An Evaluation of Candidate and Potential Candidate Research Natural Areas on the Huron-Manistee National Forest with a focus on Ecosystem Representation

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Cover photo: Dry-mesic northern forest at McDonald Creek Forest Potential Candidate Research Natural Area (MNFI)

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EXECUTIVE SUMMARY

This report represents an effort to evaluate the Candidate and Potential Candidate Research Natural Areas (C/P RNAs) on the Huron-Manistee National Forest (HMNF) and suggests a strategy for achieving representation of the full range of the Forest's ecosystems within an established network of Research Natural Areas (RNAs). This work draws heavily on data and methodology contained in the "RNA Framework" draft report to the USDA Forest Service by Faber-Langendoen et al. (2000). The "RNA Framework" report outlines an approach for achieving representation within established RNAs of high quality natural communities (or ecosystems) that occur on National Forest lands in each subsection (Keys et al. 1995). The alliance level of the US National Vegetation Classification is used to represent the diversity of natural community types, and their occurrence within each subsection is used as a surrogate for representation of ecosystems. Thus, representation of ecosystem or community types is achieved through representation of alliances at established RNAs or RNA-equivalents within each subsection. For this report, RNA-equivalents are considered to be State Natural Areas or preserves owned by The Nature Conservancy (TNC).

This report evaluates 33 C/P RNAs that occur on 9 different subsections of Michigan's northern Lower Peninsula and contain 22 alliances (Tables 1, 2 and 3). In all, 62 alliances have been documented on the HMNF from 14 subsections (Table 8). The evaluations utilized information from HMNF management records, MNFI database, field forms, and field surveys, and Michigan Department of Natural Resources (MDNR) Natural Areas files. In addition, meetings were held with staff from each of the four District Offices and the Supervisor's Office of the HMNF to gather input on administrative and management concerns, adjust boundaries, and make recommendations on the future status of each C/P RNA.

Of the 33 C/P RNAs evaluated, 18 are recommended to move forward in the RNA process by both District and MNFI staff and an additional 5 are recommended by MNFI staff alone and not by District staff. The 18 recommended C/P RNAs contain 16 alliances and help fill gaps in ecosystem representation in 8 subsections. In all, the established RNAs, RNA-equivalents, and 18 recommended C/P RNAs contain 25 alliances, or 40% of the documented alliances on the HMNF, and occur in 10 subsections. The recommended alliances contribute significantly to filling gaps in ecosystem representation in several subsections, especially in the Newaygo Outwash and Ice Contact, and Harrisville Moraines subsections.

This report recommends an approach that considers the following three criteria in filling gaps in alliance representation for each subsection:

1) Alliances that represent rare communities should be given highest priority for representation (Table 10).
2) Alliances that represent unique communities should be given second priority (Table 10).
3) Representation of matrix and large patch alliances should be given priority over small patch alliances that are not considered rare or unique (Table 8).

This approach to prioritizing alliances for representation will significantly contribute to the long-term maintenance and protection of biodiversity, and provide opportunities for research and education on a wide range of species, ecosystems, and natural processes. In addition, it offers land managers and others the chance to make long-term comparisons among managed and unmanaged sites that represent a wide range of community types.

The report offers a strategy for achieving the goal of ecosystem representation for each subsection that is based on the following components:

1) Further systematic inventory for underrepresented, high priority alliances on the HMNF.
2) Mapping and ranking the communities and alliances on all established RNAs and C/P RNAs.
3) Establishing large RNAs when feasible.
4) Working cooperatively with MDNR and TNC to support inventory and mapping efforts for high quality natural communities and their associated alliances on State Natural Areas and TNC preserves, which can then serve as RNA-equivalents.

Further inventories for natural communities and alliance mapping on the HMNF will be a critical step in meeting ecosystem representation goals and will provide important information to Forest planners and land managers. Because the HMNF occurs in a diverse and dynamic landscape where a variety of natural communities are frequently juxtaposed, representation of multiple communities and their associated alliances will be most easily achieved by establishing large RNAs, as they are likely to support a variety of upland and wetland communities and alliances. Progress on meeting goals for alliance representation can also be achieved by working cooperatively with the MDNR and TNC to support inventory and mapping efforts on State Natural Areas and TNC preserves, which can serve as RNA-equivalents.

RNAs represent a crucial component of any strategy aimed at providing long-term protection for biodiversity in northern Lower Michigan. They are important sites for research and monitoring of long-term changes in natural communities, ecological processes, and plant and animal species. They serve as outdoor classrooms for those seeking to better understand species interactions and ecosystems. Lastly, they facilitate comparisons between managed and unmanaged sites and provide an excellent baseline for land managers seeking to better understand the long-term effects of their management practices.

