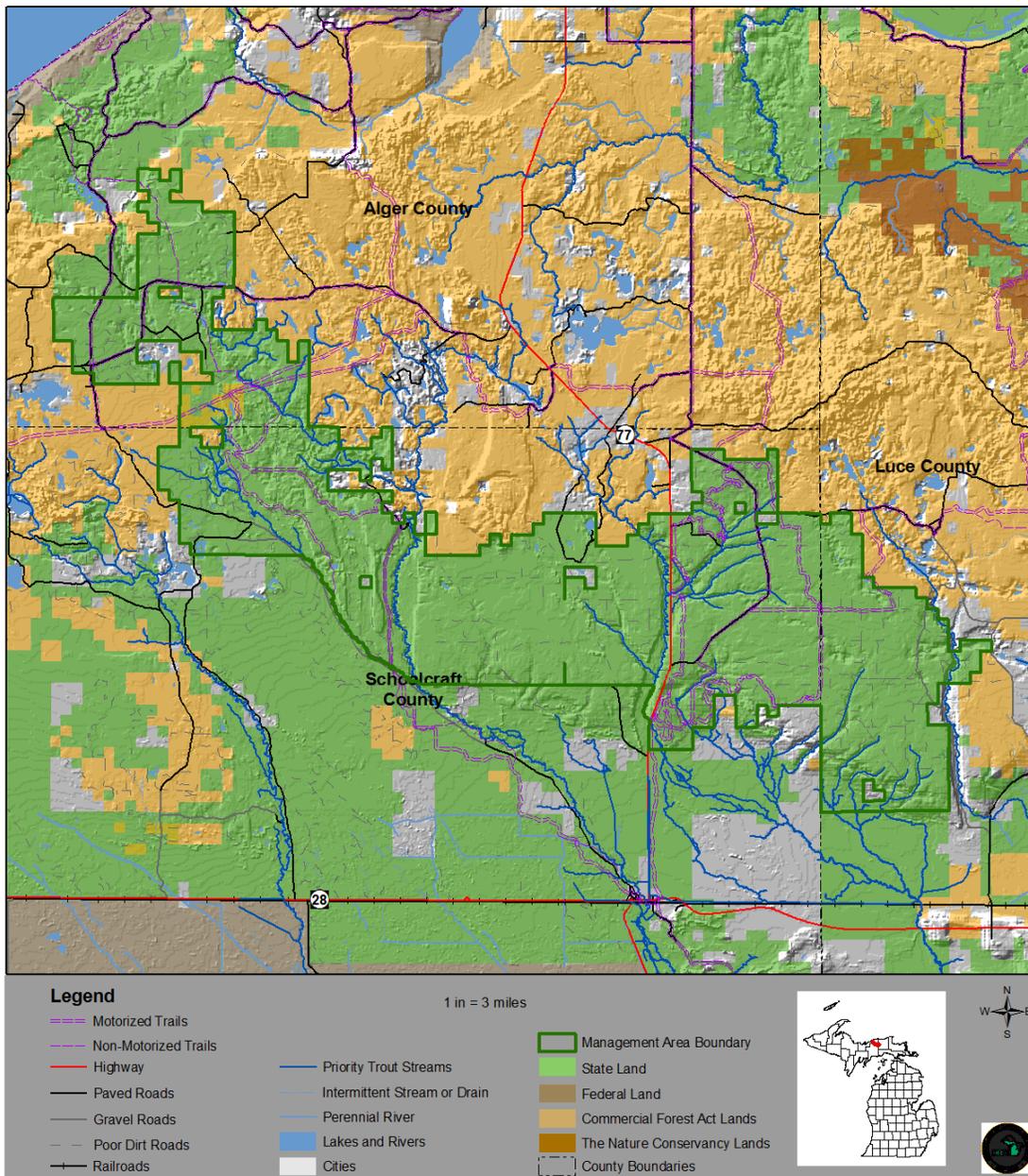


Figure 4.8.1. Location of the Danaher Kingston Outwash management area (dark green boundary) in relation to surrounding state forest lands and other ownerships within Alger, Luce and Schoolcraft Counties.

Desired Future Condition

- Maintain the historic value of the Kingston Plains stump fields through opening maintenance in key areas, thus benefiting open land wildlife species. Continue opening maintenance programs in other large openings, such as the Danaher Plains, within the management area.

10-Year Management Objectives

- Continue with opening maintenance projects where appropriate; and

- Consolidate small grass openings into larger blocks to enhance landscape values for open land species. This will be accomplished by planting some grass stands to red or jack pine, and converting some red or jack pine stands to grass, depending on site productivity.

Long-Term Management Objectives

- Maintain the large herbaceous open lands to provide habitat.
- Consider natural succession of small grass stands to white pine where site conditions favor quality white pine and they are outside of the large wildlife openings.

