USFS, Mio Ranger Station
107 McKinley Road
Mio, MI 48647

(989) 826-3252

Responsible Official:
Steven A. Goldman, District Ranger

For more information, contact:
Philip W. Huber, Wildlife Biologist

United States Department of Agriculture Forest Service

Pre-NEPA Report

Big Chase KW and Hazardous Fuels Reduction Project

October 2008

Mio Ranger District, Huron-Manistee National Forests

Oscoda and Crawford Counties, Michigan

T25N, R2W Sections 27, 32, 33, 34

T25N, R1W Sections 23, 24, 25, 26, 27, 29, 30, 32

T26N, R2W Sections 14, 20, 23, 24, 25, 26, 28, 33, 34, 35, 36

T26N, R1W Sections 19, 20, 25, 26, 27, 35

T26N, R1E Sections 18, 19, 20, 21, 22, 27, 29

Contents

List of Figures

1.0 Purpose and Need

The Mio Ranger District of the Huron-Manistee National Forests proposes to implement the Big Chase KW and Hazardous Fuels Reduction Project (Big Chase Project). The purpose of the project is to manage vegetation and other resources to implement the goal and objectives of the Land and Resource Management Plan for the Huron-Manistee National Forests (Forest Plan).

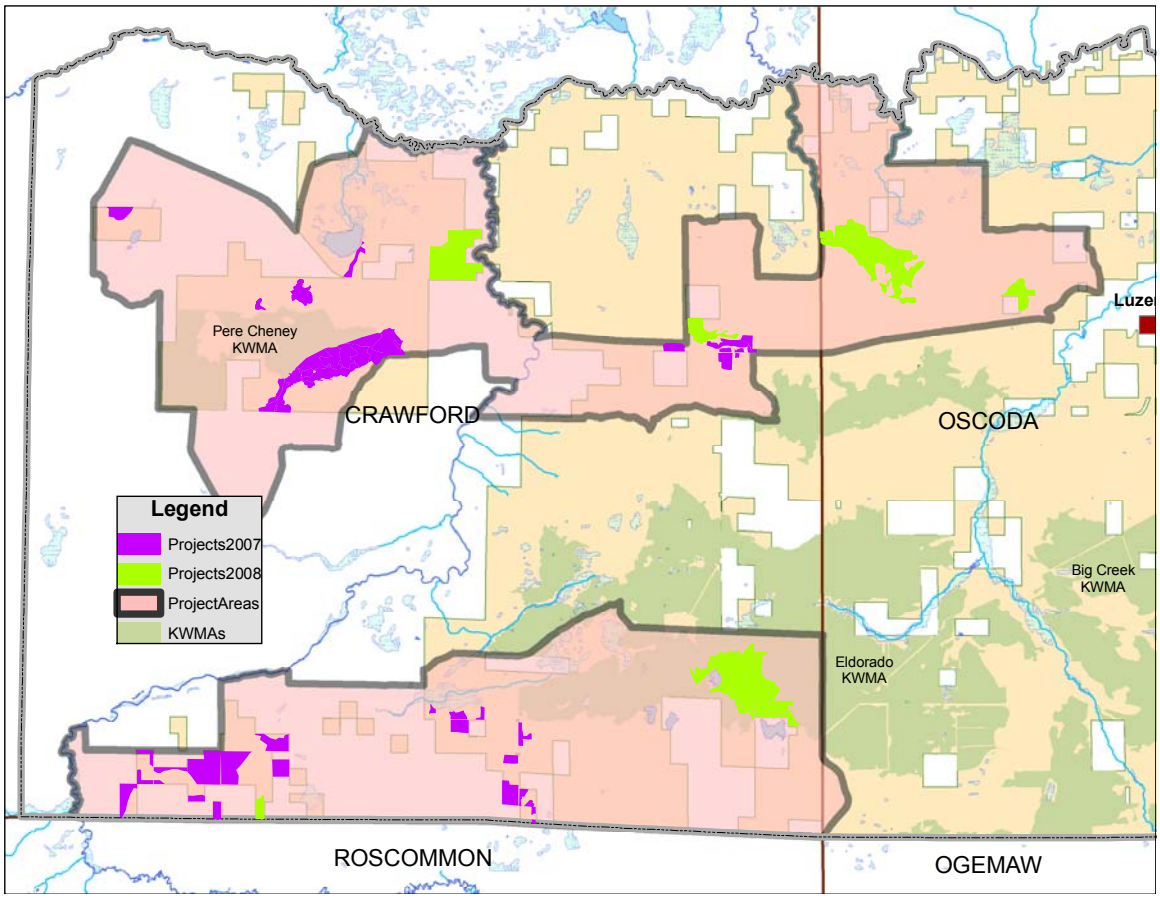
This project is needed to:

1. Reduce hazardous fuels and reintroduce fire into fire-adapted ecosystems,
2. Provide breeding and foraging habitat for the federally endangered Kirtland's warbler,
3. Improve recreation, road and trail systems,
4. Reduce or eliminate non-native invasive species (NNIS) in high priority areas,
5. Produce timber products,
6. Improve wildlife and fisheries habitat, and
7. Improve timber stand condition and age-class distribution.

1.1 Project Location

The Big Chase Project is located on National Forest System (NFS) lands on the Mio Ranger District of the Huron National Forest. It is located within two areas west of Luzerne in eastern Crawford and western Oscoda Counties (Figure 1).

Figure 1. Big Chase Project Areas.



