Garden Shoreline Complex ERA Plan

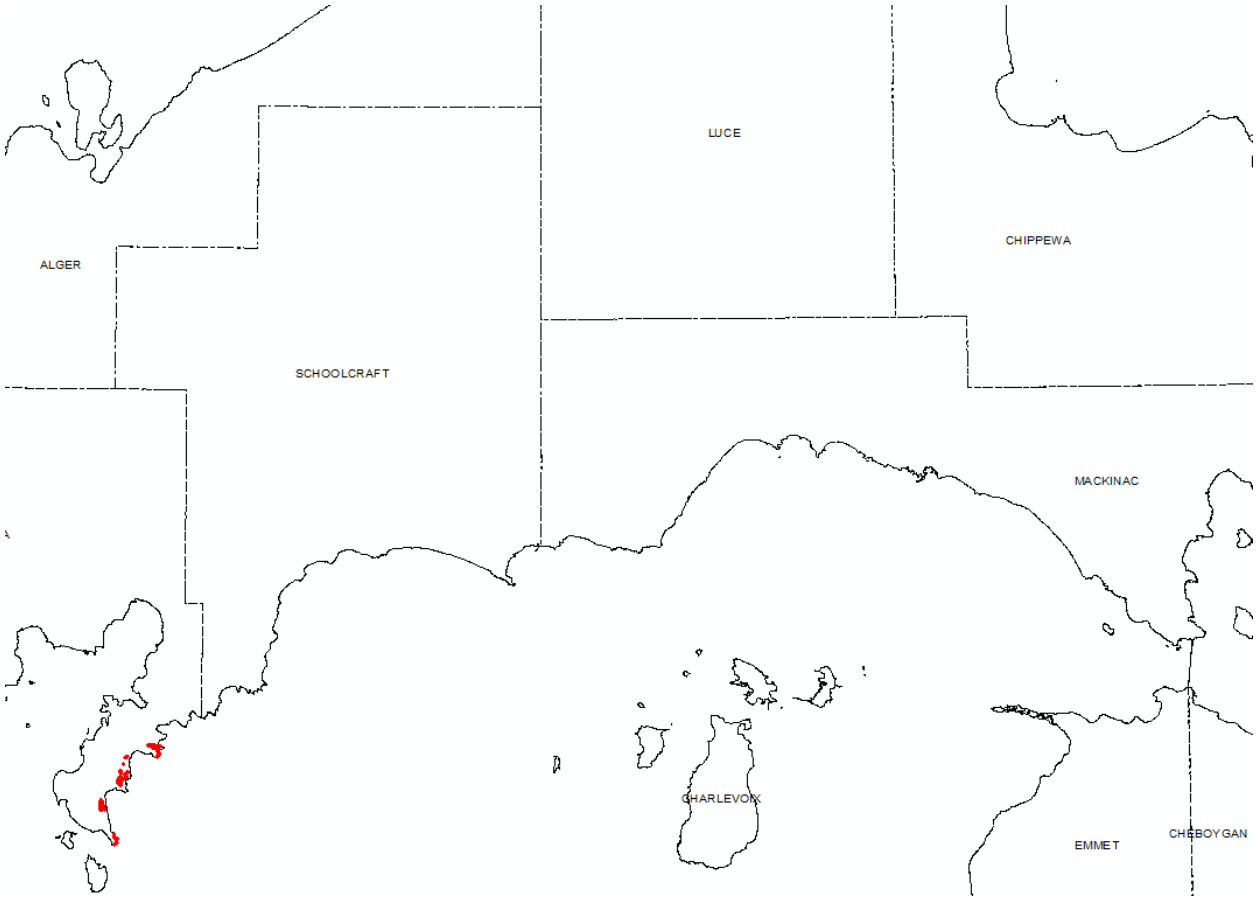

Figure 1. Garden Shoreline Complex ERA

<u>Administrative Information:</u>

- This plan is for six ERAs that are relatively close to each other on the Garden Peninsula. There are four Limestone Bedrock Glade ERAs and two Limestone Bedrock Lakeshore ERAs.

- The ERAs are within the Shingleton FMU, Lake Michigan Shoreline MA, Compartments 96, 97, 98, 99, and 100.

- These ERAs are located in Delta County, in both Fairbanks and Garden Townships. T39N, R18W, sections 23 and 33; T38N, R18W, sections 4 and 5; T38N, R19W, sections 1, 12, 13, 23, 24, 27, and 34; and T37N, R19W, sections 11 and 14.