Section 4.8.1.2 Forest Cover Type Management – Red Pine

Current Condition

Red pine grows on 11,655 acres (20%) of this management area (Table 4.8.1). Most of the red pine stands in the 40-59 year age classes were planted in the 1950-60's, and are interspersed with openings (Figure 4.8.2). Red pine stands in older age classes in this management area are of natural origin. Rubicon and Kalkaska sands are dominant and the majority of red pine stands are on outwash plains with Kotar habitat types of PArVAa, PArV and PVE (see Appendix E). Large fires that occurred after early 1900s logging severely depleted the soils throughout much of the area. Many of the planted red pine stands on these depleted soils (PVE) have a low site index. The planted red pine stands only recently became large and dense enough to thin, making red pine timber production an important focus in this area. Red pine can be expected to persist in climax stands due to their longevity and ability to thrive on the sandy soils here.

Red pine stands are thinned as soon as products can be harvested, generally once they reach age 40. Thinning on good sites occur approximately every 10 years, with longer intervals on poor sites, until stand replacement harvest at economic maturity at approximately age 80. Natural stands will be regenerated naturally through shelterwood and seed tree harvesting when possible. As planted red pine stands become available for final harvest, they may be consolidated when replanted or even moved to higher-quality sites.

Currently, there are 63 acres of red pine with a final harvest prescribed and 1,610 acres prescribed for partial harvest or thinning. There are some stands of red pine that are prescribed to be converted to other types after harvest and other cover types that are expected to convert to red pine through harvest and planting. These acres are already accounted for in the regeneration prescriptions column in Figure 4.8.2. The total acres of red pine are intended to remain similar to what they are now. There are 73 acres of red pine that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

Desired Future Condition

- Red pine will be maintained and managed with a thinning regime until stand replacement harvest at economic maturity with acres balanced between 0-89 years of age to provide for continual harvest, available wildlife habitat and recreational opportunities; and
- Inaccessible natural red pine acres may be managed for an extended rotation to allow stands to reach a biological maturity of 200+ years.

10-Year Management Objectives

- The 10-year projected final harvest of red pine is 436 acres, to work toward balancing the age classes. The decrease from the regulated amount is due to the lack of acres in older age classes, and the large number of acres in the 50-59 age class where they are available for thinning; and
- The 10-year projected partial harvest or thinning of red pine is 3,856 acres.

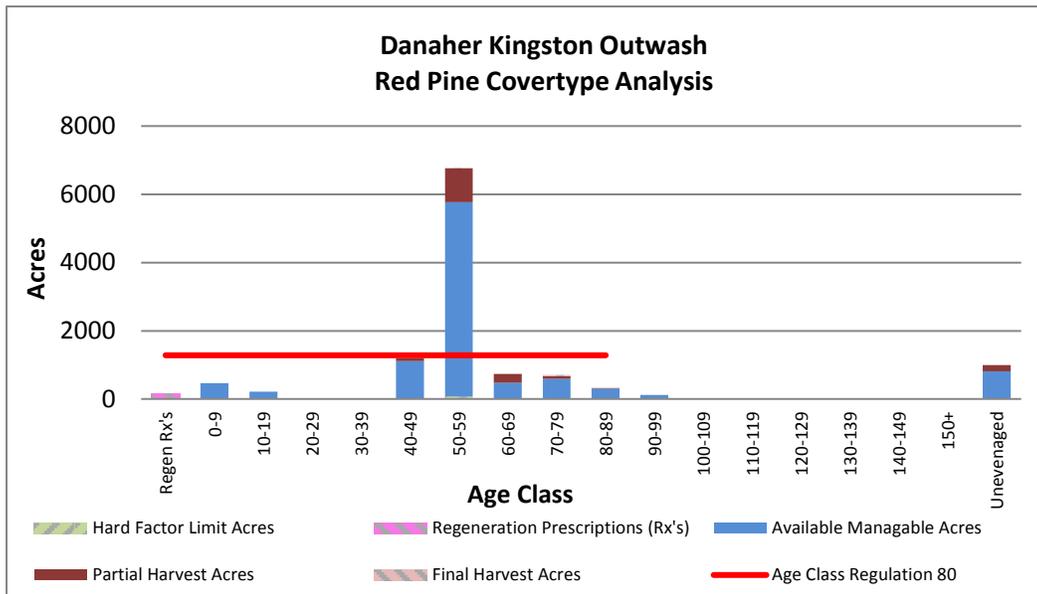


Figure 4.8.2. Age-class distribution of red pine in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of red pine, providing a regulated harvest, using an 80-year rotation age, of 1,287 acres of final harvest per decade (red line in Figure 4.8.2); and
- Consolidate the smaller blocks of planted red pine and the herbaceous openings in between to provide larger acreages of contiguous habitat (the total acreage of red pine is expected to remain similar to the current amount, though the actual location of the stands may be moved to reflect site conditions).

