Prison Camp Muskeg ERA Plan

Figure 1. Prison Camp Muskeg ERA locator map

Administrative Information:

- The Prison Camp Muskeg ERA is on State Forest land in the Newberry FMU, Whitefish Vermillion Point Management Area (MA) Compartments 57 and 58, and Charcoal Grade MA, Compartment 47. The ERA also stretches across a large portion of Tahquamenon Falls State Park.

- This ERA is in Luce County, McMillan Township, T48N R08W sections 4, 5 & 10; and Chippewa County, Whitefish Township, T49N R07W sections 1, 2, 3, 9, 10, 11, 12, 14 and 15; T50N R07W sections 35 and 36; and T49N R06W section 6.

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- Including the large portion on Tahquamenon State Park, the entire ERA is approximately 17,000 acres. The portion of the ERA on State Forest Land is approximately 4,000 acres. Private property occurs near some of the exterior boundaries.

- The majority of the ERA that occurs on state forest land is northeast of Tahquamenon State Park, and is roadless. Farm Truck Road separates the ERA on state forest land from the portion in Tahquamenon State Park. Prison Camp Muskeg extends across the park, and a small portion is found on state forest land southwest of the park. There are roads and snowmobile trails around the outside of the ERA.

- Tahquamenon State Park has written a management plan for the park, which will encompass the portion of the ERA in that ownership.

- ERA boundaries are derived from the underling Natural Community EO boundary which are mapped using NatureServe standards. EO Boundaries are informed by vegetation and other site characteristics including soils, landform, and/or historic aerial imagery. As a result, it is not uncommon for EO/ERA boundaries to differ from forest inventory stand boundaries. If these difference result in potential conflicts with proposed forest activities, consult with the Forest Conservation and Certification Specialist.