Activities are proposed in the following locations:

T25N, R2W Sections 27, 32, 33, 34
T25N, R1W Sections 23, 24, 25, 26, 27, 29, 30, 32
T26N, R2W Sections 14, 20, 23, 24, 25, 26, 28, 33, 34, 35, 36
T26N, R1W Sections 19, 20, 25, 26, 27, 35
T26N, R1E Sections 18, 19, 20, 21, 22, 27, 29

1.2 Management Areas

The Big Chase Project is within Management Areas (MAs) 4.2, 4.2KW, 4.4, and 6.1, as identified and described in the Forest Plan. The Forest Plan lists the purpose of each of these MAs as follows:

Management Area	Purpose
4.2	Management activities enhance and increase the variety of wildlife habitats with emphasis given to managing deer, grouse, wildlife and Kirtland's warbler essential habitat. High volumes of timber products are produced. Emphasis includes reducing life-threatening and property damaging wildfire potential and providing a variety of recreational opportunities. On the Huron National Forest, management activities maintain and develop essential nesting habitat for the Kirtland's warbler. Moderate to high volumes of softwood and low volumes of hardwood timber products are produced in Kirtland's warbler emphasis areas.
4.4	Management activities provide recreational opportunities, sources of firewood close to users, and moderate to high volumes of softwood timber products. Emphasis includes reducing life-threatening and property damaging wildfire potential. Wildlife management is coordinated with adjacent non-National Forest land management with emphasis on deer, grouse and wildlife management. Some small blocks will be managed to protect isolated, essential areas for endangered, threatened or sensitive species.
6.1	Management activities in these areas provide for semiprimitive, nonmotorized recreational experiences and will reduce life-threatening and property damaging wildfire potential. Areas support a wide variety of fish and wildlife species. Management enhances and improves habitats for species which avoid human activity.

These lands within these MAs can be generally characterized as dry, sandy plains and low, dry, sandy hills that support red and jack pines, oak, red maple and some aspen.

The Big Chase Project includes proposed activities within the Pere Cheney and Eldorado Kirtland's Warbler Management Areas (KWMA), as well as activities in the vicinity of these areas. These KWMAs are two of 24 KWMAs on federal and state lands in the northeast Lower Peninsula of Michigan; it is one of seven on the Huron-Manistee National Forests.

2.0 Existing Condition

2.1 Hazardous Fuels

Because the project area is dry and is dominated by jack and red pine, it is at high risk of wildfire. While fire is a beneficial natural disturbance in this ecosystem, wildfire is a potential threat to human life, property and valuable timber resources. Most NFS lands adjacent to private property in the project area have considerable fuel build up due to fire suppression, and have not had fuel reduction treatments to reduce the potential impacts of wildfire.

2.2 Kirtland's Warbler Breeding Habitat

A substantial portion of the project area is designated as essential habitat for the federally endangered Kirtland's warbler (Figure 1). The Pere Cheney and Eldorado Kirtland's Warbler Management Areas (KWMAs) have been managed since the 1970s to provide breeding habitat for the warbler in compliance with Section 7 of the Endangered Species Act. Since the warbler nests in areas of young dense jack pine, there is a continual need to create new habitat to replace habitat that has grown too old due to fire suppression. The Pere Cheney KWMA has only had one treatment to create Kirtland's warbler breeding habitat in the past 30 years, while the Eldorado KWMA has had a number of treatments. Two new treatments are proposed for the Pere Cheney and Eldorado KWMAs; the Nuthatch block would be sold in 2011, and the Hermit Thrush block would be sold in 2010.

2.3 Red Pine Plantations

A number of maturing red pine plantations occur within the area. Most of the older plantations were established by the Civilian Conservation Corps (CCCs) in the late 1930s and early 1940s, while most of the younger plantations were established in the early 1960s. Most of the older plantations have been thinned in the past, while a few others have yet to be treated with a first thinning. Those that have been thinned consist of mostly sawtimber-sized trees, while those that have not been thinned contain smaller diameter trees.

Some of the red pine plantations within the project area are designated old growth. While many of these have been thinned in the past, most of these have not been managed specifically to enhance old growth characteristics (structural diversity, species richness and evenness).

2.4 Oak

Two oak stands were identified in the Harbor Dune project to be thinned to improve growth on the remaining trees. These treatments were never implemented.

2.5 Barrens

One larger opening, an old airstrip, occurs just east of Wakeley Lake on land that was recently donated to the Forest Service (Devereaux Property). A small portion of this opening was planted to red pine. The adjacent areas and mostly made up of dense immature to mature jack pine. This jack pine puts residents in the area at high risk because it is in close proximity to some structures. In addition, areas of dense jack pine occur immediately adjacent to the only egress route.

Examination of 1938 aerial photographs of the southern project area revealed that large openings (barrens) existed in some areas at that time. These are now forested for the most part, but still have remnant openland plant species.

Greg Schmidt, Jenna Casey and Phil Huber have visited areas near Roscommon that have the potential for barrens restoration.

The pre-NEPA team met with Brian Piccolo from the Michigan Department of Natural Resources, who is doing some barrens restoration work on private land, north of NFS lands near Kneff Lake. Brian expressed an interest in working with the Forest Service, and suggested creating barrens on NFS lands adjacent to his project.

2.6 Forest Openings

A number of forest openings within the project area are in need of treatment to prevent the openings from being overtaken by encroaching woody vegetation. Openings occur within the forest that provide habitat for native animals and plants. The majority of the openings are small (average 4.5 acres), and have been maintained over time. Forest Plan guidelines state that approximately four to nine percent of the forest be maintained in small openings. Currently, approximately three percent of the project area is in forest openings.