INTRODUCTION

The US Forest Service (USFS) designates areas on National Forest lands as Research Natural Areas (RNAs) for the purposes of protecting and maintaining biological diversity, enabling non-manipulative research and monitoring, and fostering education (USDA 1994). Michigan Natural Features Inventory (MNFI) has worked cooperatively with the USFS in Michigan to conduct rare species and natural community surveys and to recommend and evaluate potential and candidate RNAs for nearly twenty years. This work has resulted in more than a dozen publications for the Huron-Manistee National Forest (HMNF). This report builds on MNFI's previous work as well as that of other organizations and USFS personnel.

For this project MNFI was asked to evaluate 33 Candidate and/or Potential Candidate Research Natural Areas (C/P RNAs) located on the HMNF (Table 1). The evaluations involved gathering information on each of the C/P RNA, meeting with staff in each of the four District Offices and the Supervisor's Office, and making recommendations on the boundaries and future status of each C/P RNA.

Guidance for this project was provided by Alix Cleveland, Forest Plant Ecologist and RNA Coordinator, HMNF, and by a draft report entitled "Establishing a Region-Wide Network of Representative Research Natural Areas (RNAs): An Assessment for the Eastern Region's RNA Framework" (Faber-Langendoen et al. 2000). Additional insight on evaluating C/P RNAs and prioritizing alliance representation was drawn from a report by the staff of the Superior National Forest (Leuelling et al. 2000).

The "RNA Framework" report mentioned above provides detailed guidance for future RNA selection (Faber-Langendoen et al. 2000). In particular, it outlines an approach for achieving representation of high quality examples of the ecosystems that occur on National Forest lands within established RNAs. The authors recommend using a representative approach to RNA selection in which high quality natural communities from each subsection of a National Forest are represented within a network of RNAs. Because subsections represent large land units that are delineated based on differences in climate, landforms, soils, vegetation, and patterns of natural disturbance, they are a useful tool for natural resource planning and decision-making (Albert 1995), and provide a structure for assessing representation of ecosystem types within a network of RNAs.

The "RNA Framework" report also outlines methods for selecting representative ecosystem or natural community types. The authors recommend that natural community element occurrences (EOs) be crosswalked to the alliance level of the U.S. National Vegetation Classification (Anderson et al. 1998, Faber-Langendoen 2001, Grossman et al. 1998). In this hierarchical vegetation classification, alliances are nested one level above associations, which in most instances are similar to natural communities. For forested systems, the alliance level is similar to SAF cover types, as both are based primarily on species of the dominant strata or canopy (Faber-Langendoen et al. 2000). However, unlike SAF cover types, alliances describe both forested and non-forested systems, and provide more comprehensive information on floristic composition and environmental patterns (Faber-Langendoen et al. 2000). In conclusion, alliance representation within RNAs in each subsection is meant to serve as a surrogate for ecosystem representation on National Forests.

Table 1. C/P RNAs evaluated in this report and their respective subsections, administrative districts, and status. "pRNA" indicates site is a Potential Candidate Research Natural Area or Unique Area under study but not identified in the Forest Plan. "cRNA" indicates site is a Candidate Research Natural identified in the Forest Plan.

Subsection C/P RNA	Administrative District	Status
Big Rapids Loamy Moraines		
South Olga Bog	Cadillac-Manistee	pRNA
Cadillac End Moraines		
Brandy Creek Wetlands	Cadillac-Manistee	pRNA
Harrisville Moraines		
Black River Complex	Huron Shores	pRNA
Loud Creek	Huron Shores	pRNA
McDonald Creek Forest	Huron Shores	pRNA
Trout Lake	Huron Shores	pRNA
Hart Outwash and Lake Sands		
Knapp Prairie	Baldwin-White Cloud	pRNA
Pine Island Marsh	Baldwin-White Cloud	cRNA
Skeel Creek Prairie	Baldwin-White Cloud	pRNA
White River (includes Sischo Prairie)	Baldwin-White Cloud	pRNA
Mio Outwash Plains		
Hunter's Lake	Mio	pRNA
McMaster's Bridge Bog	Mio	pRNA
O'Brien Lake	Mio	pRNA
South Branch Bog	Mio	pRNA
Valley Road Prairie	Mio	pRNA
Newaygo Outwash and Ice Contact		
Alley Lake	Baldwin-White Cloud	pRNA
Big South	Baldwin-White Cloud	cRNA
Casin Lake	Baldwin-White Cloud	pRNA
Fry Lake	Baldwin-White Cloud	cRNA
Indian Lake	Baldwin-White Cloud	pRNA
Little Robinson Lake Opportunity Area	Baldwin-White Cloud	pRNA
Loon Lake	Baldwin-White Cloud	pRNA
North Branch White River	Baldwin-White Cloud	pRNA
Pearl Lake	Baldwin-White Cloud	pRNA
Toft Lake	Baldwin-White Cloud	pRNA
Tawas Lake Plain		
Perch Lake	Huron Shores	pRNA
Vaughn Lake	Huron Shores	pRNA
Blockhouse	Mio	
Honawan Lake Forest	Huron Shores	pRNA
Wellston Outwash and Ice Contact		
Arquilla Creek	Cadillac-Manistee	pRNA
Bear Swamp (includes Yonker's Meadow)	Cadillac-Manistee	cRNA
Hopper's Swamp	Cadillac-Manistee	pRNA
Timmerman Lake	Cadillac-Manistee	pRNA

