

Lake Sixteen Bog ERA Plan



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Administrative Information

- This Ecological Reference Area plan is for a bog on the northern edge of the Pigeon River Country State Forest. A portion of the ERA continues north onto state forest land managed by the Indian River DNR Field Office.
- The ERA is within the Pigeon River FMU, Pigeon River Country MA, and includes stand 13 in Compartment 3. It also includes stand 77 in Compartment 182 of the Indian River Management Unit.
- The ERA is in Cheboygan County, Walker Township, T34N R01W, Sections 16 and 21.
- This ERA is surrounded by State land although private property is nearby, roughly a quarter mile to the west and north.

- Roads 2 and 3 are single-lane State Forest dirt roads and are present south and east of the bog. The Shore to Shore Trail, an equestrian trail, falls on Road 3. Neither the road or trail provide access to the ERA.
- This plan was written by Greg Rekowski, Forester for the Pigeon River Country FMU. Detailed ERA information was obtained from observation reports compiled by Michigan Natural Features Inventory (MNFI) staff.

Conservation Values

This ERA is an example of a bog natural community. Bog is a nutrient-poor peatland characterized by acidic, saturated peat and the prevalence of sphagnum mosses and ericaceous shrubs. Fire and flooding are the main natural disturbance factors. Bog is globally ranked G3G5 and state ranked S4. Bogs are common throughout this part of the Northern Lower Peninsula of Michigan.

- Lake Sixteen Bog
 - EO_ID 15963, EORANK B, last observed in 2006.
 - This ERA is recognized for having a natural community that is both rare as well as a high quality representative example.
 - The following description comes from the Element Occurrence Record.
 - Very high-quality and diverse undisturbed bog in a circular kettle depression and ranges from open bog to treed bog surrounding an alkaline lake. The bog includes both areas of grounded bog mat and floating bog mat adjacent to the lake. Areas of grounded bog mat have deep (>1 m), acidic (pH 4.0-6.0), fibric, sphagnum peat with the water table at 30 centimeters. The floating bog mat adjacent to the lake is characterized by saturated fibric peat that is slightly acidic to circumneutral (pH 6.5-7.0). Several deer trails pass through the bog and cause sphagnum mat compaction and thereby linearly raise the water table. No artificial disturbances or exotic species noted. Surrounded by very wet, hummocky mixed conifer swamp.
 - There are additional values in the area which need to be considered as part of the ERA management plan.
 - Timber production has occurred in the vicinity and will continue in the future.
 - The Shore to Shore Trail, an equestrian trail, falls on Road 3, roughly a ¼ mile east/southeast of the ERA. Aesthetics for recreational users is an important consideration in the Pigeon River Country, especially in areas where trails are present. These considerations are often applied during timber sale preparation.

Threats Assessment

- In general, the primary threats to bogs include:

- Altered hydrologic regimes which can be impacted through a variety of activities such as road construction, off-road vehicle use, peat mining and timber harvesting which can lead to altered canopy light levels and increased runoff.
- Introduction of invasive species. Aggressive invasive species that may threaten the diversity and community structure of bogs include glossy buckthorn (*Frangula alnus*), narrow-leaved cat-tail (*Typha angustifolia*), hybrid cat-tail (*Typha xglauca*), reed canary grass (*Phalaris arundinacea*), and reed (*Phragmites australis* subsp. *australis*).
- Deer herbivory and trampling.
- Conversion to closed canopy forests due to fire exclusion.
- Eutrophication from pollution.
- As of now there are only two potential threats to the ERA and they include:
 - An elevated deer population which has resulted in several deer trails throughout the bog. This has compacted the sphagnum mat in localized areas which may be impacting bog hydrology. The severity of deer herbivory was not noted during the most recent observation.
 - Timber harvests have occurred recently in adjacent upland stands to the north and east. These timber sales did not extend into lowland conifer swamp stands that surround the bog so impacts to hydrologic regimes from increased light levels are likely minimal. These harvests also took place on moderately steep slopes so there is likely increased runoff into the lowlands. However, the swamp conifer stands that surround the bog may offset any impacts.

Management Goals

- Allow natural ecological processes to occur.
- Manage for intact and functioning hydrology.
- Reduce deer density impacts.
- Eliminate invasive plant species that are identified in the ERA.
- Reduce human disturbances to the ERA.

Management Objectives

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

- Assess the entire ERA once every ten years, either during standard forest inventory of Compartment 3 (2024 YOY) or opportunistically by MNFI staff.
- Retain a forested buffer around the bog when implementing surrounding forest treatments.
- Identify invasive species within the ERA during reassessment and treat with herbicides the following spring/summer/fall.

- No invasive species have currently been identified in the ERA.
- Assess any instances of human disturbance to the ERA.
 - No impacts have currently been identified.
- Assess the degree of deer herbivory and sphagnum compaction within each bog.
- Complete a Pigeon River Country Fire Management Plan by 2022 which will include language allowing wildfires to burn through this ERA without intrusive suppression activities.

