Maxton Plains Complex ERA Management Plan

Figure 1. Maxton Plains Complex ERA locator map.

Administrative Information:

- The Maxton Plains Complex ERA plan encompasses a large alvar ERA, and nearby ERAs of Limestone Bedrock Glade, Limestone Bedrock Lakeshore, Great Lakes Marsh, and Northern Wet Meadow.

- The ERAs are within the Sault Ste. Marie FMU, Maxton Plains and a small portion of Drummond Island Management Areas (MA), Compartments 1, 2, and 4.

- Chippewa County, Drummond Township, T43N, R06E, sections 19, 20, 21, and 25-36; T43N, R07E, sections 31 and 32; T42N, R07E, sections 5 and 6; T42N, R06E, section 3.

- Primary plan author: Kristen Matson, Forest Resources Division (FRD) Inventory and Planning Specialist; Contributors and reviewers include Sherry MacKinnon, Wildlife Division (WLD) Wildlife Ecologist; Keith Kintigh, FRD Forest Certification and

Conservation Specialist; Dave Jentoft, WLD Wildlife Biologist; Karen Rodock, FRD Unit Manager; and Jeff Wise and Josh Brinks FRD Foresters.

- State forest ownership in this area is mainly contiguous, with private parcels surrounding the core Maxton Plains area.

- The main road along the south of the Maxton Plains is also a snowmobile trail. There is an informational kiosk describing the Maxton Plains and the alvar ecosystem.

- Maxton Plains had an older ERA plan that was approved in 2009. This current ERA plan will supersede the old ERA plan. The Drummond Island Comprehensive Resource Management Plan (2015) addresses management on state forest land on Drummond Island, including the Maxton Plains area. The Nature Conservancy (TNC) has a plan for their ownership on the Maxton Plains which is adjacent to state forest land ownership. The Maxton Preserve Management Plan was updated in January of 2017. There are also DEQ plans for the coastal environmental areas.

- 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. Maxton Plains ERA Complex area map with EO ID labels.