- 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, Forest Certification and Conservation Specialist; Cody Norton, WLD Wildlife Biologist; Bob Burnham, FRD Unit Manager; Tori Irving and Adam Petrelius, FRD Foresters; Tom Burnis, FRD Forest Technician.

- The area has State forest land interspersed with private parcels. Two-track woods roads go through most of the ERAs. Portage Bay campground, boat ramp, and the Ninga Aki Pathway are just north of Charbenou Lake limestone bedrock glade ERA.

- Other documents related to this ERA include the Garden Glades and Limestone Bedrock Shoreline Complex ERA plan that was approved in 2012. This new ERA plan will supersede that original ERA plan.

- 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.

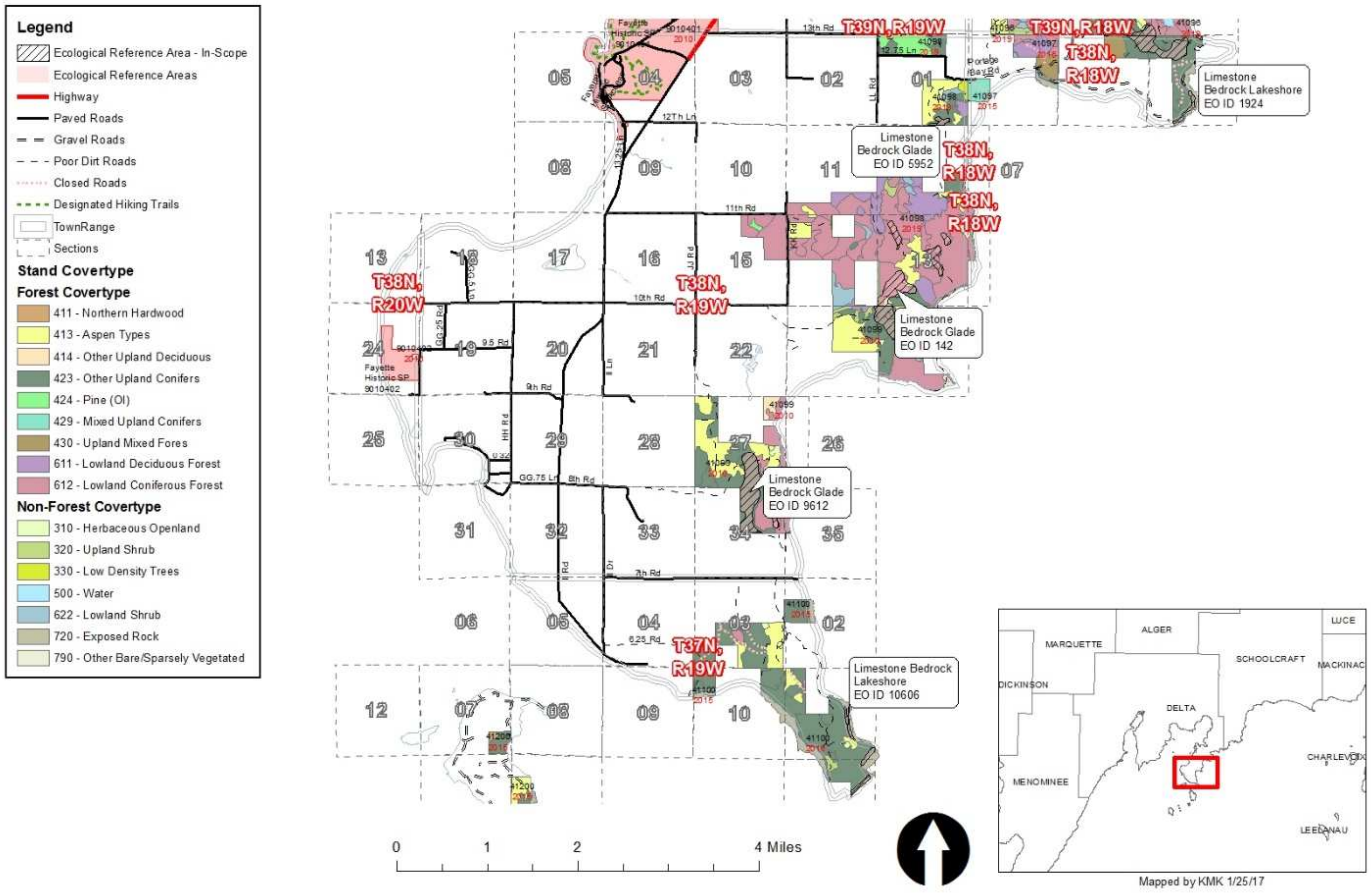

Figure 2. Garden Shoreline Complex ERA area map with EO ID labels

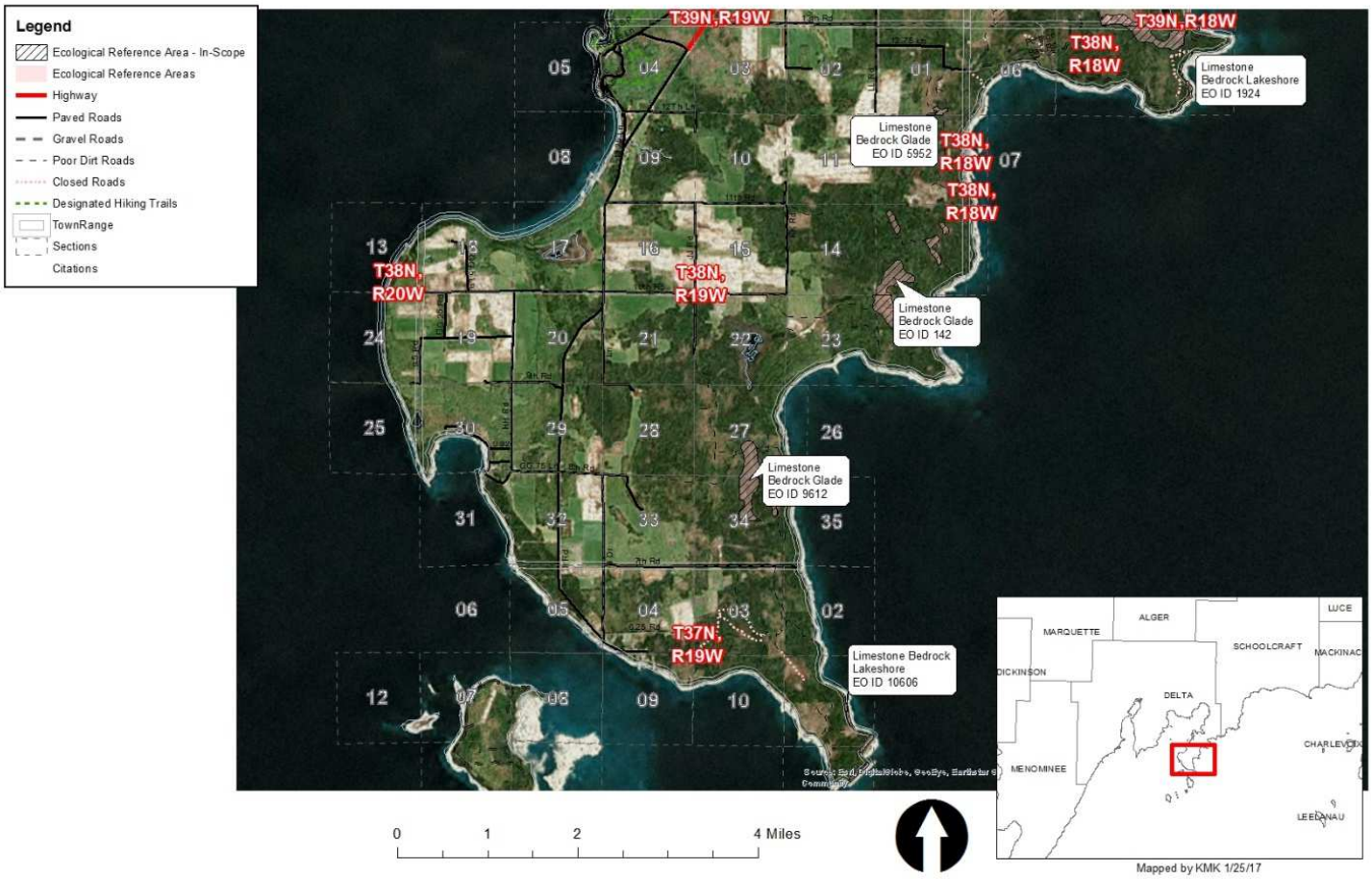

Figure 3. Garden Shoreline Complex ERA Imagery

Conservation Values

This ERA complex encompasses six individual ERAs found within two natural communities; four examples of limestone bedrock glade and two of limestone bedrock lakeshore. It is recognized for having both natural communities that are rare as well as high quality representative examples.