METHODS

Crosswalk of Natural Communities to Associations and Alliances

The "RNA Framework" report suggests that representation of ecosystem types be at the alliance level of the national classification (Faber-Langendoen et al. 2000). Following guidance set forth in the "RNA Framework" report, MNFI staff crosswalked each of the natural community EOs that occurred within the C/P RNAs to the most appropriate association and alliance. The crosswalk utilized the national vegetation types listed in the Midwest-based classification (Faber-Langendoen 2001). Because natural communities are typically analogous to associations, it was necessary to first determine which association best matched the natural community EO. Determinations of associations relied on information from MNFI element occurrence records (EORs), field forms, reports, and field visits. After crosswalking the community EOs to the most appropriate association, the alliances were easily deduced due to the hierarchical arrangement of the USNVC.

It is worth noting that while the hierarchical arrangement of the classification makes it easy to decipher the alliance after determining the association, a single alliance typically represents several different associations (e.g., different natural communities may be represented by a single alliance). In addition, the crosswalk between natural community types and associations and alliances does not represent a one to one relationship. For example, dry-mesic northern forest may be represented by several different associations, and their corresponding alliances, depending on the floristic composition of the individual EO.

Sort by Subsection

After each community EO was crosswalked to the appropriate association and alliance, the C/P RNA and their associated ecological information (e.g., communities, associations, and alliances) were sorted by subsection to produce a list of representative alliances for each subsection. Subsections used in this report are by Keys et al. (1995) and are illustrated in Figure 1. With the exception of further climatic subdivision, the subsections used by Keys et al. (1995) closely follow previously mapped regional boundaries (Albert et al. 1986, Albert 1995), which are utilized in management decision-making by the Michigan Department of Natural Resources (MNDR) and Michigan Department of Environmental Quality.

Alliance Ranking

Each occurrence of an alliance was numerically ranked against all other occurrences of the same alliance within a subsection based on their perceived ability to adequately meet the goals of the RNA program. If an alliance occurred at a single C/P RNA within a subsection it was assigned a top rank. However, when multiple C/P RNAs contained the same alliances within a subsection, a decision had to be made to determine which of the alliances would best meet conditions for RNA establishment. For these instances, a model was developed to aid the decision-making process. The model assigned numerical ranks to each alliance that occurred at multiple C/P RNAs within the same subsection. The following four factors were used in the model:

1) EO rank
2) Size of EO
3) Numbers of rare species
4) Ownership

Each factor was scored individually with larger numbers indicating more favorable conditions for RNA establishment.

EO Rank

For the EO rank factor, all A-ranked EOs were assigned 3 points, AB ranks were assigned 2 points, B ranks were assigned 1 point, and all EOs ranked less than B (e.g., BC and C) received 0 points.

EO Size

A relative ranking system was used for EO Size. The ranks were assigned as follows: The differences in size between the largest and smallest alliances of the same type within a subsection were compared and if the largest

alliances were more than 4 times greater than the smallest alliance (10 acres vs. 41 acres), they were assigned 3 points and the smallest alliance 0 points. Alliances between 3 and 4 times larger in size than the smallest alliance (e.g. 10 acres vs. 31 acres) were assigned 2 points and the smallest alliance 0 points. Alliances more than twice the size of the smallest alliance (e.g. 10 acres vs. 21 acres) were assigned 1 point, and the smallest alliance 0 points. When the difference between the sizes of alliances was less than 100% (e.g., 10 acres vs. 19 acres) they were all assigned 0 points to indicate minimal differences in size between alliances.

