Draft North Lake Muskeg ERA Plan

Figure 1. North Lake Muskeg ERA locator map

Administrative Information:

- The North Lake Muskeg ERA is on State Forest land in the Escanaba Forest Management Unit (FMU), Green Bay Lake Plain Management Area (MA), Compartment 59.

- This ERA is in Menominee County, Stephenson Township, T35N R26W sections 25 &36; Cedarville Township, T35N R25W sections 30 & 31.

- Primary plan author: Dan Beaudo- Forest Resources Division (FRD) Forester. Contributors and reviewers include Karen Sexton- Wildlife Division (WLD) Wildlife Biologist, Keith Kintigh- FRD Forest Certification and Conservation Specialist, Sherry Martine MacKinnon- WLD Wildlife Ecologist, Eric Thompson- FRD Unit Manager, Dustin Salter- FRD Forester, and John Hamel- FRD Inventory and Planning Specialist.

- The entire ERA is approximately 750 acres and completely on State Forest Land.

- North Lake ERA has County Road 352/G-12 along its north boundary. There is a winter road in the northwest part of the ERA extending down from G-12 to an upland ridge that is used for access during the frozen period of the year. Another old winter access road/fire control line extends down from G-12 through the center to the southeast corner of the ERA.

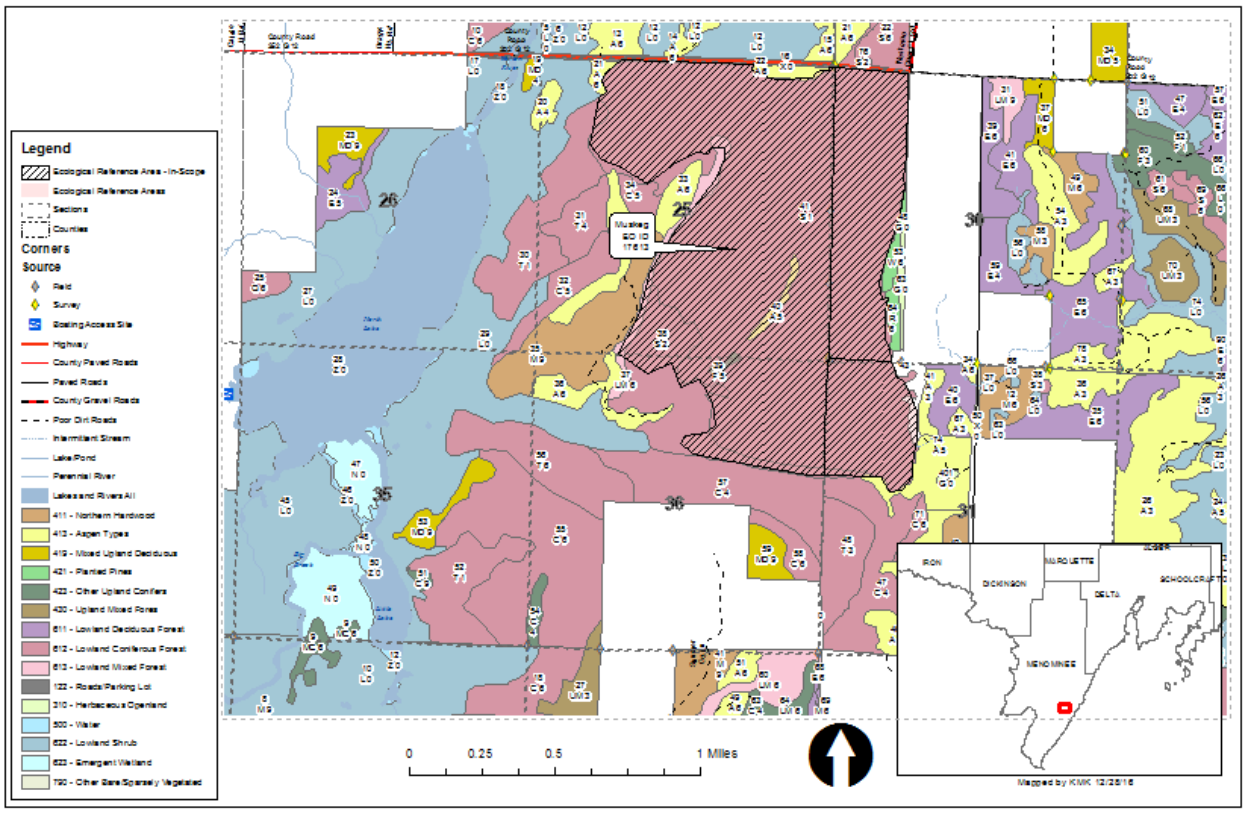

Figure 2. North Lake Muskeg ERA area map with EO ID labels

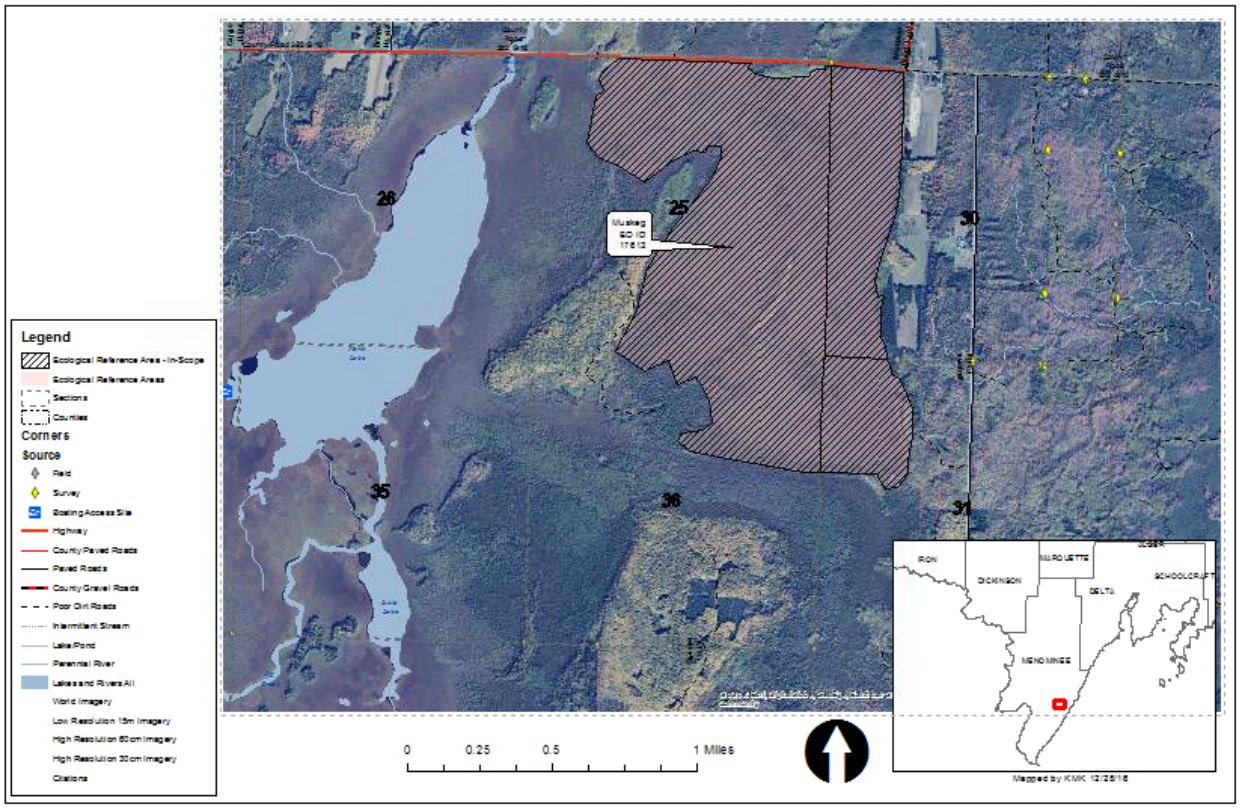

Figure 3. North Lake Muskeg ERA Imagery with EO ID labels

Conservation Values

Muskeg is a nutrient-poor peatland characterized by acidic, saturated peat, and scattered or clumped stunted conifer trees set in a matrix of sphagnum mosses and ericaceous shrubs. The community primarily occurs in large depressions on glacial outwash and sandy glacial lakeplains. Fire occurs naturally during periods of drought and can alter the hydrology, mat surface, and floristic composition of muskegs. Windthrow, beaver flooding, and insect defoliation are also important disturbance factors that influence species composition and structure.