2.7 Recreation, Roads and Trails

During a field review, the pre-NEPA planning team identified a number of issues related to recreation. They are as follows:

Wakeley Lake

At Wakeley Lake, the parking area has approximately 12 trees that need to be felled and removed to facilitate parking, and movement of vehicles within the parking area. The parking lot needs to be 'squared up'. Some fencing needs to occur on the perimeter of the parking area to restrict motor vehicle access. Visibility at highway entrance is poor to the west.

The trail to the lake is not accessible. The trail needs to be hardened from the parking lot to the campground, approximately ¼ mile long by six feet wide.

Fishing from the shoreline is difficult, if not impossible due to weed growth.

The cross country ski trail follows the existing hiking trails and is not groomed. No warming shelter is available for skiers anywhere on the property.

The Wakeley property has an interesting history, and no interpretation of that history exists.

Meridian ORV Trailhead

Improvements need to be made to the ORV trailhead on the north side of M-72 just west of Meridian Road. The trailhead is too small and is in an area that is sloped. It needs to be larger and in an area that is not sloped. A trailhead should be fenced to define its boundaries.

Shore-to-Shore Trail

The Shore-to-Shore Trail follows the edge of the proposed Nuthatch treatment block in Crawford County. This horse and hiking trail is on an open two-track road. A section of the trail may not meet equestrian standards. Areas for erosion may exist on some parts of the trail, but the trail has not been field checked.

Dispersed Campsites

Hunters have developed a few dispersed campsites within the Whitewater Creek Semi-primitive Nonmotorized Area (SPNM) that should be eventually closed to motorized traffic. There are few sites available around the perimeter of the SPNM for dispersed camping.

Roads

The project areas have a number of unnecessary user-created roads. A roads analysis has not been completed for the entire area. However, portions of the area have been analyzed (Eldorado) in a roads analysis. The Canoe Harbor EA includes some closures within this project area that have not been implemented.

Hill Climb Areas

A number of hill climb areas are in need of rehabilitation.

2.8 Non-native Invasive Species

Occurrences of non-native invasive species were mapped by Christie Sampson and Greg Schmidt during the June through September of 2007 botanical inventories. The 2008 surveys for this project have not yet been completed. Among the 45 species that are ranked by the Huron-Manistee as non-native invasive species requiring management action, 12 were found: *Arctium minus* (lesser burdock); *Bromus inermis* (smooth brome); *Centaurea stoebe* (spotted knapweed); *Cirsium vulgare* (bull thistle); *Dactylis glomerata* (orchardgrass); *Daucus carota* (Queen Anne's lace); *Elymus repens* (quackgrass); *Elaeagnus umbellata* (autumn olive), *Euphorbia esula* (leafy spurge),

Hypericum perforatum (common St. Johnswort); *Melilotus officinalis* (sweet clover), and *Populus alba* (white poplar).

Most of the named roads surveyed had low to high amounts of spotted knapweed, common St Johnswort, and/or smooth brome. Exceptions include large stretches of FR-3106 and FR-1001, which seemed relatively weed free. Leafy spurge and autumn olive were only found along and near Pioneer Road. The gross area of infestation along the 9-16 miles (15-25 km) of roads in the project area is 11-38 acres (4.5-15 ha) in 2007. Weed inventory results in 2008 will approximately double these estimates. Stand 51-7 was essentially a large infestation of knapweed, smooth brome, and St Johnswort associated with an old homestead. Stand 51-14 had a small interior infestation of St Johnswort. The trail to Wakeley Lake is infested with knapweed, St. Johnswort, and smooth brome. The Wakeley Lake trail terminates at a large open meadow infested with knapweed, smooth brome, orchard grass, quackgrass, and St. Johnswort.

2.9 Fisheries/Watershed

A steep bank along the east side of South Branch of the Au Sable River is eroding and in need of stabilization.

2.10 Minerals

An abandoned well pad occurs just east of M-18, near the Crawford/Roscommon County line. This well pad is no longer needed and should be reforested.

Portions of the Chase Bridge gravel pit that are no longer needed for mineral extraction are reforested.

2.11 Trash and Other Debris

A pile of asphalt chunks remain on the Devereaux property, the remnants of an old tennis court. A large metal roller is also present on the property, although a portion of it was recently stolen for scrap metal. Hanger foundation is present near the old runway.

Other trash piles occur within the project area.

3.0 Desired Condition

3.1 Hazardous Fuels are Reduced

Hazardous fuels are reduced within the project area, particularly near private property. This is accomplished by fuel break construction and maintenance, prescribed burning (red pine plantations, barrens, fuel breaks, and openings), red pine thinnings, and coordinating the placement of barrens and permanent openings to reduce fuel loading and providing defensible space near private property. Fuelbreaks are maintained on a regular basis (every 3 to 7 years) through mowing, prescribed burning or other mechanical means to insure their effectiveness.

3.2 Kirtland's Warbler Breeding Habitat is Developed

Two new blocks of breeding habitat are developed - the Nuthatch block in the Pere Cheney KWMA and the Hermit Thrush block in the Eldorado KWMA. These areas are treated to remove the most of the existing trees, and are regenerated to a dense young stand of jack pine that meets Kirtland's warbler needs (1452 trees per acres over 75% of the area).

3.3 Red Pine Plantations are Thinned

Red pine plantations within the project area are thinned to produce timber products and improve growth on the remaining trees and improve vegetative and structural diversity. The thinning, or thinning and prescribed burning, has reduced fuel loading to an acceptable level in these stands. The combination of thinning and prescribed burning has reduced the probability of a catastrophic wildfire occurring in these stands.

Plantations designated as old growth are treated to improve old growth conditions. Thinning, burning, snag and down wood creation may all occur to move designated stand toward old growth.