Section 4.8.1.3 Forest Cover Type Management – Jack Pine

Current Condition

Jack pine occurs on 9,397 acres (16%) of the management area (Table 4.8.1). Nearly all of the jack pine stands in this management area are found on Rubicon and Kalkaska sands, with Kotar habitat classes of PVE and PArV (see Appendix E). These outwash plains are very dry to dry-poor nutrient sites which jack pine grows well on. In recent years, jack pine budworm outbreaks have adversely affected some stands. Jack pine has been consistently harvested and regenerated over the past 40 years (Figure 4.8.3). While most of the stands were regenerated naturally through scarification or prescribed fire, some were replanted. Many of the planted stands of jack pine are in 10, 20 and 40 acre blocks and are interspersed with open areas of the same size.

Currently, there are 1,038 acres of jack pine with a final harvest prescription assigned. Some jack pine stands that are currently prescribed for harvest will be converted to other types and some other types that are currently prescribed will be converted to jack pine after harvest. This has already been included in the total acreage and is shown in the regeneration prescriptions column in Figure 4.8.3. The total number of jack pine acres is expected to remain similar. There are 425 acres of jack pine 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. Jack pine stands that are inaccessible for commercial harvest will eventually succeed to mid- or late-successional species.

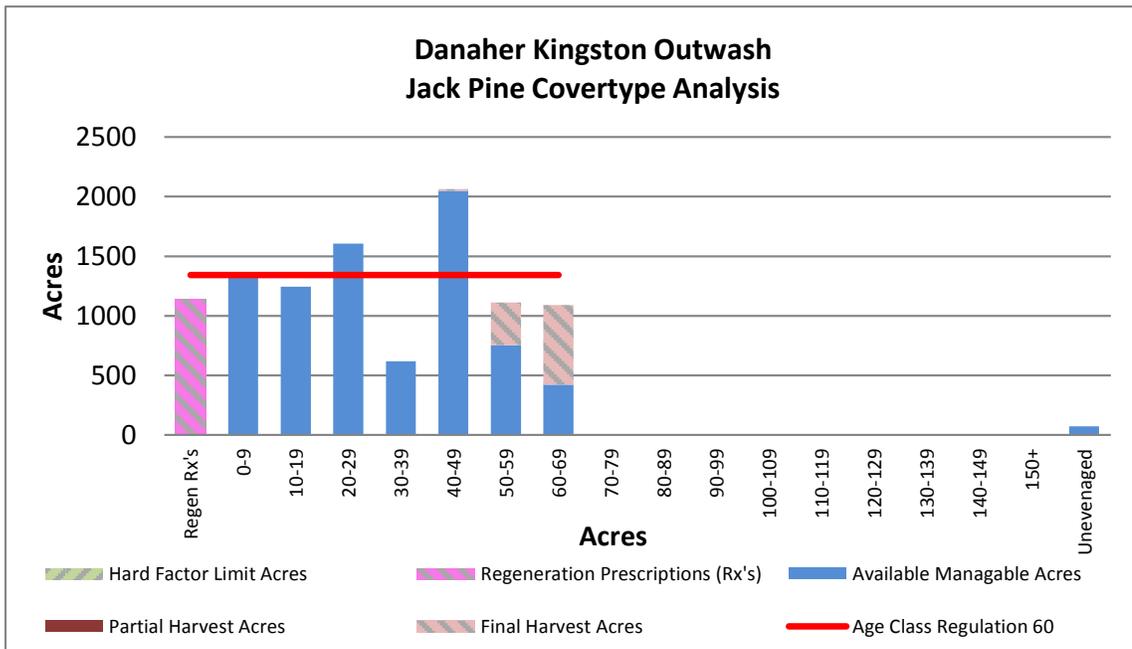


Figure 4.8.3. Age-class distribution of jack pine in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year final harvest projection is 425 acres of jack pine. This is significantly lower than the regulated amount due to the current age-class structure where the amount of mature acres is low and the acres in the process of regenerating is already close to the regulated amount.

Long-Term Management Objectives

- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks; and
- Balance the age classes of jack pine providing a regulated harvest of approximately 1,342 acres every decade based on a 60-year rotation.

Section 4.8.1.4 Forest Cover Type Management – White Pine

Current Condition

White pine occurs on 6,737 (11%) of the management area (Table 4.8.1). White pine stands in this management area are found on sandy soils of outwash plains and lake plains, with Kotar habitat types of PVE, PArV and PArVAa (see Appendix E). White pine in this area grows in association with aspen, northern hardwood and other pine species. White pine regeneration grows well here and stands that have been thinned may have several ages of white pine. Approximately 40% of the white pine stands have been classified as uneven-aged stands (Figure 4.8.4). These are generally stands that have had thinning and/or shelterwood harvesting in the past and many have widespread larger diameter trees with seedlings and saplings throughout. Because of the large number of stands in the uneven-aged category from selection harvesting, there are not many stands in the younger age classes.

As mixed pine stands are harvested through thinning and shelterwood treatments, white pine will increase in proportion to other pines due to its prolific seeding and shade tolerance. Many of the openings created by logging and subsequent fires in the early 1900s are being naturally reforested by white pine trees. This is more apparent in smaller openings, and near the edges of the large openings. Without opening maintenance some of the acres of herbaceous openings will eventually be reforested and reclassified as white pine.