Numbers of Rare Species

The number of rare species occurring within the natural community EO boundaries that represent a given alliance was used for the Numbers of rare species factor. Alliances with no known rare species were assigned 0 points. Alliances with 1 to 3 rare species EOs were assigned 1 point. Alliances with 4 to 6 rare species EOs earned 2 points. All alliances with greater than 6 rare species EOs were awarded 3 points.

Ownership

Because public ownership is crucial to RNA establishment, the model used an ownership factor in ranking alliances. Alliances with greater than 80% of their acreage in USFS ownership were assigned 2 points. All alliances having 80% to 20% of their acreage in USFS ownership (e.g., split between public and private ownership) were assigned 1 point. Alliances that occurred primarily on private land (e.g., greater than 80% private ownership) were awarded 0 points for the Ownership factor.

RNA-equivalents

A review of the MNFI database was conducted for each subsection to detect the presence of RNA-equivalents or other similar high quality natural community EOs. The "RNA Framework" report suggests that in addition to RNAs, other protected natural areas may contribute to a regional network of representative ecosystems if they have a similarly high a level of biodiversity protection and management for natural processes as that for RNAs (Faber-Langendoen et al. 2000). Areas that help achieve the goals of the RNA program but are not designated RNAs are referred to as RNA-equivalents. In Michigan, personnel from the Ottawa, Hiawatha, Huron-Manistee National Forests and MNFI have agreed that preserves owned by The Nature Conservancy (TNC) and State Natural Areas on state-owned land that are documented and secure can serve as RNA-equivalents (Faber-Langendoen et al.2000). This report utilized the lands mentioned above as RNA-equivalents.

Other Representation within Subsection

A review of the MNFI database was conducted to locate natural community EOs that may be of similar quality to the C/P RNAs in this report. This review involved sorting all community EOs in the MNFI database by subsection, and then identifying high quality community EOs (ranks of A, AB, and B) on public or TNC-owned land that were of the same types as those occurring within the C/P RNAs.

Meetings with HMNF District Staff

Meetings were held with staff from each of the four District Offices of the HMNF. Alix Cleveland, Forest Plant Ecologist and RNA Coordinator, was present for the meetings with three of the Districts. At each meeting all C/P RNAs administered by the District were reviewed. The meetings served to gather information from District staff on issues related to land ownership, special uses, roads and trails, management concerns, and boundaries. In addition to gathering information, District and MNFI staff worked to develop potential boundaries for each C/P RNA that more adequately matches with the goals of the RNA program and the needs of the Districts for clear and concise boundaries. The previous boundaries for most of the C/P RNAs were derived from delineations of natural communities and were not meant to serve as RNA boundaries. For example, the community EO boundaries do not typically include buffer areas and are seldom adequate for protecting the feature on which the C/P RNA designation is based. An attempt was made to incorporate a buffer around most natural community boundaries and when feasible, nearby roads, railroad grades, and trails were used as boundaries.

Format of C/P RNA Site Summaries

Information gathered at the District Office meetings along with data derived from the MNFI database, MNFI reports, and other sources was compiled to produce a site summary for each C/P RNA (Appendix 1). An Access database was designed to assemble and report information on each site (Appendix 1). The site summaries for each C/P RNA include the following information and are presented in Appendix 1.

1. Site Name
2. Status (e.g., Candidate or Potential Candidate RNA)
3. Subsection (Keys et al. 1995)
4. Landtype Association (Corner and Albert 1999a-e)
5. Administrative District of the HMNF
6. Alliances Represented
7. Associations Represented
8. Element Occurrences
9. Ecological Description
10. RNA-equivalents
11. Similar Community EOs occurring on Public Lands within the Subsection
12. Alliance Representation Comments
13. Administrative and Management Concerns
14. Boundary Description
15. Map of C/P RNA and EOs

Maps

A map of each C/P RNA was produced using ArcView, with digital USGS topographic maps serving as the background. Each map illustrates the boundaries of C/P RNAs, associated natural communities, and the centroids of any rare plant and animal EOs, or other natural feature (e.g., great blue heron rookeries or significant geologic sites) (Appendix 1).