3.4 Oak Stands are Thinned

Two oak stands within the project area are thinned to produce timber products and improve growth on the remaining trees.

3.5 Barrens are Created

The Devereaux Property is treated to create a large jack pine barren to provide habitat for native plants and animals. Regional Forester's sensitive species that would benefit from barrens creation include Hill's thistle and rough fescue. Patches of naturally

regenerating jack pine are allowed to develop into occupiable Kirtland's warbler breeding habitat. Areas of jack pine near the main road and near structures are cleared to create fuel breaks providing safe egress and defensible space. This barrens area is burned every 15-25 years to maintain a structural component of young jack pine trees (scattered and dense clumps) for wildlife. Red pine in the northeast portion of the property would be thinned to create a pine savannah (70 BA). The oak stand to the southwest would be underburned with opening. Non-native invasive plants are eradicated by chemical treatment, biocontrol, and/or mechanical means over many years.

A large area on both sides of Chase Bridge Road is treated to restore and maintain a jack pine barren, improving wildlife and plant habitat, and reducing wildfire risk. The barren would be maintained by prescribed fire or mechanical means over time.

An area near Kneff Lake is treated to restore and maintain barren habitat. Once open, this area is prescribe burned at the same time as adjacent to private property.

All proposed barrens provide additional defensible space around private property and the Kneff Lake Campground.

3.6 Forest Openings are Improved or Created

Forest openings are treated to maintain or expanding their size. Treatments set back succession through manual or mechanical means, or through the use of prescribed fire.

3.7 Recreation, Roads and Trails are Managed

Facilities at Wakeley Lake are Improved

The parking area at Wakeley Lake is improved and fenced, making parking easier and safer.

The trail to the lake is accessible. The trail is hardened with limestone from the parking lot to the campground.

A floating accessible pier is in place to provide a place for visitors to fish from the shoreline. The pier would be approximately 6' x 40', with a t-shaped section at the end that is approximately 16' x 12'.

A small log cabin warming shed (approximately16x20) is constructed and available for skiers. It would be located near the existing toilet facilities.

Signs are present for historical interpretation of the Wakeley property.

Meridian ORV Trailhead is Improved

The Meridian trailhead is enlarged and improved, and is on a level surface. The parking area is designed by engineering with good ingress and egress. Vehicles with trailers no longer have trouble turning around.

Shore-to-Shore Trail is Improved

The section of trail in the vicinity of the Nuthatch treatment block is in the best location possible and meets equestrian standards. Areas of erosion on the trail are repaired and hardened, and old sections of trail are revegetated.

Dispersed Campsites Established near the SPNM

Dispersed campsites are developed on the south side of Randall Road, along the perimeter of the SPNM area. These sites are established for hunters that would like to hunt the Whitewater Creek SPNM area.

Unnecessary Roads are Closed or Obliterated

Roads that are not needed for management or public access are closed and/or obliterated.

ORV Hill Climb Areas

ORV hill climb areas are closed and rehabilitated.

3.8 Non-native Invasive Plant Species are Controlled/Eradicated

Non-native invasive plant species are controlled or eradicated within identified areas as necessary and appropriate, using manual pulling, chainsaw, tilling, planting native vegetation or herbicides (see Appendix A for herbicide treatment methods). Native vegetation is reestablished by planting locally acquired native sod clumps and by inter-seeding native grasses (e.g. Canada wild rye).

All federally owned roadside infestations in the Big Chase Project area are controlled to the degree that they no longer serve as significant seed sources for National Forest lands. Roadside infestations adjacent to barrens restoration areas will be eradicated chemically and/or mechanically so that infestations do not spread into newly restored barrens. Non-native invasive plant species that are not already widespread (e.g. the leafy spurge), are selectively eradicated from the project area so that the species does not become widespread.

Interior infestations are eradicated or controlled depending on infestation size and the naturalness of the surrounding vegetation. Large infestations in a matrix of artificially managed vegetation (e.g. Stand 51-7) are controlled with the appropriate herbicides, burned, and then seeded with native grasses as native genotypes become available. Small infestations under forest cover or in small openings (e.g. within stand 51-14 and along the Wakeley Lake Trail) are eradicated chemically or otherwise and then covered with weed-free mulch or wood chips to inhibit weed seedlings. Large infestations within context of naturally managed vegetation (e.g. The Wakeley Lake meadow and dike infestations) are eradicated and restored to natural vegetation. Such restoration may include a combination of tilling or burning in conjunction with an appropriate chemical treatment.

Species found in project area and anticipated treatment

Arctium minus (lesser burdock); no action unless in conjunction with other treated species.

Bromus inermis (smooth brome); herbicide treatment or tilling where in and adjacent to barrens.

Centaurea stoebe (spotted knapweed); herbicide treatment where in and adjacent to barrens.

Cirsium vulgare (bull thistle); herbicide treatment where in and adjacent to barrens.

Dactylis glomerata (orchardgrass); no action unless in conjunction with other treated species.

Daucus carota (Queen Anne's lace); no action unless in conjunction with other treated species.

Elymus repens (quackgrass); herbicide treatment or tilling where in and adjacent to barrens.

Elaeagnus umbellata (autumn olive); herbicide cut stems in and adjacent to barrens, selected openings, and timber sale areas.

Euphorbia esula (leafy spurge); herbicide treatment of all known occurrences in project area.

Hypericum perforatum (common St. Johnswort); herbicide treatment where in and adjacent to barrens.

Melilotus officinalis (sweet clover); Herbicide treatment where in and adjacent to barrens.

Populus alba (white poplar); Cut and treat with herbicide all known stems.