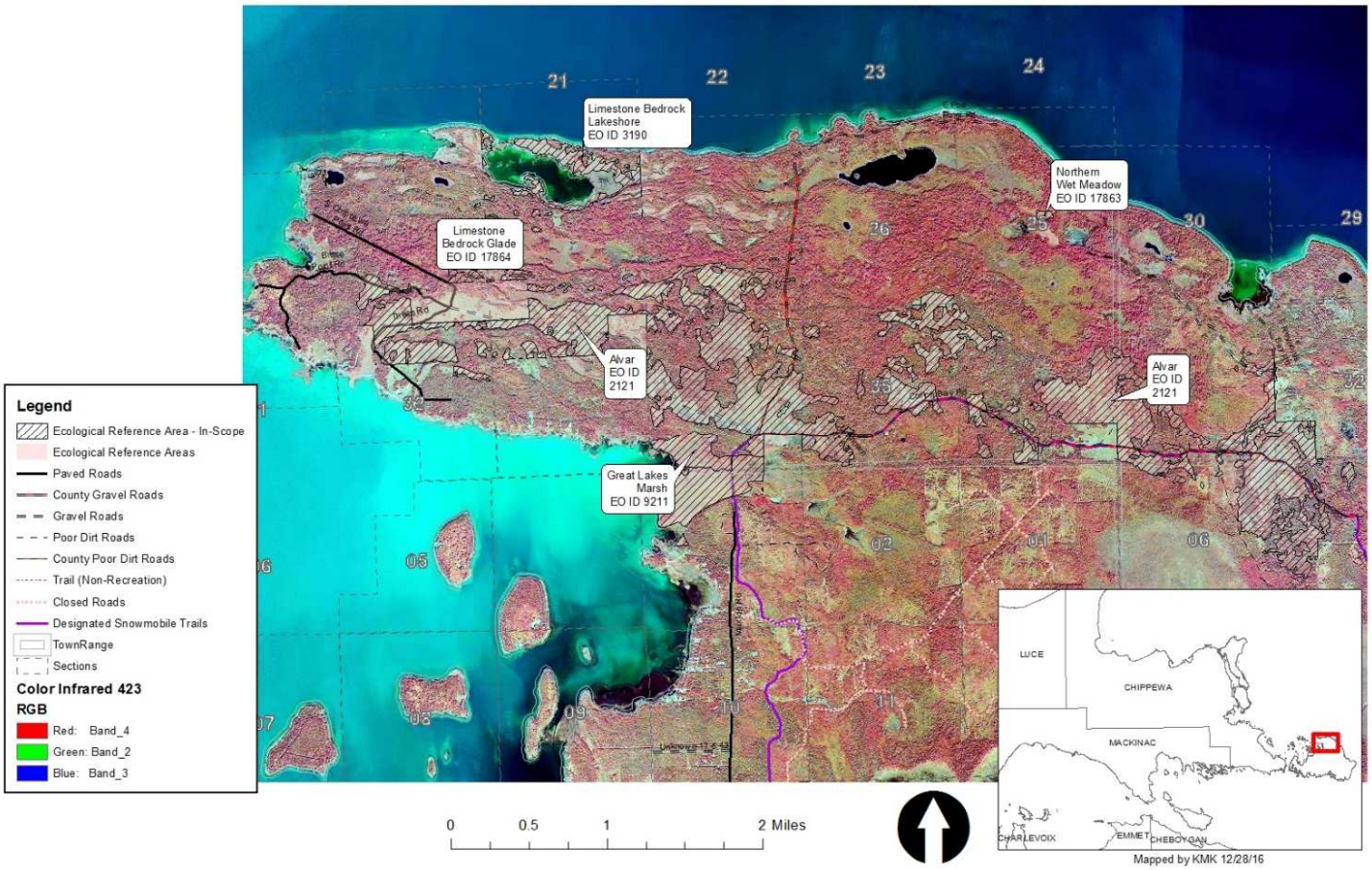

Figure 3. Maxton Plains ERA Complex map. Imagery with EO ID labels.

Conservation Values

This ERA complex is recognized for five natural communities: alvar, Great Lakes marsh, limestone bedrock glade, limestone bedrock lakeshore, and northern wet meadow. It is recognized for having both natural communities that are rare as well as high quality representative examples.

Alvar

Alvar is ranked G2? S1, globally imperiled and critically imperiled in the state. Alvar is a grass- and sedge-dominated community, with scattered shrubs and sometimes trees. The community occurs on broad, flat expanses of calcareous bedrock (limestone or dolostone) covered by a thin veneer of mineral soil, often less than 25 cm deep. Alvars are only known from three areas of the world: the Basaltic region of northern Europe, Counties Clare and Galway of northwest Ireland, and the Great Lakes region south of the Canadian Shield. In Michigan, most of the sites occur in the Upper Peninsula along the shorelines of Lake Huron and Lake Michigan, in a band from Drummond Island to Cedarville, west to Seul Choix Point

on the Garden Peninsula. Alvar also occurs farther west and inland along the Escanaba River. The plant community is also referred to as alvar grassland.

Maxton Plains Alvar: EO_ID 2121, A rank, Last Observed 2007-06-14.

This element occurrence represents three separate sites that were combined into one: Maxton Plains, Middle Maxton Plains, and Maxton Plains East (sites A, B, and C respectively). The sites total approximately 1,474 acres. These large alvar openings occur on Drummond Island on shallow soils (both mineral and organic) over south-tilting Engadine dolomite. There are numerous areas of exposed dolomite bedrock in addition to bare soils and boulders. Where the thin soils have accumulated, they are circumneutral to alkaline (pH 7.2-8.0) and include muck and Detour stony loam. The soils are typically 9 cm deep but there are areas where soil depth approaches 20 cm. In the spring, there are areas where water pools in shallow depressions in the bedrock and there are several small drainages within the alvar openings. The alvar pockets are surrounded by boreal forest.