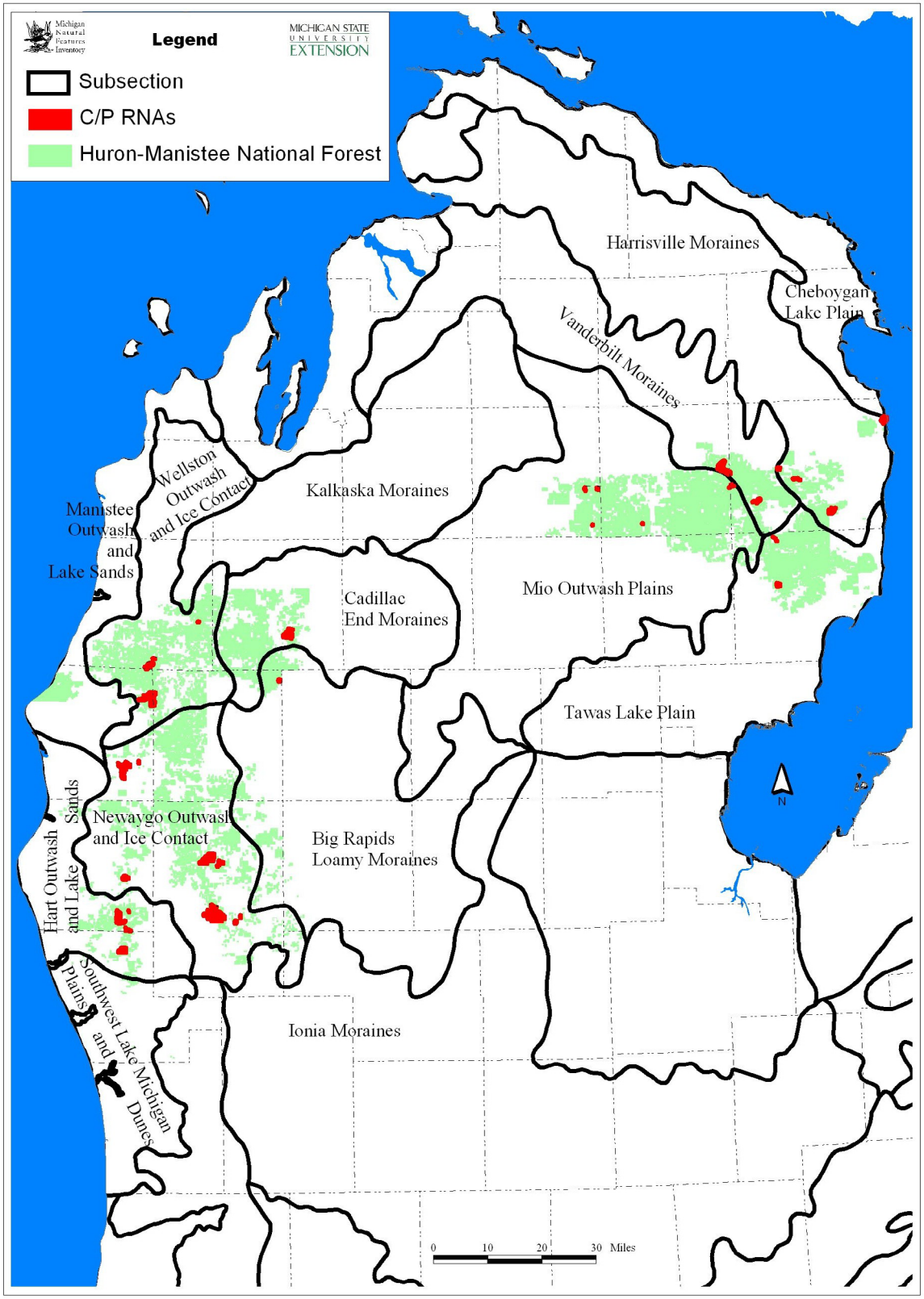

Figure 1. Subsections of the Huron-Manistee National Forest (Keys et al. 1995).

RESULTS

Representation of Alliances within C/P RNAs

The crosswalk of natural communities to alliances revealed that 22 different alliances occur within the C/P RNAs evaluated in this report (Table 2). The C/P RNAs and their associated alliances occur within 9 different subsections (Table 3). Comparisons with the "RNA Framework" report show that one alliance, Great Lakes Wooded Dune and Swale Complex, was added to the list of alliances previously documented from the HMNF. In addition, the C/P RNAs evaluated in this report contain approximately one-third (22/62) of the reported alliances on the HMNF (Faber-Langendoen 2000).

Ranking of Alliances: Model Results

All alliances that occur at only one C/P RNA within a subsection were automatically considered as having good potential to meet the goals of the RNA program. However, in six instances, the same alliances occur at multiple C/P RNAs within a subsection (Table 3). For example, dry sand prairie, which is represented by the Little Bluestem - (Sand Dropseed) Herbaceous Alliance occurs at three C/P RNAs within the Hart Outwash and Lake Sands Subsection (Table 3). Where more than one alliance of the same type occurs within a subsection, a model was used to determine which of the occurrences best meets the criteria for RNA establishment. The results of this analysis are listed in Table 4.