3.9 Fisheries/Watershed Conditions are Improved

Erosion is controlled on the steep bank on the east side of the South Branch of the Au Sable River.

3.10 Mineral Extraction and Exploration Sites are Rehabilitated

The M-18 well pad and unneeded portions of the Chase Bridge Gravel Pit are reforested to red or jack pine.

3.11 Trash and Other Debris are Cleaned Up

The pile of asphalt chunks, hanger foundation and large roller on the Devereaux property are removed and disposed of properly. Other piles of trash throughout the project area are cleaned up.

4.0 Preliminary Proposed Actions

Summary of Activities

1. Harvest by clearcutting approximately 1277 acres; 813 acres of jack pine in two areas to create KW breeding habitat; 388 acres in three areas to create barrens; 65 acres in one area to create an opening; and 11 acres in one area to regenerate aspen.

2. Thin approximately 965 acres of red pine in approximately 20 areas to improve growth of remaining trees, reduce hazardous fuels, and restore old growth conditions.

3. Maintain approximately 448 acres of barrens in three areas through prescribed burning and/or mechanical or manual treatments.

4. Construct approximately 2 miles of temporary roads and associated landings to remove forest products. These roads and landings would be closed and rehabilitated when harvest activities are completed.

5. Reforest approximately 813 acres of clearcut to jack pine where necessary to create KW breeding habitat; recontour and reforest approximately 47 acres of the Chase Bridge Gravel Pit to jack or red pine; reforest approximately a one-acre abandoned well pad; reforest approximately 0.5 acre erosion site to white pine on the South Branch Au Sable River.

6. Reduce hazardous fuels and improve wildlife habitat by prescribed burning approximately 1288 acres.

7. Create and maintain approximately 193 acres of fuelbreaks through timber harvest, mechanical or manual cutting, and prescribed burning. Approximately 50 acres would be removed from KW essential habitat designation to create the fuelbreaks.

8. Maintain approximately 16 acres of existing fuelbreaks by cutting encroaching woody vegetation by mechanical or manual treatments, or prescribed burning.

9. Create and maintain an 8 acre opening, and improve approximately 110 acres of existing forest openings for wildlife. Treatments include cutting encroaching vegetation by mechanical or manual means, or prescribed burning.

10. Control or eradicate non-native invasive plant species (NNIS) within the Project area (approximately 2934 acres) where necessary and appropriate. NNIS would be treated with herbicides, biological controls, mechanical and/or manual means.

11. Stabilize a 0.5-acre eroding bank on the South Branch of the Au Sable River.

12. Pick up trash and close roads and trails at the Chase Bridge Gravel Pit.

13. Enlarge and improve the parking area at the Meridian ORV Trailhead off M-72 (approximately 3 acres).

14. Enlarge and improve the parking area at Wakeley Lake off M-72 (approximately 1.5 acres).

15. Remove and dispose of discarded materials in the South Branch barrens area.

5.0 Forest Plan Direction

The Huron-Manistee National Forests Land and Resource Management Plan (USDA Forest Service 2006) provides general direction for management of the Forests. The Huron-Manistee National Forests Land and Resource Management Plan divides the Forest into Management Areas (MAs) and outlines goals, objectives and desired future condition for each MA. The following is Forest Plan direction related to this project:

5.1 Forest-wide Goals and Objectives and Desired Future Condition:

Health and Safety:

Fire use is suitable on National Forest System lands. Fire use will, to the extent possible, mimic natural processes to accomplish resource objectives, while protecting wilderness values and cultural, historical and developed resources.

Implement fuels reduction and fuelbreak projects where conditions warrant for the protection of life, property and safety. High-risk areas adjacent to private land will receive treatment priority.

Provide for the protection of National Forest System lands and for the property and safety of users.

Natural Resources:

Manage designated old growth across all management areas and vegetation classes emphasizing old growth characteristics.

Integrate the Scenery Management System into project-level planning.

Meet species viability needs, achieve fire hazard reduction, and accomplish fiber production from regulated (Allowable Sale Quantity) and non-regulated (non-chargeable) forest lands primarily through timber harvest.

Reduce non-native invasive species infestations and prevent new invasive species from becoming established, when possible.

Wildlife and fisheries habitats and plant communities shall be managed to maintain viable populations of existing native and desired non-native species.

Maintain or improve the populations of endangered, threatened or sensitive species or communities.

Restore and maintain savannahs, prairies, dry grasslands, mesic grasslands, shrub/scrub and oak-pine barrens in areas where they were known to previously occur, to provide for habitat diversity and to meet species viability needs.

Utilize prescribed fire to meet management direction as appropriate for the ecosystems involved.

Cooperate with individuals; organizations and local, state, Tribal and federal governments to promote ecosystem health and sustainability across landscapes.

Reduce the net miles of roads on the Forests by emphasizing closures of roads determined to be non-essential for resource management.

Provide for a combination of motorized and nonmotorized recreation opportunities.

Provide a variety of access opportunities for a range of user abilities consistent with management area direction and Standards and Guidelines.

Manage Off-Highway Vehicles, including snowmobiles, by designating trails or routes to minimize user conflicts and to provide for user satisfaction, resource protection and public health and safety.

All management activities should meet or exceed the Scenic Integrity Objectives established for the Forests through the Scenery Management System.

Desired Future Condition:

All management activities provide for safe conditions for the public and employees.

Recreation management provided is compatible with the Recreation Opportunity Spectrum objectives.

The total of early successional habitat less than or equal to 15 years, and open-land habitat, such as agricultural, urban development and roads, should generally not exceed 66 percent of the area within any 6th level watershed on the forests. In most cases, 6th level watersheds have an area up to 40,000 acres associated with a creek and tributary.