High-quality occurrences are virtually undisturbed and should exclude portions of the muskeg damaged by ditching and road building. Stable hydrology is the most important characteristic of muskegs and other peatlands. Changes in hydrology can lead to muskegs becoming bogs or poor conifer swamps.

North Lake Muskeg: EO_ID 17613, BC rank (good to fair viability), last observed 2010-09-25. This muskeg is globally G4G5 (apparently and demonstrably secure) and in Michigan rank a S3 (rare or uncommon).

Figure 4. North Lake Muskeg. Photo by Dan Beaudo.

A large, mostly ombrotrophic lake-fill muskeg in an extensive wetland complex supporting two lakes, several streams, northern shrub thicket, northern wet meadow, poor fen, rich fen, rich conifer swamp, emergent marsh, and embedded forested uplands supporting aspen or logged mesic northern forest. The majority of the muskeg is dominated by dwarfed ericaceous shrubs and scattered, stunted and clumped conifers, with low species richness and diversity. Fibric to hemic moss and woody peats are deep (>42") and extremely to very strongly acid (pH=4.0-5.0). Local areas of groundwater infusion support minerotrophic species. Attempts at drainage have created shallow, peat-filled channels on the muskeg surface that pool water and dry adjacent peats, resulting in areas of more aggressive shrub and tree growth. The site has also been disturbed by the construction of Cedar River Road (County Road 352/G-12) across the northern portion of the peatland, resulting in shifts in vegetative composition and structure north of the road. Glossy buckthorn is widespread in the wetland complex and threatens ground water influenced areas of the peatland. Tree DBH (cm): black spruce 4.2, 3.2, 3.8, 3.6, 5.9 (~40 yrs), 8.8, 10.0. tamarack: 9.2, 9.1. northern white cedar: 7.2, 6.5.

The majority of the muskeg is characterized by scattered, clumped, generally stunted black spruce (Picea mariana) and, to a lesser extent, tamarack (Larix laricina), on a sphagnum substrate consisting of low, broad hummocks dominated by stunted ericaceous shrubs, primarily leatherleaf (Chamaedaphne calyculata), associated with labrador tea (Ledum groenlandicum), bog laurel (Kalmia polifolia), blueberry (Vaccinium angustifolium), and small cranberry (Vaccinium oxycoccos). The ground layer is characterized by cotton-grasses (Eriophorum spp), wintergreen (Gaultheria procumbens), and snow berry (Gaultheria hispida). Animal trails, ditches/channels, and logging roads support white beak-sedge (Rhynchospora alba) and bog rosemary (Andromeda glaucophylla) on wet sphagnum. Local areas of groundwater infusion support minerotrophic indicators, including northern white cedar (Thuja occidentalis), speckled/tag alder (Alnus rugosa), marsh fern (Thelypteris palustris), crested wood fern (Dryopteris cristata), spiked muhly (Muhlenbergia glomerate), northern bog goldenrod (Solidago uliginosa), three-leaved false solomon's seal (Smilacina trifolia), bog sedge (Carex limo), slender sedge (Carex lasiocarpa) and royal fern (Osmunda regalis).