The model worked well for each group of alliances except the Black Ash – Red Maple Saturated Forest Alliance, which occurs at both the Bear Swamp and Hopper's Swamp C/P RNAs. Because both C/P RNAs received the same score, a decision was made to rank Bear Swamp as the best location to represent this alliance. At Bear Swamp the alliance occurs as part of a much larger system of forested and non-forested wetlands and the presence of ecological processes that support the alliance are more likely to occur in a larger, well buffer group of natural communities like at Bear Swamp. Lastly, the Bear Swamp C/P RNA also contains two additional alliances and three rare plant species that are not known from Hopper's Swamp.

Other Representation within Subsection

A review of the MNFI database revealed that the alliances contained within the C/P RNAs evaluated in this report were consistently better suited for inclusion within RNAs than other known occurrences within their respective subsections. Detailed comments on representation are provided for each C/P RNA in Appendix 1. However, in several instances, the C/P RNAs contain the same alliances reported from established RNAs or RNA-equivalents (see below).

Representation at RNAs

Within the Vanderbilt Moraines Subsection the White Pine - Oak (White, Red, Black) Forest Alliance occurs at Honawan Lake Forest and is also reported by Faber-Langendoen et al. (2000) to occur at the Hayes Tower RNA. The dry-mesic northern forest EOs at Honawan Lake Forest and Hayes Tower RNA were originally crosswalked to different associations. However, because the USNVC is hierarchical, with associations nested under alliance, the two associations represent the same alliance. The Hayes Tower Establishment Report (Comer 1992) and community EORs from both sites were carefully reviewed. While they do appear to represent the same alliance, the Hayes Tower RNA is a much drier site than Honawan Lake Forest. In addition to upland dry-mesic forest, the Honawan Lake Forest C/P RNA contains numerous wetlands and lakes that occur in small depressions throughout the site. In summary, the overall area encompassed by the two sites appears to be quite different but representation of the alliance is well served at either site.

Although no EO for oak-pine barrens is documented within the Newaygo Prairies RNA, the "RNA Framework" report suggests that the White Pine - Oak (White, Red) Wooded Herbaceous Alliance, which represents the community, occurs there. The Big South C/P RNA also contains a portion of a small (15 acres), low ranking occurrence of this same alliance. Because the alliance represents only a very small portion (approximately 6%) of the Big South C/P RNA , its occurrence within an already established RNA should not influence RNA establishment or the boundary of the Big South C/P RNA. A larger occurrence (98 acres) of the alliance is also known from USFS land at Casin Lake, and should be considered as a C/P RNA if it is in better condition and larger than at the Newaygo Prairies RNA.

Within the Newaygo Outwash and Ice Contact Subsection the alliance that represents dry sand prairie occurs at the Indian Lake C/P RNA, the Newaygo Prairies RNA, and the Ore-Ida Prairie. The Ore-Ida Prairie is owned by TNC and serves as an RNA-equivalent. Thus, the alliance is represented at both an RNA and RNA-equivalent within the subsection.

RNA-equivalents:

Within the Mio Outwash Plains Subsection, the Red Pine Forest Alliance occurs at the O'Brien Lake C/P RNA and in two State Natural Areas, Crawford Red Pines and Roscommon Red Pines. However, the majority of area within the O'Brien Lake C/P RNA supports an occurrence of the Black Spruce Saturated Forest Alliance, and therefore, the State Natural Areas should not be considered as an RNA-equivalent for the entire C/P RNA. Lastly, the EOs represented by the Red Pine Forest Alliance at the two State Natural Areas are relatively small (14 and 36 acres, respectively), as is the portion of O'Brien Lake C/P RNA that represents this alliance. Thus, if a larger high quality occurrence of the Red Pine Forest Alliance is discovered in the future it should be considered for RNA establishment.

The Blockhouse C/P RNA contains a small (32 acre) mesic northern forest EO that represents the White Pine Forest Alliance. An occurrence of this same alliance has also been documented within the Vanderbilt Moraines Subsection at the Pigeon River Pines State Natural Area. The occurrence at Pigeon River Pines is larger (87 acres) and higher ranking (B vs. C) than at Blockhouse and can serve as an RNA-equivalent for this portion of the C/P RNA. Because the White Pine Forest Alliance represents less than 3% of the Blockhouse C/P RNA, the Pigeon River Pine State Natural Area should not serve as an RNA-equivalent for the entire C/P RNA.