Areas with unique character are protected.

Prairies, savannahs, and oak-pine barrens have been restored and maintained on approximately 10,000 acres within old-growth areas.

Maintain favorable conditions of water flow and quality. Management practices will not result in a long-term decline in water quality conditions.

Indiana bat, Karner blue butterfly, bald eagle, Kirtland’s warbler, piping plover and Pitcher's thistle are managed according to their recovery plans.

Severe and moderately eroding streambanks are restored.

The cumulative amount of streamside stabilization over time does not exceed five percent of the total shoreline length of a river system within National Forest System boundaries.

5.2 Management Area 4.2 Goals and Objectives and Desired Future Condition:

Kirtland's Warbler Management Areas

Maintain and develop essential nesting habitat for the Kirtland's warbler in compliance with the Kirtland's Warbler Recovery Plan.

Create approximately 1,600 acres of essential breeding habitat each year.

Approximately 15,960 acres of essential breeding habitat will be available at any one time into the foreseeable future. This will enable the Forests to provide for a minimum of 420 pairs of Kirtland's warblers.

General Direction

Provide opportunities for dispersed recreational opportunities.

Provide low amounts of developed recreational opportunities.

Provide for water-related recreational opportunities.

Provide a roaded natural recreational experience.

Provide vegetative age diversity in all vegetation classes.

Manage permanent openings and/or grasslands to meet species viability needs.

Distribution of openings will recognize the contribution of adjacent private lands.

Provide recreation opportunities consistent with essential habitat maintenance.

Fulfill the Forests' responsibilities in the interagency effort outlined in the "Strategy for Kirtland's Warbler Habitat Management."

Management will strive to increase utilization of wood residues and other currently nonmerchantable material, when not needed for resource concerns such as soil productivity and wildlife habitat, for fuelwood and other special forest products.

Quality sites and opportunities for intensive timber management practices will be identified commensurate with the site's ecological capabilities.

Desired Future Condition:

Each prescription area usually contains 1,000 acres or more and ownership is primarily National Forest. Human activities such as vegetative management, facilities, structures, utility corridors, mineral exploration and mineral development are evident. Users are

aware of ecosystem processes, habitat management techniques, area closures, visitor information and other services provided. The area will provide roads and trails appropriate for motorized and non-motorized uses. Road closures are evident. Timber stands are dominated by red, white and jack pines; red, white and black oaks; and aspen. The dominant trees in stands are the same age and about the same size. Stands differ in age and are irregular in size and shape, giving the landscape a mosaic appearance. Openings are interspersed throughout the area. There are approximately 27,700 acres of designated old growth in this management area.

5.3 Management Area 4.4 Goals and Objectives and Desired Future Condition:

Emphasize hazardous fuels treatment in wildland urban interface and intermix areas.

Provide recreational facilities for camping or picnicking.

Provide improvements for fish habitat.

Management will strive to increase utilization of wood residues and other currently nonmerchantable material, when not needed for resource concerns, such as soil productivity and wildlife habitat, for fuelwood and other special forest products.

Quality sites and opportunities for intensive timber management practices will be identified commensurate with the site's ecological capabilities.

Manage permanent openings and/or grasslands to meet species viability needs.

Distribution of openings will recognize the contribution of adjacent private lands.

Manage for mesic grassland habitats.

Acquire, create and manage shallow water-emergent wetlands.

Desired Future Condition:

The ownership pattern of National Forest System land within this management area is often scattered. It is often a mixture of agricultural land, private lots and wooded National Forest System land that creates a rural environment. Human activities such as vegetation management, facilities, structures, utility corridors, mineral exploration and development are evident and harmonize with the surrounding environment. Interaction between users is frequent and users are aware of services provided, such as visitor information and law enforcement. There are few opportunities to test primitive outdoor skills. The area will provide roads and trails appropriate for motorized and non-motorized uses. Red, white and jack pine are the dominant tree species, although aspen and other hardwoods are present. The trees within each stand are about the same age and size. The scattered openings on private land are agricultural fields, idle land, borrow pits and roads. Openings are interspersed throughout the area. There are approximately 6,900 acres of designated old growth in this management area.

5.4 Management Area 6.1 Goals and Objectives and Desired Future Condition:

Wakeley Lake

Provide fish and sensitive wildlife habitats.

Whitewater Creek

Provide opportunities for semiprimitive nonmotorized experiences.

General Direction

Provide visual variety by providing vegetative diversity.

Provide for semiprimitive, nonmotorized recreational experiences.

Provide a variety of fish and wildlife habitats for species which avoid human activity.

Produce low to moderate volumes of forest products.

Provide habitat suitable for species requiring an old-growth environment.

Allow facility development to separate competing uses.

Provide for recreational activities such as hunting, fishing, viewing scenery, and water-based recreational opportunities.

Management will strive to increase utilization of wood residues and other currently nonmerchantable material, when not needed for resource concerns such as soil productivity and wildlife habitat.

Quality sites and opportunities for intensive timber management practices will be identified commensurate with the site's ecological capabilities.

Manage permanent openings and/or grasslands to meet species viability needs.

Distribution of openings will recognize the contribution of adjacent private lands.

Desired Future Condition:

The desired future condition of this management area will be characterized by a predominantly natural or natural-appearing environment. Concentration and interaction between users is low, but there is often evidence of other users. The areas are managed in such a way that on-site controls and restrictions may be present, but are subtle. Nonmotorized use is emphasized.

Closed roads may be evident and some may be utilized as trails. Users are aware of the services provided, such as visitor information, and restrictions and controls are evident.