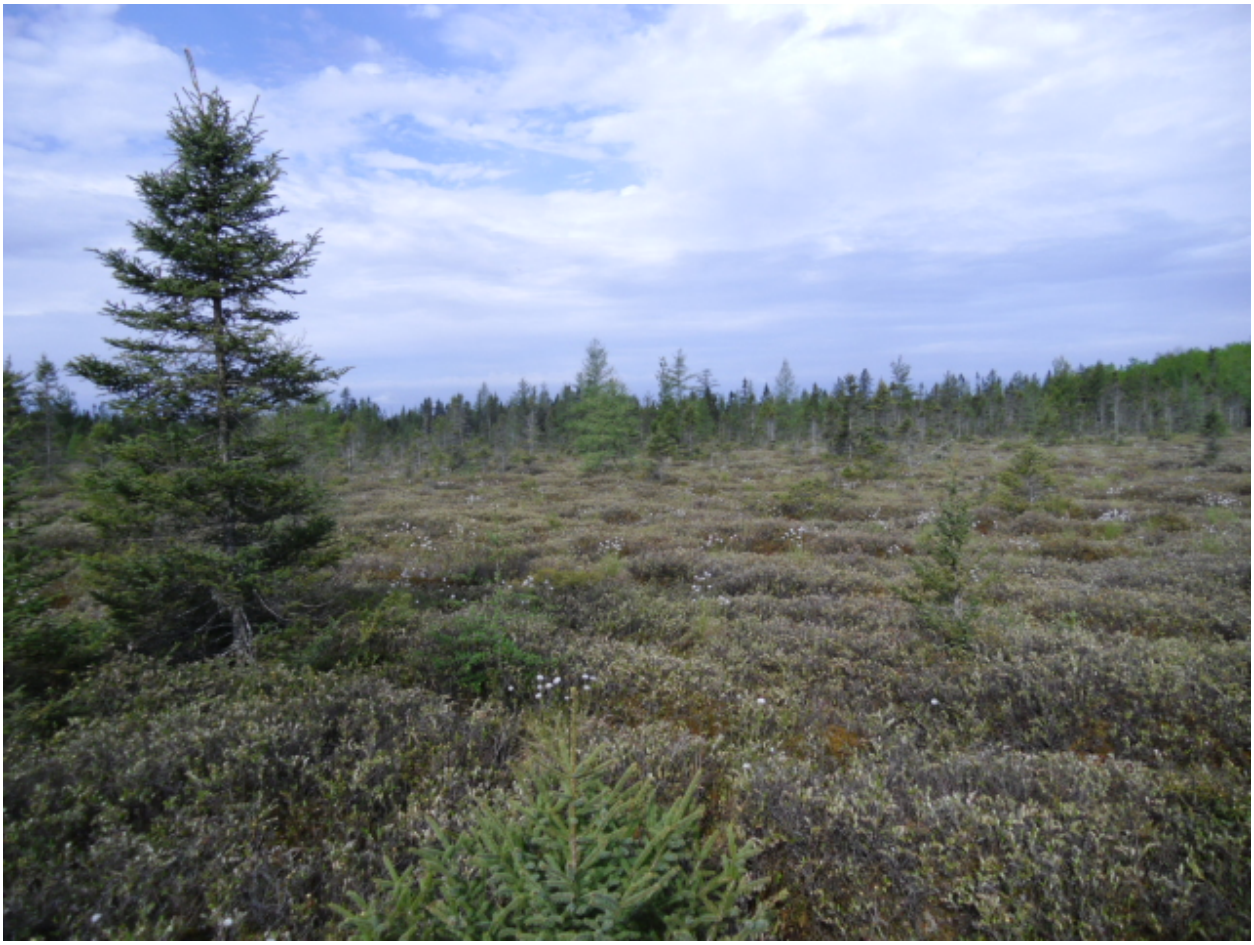

Figure 5. North Lake Muskeg, one of the state's smaller muskeg communities, is characterized by sphagnum peats, low ericaceous shrubs, and scattered, stunted conifers. Photo by Dan Beaudo.

There appear to have been several attempts to ditch and drain the muskeg. These drains have locally disrupted the hydrology, drying nearby areas of peat and causing increased growth of ericaceous shrubs and trees, resulting in strongly hummocky microtopography. Water pools and flows in the drains, and species uncommon in the undisturbed portions of the muskeg (e.g., white beak-rush) are concentrated in these features. A wide logging road that extends from an upland island north to Cedar River Rd. has the same effect. Cedar River Road, a paved, two-lane highway, crosses the northern portion of the muskeg, and has altered hydrology and converted muskeg north of the road to more minerotrophic sedge- and shrub-dominated wetlands. Glossy buckthorn is common in the greater wetland complex, and occurs within the muskeg in groundwater-influenced areas at the bases of mineral soil islands. Away from areas of groundwater influence, plants are stunted. Glossy buckthorn is a local threat within the muskeg, but is a significant threat in the minerotrophic wetlands south and west of the acidic peatland.

Figure 6. North Lake Muskeg winter logging road to access upland ridge last used in 1999. Photo by Dan Beaudo.

Figure 7. North Lake Muskeg outlined, aerial view of winter access roads, historical fire control lines, drainage canal attempts, upland ridges and private property. 2016 NAIP CIR.

There was a wildfire in the northeast part of the ERA during the 1976 drought period. As the fire advanced and jumped the control line, a new one was constructed thus resulting in the multiple lines that are still evident today. It was noted that sand was contacted about three feet below the moss in that area of the ERA. These lines are irregular in pattern but may be mistaken for attempts to convert the habitat. Locals reported that blueberry production was tremendous the years following the fire. But, not much berry production is observed now.