Management Actions

- Do not harvest the swamp conifer stands that surround the bog. Consider extending a no-cut buffer into upland areas where steep slopes are present.
- Consider extending the rotation length of adjacent upland stands to reduce deer densities.
- If invasive species are identified within the ERA, then develop an FTP and PAP for the area and treat using appropriate control methods for each species.
- If human impacts are identified, such as illegal trail construction to the lake, then work with volunteer groups to reduce erosion and erect barriers to limit access.
- Update plan with additional knowledge as it becomes available.

Monitoring

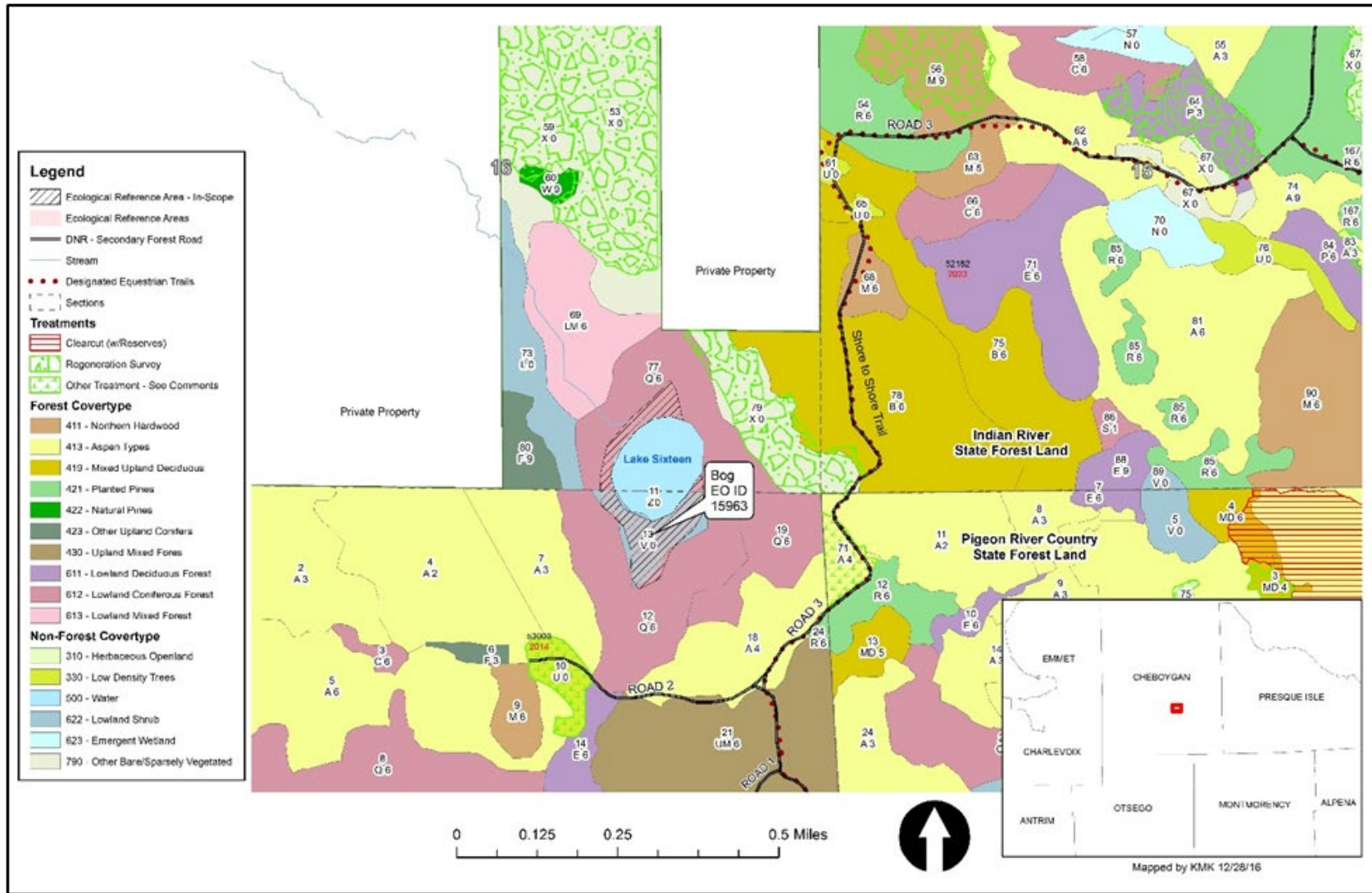
- Monitoring of the ERA will happen once every 10 years as part of the standard inventory planning schedule or opportunistically by MNFI staff, and will include the following:
 - Presence/absence of invasive plant species
 - Impacts from recreational users (hikers and equestrian users)
 - Deer herbivory and trampling impacts
 - Change in EO rank
 - Occurrences of representative and rare species