Dominant forest types are variable depending on the area and will range from northern hardwoods on morainal hills and plains to aspen, oaks and red and white pines on dry sandy plains. Low, wet areas will be characterized by aspen, black ash, cedar, fir and

hemlock. Stand distribution by age and size, across the landscape, is natural in appearance and dominated by old growth characteristics.

There are approximately 46,800 acres of designated old growth in this management area.

Some roads are present but gated to provide access only for administrative or other permitted purposes. Improvements on these roads are infrequent and maintained to minimal standards necessary for health and safety needs. Other public agency roads may be present.

Appendix A
NNIS Design Criteria and Proposed Treatment Methods

Project Design Criteria for NNIS Treatments

- Notices would be posted near all areas to be treated, and recently treated, with herbicides.
- Herbicide application would only occur when wind speeds are less than 10 mph, or according to label direction, to minimize herbicide drift.
- Herbicide label directions would be carefully followed. This could include temporary closure of treatment areas for public health and safety.
- Appropriate protective gear would be worn by herbicide applicators per label direction.
- Herbicide containers would be disposed of following label and Forest Service guidelines.
- Herbicides would be labeled and stored appropriately in accordance with label specifications, state and federal laws, and Forest Service regulations.
- Herbicides stored on-site would have Material Safety Data Sheets per Forest Service guidelines.
- All those working with herbicides would review corresponding Material Safety Data Sheets.
- Rinse water for cleaning or rinsing actions in conjunction with herbicide treatment would be disposed of according to Environmental Protection Agency regulations.
- Weather forecasts would be obtained prior to herbicide treatment, and treatment activities would be halted, if needed, to prevent runoff during heavy rain events.
- Areas to receive herbicide treatment would be evaluated to ensure protection of threatened, endangered, and sensitive (TES) species. If any TES species are located, then appropriate protective measures would be implemented.
- Only formulations approved for aquatic-use would be applied in or adjacent to wetlands, lakes, and streams, following label direction.
- Avoid herbicide use in wetlands with suitable amphibian breeding habitat, as determined by Forest wildlife staff during pre-treatment review.
- Aquatic herbicide applications require a permit from the Michigan Department of Environmental Quality (DEQ).
- All private landowners, residents, and lake associations of affected lakes would be notified of plans for aquatic herbicide application.
- Areas to receive ground disturbance would be surveyed to ensure protection of cultural resources. If any cultural resource sites are located, then appropriate protection measures would be implemented.
- Following NNIS treatments, revegetate exposed soils promptly to avoid re-colonization by NNIS. For manual treatments that disturb the soil, tamp the soil down. Use only approved seed mixtures and weed seed-free mulch.
- Retain native vegetation and limit soil disturbance as much as possible.
- Fueling or oiling of mechanical equipment would occur away from aquatic habitats.
- Equipment, boots, and clothing would be cleaned thoroughly before moving from treatment site to ensure that seeds or other propagules are not transported to other sites.

- NNIS parts capable of starting new plants (seeds, rhizomes, etc.) will be disposed of in a way that will not facilitate spread.
- All control treatments should be timed to be most effective, based on the species phenology and life history.

Proposed manual and mechanical methods for NNIS treatment

Manual or mechanical methods would be the principle method of control for small spot infestations. Examples of hand tools that might be used include shovels, saws, axes, loppers, hoes, or weed-wrenches. Mechanical methods may include cutting with a string trimmer, chainsaw, brush saw, aquatic harvester, or mower. Plowing or disking may be used in gravel pits or other heavily disturbed sites.

Small infestations of herbaceous plants with shallow roots, such as garlic mustard and Eurasian water-milfoil, would typically be hand-pulled. Deeper-rooted herbaceous plants such as autumn olive would be dug up with a shovel. Larger infestations would be mowed or otherwise cut. Individual bushes or small groups of bushes, of exotic honeysuckle, buckthorn, and Japanese barberry would typically be dug up or girdled. Large infestations of exotic bushes would generally not be treated with manual or mechanical methods.

Proposed herbicide use for NNIS treatment

The objectives of herbicide use would be to control invasive plant species at sites where manual or mechanical means would be cost-prohibitive or result in excessive soil disturbance or other resource damage. Herbicide application may also be the preferred treatment for certain NNIS species that do not adequately respond to mechanical treatment. Herbicide drift is much reduced with spot treatment. In most cases, herbicides would be directly applied to non-native invasive plants using spot treatments or linear treatment along travel corridors.

Treatments consist of various techniques for applying herbicides to target NNIS without impacting desirable vegetation and other non-target organisms, including humans. Techniques that may be used include:

- Spraying foliage using hand held wands, backpack sprayers, or a sprayer mounted on an ATV or tractor;
- Basal bark and stem treatments using spraying or painting (wiping) methods;
- Cut surface treatments (spraying or wiping); and
- Woody stem injections.

No herbicides would be applied aerially. Only formulations approved for aquatic-use would be applied in or adjacent to wetlands, lakes, and streams, following label direction.

Proposed herbicides
All herbicides would be used in strict accordance with manufacturer's labeling directions concerning concentrations, rates, exposure times, and application methods:

2,4-D ([2,4-dichlorophenoxy] acetic acid) is a selective herbicide that controls invasive broadleaf herbaceous plants and woody seedlings, but does not harm certain monocots (including grasses). 2,4-D has been found to be effective at controlling leafy spurge, purple loosestrife, buckthorn, spotted knapweed, exotic thistles, and crown vetch (Lajeunesse et al. 1999, pp. 256-257; Mullin, 1999, p. 303; Converse, 1984; Sheley et al. 1999, pp. 357-358; Hoffman and Kearns 1997, p. 36, 38; Tu, 2003). Aquatic formulations of 2,4-D are effective for the control of Eurasian water-milfoil in lakes (Michigan Department of Environmental Quality, 2003) .