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. There are 14 known occurrences located wholly or partially on state land.

1. **Charbenou Lake Limestone Bedrock Glade**: EO_ID 7436, C rank, Last Observed 1995-7-19.

   Charbenou Lake glade is approximately one quarter to three quarter mile from the Lake Michigan shoreline, at the end of Portage Bay Road. There is a boat landing approximately 1/8 mile away. This ERA is on approximately 90 acres of state forest land. The area is mapped as sand lakeplain. There is mostly dense forest or recently clearcut areas surrounding the site.

   The northwest section of this EO has been clearcut, which resulted in some of the shallow soils being scraped from the surface. There are pockets of open sedge dominated areas in a matrix of white spruce, northern white-cedar and iris glade. Surrounding pockets are more dense forest of white spruce, balsam fir, northern white-cedar, and aspen over shallow soils. Small pockets of seasonally wet swamps are scattered throughout.

2. **Kregg Bay Glade**: EO_ID 5952, B rank, Last Observed 1996-02-07.

   Kregg Bay Glade is a sinuous limestone bedrock glade located less than half a mile from the shoreline surrounded by second-growth boreal forest of white spruce, balsam fir, and northern white-cedar, and aspen clearcuts. The majority of this 70-acre ERA is on private land, with only about 10 acres on state forest land. The soils are thin (0-14 cm) loamy alkaline sands and organics over limestone bedrock with local exposures of bedrock.

   The alvar glade is characterized by a scattered to clumped canopy (20-50% cover) of white spruce (10-30 cm DBH) and northern white-cedar (20-40 cm DBH) with sparse balsam fir, white pine, red pine and quaking aspen. The open subcanopy and tall shrub layer (10-40% cover) is dominated by white spruce with occasional choke cherry (*Prunus virginiana*). Scattered low shrubs include soapberry (*Shepherdia canadensis*), ground juniper (*Juniperus communis*), and alder-leaved buckthorn (*Rhamnus alnifolia*). White spruce also occurs in the low shrub layer. The ground layer is characterized by ebony sedge (*Carex eburnea*), poverty grass (*Danthonia spicata*), dwarf lake iris (*Iris lacustris,* federal/state threatened), and Richardson's sedge (*Carex richardsonii*, state special concern). Fifty-seven vascular plant species

were documented during the survey. Following 2006 surveys, this site, which was formerly classified as alvar, was re-classified as limestone bedrock glade.

Figure 4. Kregg Bay Glade. Photo by Bradford S, Slaughter.

3. **Garden Glade Southeast**: EO_ID 9612, B rank, Last Observed 2006-07-28. (Downgraded to B in 2006 due to high deer browse and roads running through.)

   This extensive limestone bedrock glade occurs over limestone pavement paralleling the shoreline on a gentle eastern slope a quarter of a mile from Lake Michigan. This ERA is on approximately 103 acres of state forest land. Closed-canopy boreal forest of quaking aspen, white spruce, and balsam fir surround the glade. The site is characterized by thin (0-15 cm) alkaline (pH 8.0) organic and loam soils over limestone pavement. Exposed limestone slabs occur occasionally.

   This alvar glade exhibits structural complexity, grading from sparse vegetation zones to grassland to glade to woodland. In addition, the glade has several seasonally wet pockets. During July surveys, the glade was dry and droughty but pockets of wetland plants indicated spring saturation. In areas of exposed bedrock, vegetation is sparse except for in cracks in the limestone where sufficient soil has developed to support plant growth. In other areas, several centimeters of loam or organic soils

support a tree canopy of scattered northern white-cedar. Additional canopy associates include white spruce, aspens, and white pine. Distribution of northern white-cedars is very clumpy, and a distinct browse line is visible on the trees and shrubs. Scattered clumps of common juniper occur in the low shrub layer and the ground layer is dominated by poverty oats in drier areas and dwarf lake iris is prevalent in moister areas. In addition to the rare dwarf lake iris, Richardson's sedge and beauty sedge (*Carex concinna,* state special concern) are known from the alvar glade. Following 2006 surveys, this site, which was formerly classified as alvar, was re-classified as limestone bedrock glade.

Figures 5 and 6. This limestone bedrock glade is characterized by an herb- and graminoid-dominated ground cover with scattered clumps of stunted trees and shrubs growing on thin soil over limestone bedrock. Photos by Adrienne L. Bozic.