At this time there are no white pine stands with harvest prescriptions. There are 142 acres prescribed for harvest in other cover types that are expected to convert to white pine after harvest. These acres are shown in the regeneration prescriptions column in Figure 4.8.4. There are 337 acres of white pine 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

- White pine stands will be maintained on operable sites with acres balanced between 0-109 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities; and
- White pine stands will be managed through thinning up until rotation age followed by shelterwood or seed tree regeneration harvests.

10-Year Management Objectives

- The 10-year projected final or regeneration harvest is 1,383 acres of white pine to work toward balancing the age classes; and
- The 10-year projected partial harvest of white pine is 536 acres.

Long-Term Management Objectives

- A regulated harvest would allow approximately 582 acres of white pine to be harvested per decade.

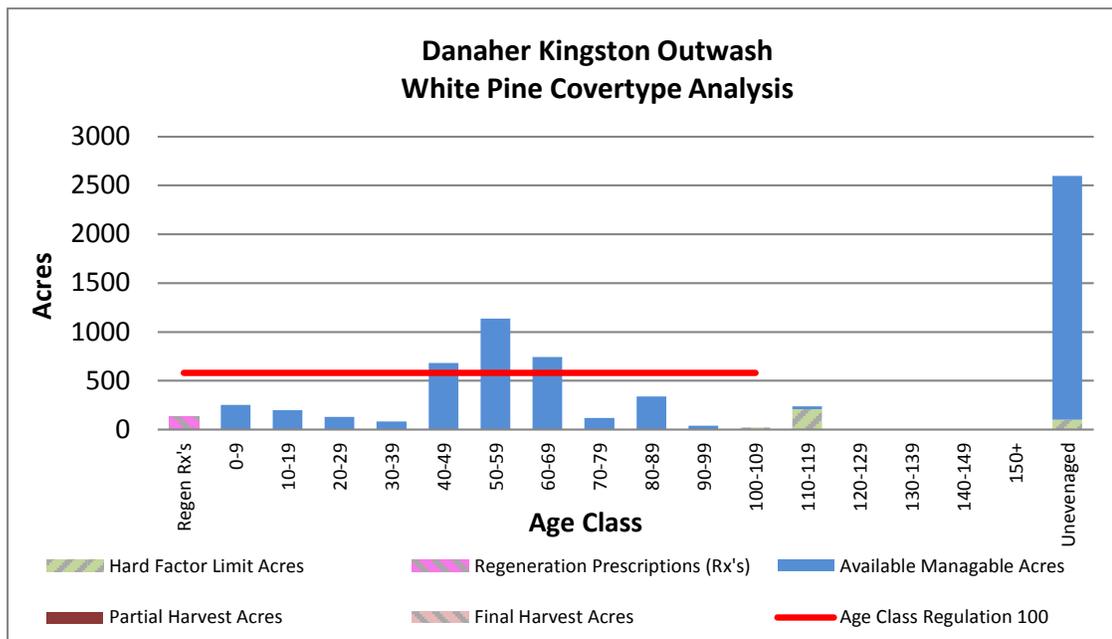


Figure 4.8.4. Basal area distribution of white pine in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

Section 4.8.1.5 Forest Cover Type Management - Aspen

Current Condition

Aspen occurs on 5,960 acres (10%) of the management area (Table 4.8.1). Aspen stands are distributed mainly on Rubicon and Kalkaska sands of outwash plains with Kotar habitat types of PVE and PARV (see Appendix E). Aspen in this management area tends to grow slowly due to the dry poor nutrient sites. Aspen has been consistently harvested and

regenerated in recent years, resulting in over 60% of the aspen acres occurring in the 0-29 year age classes (Figure 4.8.5). Over 10% of the aspen acres have been classified as uneven-aged stands. These aspen stands are generally old open areas that are regenerating with different aged aspen clones. As these stands are harvested, the amount of uneven-aged aspen here will decrease.

Currently, there are 221 acres of aspen with a final harvest prescribed. There are 121 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Inaccessible aspen areas will eventually succeed to late successional species.

Desired Future Condition

- Aspen stands 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 recreation opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of aspen is 413 acres. The reduction in acres from the regulated amount is due to the current age-class structure where the majority of stands are under 30 years of age.