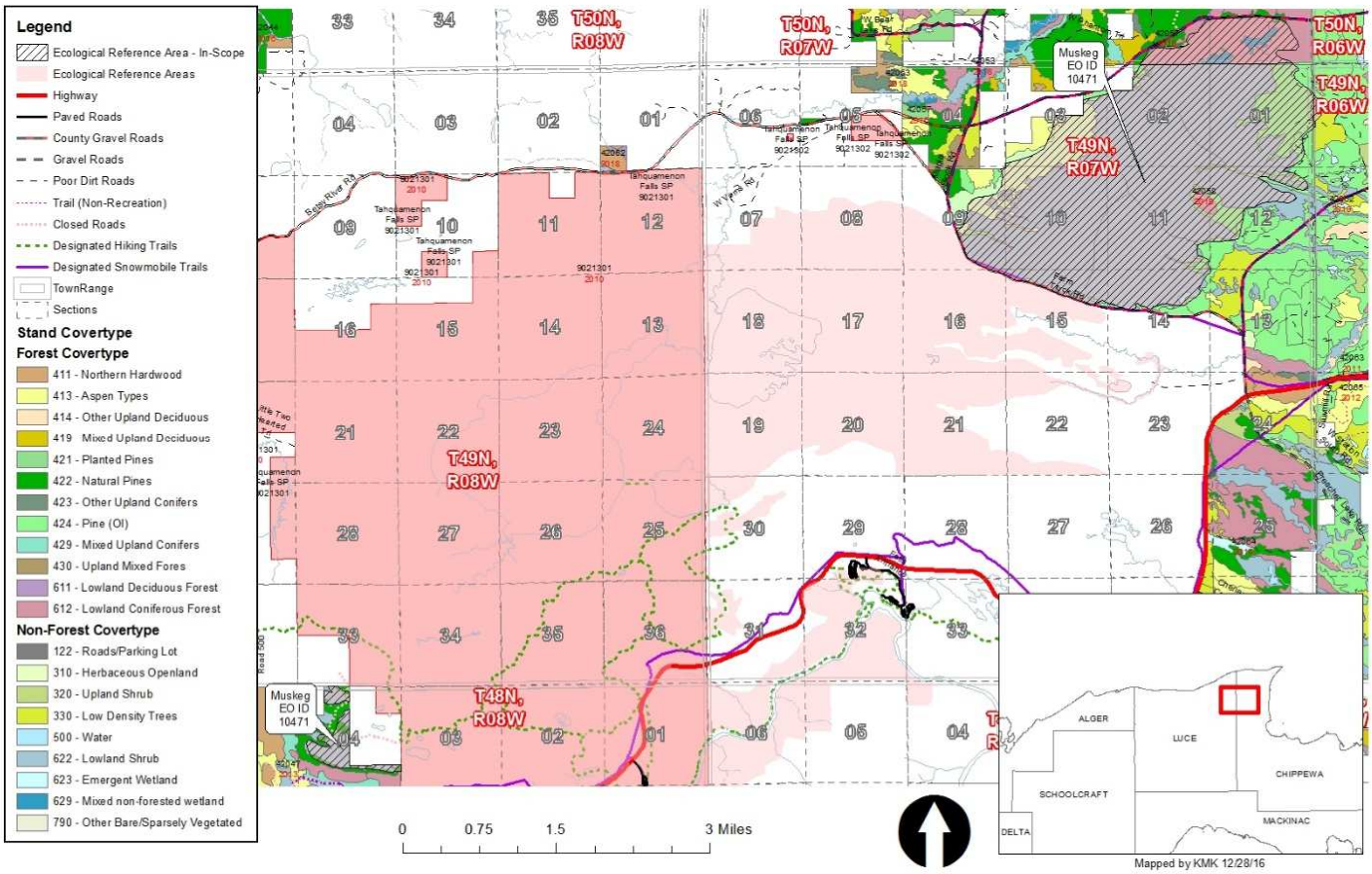

Figure 2. Prison Camp Muskeg ERA area map with EO ID labels

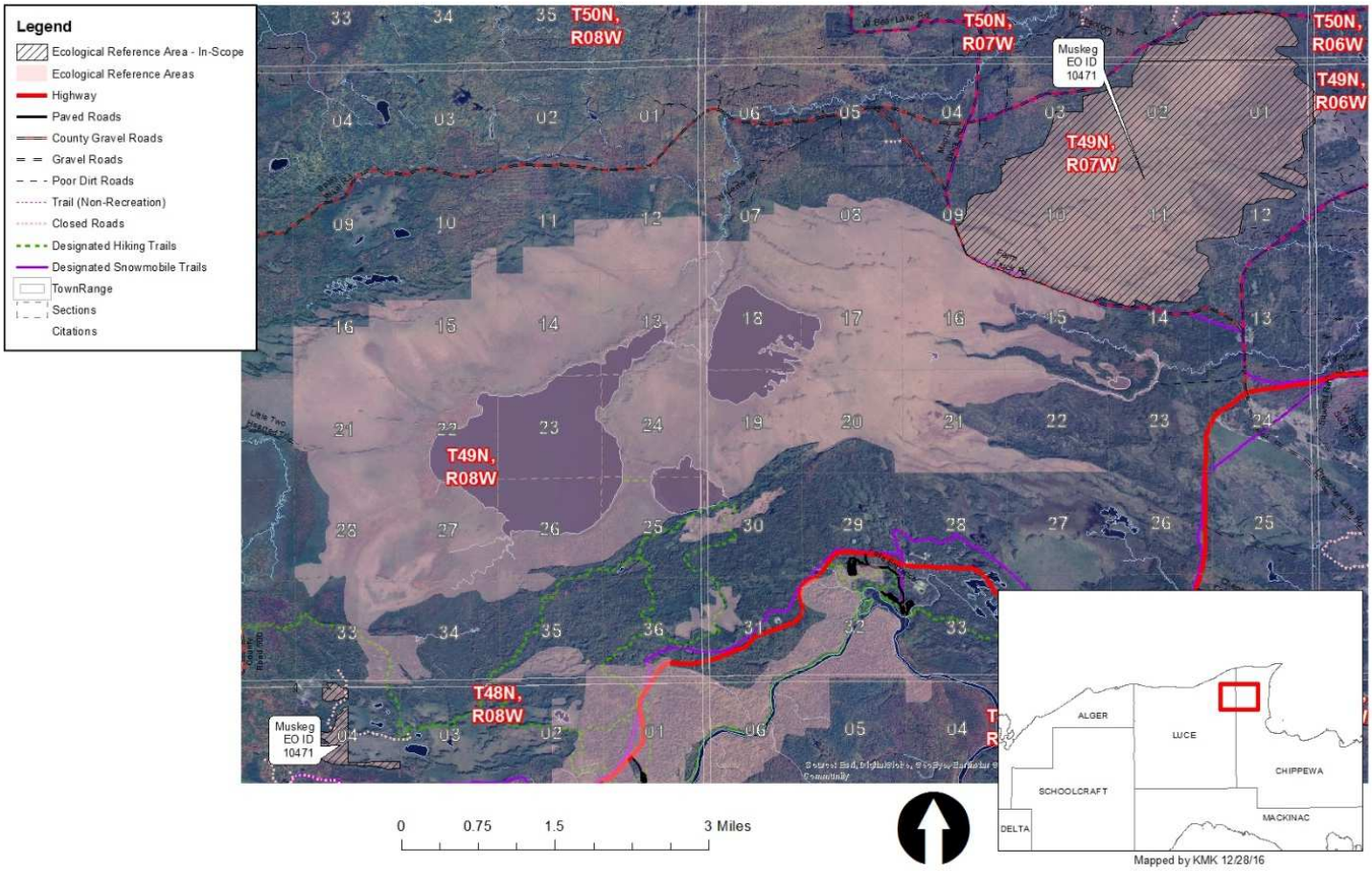

Figure 3. Prison Camp Muskeg ERA Imagery with EO ID labels

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.

Prison Camp Muskeg: EO_ID 10471, AB rank, last observed 2010-08-31
This muskeg is G4G5 S3, apparently secure globally and vulnerable within the state

The rank was slightly downgraded in 2010 from A to AB. Following a wildfire along a dune ridge north of Betsy Lake, a fire line was established north of the ridge within the peatland, locally altering the hydrology and degrading the vegetation.