These thin-soil alvar openings are dominated by grasses, sedges, and lichens with spike-rushes prevalent in the wettest areas. Although each opening has its own character, a few broad dominance patterns emerge at the landscape scale. Dry rises are typically dominated by little bluestem (*Andropogon scoparius)* and poverty oats (*Danthonia spicata*) with bastard toadflax (*Comandra umbellata*) as a common forb and bearberry (*Arctostaphylos uva-ursi*) locally important. Mesic flats are dominated by prairie dropseed (*Sporobolus heterolepis,* state special concern), with non-native grasses locally common. Wet-mesic to wet depressions and flats are dominated by flattened spike-rush (*Eleocharis compressa,* state threatened) and hair grass (*Deschampsia cespitosa*) with Richardson's sedge (*Carix richardsonii,* state special concern) locally important. Wettest areas of alvar with standing water are dominated by bluejoint grass (*Calamagrostis Canadensis)* and golden-seeded spike-rush (*Eleocharis elliptica*) with wild blue flag (*Iris versicolor*) and willows (*Salix* spp.) common.

In addition to these zones, there are areas of dolomite pavement dominated by creeping juniper (*Juniperus horizontalis*) with patchy cover of prairie dropseed (*Sporobolus heterolepis*, state special concern), little bluestem, bulrush sedge (*Carex scirpoidea,* state threatened), and shrubby cinquefoil (*Potentilla fruticosa*). Within areas dominated by grasses, there are groves of scattered and small-diameter quaking aspen (*Populus tremuloides*) and white spruce (*Picea glauca*) with common juniper (*Juniperus communis*) in the shrub layer.

Within Site A, flattened spike-rush dominates the wet depressions. Characteristic species within this site include lichens, little bluestem, balsam ragwort (*Senecio pauperculus*), prairie-smoke (*Geum triflorum,* state threatened), and Crawe's sedge (*Carex crawei*). Site B is the driest and most diverse of the openings with common species including bastard toadflax, bearberry, bulrush sedge, balsam ragwort, and field chickweed (*Cerastium arvense*). Richardson's sedge, flattened spike-rush, and Hill's thistle (*Cirsium hillii,* state special concern) also occur within Site B. These rare plants, in addition to prairie dropseed, also occur in Site C. Common species in Site C include common juniper, creeping juniper, bastard toadflax, and Kalm's brome (*Bromus kalmia*).

Figures 4 and 5. Maxton Plains supports extensive alvar grassland occurring over dolomite bedrock. Photos by Bradford S. Slaughter.

Great Lakes Marsh

Great Lakes marsh is an herbaceous wetland community occurring statewide along the shoreline of the Great Lakes and their major connecting rivers. Vegetation patterns are strongly influenced by water level fluctuations and type of coastal feature, but generally include the following: a deep marsh with submerged plants; an emergent marsh of mostly narrow-leaved species; and a sedge-dominated wet meadow that is inundated by storms. Great Lakes marsh is ranked G2 S3, globally imperiled and vulnerable within the state.

Paw Point-Scott Point Great Lakes Marsh: EO_ID 9211, BC rank, Last Observed 2007-06-21.

This element occurrence represents two adjacent Great Lakes Marsh sites: Paw Point and Scott Point. The area encompasses approximately 171 acres. This marsh complex occurs on active lakeplain of Drummond Island. Scott Point is a bay marsh community and Paw Point includes narrow coastal marsh, as well as river mouth marsh. The soils are typically shallow and predominantly circumneutral to alkaline organics overlying dolomite bedrock.