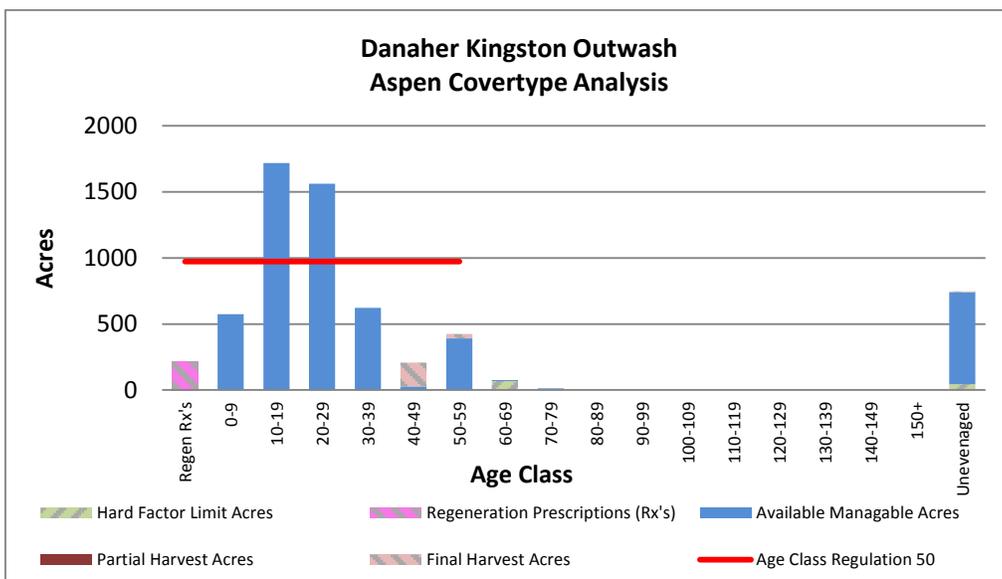


Figure 4.8.5. Age-class distribution of aspen in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing a regulated harvest of approximately 973 acres of aspen per decade based on a 50-year rotation.

Section 4.8.1.6 Forest Cover Type Management – Northern Hardwoods

Current Condition

Northern hardwoods occur on 4,085 acres (7%) of the management area (Table 4.8.1). Most of the hardwood stands in this management area are composed of red maple and beech, with white pine and hemlock scattered throughout. These stands are found on Rubicon and Kalkaska sands, with Kotar habitat classes of PARVAa and ATFD (see Appendix E). These are dry to mesic, poor to medium nutrient sites. In general, hardwood stands in this management area do not provide high-quality timber products. Where stand quality warrants stands will have selection harvests when the basal area is over 120 square feet per acres, decreasing stocking levels to approximately 80 square feet per acre. In general, this will allow most hardwood stands to be selectively harvested every 20 years. Where site quality is poor, shelterwood and other even-aged harvesting systems will be considered. A portion of the hardwood stands have been managed using even-aged systems and these acres are represented in the immature column of Figure 4.8.6.

Beech bark disease is prevalent throughout the management area, and salvage of beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and Eastern Upper Peninsula Regional State Forest Management Plan MA 8 Danaher Kingston Outwash

salvage harvesting. Further selection harvesting in these stands will be delayed, due to resultant lower than normal residual basal area.

Currently, there are 394 acres with a partial harvest assigned (Figure 4.8.6). There are some northern hardwood stands prescribed for harvest that are expected to convert to other types after harvest and some other types are expected to convert to northern hardwood after harvest. The total acreage of northern hardwoods is expected to remain similar.

Desired Future Condition

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

10-Year Management Objectives

- The 10-year projected partial harvest is 1,461 acres of northern hardwoods;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and
- To favor regeneration of other hardwood species, consider herbicide applications and planting of hard mast producing trees, including oak and disease resistant beech.

Long-Term Management Objectives

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

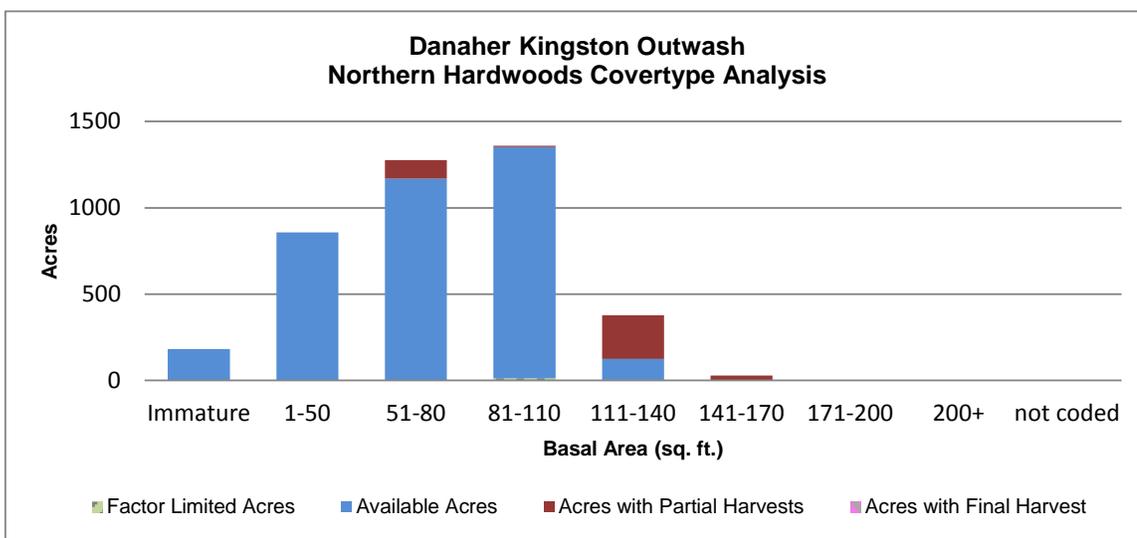


Figure 4.8.6. Basal area distribution of northern hardwood in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