Figure 8. North Lake Muskeg wildfire control line. Photo by Dan Beaudo.

High Conservation Value (HCV) Attributes:

The North Lake ERA is a small (750 acres) muskeg community surrounded by highly fragmented forest, agriculture and property ownership. Several indicative plant and animal species can be found within the ERA.

Threats Assessment

A serious threat to muskeg hydrology is posed by off-road vehicle traffic, which can significantly alter hydrology through rutting. Controlling access to peatland systems will help decrease detrimental impacts. Avoiding the construction of new roads that traverse peatlands will help prevent unintended hydrologic alteration. The installation and maintenance of culverts under existing roads passing through peatlands can avert flooding and drying. In uplands and forested peatlands adjacent to muskegs potential impacts to hydrologic regimes, especially increased

surface flow, are minimized by establishing a no-cut buffer around muskegs, avoiding road construction and complete canopy removal in stands immediately adjacent to muskegs.

Figure 9. North Lake Muskeg, indication of off-road vehicle use. Photo by Dan Beaudo.

Peatland vegetation is extremely sensitive to minor changes in water levels and chemistry. Succession to more minerotrophic wetlands can occur as the result of increased alkalinity and raised water levels, which can cause the increased decomposition of acidic peats. Flooding of muskegs and poor conifer swamps can cause the death of canopy trees and the conversion of forested peatland to open wetlands. Flooding of poor conifer swamps can result in the conversion to muskeg. Roads and highways traversing through large peatland complexes, especially in the Upper Peninsula, have caused the blockage of drainage (impoundment of water) and the alteration of muskegs and poor conifer swamps to open peatlands. Conversely, lowering of water tables from drainage can allow for tree and shrub encroachment into open bogs and muskegs and the eventual succession to closed-canopy peatland.

Figure 10. North Lake Muskeg, roadway ditch with invasive phragmites and glossy buckthorn. Photo by Dan Beaudo.

The dependence of muskegs on precipitation for nutrients and water makes them especially susceptible to acid rain and air pollution. Atmospheric deposition can contribute nitrogen, sulphur, calcium, and heavy metals to peatlands. Eutrophication from pollution and altered hydrology can detrimentally impact peatlands by generating conditions favorable for invasive plant species. Particularly aggressive invasive species that may threaten the diversity and community structure of muskeg include glossy buckthorn (*Rhamnus frangula*), narrow-leaved cat-tail (*Typha angustifolia*), hybrid cat-tail (*Typha* x*glauca*), reed canary grass (*Phalaris arundinacea*), and reed (*Phragmites australis*). At present, most of these invasive species appear to be restricted to the margins of muskegs, where they occur in moats or ditches along roads and trails that border the community. Monitoring to detect and implementing methods to control invasive species before they become widespread are critical to the long-term viability of muskeg.

Fire suppression in the overall landscape may reduce the fire frequency within the muskeg. The roads that pass through the peatland create microhabitats colonized by sometimes dense stands of tag alder (Alnus rugosa), with herbaceous species such as soft-stemmed rush (Juncus effusus) and rattlesnake grass (Glyceria canadensis). The roads are also likely associated with increased nutrient input, locally altering the muskeg structure and composition in their immediate vicinity.

Non-native species occur along the road margins including: spotted knapweed (*Centurea maculate*), reed canary grass (*Phalaris arundinacea*), and phragmites (*Phragmites australis*).

General Management of ERAs

- ERAs will generally not be managed for timber harvest. Management activities or prescriptions in Ecological Reference Areas are limited to low impact activities compatible with the defined attributes and values of the community type, except under the following circumstances:

  i. Harvesting activities where necessary to restore or recreate conditions to meet the objectives of the ERA, or to mitigate conditions that interfere with achieving the ERA objectives. In this regard, forest management activities (including timber harvest) may be used to create and maintain conditions that emulate an intact, mature forest or other successional phases that may be under-represented in the landscape.

  ii. Road building only where it is documented that it will contribute to minimizing the overall environmental impacts within the FMU and will not jeopardize the purpose for which the ERA was designated.

  iii. Existing and new land use activities should be evaluated in the context of whether they detract from achieving the desired future conditions of the natural community for which the ERA was designated. The acceptability of land use activities within DNR administered ERAs will be evaluated using severity, scope, and irreversibility criteria, as established in DNR IC4199, Guidance for Land Use Activities within DNR Administered Ecological Reference Areas.