4. **Sucker Lake Limestone Bedrock Glade**: EO_ID 142. AB rank, Last Observed 2006-07-25.

   This limestone bedrock glade is located a half mile from the shoreline on the Garden Peninsula and is surrounded by aspen forest and rich conifer swamp. It is on approximately 126 acres of state forest land. The alvar glade is characterized by thin (2-10 cm) calcareous (pH 8.0) sandy to clay loam soils over limestone bedrock with almost no areas of bedrock exposure.

   The limestone bedrock glade is dominated by a scattered canopy of white spruce, northern white-cedar, paper birch, and quaking aspen. These tree species are also found in the surrounding boreal forest with occasional white pine (20-40 cm DBH). The scattered shrub layer of the limestone bedrock glade is characterized by common juniper and soapberry, and the ground layer is dominated by ebony sedge, poverty grass, dwarf lake iris, and Richardson's sedge. Over 70 vascular plant

species were documented during the survey. Following 2006 surveys, this site, which was formerly classified as alvar, was re-classified as limestone bedrock glade.

Figure 7. Sucker Lake Limestone Bedrock Glade. Photo by Michael A. Kost.

Limestone Bedrock Lakeshore

Limestone bedrock 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. Shoreline processes (winter ice, storms, and wind) maintain the Limestone Bedrock Lakeshore. Limestone bedrock lakeshore is ranked G3 S2, vulnerable globally and imperiled in the state. There are eight known occurrences located wholly or partially on state land.

1. **Kregg Bay Northeast** Limestone Bedrock Lakeshore: EO_ID 1942, B rank, Last Observed 2006-07-27, G3S2.

   Limestone bedrock lakeshore extends for just under a mile along the shoreline of northern Lake Michigan. This ERA is approximately 12 acres of state forest land. Three distinct stretches of bedrock lakeshore occur and are separated by limestone cobble shore and backed by a high cobble ridge. The exposed, flat to gently sloping limestone bedrock pavement has sparse calcareous soils. Soil development is concentrated in grykes and holes in the bedrock and soils are approximately 1-5 cm

deep and are alkaline (pH 8.0) sands with a high organic content. Wave action and ice scrape limit vegetation development near the shoreline: vegetation development and maturity increase with distance from the lake. Patches of dense vegetation are interspersed with flat open bedrock and occasional one to two-meter limestone shelves and open water pools.

Vegetation is confined primarily to cracks in the flat bedrock pavement. Dominant vegetation includes silverweed (*Potentilla anserina*), common water horehound (*Lycopus americanus*), harebell (*Campanula rotundifolia*), low calamint (*Calamintha arkansana*), hair grass (*Deschampsia cespitosa*), dwarf lake iris, smooth aster (*Aster laevis*), balsam ragwort (*Senecio pauperculus*), and small, shrub-sized balsam poplar (*Populus balsamifera*). Sporadic dense patches of vegetation with Baltic rush (*Juncus balticus*), silverweed, sedges (*Carex* spp.), and blue wild rye (*Elymus glaucus*) are confined to areas where soil development has occurred farther from the lakeshore.

Figures 8 and 9. Vegetation is concentrated in the cracks in the exposed limestone bedrock, which is flat to gently sloping. Photos by Rebecca K. Schillo.

2. **Point De Tour** Limestone Bedrock lakeshore: EO_ID 10606, A rank, Last Observed 2006-07-26, G3S2.

   This site is characterized by a mile-long stretch of limestone bedrock lakeshore along the northern coast of Lake Michigan. This bedrock community varies in width from 16 to 100 m. It is approximately 18 acres of state forest land. The shoreline, which is primarily limestone bedrock lakeshore, includes stretches of limestone cobble shore, low limestone ledges, and small pools of open water. The limestone bedrock lakeshore is backed by a one to five-meter high limestone cobble ridge and dense boreal forest. The limestone bedrock lakeshore is sparsely vegetated with patchy vegetation concentrated in the cracks within the bedrock. Soils are absent or thin (3-10 cm) and alkaline (pH 8.0) with high organic content and are mainly confined to grykes (cracks) and holes in the limestone pavement.