Section 4.8.1.7 Forest Cover Type Management – Other Types

Current Condition

Lowland spruce/fir occurs on 1,137 acres (2%) and other types occur on 3,169 acres (5%) of the management area. The “other types” category is made up of all the rest of the cover types that are individually less than 5% of the management area. They include: natural mixed pines, upland mixed forest, upland conifers, lowland conifers, upland spruce/fir, hemlock, mixed upland deciduous, planted mixed pines, paper birch, lowland deciduous, cedar, oak, lowland aspen/balsam poplar and tamarack. The miscellaneous other category (518 acres or 1%) includes water, roads and sand/soil.

The majority of these forested cover types are managed using even-aged harvesting systems and will be reforested by natural regeneration. Following general timber management guidelines, perform regeneration harvests in even-aged forested cover types, attempting to balance the age classes where possible. Mixed cover types with high basal area may be thinned, depending on their species composition, prior to final harvest.

There are 342 acres of these other minor cover types that have site conditions limiting their harvest this planning cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Stands that are inaccessible for harvesting will be subject to natural succession.

Desired Future Condition

- Harvesting and regenerating these cover types will contribute to the compositional diversity of the landscape, in addition to providing wood products, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest is 165 acres of lowland spruce/fir and 537 acres of other types with natural regeneration of species currently on site is expected; and
- The projected 10-year partial harvest is 440 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.

4.8.2 Featured Wildlife Species

The management of large open-land complexes is the primary wildlife focus for this management area. Another key wildlife value is the management of large blocks of jack pine forest for early successional wildlife including Kirtland's warbler, snowshoe hare and associated species. In mixed pine and white pine stands, species that depend upon mature seed bearing trees will be a focus. Connectivity and structure are also important concepts in older jack pine stands and lowland conifer stands in this landscape.

Eastern Bluebird

The goal for eastern bluebird in the eastern Upper Peninsula is to maintain suitable habitat in occupied opening complexes and to encourage re-occupancy of openings where they have not been in recent history. Management should focus on the maintenance of opening complexes and manage for the production and maintenance of snags.

Wildlife habitat specifications:

- Maintain herbaceous open-land complexes within the management area.
- Protect snags or dying standing trees within the open-lands.
- If nest cavities are not present, consider planting scattered oak to serve as future cavity trees.
- Maintain scattered live trees within open-land complexes so they will provide future nest cavities.
- Manage for the production and maintenance of snags by retaining live trees in final harvest timber sales.
- The use of prescribed fire to maintain open-land complexes is desirable.

Kirtland's Warbler

The statewide goal for Kirtland's warbler is to maintain a population of at least 1,000 breeding pairs, as indexed by the annual breeding survey. In the Upper Peninsula, it is desirable to have available habitat for birds outside the "core" range in the northern Lower Peninsula. Management should focus on maintaining breeding habitat in selected management areas, while providing a sustainable supply of wood to the timber market. These two goals are compatible with only minor changes to timber harvest specifications. The eastern Upper Peninsula goal for Kirtland's warbler during this planning period is to provide suitable breeding and foraging habitat within this management area.

Wildlife habitat specifications:

- Jack pine should be harvested using techniques that mimic both the size of a natural disturbance event and the structure of the stands that such an event would leave. Large scale harvest of jack pine is ecologically appropriate, given the catastrophic nature of historic fires.

- Regenerate one treatment block of jack pine in patches of 300 to 500 acres for Kirtland's warbler this planning period. Patch size, age-class distribution and distance to other jack pine stands should be taken into consideration when managing jack pine. Stands that are currently sold and scheduled to be cut during this time frame are contributing toward this habitat goal.
- Post-disturbance legacies include simulated skips or fingers of jack pine; snags; and larger diameter, fire-tolerant trees such as red pine. These features should be left in stands of harvested jack pine as retention to benefit Kirtland's warbler.
- Large blocks of regenerating jack pine that are adjacent to herbaceous openings are desirable as they function as open-lands until the trees are 3-4 feet in height and benefit open-land species as well.
- Use prescribed fire where feasible to maintain jack pine, or scarify stands quickly after stands are harvested to ensure maximum stem density.

Red Crossbill

In the eastern Upper Peninsula, the goal for red crossbill is to maintain or increase suitable habitat. Management should focus on maintaining mature and over-mature seed producing trees in priority areas.