Metric	Current Status	Desired future status
Presence/absence of invasive species- number and scope by species	No invasive species observed during most recent site visit.	Eliminated/zero occurrences
Representative and rare species occurrences	Baseline EO Records; updated when EO's are updated every 10-20 years or opportunistically; CMU monitoring data	No decreases
Recreational user impacts	Most recent site visit documented no signs of anthropogenic disturbance.	No increases in human impacts
Deer herbivory and trampling impacts	Most recent site visit noted prevalence of deer trails. Deer browse severity was not noted.	No net loss of native plant species due to deer browse. No altered hydrology due to deer trampling.
Change in EO rank	Determined by MNFI field staff at next site visit.	No decrease in rank

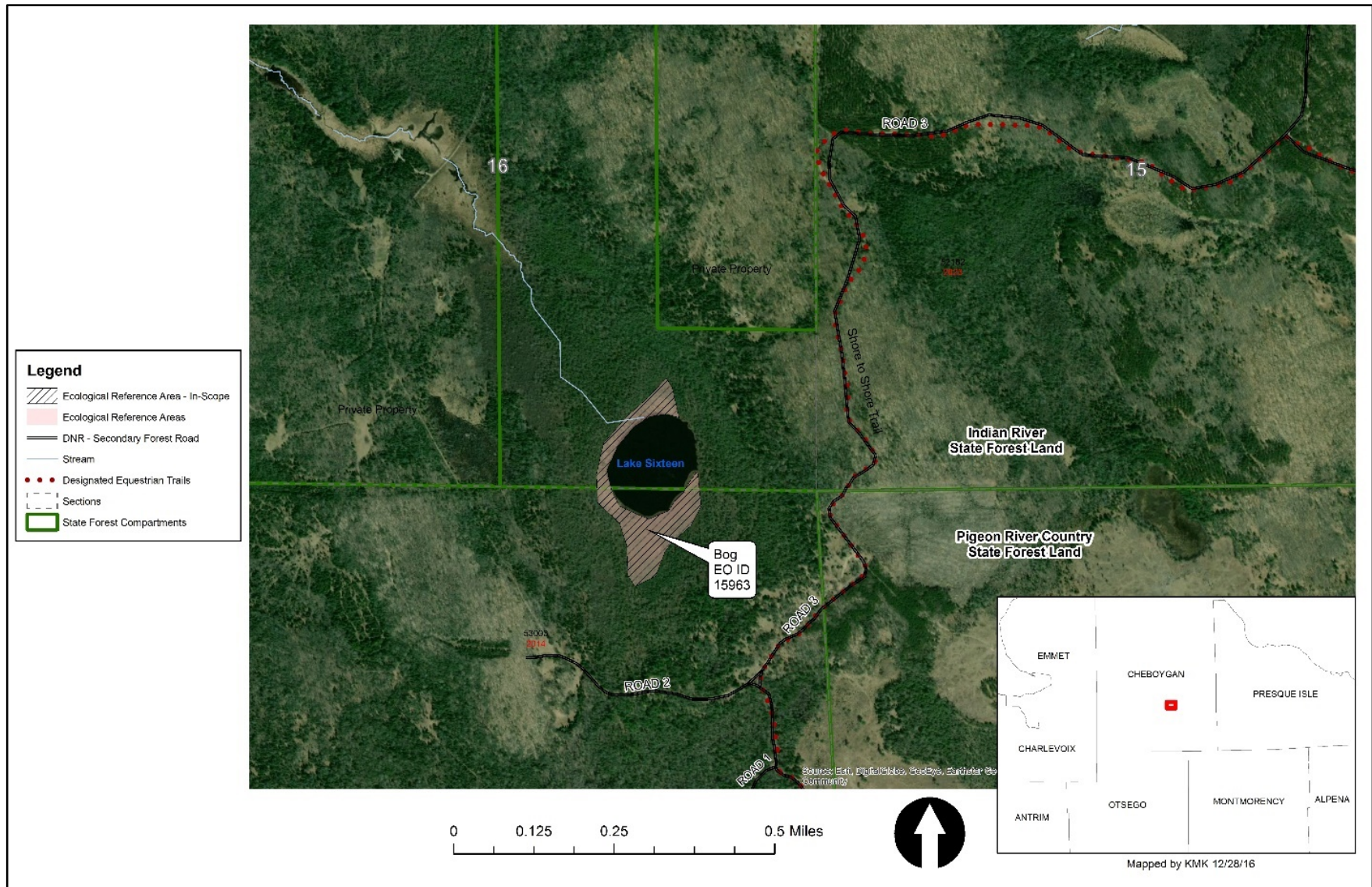
Additional Resources:

MNFI Natural Community Abstracts: <https://mnfi.anr.msu.edu/communities/classification>

Maps



Lake Sixteen Bog ERA area map with EO ID labels.



Lake Sixteen Bog ERA area map with imagery.