The marsh is characterized by several ecological zones including submergent marsh, emergent marsh, northern wet meadow, northern shrub thicket, and a small amount of treed swamp. Submergent marsh and emergent marsh occur along the shore, particularly in the narrow, protected embayment just south of Maxton Plains. Broad emergent marsh occurs at both sites with pockets of submergent marsh. Typical vegetation within the submergent marsh zones include milfoils (*Myriophyllum* spp.), pondweeds (*Potamogeton* spp.), yellow pond-lily (*Nuphar variegata*), and sweet-scented water-lily (*Nymphaea odorata*). Areas of emergent marsh are dominated by hardstem bulrush (*Schoenoplectus acutus*) with low beach flats supporting spike-rushes (*Eleocharis* spp.) and twig-rush (*Cladium mariscoides*). Muskrats (*Ondatra zibethicus*) have created numerous submergent pockets within the emergent marsh.

The majority of the marsh complex is dominated by northern wet meadow with dominant species including tussock sedge (*Carex stricta*), bluejoint grass, and wiregrass sedge (*Carex lasiocarpa)*. Reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), and willows are locally important. The wetland exhibits coastal fen characteristics east of Maxton Road where tamarack, shrubby cinquefoil (*Potentilla fruticosa*), and bog buckbean (*Menyanthes trifoliata)* are prevalent. In addition, areas of limestone cobble shore occur sporadically along the lakeshore.

Figure 6. Great Lakes Marsh. Photo by Bradford S. Slaughter.

Limestone Bedrock Glade

Limestone bedrock glade is an herb- and graminoid-dominated plant community with scattered clumps of stunted trees and shrubs growing on thin soil over limestone or dolomite. Tree cover is typically 10 to 25%, but occasionally as high as 60%. Shrub and herb cover is variable and there are typically areas of exposed bedrock. Mosses, lichens, and algae can be abundant on the exposed limestone bedrock or thin organic soils. Seasonal flooding and summer drought maintain the open conditions. This community is also referred to as alvar glade. Limestone bedrock glade is ranked G3 S2, vulnerable globally and imperiled in the state.

Maxton North Limestone Bedrock Glade: EO_ID 17864, B rank, Last Observed 2010-07-23.

This glade occurs north of the Maxton Plains, and is about 70 acres in size. The scattered and stunted canopy is typically 15-25 feet with occasional trees reaching 40 feet, and diameters of canopy trees range from 2-12 inches. Northern white cedar is the canopy dominant with canopy associates including white spruce, white pine, balsam fir and quaking aspen. Canopy coverage ranges from 10-25% with denser areas having

deeper and moister soils. The understory is dominated by saplings of the canopy trees with cedar, balsam fir and white spruce the most prevalent.

The area is limestone bedrock glade fingers occurring within matrix of boreal forest and alvar. Shallow soils result in droughty conditions. Charred stumps throughout the landscape indicate that the site burned. Canopy dominants are uneven-aged as establishment, and not competition, is the limiting factor for regeneration. Snags and downed logs are scattered throughout the site. Areas with deeper soils characterized by greater moisture retention and subsequently greater tree and shrub cover. Very shallow, circumneutral to alkaline (pH 7.0-7.5) loamy soils over limestone cobble and bedrock, with soils accumulating between cobble and on limestone pavement. There is scattered limestone cobble. Loam soils are dry to moist. Moisture increases in areas where soils are relatively deeper.

ORV trails occur in some fingers of limestone bedrock glade and are seasonally used by deer hunters. Invasive species are concentrated along the margins of these linear disturbances. Non-native species are scattered throughout the glade but do not threaten species composition and structure. There is a high percentage of natural cover, and low road densities within the large block of state forest managed for recreation and biodiversity.

Limestone Bedrock Lakeshore

Limestone bedrock lakeshore is a sparsely vegetated natural community dominated by lichens, mosses, and herbaceous vegetation. This community, which is also referred to as alvar pavement and limestone pavement lakeshore, occurs along the shorelines of northern Lake Michigan and Lake Huron on broad, flat, horizontally bedded expanses of limestone or dolomite bedrock. Limestone bedrock lakeshore is ranked G3 S2, vulnerable globally and imperiled in the state.