Glyphosate (N-[phosphonomethyl] glycine) is a non-selective, broad spectrum, systemic herbicide that is used to control many grasses, forbs, vines, shrubs, and trees. Glyphosate is effective against garlic mustard, Japanese barberry, leafy spurge, honeysuckle, purple loosestrife, buckthorn, crown vetch, and Japanese knotweed (Hoffman and Kearns 1997, pp.13, 20, 28, 39, 42, 59; Johnson 1996, p. 47; Seiger, 1991).

Sethoxydim (2-[1-{ethoxyimino}butyl] -5[-2-{ethylthio}propyl]-3-hydroxy-2-cyclohexen-1-one) is a selective herbicide used to control annual and perennial grasses (Tu et al. 2001). It has little or no impact on broadleaf herbs or woody plants. Species of concern on the Forests that may be controlled by sethoxydin would be smooth brome or reed canary grass.

Triclopyr ([{3,5,6-trichloro-2-pyridinyl}oxy] acetic acid) is a selective herbicide that controls invasive, broadleaf herbaceous and woody plants, but does not harm certain monocots (grasses). It is particularly effective at controlling woody species with cut-stump or basal bark treatments. Triclopyr is effective against garlic mustard, Japanese barberry, honeysuckle, buckthorn, and crown vetch (Hoffman and Kearns 1997, pp.13, 20, 23, 28, 39).

Clopyralid (3,6-dichloro-2-pyridinecarboxylic acid) controls many annual and perennial broadleaf weeds. It is particularly effective against members of the sunflower, nightshade, and knotweed families. Clopyralid may be used against spotted knapweed, thistles, and crown vetch (Hoffman and Kearns 1997, pp. 39, 45-46; Beck 1999, p. 155; Morishita 1999, p. 169-170). Clopyralid is a pre-emergent and post-emergent herbicide, and so can be effective not only on the plants to which it is applied, but can also prevent germination from seeds in the seed bank.

Fosamine ammonium salt (FAS) (ethyl hydrogen [aminocarbonyl] phosphonate) is a selective herbicide that inhibits growth in undesirable woody species. It is commonly used for brush control (Tu et al. 2001, 7d.1). FAS works through absorption by leaves, stems, and buds. FAS may be used on honeysuckle, buckthorn, and Japanese barberry.

Dicamba (3,6-Dichloro-o-anisic acid) is a growth regulator effective against broadleaf species. It is effective against leafy spurge, spotted knapweed, and thistles (Lajeunesse et al. 1999, pp. 256-257; Hoffman and Kearns 1997, pp. 36, 42, 45). It is typically applied in a mix with other herbicides.

REFERENCES

Beck, K. G. 1999. Biennial thistles. In: R. L. Sheley and J. K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. p. 155. Oregon State University Press. Corvallis, Oregon.

Converse, C. K. 1984. Element Stewardship Abstract for *Rhamnus cathartica, Rhamnus frangula*. The Nature Conservancy. Wildland Invasive Species Team. Arlington, Virginia. Available: http://tncweeds.ucdavis.edu/esadocs.html

Hoffman, R. and K. Kearns (eds.) 1997. Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants. Bureau of Endangered Resources, Wisconsin Department of Natural Resources. Available: http://www.dnr.state.wi.us/org/land/er/invasive/manual_toc.htm

Johnson, E. 1996. *Berberis thunbergii*. In J. M. Randall and J. Marinelli (eds.) Invasive Plants: Weeds of the Global Garden. Brooklyn Botanic Garden. Brooklyn, New York.

Lajeunesse, S., R. Sheley, C. Duncan, and R. Lym. 1999. Leafy spurge. In: R. L. Sheley and J. K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. pp. 256-257. Oregon State University Press. Corvallis, Oregon.

Michigan Department of Environmental Quality, 2003. Common Aquatic Plant Species and Herbicides Used as Potential Control Agents. Michigan Department of Environmental Quality, Water Division. Available: http://www.michigan.gov/deq/0,1607,7-135-3313_3681_3710---,00.html

Morishita, D. W. 1999. Canada thistle. In: R. L. Sheley and J. K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. p. 169-170. Oregon State University Press. Corvallis, Oregon.

Mullin, B. 1999. Purple loosestrife. In: R. L. Sheley and J. K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. p. 303. Oregon State University Press. Corvallis, Oregon.

Seiger, L. 1991. Element Stewardship Abstract for Polygonum cuspidatum. The Nature Conservancy. Wildland Invasive Species Team. Arlington, Virginia. Available: http://tncweeds.ucdavis.edu/esadocs.html

Sheley, R. L., J. S. Jacobs, and M. L. Carpinelli. 1999. Spotted knapweed. In: R. L. Sheley and J. K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. pp. 256-257. Oregon State University Press. Corvallis, Oregon.

Tu, M. 2003. Element Stewardship Abstract for Coronilla varia L. The Nature Conservancy. Wildland Invasive Species Team. Arlington, Virginia. Available: http://tncweeds.ucdavis.edu/esadocs.html

Tu, M., C. Hurd, and J. M. Randall. 2001. Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas. Pages 3.3, 7d.1, 7j.1. The Nature Conservancy Wildland Invasive Species Team. Available: http://tncweeds.ucdavis.edu/handbook.html

USDA Forest Service, 2006. Huron-Manistee National Forests Land and Resource Management Plan. Cadillac, MI. Available: http://www.fs.fed.us/r9/hmnf/pages/PlanningandProjects/ForestPlan.htm