This is the state's largest expanse of muskeg, covering over 35 square miles. This muskeg occurs in a large peatland complex that consists of muskeg, bog, patterned fen, and poor conifer swamp. This complex of wetlands is located on poorly drained, sandy lakeplain. The deep sphagnum mat is continuous and dominated by graminoids and forbs, with patchy shrub cover. Diversity of the site is enhanced by the presence of open pools of water fringed by quaking saturated sphagnum mats. The sphagnum peats are strongly acidic (pH 4.0-4.5). The extensive peatland contains projections of dry, sandy pine ridges, and several large and small lakes. The ridges connect to surrounding uplands of pine-dominated dry northern forest and dry-mesic northern forest. High-quality mesic northern forest and intermittent wetland occur adjacent to the muskeg.

The canopy of the muskeg is characterized by well-spaced, mostly stunted tamarack, black spruce, and jack pine. The scattered and stunted trees are typically 1-4" in DBH, 15 to 30 feet tall and the canopy coverage ranges from 20-50%. The site is characterized by an open understory with conifer tree saplings and mountain holly (*Nemopanthus mucronata*), which is uncommon. The low shrub layer is dominated by patchy, ericaceous shrubs including leatherleaf (*Chamaedaphne calyculata*), bog rosemary (*Andromeda glaucophylla*), bog laurel (*Kalmia polifolia*), and Labrador tea (*Ledum groenlandicum*). Graminoids, especially few-seed sedge (*Carex oligosperma*), and sphagnum species dominate the ground cover. Additional species include small cranberry (*Vaccinium oxycoccos*), pitcher-plant (*Sarracenia purpurea*), bog aster (*Aster nemoralis*), and cotton-grasses (*Eriophorum spp.*). Quaking mats associated with open pools are dominated by white beak-rush (*Rhynchospora alba*), yellow-eyed grass (*Xyris montana*), sundews (*Drosera spp*.), large cranberry (*Vaccinium macrocarpon*), and arrow-grass (*Scheuchzeria palustris*). Narrow upland ridges are dominated by relatively large red pine (14-22" DBH), with red pine, jack pine, and black spruce in the understory, and a shrub-dominated ground cover. There are local areas of patterning with linear strings and flarks, the former supporting rows of small conifers, the latter being open and sedge-dominated, creating the appearance of tree-lined alleys. Over 40 vascular plant species were documented during the survey.

Although minimal, there are areas within and along this ERA where timber has been harvested. There is evidence of past logging along the far northeastern and western

parts of this ERA. Most logging occurred along the narrow upland pine ridges that finger out into the lowlands. This logging likely occurred around 40 years ago. More recently, within the past 10-15 years, there are a few stands that have been harvested immediately adjacent to the east side of this ERA.

Figure 4. Prison Camp Muskeg. Photo by Joshua G. Cohen.

Figure 5. Prison Camp Muskeg, the state's largest expanse of muskeg, is characterized by deep sphagnum peats, low ericaceous shrubs, and scattered, stunted conifers. Photo by Joshua G. Cohen.

High Conservation Value (HCV) Attributes:

The Prison Camp ERA is part of a large peatland consisting of muskeg, bog, patterned peatland, and poor conifer swamp. The entire muskeg ERA is part of a landscape level forest, and is over 35 square miles, much of which is roadless.

The ERA is a rare natural community of regional significance. Ebony boghaunter (*Williamsoria fletcheri)* G4S1S2 has been observed on state forest land in this ERA, along with Hoary comma (*Polygonia gracilis)* G5S3. Several rare and endangered plants and animals were observed on the portion of the ERA within Tahquamenon State Park.

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.

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.

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*), ox-eye daisy (*Chrysanthemum leucanthymum*), and St. John's Wort (*Hypericum perforatum*).

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.)
- The ERA has representation of native plants, indicator species, and rare species.

Management Objectives

The following Management Objectives describe the measures necessary to ensure the maintenance and/or enhancement of the ERA site or sites. Objectives and associated management actions will be prioritized and implemented based upon available resources.

- 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, prescribed burning) using partnerships where appropriate, develop Forest Treatment Proposals and Pesticide Application Proposals. (M, R)

- Consider 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.
- Minimal Impact Suppression Tactic (MIST) practices should be used for wildfire response in this area if possible. (M, R)
- Maintain an appropriate buffer of natural vegetation surrounding the muskeg to reduce the threat of negative hydrologic impacts.
- Forested inclusions within the muskeg should be left uncut. (M, R)
- Close illegal roads and trails. (M, R)
- Vehicular traffic within the ERA should be avoided; avoid creating new roads. (M, R)
- Install culverts under roads as needed and ensure that current culverts are functioning.
- 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)
- As opportunities arise, work with local landowners to manage muskeg on property directly adjacent to ERA. (R)

Monitoring

Monitoring approaches and indicators appropriate for the natural community and in line with the objectives and management actions suggested, including appropriate frequency and timing considerations. (Unless otherwise specified, monitoring is expected to occur once every 10-year inventory 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	AB	No decrease	
Illegal ORV activity – number of new instances	Severity unknown	Eliminated/fewer occurrences	
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