Grand Marais Lake Limestone Bedrock Lakeshore: EO_ID 3190, A rank, Last Observed 2010-07-29.

This limestone bedrock lakeshore is characterized by a series of low bedrock steps that create a series of narrow lakeshore and alvar openings between higher areas of limestone bedrock glade or boreal forest. The site occurs on Drummond Island adjacent to Lake Huron, and is approximately 104 acres. The bedrock throughout this site consists of limestone with no large solution cracks. A thin layer of carbonates coat the plants and rock along the shores of Grand Marais Lake, which is shallow and occupies a large depression in the bedrock. The ecological gradient includes dry, exposed

limestone pavement, narrow zones of northern fen and wet meadow, and low beach ridges with wave-deposited cobbles. Ants are common under the loose cobble and black bears are commonly encountered.

Characteristic species along the limestone bedrock lakeshore include algae, low calamint (*Calamintha arkansana*), bulrush sedge (*Carex scirpoidea,* state threatened), and flattened spike-rush (*Eleocharis compressa,* state threatened). Typical species of the limestone bedrock glade include northern white-cedar (*Thuja occidentalis)*, ebony sedge (*Carex eburnean*), and Crawe's sedge (*Carex crawei*). Prairie dropseed (*Sporobolus heterolepis,* state special concern) and Hill's thistle (*Cirsium hillii,* state special concern) are common in areas of alvar grassland. Common species throughout the site include low calamint, shrubby cinquefoil, bluejoint grass, Richardson's sedge, Indian paintbrush (*Castilleja coccinea*), Kalm's lobelia, small-fringed gentian (*Gentianopsis procera*), and tall flat-top white aster (*Aster umbellatus*).

Figure 7. Limestone Bedrock Lakeshore. Photo by Dennis A. Albert.

Northern Wet Meadow:

Northern wet meadow is an open, groundwater-influenced, sedge- and grass-dominated wetland that occurs in the northern Lower and Upper Peninsulas and typically borders streams but is also found on pond and lake margins and above beaver dams. Soils are nearly always sapric peat and range from strongly acid to neutral in pH. Open conditions are

maintained by seasonal flooding, beaver-induced flooding, and fire. Northern wet meadow is ranked G4G5 S4, apparently secure globally and apparently secure in the state.

Maxton North Northern Wet Meadow: EO_ID 17863, AB rank, Last Observed 2010-07-29.

Northern wet meadow occurring on poorly drained lakeplain, and surrounded by boreal forest. This site is approximately 11 acres of state forest land. High-quality limestone cobble shore and limestone bedrock lakeshore on nearby Lake Huron shoreline. The northern wet meadow is influenced by seasonal flooding and periodic flooding from beaver activity. There is beaver sign surrounding the northern wet meadow. Sedge (*Carex* spp.) hummocks throughout the complex provide micro-topography and fine-scale gradients in soil moisture and chemistry. The site is shaped by natural processes and is buffered by wetlands and unfragmented forests. The soils are characterized by slightly acidic to circumneutral (pH 6.8-7.0) peats (30 cm) overlying circumneutral sandy clay (pH 7.0).

The site is shaped by natural processes and is buffered by additional wetlands and unfragmented forests. No anthropogenic disturbances or non-native plants were noted during the course of the survey. Unfragmented landscape on state forest on Drummond Island managed primarily for recreation and biodiversity near the Lake Huron shoreline. Much of the area remains roadless, but there are some scattered woods trails. Some timber management has occurred in nearby forests and swamps. Weedy invasive species associated with roads, trails, and shoreline in the vicinity include spotted knapweed (*Centurea maculosa*), St. John's Wort (*Hypericum perforatum*), and timothy grass (*Phleum pratense*).

<u>High Conservation Value (HCV) Attributes:</u>

The Maxton Plains landscape, in general, is largely an intact and functional landscape. It is part of a large landscape level forest with minimal road density and management activity. The alvars found here are the largest remaining high quality alvars in North America.