Meetings with HMNF District Staff

Meetings with District staff resulted in new boundaries for many C/P RNAs and District staff provided comments on administrative and management concerns for each of the C/P RNAs. The modified boundaries and comments for each C/P RNA are included in the site summaries and maps of Appendix 1. In addition to setting boundaries and voicing administrative and management concerns, District staff also made recommendations on the future status of each C/P RNA included in this report. These recommendations along with MNFI's recommendations for each site are listed in Table 5. While there is agreement between MNFI and District staff on the course of future actions for most C/P RNAs, there are 7 sites for which MNFI's recommendations do not match those of District staff (Table 5). Details regarding these differences are discussed for each site in the Discussion section of this report.

In all, 17 C/P RNAs are recommended to move forward in the RNA process by both MNFI and District staff (Table 5). MNFI and District staff differ in their recommendations for Loon Lake and Little Robinson Lake Opportunity Area with the District preferring Loon Lake and MNFI recommending Little Robinson Lake Opportunity Area (see comments in Discussion section). Because at least one of these C/P RNAs (e.g., Loon Lake or Little

Robinson Lake Opportunity Area) will be recommended to move forward, the number of sites recommended totals 18. An additional 5 C/P RNAs are recommended to move forward by MNFI alone but not by District staff (Table 5).

Representation of Alliances on Recommended C/P RNAs

Of the 22 alliances known to occur within the C/P RNAs evaluated in this report, 16 are represented within the C/P RNAs recommended to move forward in the RNA establishment process by both MNFI and District staff (e.g., agreement between MNFI and District staff) (Table 6). Two additional alliances (for a total of 18) occur within the C/P RNAs recommended for advancement in the RNA establishment process by MNFI alone (Table 6). The 6 alliances occurring exclusively at C/P RNAs that were not recommended to move forward by MNFI and District staff are listed in Table 7.

Comparisons with the "RNA Framework" report (Faber-Langendoen et al. 2000) reveal that 25 of the 62 alliances (40%) reported from the HMNF are represented at established RNAs, RNA-equivalents, or the C/P RNAs recommended by both MNFI and District staff (Table 8). Alliances lacking representation within the RNAs, RNA-equivalents, or C/P RNAs, are shown in Table 8 as shaded cells containing dashes. These shaded cells with dashes indicate gaps in alliance representation within their respective subsections (Table 8). The subsections with the highest percentage of alliance representation within established RNAs, RNA-equivalents, and C/P RNAs recommend by both MNFI and District staff are the Newaygo Outwash and Ice Contact with 40%, and Harrisville Moraines with 36% of alliances represented (Table 8).

Size of C/P RNAs

The size of the C/P RNAs recommended by both District and MNFI staff ranges from 2,136 acres to 26 acres (Table 9). Several of the larger C/P RNAs contain numerous habitat types, which can facilitate the long-term protection and maintenance of biodiversity and wildlife corridors. Larger C/P RNAs also typically allow for representation of multiple alliances. For example, multiple alliances are represented at several of the larger C/P RNAs including Big South (5), Brandy Creek (4), and Bear Swamp (3) (Table 9). In addition, larger C/P RNAs generally have a greater number of EOs and support greater numbers of rare species than smaller C/P RNAs (Table 9 and Appendix 1).

While it may be ecologically more beneficial to establish larger RNAs, it is important to note that several of the smaller C/P RNAs support unique natural features that are typically very small in size. For example, small ice-block depressions support bogs at the Vaughn Lake and South Olga Bog C/P RNAs, and intermittent wetlands at the Hunter Lake and Timmerman Lake C/P RNAs. Northern fen, which occurs at the Perch Lake C/P RNA, is also frequently very limited in extent because the unique, calcareous groundwater seepage zones that maintain the community are typically very small and limited in geographic distribution. Thus, representation of unique features that are typically small in size and/or limited in geographic distribution may occasionally necessitate establishing small RNAs in some locations. Ideally, these features would be captured within larger RNAs that incorporate adequate buffers and allow for the protection and maintenance of ecological processes and wildlife corridors between wetlands and adjacent uplands.

Table 2. Alliances and alliance codes represented on the C/P RNAs of the HMNF evaluated in this report.