Wildlife habitat specifications:

- Identify and maintain a minimum of 15% of the total acres of appropriate cover types (upland spruce/fir, upland conifers, natural mixed pine and natural red and white pine) in the management area for red crossbill in a mature forest condition (e.g., >150 years for red pine, > 130 years for white pine and > 80 years for white spruce). This can be accomplished with existing factor-limited stands, or alternatively by extending the rotation length of these types to 150, 130 and 80 years respectively. Current forestry practices in this management area provide sufficient habitat for red crossbills. Habitat is specifically located in the Fox River high value conservation area and within the stands with hard factor limits.
- Retain large mature and over-mature red pine, white pine and white spruce in shelter-wood and seed tree cuts.
- Evaluate the management area for the establishment of core tracts of old (>100 years old) pine stands in special resource areas or Type 1 or Type 2 old growth.

Sharp-tailed Grouse

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or improve suitable habitat. Management should focus on enhancing large opening complexes so there is an increase of available habitat.

Wildlife habitat specifications:

- Maintain or expand herbaceous open-lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Consolidate grass openings and planted red pine to increase the stand size of both cover types.
- Use prescribed fire where appropriate to maintain openings and manage pine types.
- Within open-land complexes maintain connectivity across the landscape.

Spruce Grouse

The goal for spruce grouse in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on retention of mixed conifers on riparian/lowland edges, the increase of within-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.

Upland Sandpiper

The eastern Upper Peninsula goal is to provide suitable breeding habitat for upland sandpiper. State forest management should focus on the maintenance of permanent large opening complexes.

Wildlife habitat specifications:

- Maintain opening complexes of 250 acres or larger.
- Open blocks within complexes should be within one mile of each other.
- Where possible, strive to consolidate patches into larger opening complexes by creating temporary openings associated with permanent openings. This could be accomplished by scheduling jack pine clearcuts associated with permanent openings on a sustainable rotation, scheduling harvests adjacent to burns or scheduling similarly-aged jack pine treatments in close proximity to each other.
- Mow or burn patches every 3-5 years to eliminate woody vegetation succession.

4.8.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species 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 two listed species as well as one natural community of note occurring in the management area as listed in Table 4.8.2. Any established management guidelines will be followed.

Table 4.8.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Danaher Kingston Outwash management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
Natural Community								
Pine barrens		S2/G3	Confirmed				Jack Pine	Early
Birds								
Kirtland's warbler	<i>Dendroica kirtlandii</i>	LE/E/G1/S1	Confirmed	PS	Very High	Pine barrens	Jack Pine	Early
						Dry northern forest	Jack Pine, Red Pine	Early
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A

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

Stanley, Dutch Fred Lake and Spring Lakes have been identified as cold water lake special conservation areas. The area surrounding the Stanley Lake flooding is identified as a special conservation area for wildlife management. Other special conservation areas include several creeks and rivers that are special conservation areas as cold water streams and high priority trout streams (Figure 4.8.1).

The Fox River and the East Branch Fox River are designated natural rivers, and along with their respective river corridors are high conservation value areas. The Fox River Natural River Plan (DNR, Nov. 3, 1988) contains specific requirements for management in this area. The special conservation areas and high conservation value areas are shown in Figure 4.8.7.

There are currently no identified ecological reference areas in the management area.