  iv. Threats such as fire, natural or exotic pests or pathogens may warrant other management measures.

  v. Harvesting and other management activities in presently accessible areas located within the peripheral boundary of an ERA that are NOT the natural community of

focus and which may or may not be typed as a separate stand or forest type (e.g. an upland island of previously managed aspen within a bog complex) may be prescribed for treatments, contingent upon a determination of no anticipated direct or indirect adverse impact to the defined attributes and values of natural community for which the ERA was designated. The FRD Biodiversity Conservation Program leader shall be consulted regarding the determination of any direct or indirect adverse impact.

vi. Land management activities immediately adjacent to an ERA should consider any anticipated direct or indirect adverse impact to the defined attributes and values of natural community for which the ERA was designated.

Management will be adaptive. ERAs will be monitored to determine if implemented management activities are moving the natural communities forward, or maintaining them at their desired future condition. The network of ERAs will be evaluated every five years for their contribution to the overall goal of biodiversity conservation. This review cycle will allow for the potential addition or subtraction of lands from an ERA, designation of new ERAs, or removal of the ERA planning designation.

Management Goals

- Allow natural process to operate unhindered.
- Prevent hydrologic alteration at the upland borders.
- Invasive Species: Ideally, the best goal would be to eliminate invasive species (or maintain an absence of invasive species), but in some areas, that may not be possible and a goal that recognizes this may be necessary.
- Reduce other Threats (Encroachment of Woody Vegetation, ORVs, etc.)
- Allow usage of winter access routes to upland areas for land management activities including timber sales.
- The ERA has representation of native plants, indicator species, and rare species.

Management Objectives

- Identify and eliminate illegal ORV access points.
- Identify and prioritize critical areas within the ERA to treat for invasive species.
- Assess EO quality every 10-20 years.
- Determine if there are impacts to hydrological system.
- Work with adaptation specialist to determine threats associated with climate change.
- Allow naturally occurring fires to spread through wetland.

Management Actions

Suggested actions or series of actions that would help to achieve the above objectives.
(M= Maintenance action, R= Restoration action)

- If current data/knowledge are not available regarding the management goals, actions may address needed assessments (i.e. surveys may be needed) (M, R).
- Identify vectors of invasive species and reduce their introduction to the site (M, R).
- Remove invasive plants using appropriate control methods for that particular species (hand-pull, herbicide, Rx) using partnerships where appropriate, develop FTP's and PAP's (M, R).
- Assess using periodic burning to maintain presence of native plant species, reduce invasive plants, and to reduce woody encroachment (M, R).
- To reduce woody encroachment, selective cutting can occur in winter using techniques to avoid impacting hydrology.
- Assess writing a wildfire plan to incorporate a "let it burn" policy where safety concerns and proximity to private property allow. (M, R).
- Avoid establishment of new fire lines to reduce invasive species encroachment (M, R).
- Retain an intact 100-foot buffer of natural vegetation surrounding the ERA to reduce the threat of negative hydrologic impacts.
- Consult with FRD Biodiversity Conservation Program leader to determine direct or indirect impacts from utilizing winter logging access roads.
- Work with LED to reduce illegal ORV activity and enforce state land use rules (M, R).
- Work with MNFI and other experts to update EO inventory (M, R).
- Update plan with additional knowledge as it becomes available (M).

Monitoring

Unless otherwise specified, monitoring is expected to occur once every 10-year cycle.

Metric	Current Status	Desired Future status	Assessment
Populations of invasive species – number and scope of species	Severity unknown; treatments should be monitored appropriately; detection monitoring opportunistically or every five years' maximum	Eliminated/fewer occurrences	
Change in EO rank	BC	No decrease	
Illegal ORV activity – number of new instances	Minimal severity with one known location	Eliminated/fewer occurrences	

Metric	Current Status	Desired Future status	Assessment
Representative and rare species – species occurrences	Baseline EO Records; updated when EO's are updated every 10-20 years	No decreases	

Additional Resources:

MNFI Natural Community Abstracts: http://mnfi.anr.msu.edu/pub/abstracts.cfm#Communities

Michigan Department of Natural Resources Forest Certification Work Instruction 1.4: http://www.michigan.gov/documents/dnr/WI_1.4BiodMgt_320943_7.pdf