These ERAs are rare natural communities of global or regional significance and provide habitat for rare, threatened and endangered native plants and animals. This area attracts a large number of birds, including rare and threatened species such as upland sandpiper, osprey, northern harrier, yellow rail, tapered vertigo, crested vertigo and sharp-tailed grouse.

In addition to the five ERAs included in this plan, the Maxton Plains area also contains three Drummond Township Coastal Environmental Area HCVAs (121 acres, 27 acres, 17 acres), and the Maxton Plains Natural Area SCA (1,324 acres).

Recreational uses in the area include camping, hiking, hunting, photography, plant and bird viewing, ORV and snowmobile riding, and the shoreline is popular for kayaking.

Threats Assessment

Alvar

Threats to the alvar community include introduction of non-native invasive plants, ORV damage (alters hydrology through rutting), trampling of the thin soil, rock and fossil collecting, and building of rock cairns. Recreational users of all-terrain vehicles, trail bikes, and off-road trucks are attracted to alvar areas because of their flat open terrain and remoteness. The rutting caused by these vehicles disrupts local hydrological patterns, creates conditions suitable for invasion by exotic invasive species and visually scars the alvar surface.

Controlling illegal off-road vehicle activity is a primary means of protecting the ecological integrity of alvar. Monitoring to detect and implementing methods to control invasive species are critical to the long-term viability of alvar. New and existing roads stress alvars by modifying hydrology thereby disrupting overland surface flows, typically flooding one side of the road and drying out the other. Road corridors and associated maintenance also facilitate the introduction and expansion of invasive plants. Deer grazing can reduce plant diversity and threaten rare species in some locations.

The Maxton alvar has had past surveys for invasive species, which were mapped and control efforts initiated.

Great Lakes Coastal Marsh

Waterfowl management, including the creation of potholes, has altered plant composition and structure, and they should be abandoned and allowed to succeed to marsh/aquatic vegetation. Avoid soil disturbance.

Continued residential development along the private shoreline is a threat to the site. Off-road vehicle damage was noted along portions of the shoreline. The recreational use of airboats is an emerging threat to the natural community and nesting birds within Great Lakes marsh ecosystem; use at this site is unknown.

Invasive plants threaten the diversity and community structure of Great Lakes marsh and constant vigilance should be employed. Portions of the wetland occurring on private lands could be acquired or protected through conservation easements.

Limestone Bedrock Glade

Principal threats to limestone glade are overgrazing, alteration of hydrology from road construction, maintenance of existing roads, off-road vehicle use, development, dumping of waste materials, and quarry development. All of these disturbances provide pathways for the introduction or spread of invasive plant species. Recreational off-road vehicle (ORV) use has degraded this glade. High deer densities are influencing community structure and are likely negatively impacting species diversity and northern white-cedar's (*Thuja occidentalis*) regeneration capacity.

Invasive species can reduce the diversity and alter the community structure of limestone bedrock glade. Monitoring to detect and implementing methods to control invasive species before they become widespread will help maintain the native biodiversity of limestone bedrock glade and surrounding natural communities.

Limestone Bedrock Lakeshore

Threats include motorized and non-motorized recreation, and invasive species. Trampling of vegetation and off-road vehicle traffic use can kill or reduce vegetation coverage, destroying the root systems that bind small accumulations of soil to cracks in the bedrock. The removal of lakeshore vegetation facilitates the loss of soil by wind, rain, ice, or wave action, which is especially damaging in this erosive landscape where soil development and plant reestablishment are slow. Controlling legal and illegal off-road vehicle activity is a primary means of protecting the ecological integrity of limestone bedrock lakeshore and associated shoreline communities.