Danaher Kingston Outwash

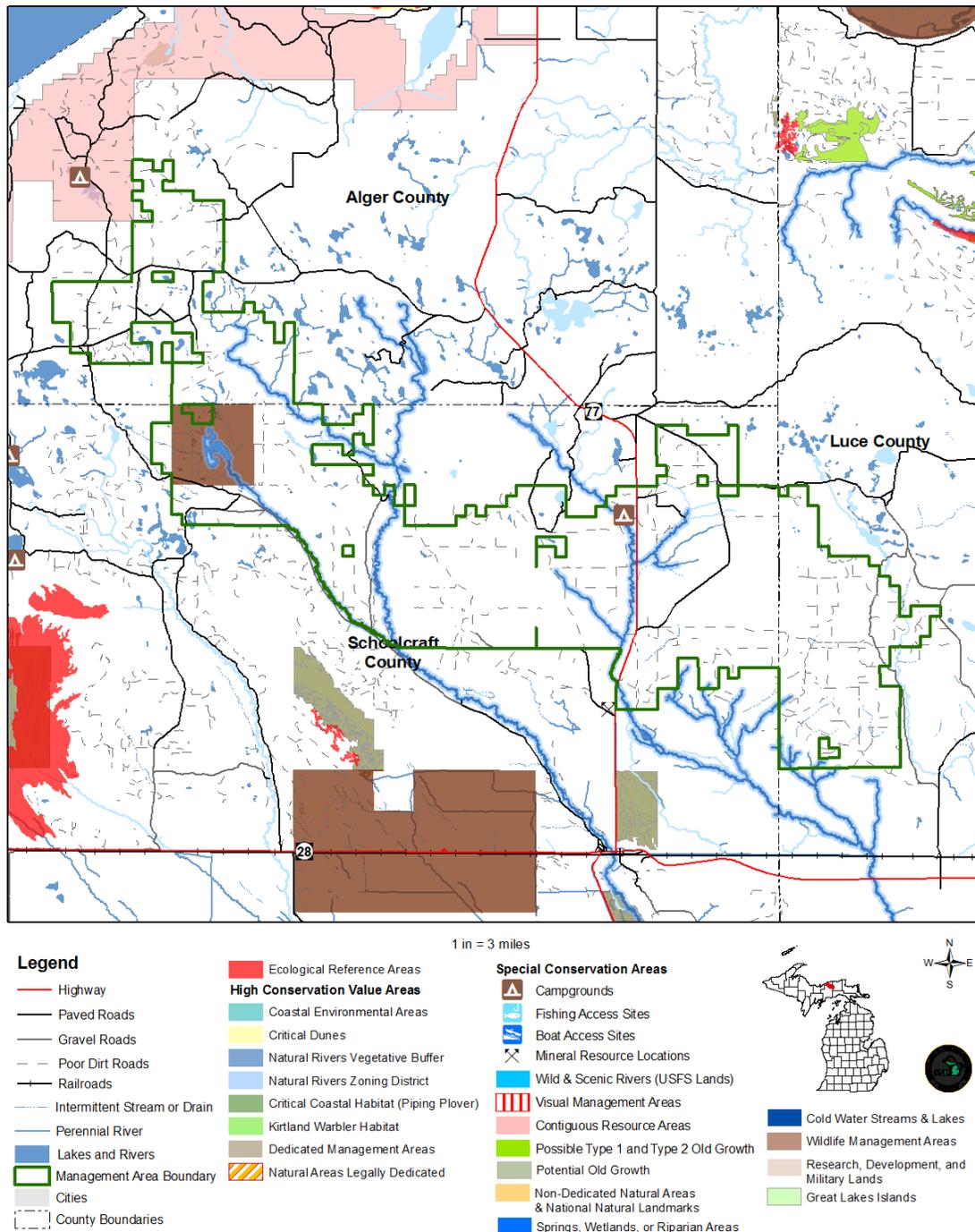


Figure 4.8.7. A map of the Danaher Kingston Outwash management area showing the special resource areas.

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.

4.8.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors.

Some of the more important forest health pests in this management area by major cover type include:

- Red and jack pine: jack pine budworm, white grubs (Danaher and Kingston Plains), red-headed pine sawfly, pine engraver and *Scleroderris* canker;
- White pine: white pine blister rust; and
- Northern hardwoods: beech bark disease.

Further information on forest health can be found in 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. No invasive plant species have yet been documented within the management area, but leafy spurge has been documented within a five-mile buffer of the management area (Table 4.8.2) and monitoring efforts should specifically look for new populations of this 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.

Table 4.8.2. Invasive plant species within or near the Danaher Kingston management area (Data from the Michigan Invasive Plant Identification Network database).

Danaher Kingston Outwash - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	1	1	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Leafy Spurge <i>Euphorbia esula</i>	1	

4.8.5 – Fire Management

This area is predominantly fire adapted communities, dominated by barrens at its heart, under natural disturbance regimes. Dry and dry mesic northern forest communities make up the bulk of the land area that remains.

This area was probably subject to periodic stand replacement fires that spread rapidly over large areas, frequently in single events. Since 1981, six fires larger than 50 acres have been suppressed. The largest among these was the Fox River fire that burned 878 acres on May 8, 1987. Since 1974, 18 prescribed burns for 4,500 acres have been conducted, covering at least 2,000 acres.

- Management objectives for maintaining large openings and promoting natural pine regeneration may be considered in this management area.
- Due to the public use of the management area for camping, hiking, off-road vehicle use, and berry picking, prevention information relating to these uses could be posted at trailheads, campground bulletin boards, and local vendors in Seney.
- Included here is the Fox River Zone Dispatch Area, which provides for aggressive initial attack, based on current fire danger.

4.8.6 – Public Access and Recreation

The state forest lands in this management area are contiguous, with few private in-holdings. The majority of this management area is accessible to vehicles on gravel county roads, and sandy two-track roads.

This management area includes the Fox River Pathway, the Danaher Off-Road Vehicle trail and trailhead and various snowmobile trails (Figure 4.8.1).

The East Branch Fox River state forest campground is in the management area (Figure 4.8.7). There are boating access sites in the vicinity as well Clear Creek Pond, Dutch Fred Lake, Wagner Dam, Stanley Lake and Spring Creek Trout Pond.

Blueberry picking, hunting, trapping and wildlife viewing are popular here.

4.8.7 – 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 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. High priority trout streams in this management area are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.8.1.

4.8.8 – Minerals

Surface sediments consist of primarily glacial outwash sand and gravel, postglacial alluvium, minor peat and muck, and an end moraine of coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the general area and there is good potential for additional pits on the uplands.

The Ordovician Utica and Collingwood Shales, Trenton and Black River Formations, Prairie du Chien Group and Cambrian Trempealeau Formation subcrop below the glacial drift. The Trenton and Black River are 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 (five in Schoolcraft, two in Luce and one mineral well in Alger). 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.