   Characteristic species along the limestone bedrock lakeshore include balsam poplar seedlings, shrubby cinquefoil (*Potentilla fruticosa*), silverweed, grass-leaved goldenrod (*Euthamia graminifolia*), Kalm's St. John's-wort (*Hypericum kalmianum*), beak-rush (*Rhynchospora capitellata*), golden-seeded spike-rush (*Eleocharis*

elliptica), Baltic rush, Ohio goldenrod (*Solidago ohioensis*), common water horehound, harebell, low calamint, and sedges (*Carex spp*.). A small limestone bedrock glade occurs at the southern and inland edge of the site with white spruce (*Picea glauca*), northern white-cedar (*Thuja occidentalis*), and dwarf lake iris.

Figures 10 and 11. Point Detour supports over a mile of limestone bedrock lakeshore along the northern Lake Michigan shoreline. Photos by Michael A. Kost.

High Conservation Value (HCV) Attributes:

This portion of the Garden Peninsula also contains the following: Garden Township Coastal Environmental Area HCVA, Point Detour Non-Dedicated Natural Area SCA, and obligate deer winter range SCA. The Portage Bay WDS ERA is to the northeast.

There are many recreational, cultural, and intrinsic values associated with this landscape. Portage Bay State Forest Campground is popular for swimming, kayaking, hiking and camping. Along the shoreline are traditional fishing areas, and areas of pre-historic, historic and current Native American use. There are known archaeology sites near some of these ERAs. The area contains long stretches of undeveloped Lake Michigan shoreline.

These ERAs are rare natural communities of regional significance and provide habitat for rare threatened and endangered native plants, including dwarf lake iris, Lake Huron tansy, and limestone oak fern. Migratory and nesting interior birds are dependent on spring midge hatches and near shore lowland conifer forests.

Threats Assessment

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 several glades on Drummond Island and the Garden Peninsula. High deer densities, especially on the Garden Peninsula, are influencing community structure and are likely negatively impacting species diversity and northern white-cedar's regeneration capacity.

Invasive species that threaten to reduce the diversity and alter the community structure of limestone bedrock glade include glossy buckthorn (*Rhamnus frangula*), common buckthorn (*R. cathartica*), spotted knapweed (*Centaurea maculosa*), ox-eye daisy (*Chrysanthemum leucanthemum*), Kentucky bluegrass (*Poa pratensis*), Canada bluegrass (*P. compressa*), and lawn prunella (*Prunella vulgaris*). Monitoring to detect and implementing methods to control these and other 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 limestone bedrock lakeshore include spotted knapweed, mossy stonecrop (*Sedum acre*), ox-eye daisy, common St. John's-wort (*Hypericum perforatum*), Canada bluegrass, Kentucky bluegrass, hawkweeds (*Hieracium* spp.), sheep sorrel (*Rumex acetosella*), garden tansy (*Tanacetum vulgaris*), common mullein (*Verbascum thapsus*), and glossy buckthorn. In addition, empty shells of zebra mussels (*Dreissena polymorpha*), a small invasive bivalve mussel, form deep

piles on limestone bedrock pavement and locally limit vegetation establishment and impact soil accumulation, deposition, and erosion.

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 and/or expansion of the ERA 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.
- Representative, indicator and rare species are present at the ERA.
- Reduce fragmentation.
- Reduce detrimental recreational impacts to ERA.
- 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 reduce illegal ORV access points.
- Identify areas of excessive foot and mountain bike traffic.
- 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.

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)
- Close illegal roads and trails where feasible. Consult with PRD Trails Specialist when roads and access points need to be closed. (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)
- Timber harvest adjacent to this wetland ERA may negatively impact site hydrology and wildlife habitat. Site hydrology may be impacted by decreasing evapotranspiration potential and increasing surface and sub-surface water flow which can negatively alter vegetation composition within the ERA. Additionally, many amphibians and reptiles are terrestrial hibernators, using upland areas adjacent to wetlands during winter months. These species may also use adjacent upland areas for feeding, seasonal movements to breeding areas, and dispersal of juveniles. Follow BMP Riparian Management Zone (RMZ) buffering guidelines as applicable. (M, R)
- Reintroduce missing associated native plant species using local genotypes if applicable. (R)
- Use prescribed fire to maintain open aspect of the glade every couple of decades as needed. (M, 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 lands, based on Department priorities and strategies. (M, 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 by species	Severity unknown (with the exception of non-native Phragmites); treatments should be monitored appropriately; detection monitoring opportunistically or every five years' maximum	Eliminated/fewer occurrences	TBD
Representative and rare species- species occurrences	Baseline EO Records; updated when EO's are updated every 10-20 years or opportunistically; CMU monitoring data	No decreases	TBD
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