Invasive plant species that threaten the diversity and community structure of this limestone bedrock lakeshore include: spotted knapweed (*Centaurea maculosa*), ox-eye daisy (*Chrysanthemum leucanthemum*), common St. John's-wort (*Hypericum perforatum*), Canada bluegrass (*Poa compressa*), common mullein (*Verbascum thapsus*). In addition, empty shells of zebra mussels (*Dreissena polymorpha*), a small invasive bivalve mussel, can form deep piles on limestone bedrock pavement and locally limit vegetation establishment and impact soil accumulation, deposition, and erosion.

Northern Wet Meadow

The hydrology of these systems is threatened by agricultural runoff and nutrient enrichment, stream channelization, and reductions in local water tables due to

excessive groundwater withdrawals and ditching. Lowering of the water table has caused the conversion of many sedge meadows to shrub thickets. In addition, fire suppression has allowed shrub encroachment with many sedge meadows converting to shrub thicket within ten to twenty years.

Avoid harvesting uplands adjacent to the wetlands, and retain an intact buffer of natural communities surrounding the wetland. Strive to prevent the establishment and spread of invasive species.

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

- Restoration of and/or expansion of the natural communities where applicable.
- Allow natural ecological processes to occur.
- 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 (ORV's, shoreline armoring, altered hydrology, airboats, encroachment of woody vegetation, excessive foot and mountain bike traffic, etc.).
- The ERA has representation of native plants, indicator species, and rare species.
- Reduce fragmentation.

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 reduce illegal ORV access points.
- Determine if other forms of recreation are detrimentally impacting the site (mountain bikes, excessive walking trails, cairn building).
- Identify and prioritize critical areas within the ERA to treat for invasive species.
- Identify opportunities for acquisition where applicable.

- Allow blowdown/windthrow to occur without salvage harvest.
- Assess EO quality every 10-20 years.
- Work with adaptation specialist to determine threats associated with climate change.
- Determine if there are negative impacts to the hydrological system.

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)
- Work with TNC, Three Shores CISMA, and others to comprehensively survey the Maxton Plains alvar ERA and develop a control strategy. (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 species (hand-pull, herbicide, Rx) using partnerships where appropriate, develop FTP's and PAP's. (M, R)
- Close illegal roads and trails where feasible. Consult with PRD Trails Specialist when roads and access points need to be closed. (R)
- Remove rock cairns. (R)
- Work with LED to increase patrols for 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)
- Collaborate with public and private landowners to inform the public about threats to limestone bedrock glade and develop educational strategies to prevent degradation of the ERA (M, R)
- Incorporate signage at scenic viewing sites to inform the public about the value of limestone bedrock glade and as an educational tool to reduce human impacts (M, R)
- Maintain a mature unfragmented forested buffer around the ERA to reduce invasive species establishment, and to reduce the threat of negative hydrologic impacts. (M, R)
- Reintroduce missing associated native plant species using local genotypes if applicable. (R)
- Minimal Impact Suppression Tactic (MIST) practices should be used for wildfire response in this area if possible. (M, R)
- Explore negotiating conservation easements or acquiring adjacent lands, based on Department priorities and strategies. (M, R)
- Where recreational use of airboats is a threat to the ERA consider closing the marsh to that activity. (M, R)

- Use periodic burning to maintain presence of native plant species, reduce invasives, and to reduce woody encroachment. (M, R)
- To reduce woody encroachment selective cutting can occur in winter using techniques to avoid impacting hydrology.
- Avoid establishment of new fire lines to reduce invasive species encroachment. (M, R)
- Avoid creating new roads adjacent to or within the ERA.
- Install culverts under state forest roads and work with Chippewa County Road Commission on county roads as needed and ensure that current culverts are functioning.

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	In cooperation with TNC we will set up long term monitoring plots
Representative and rare species – species occurrences	Baseline EO records; updated when EO's are updated or opportunistically	No decreases	In cooperation with TNC we will set up long term monitoring plots.
Change in EO rank	Various (see above)	No decrease	TBD
Illegal ORV/mountain bike activity – number of new instances and number of citations issued	Moderate; monitored via patrols, reports or opportunistically	Eliminated/fewer occurrences	TBD

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