Scientific Name	Common Name
Acer saccharinum Temporarily Flooded Forest Alliance (I.B.2.N.d)	Silver Maple Temporarily Flooded Forest Alliance
Andropogon gerardii - (Sorghastrum nutans) Herbaceous Alliance (V.A.5.N.a)	Big Bluestem (Indian Grass) Herbaceous Alliance
Calamagrostis canadensis Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Canada Bluejoint Seasonally Flooded Herbaceous Alliance
Carex (rostrata, utriculata) Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Sedge spp. (Carex rostrata, C. utriculata) Seasonally Flooded Herbaceous Alliance
Carex lasiocarpa Saturated Herbaceous Alliance (V.A.5.N.m)	Wiregrass Sedge Saturated Herbaceous Alliance
Chamaedaphne calyculata - (Kalmia angustifolia) Seasonally Flooded Dwarf-Shrubland Alliance (IV.A.1.N.f)	Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance
Fraxinus nigra - Acer rubrum Saturated Forest Alliance (I.B.2.N.g)	Black Ash - Red Maple Saturated Forest Alliance
Larix laricina Saturated Forest Alliance (I.B.2.N.g)	Tamarack Saturated Forest Alliance
Great Lakes Wooded Dune and Swale Complex (nonstandard type)	Great Lakes Wooded Dune and Swale Complex
Picea mariana Saturated Forest Alliance (I.A.8.N.g)	Black Spruce Saturated Forest Alliance
Pinus resinosa Forest Alliance (I.A.8.N.b)	Red Pine Forest Alliance
Pinus strobus Forest Alliance (I.A.8.N.b)	White Pine Forest Alliance
Pinus strobus - Quercus (alba, rubra) Wooded Herbaceous Alliance (V.A.6.N.f)	White Pine - Oak (White, Red) Wooded Herbaceous Alliance
Pinus strobus - Quercus (alba, rubra, velutina) Forest Alliance (I.C.3.N.a)	White Pine - Oak (White, Red, Black) Forest Alliance
Potamogeton spp. - Ceratophyllum spp. Elodea spp. Permanently Flooded Herbaceous Alliance (V.C.2.N.a)	Pondweed spp. - Hornwort spp. - Waterweed spp. Permanently Flooded Herbaceous Alliance
Rhynchospora spp. – Panicum (rigidulum, verrucosum) - Rhexia virginica Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance
Schizachyrium scoparium - (Sporobolus cryptandrus) Herbaceous Alliance (V.A.5.N.c)	Little Bluestem - (Sand Dropseed) Herbaceous Alliance
Spartina pectinata Temporarily Flooded Herbaceous Alliance (V.A.5.N.J.)	Prairie Cordgrass Temporarily Flooded Herbaceous Alliance
Thuja occidentalis - Acer rubrum Saturated Forest Alliance (I.C.3.N.d)	Northern White Cedar - Red Maple Saturated Forest Alliance
Thuja occidentalis Saturated Forest Alliance (I.A.8.N.g)	Northern White Cedar Saturated Forest Alliance
Typha (angustifolia, latifolia) - (Schoenoplectus spp.) Semipermanently Flooded Herbaceous Alliance (V.A.5.N.I)	Cattail (Narrowleaf, Common) - (Bulrush) Semipermanently Flooded Herbaceous Alliance

Table 3. Alliance representation by subsection and C/P RNA.

Subsection Alliance	C/P RNA
Big Rapids Loamy Moraines	
Leatherleaf Saturated Dwarf-Shrubland Alliance	South Olga Bog
Cadillac End Moraines	
Leatherleaf Saturated Dwarf-Shrubland Alliance	Brandy Creek Wetlands
Northern White Cedar - Red Maple Saturated Forest Alliance	Brandy Creek Wetlands
Northern White Cedar Saturated Forest Alliance	Brandy Creek Wetlands
Tamarack Saturated Forest Alliance	Brandy Creek Wetlands
Harrisville Moraines	
Great Lakes Wooded Dune and Swale Complex	Black River Complex
Northern White Cedar - Red Maple Saturated Forest Alliance	Trout Lake
Northern White Cedar Saturated Forest Alliance	Loud Creek
White Pine Forest Alliance	McDonald Creek Forest
Hart Outwash and Lake Sands	
Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance	Pine Island Marsh
Big Bluestem (Indian Grass) Herbaceous Alliance	Knapp Prairie
Canada Bluejoint Seasonally Flooded Herbaceous Alliance	Knapp Prairie
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	Knapp Prairie Skeel Creek Prairie White River (includes Sischo Prairie)
Silver Maple Temporarily Flooded Forest Alliance	White River (includes Sischo Prairie)
White Pine - Oak (White, Red) Wooded Herbaceous Alliance	Knapp Prairie Skeel Creek Prairie
Mio Outwash Plains	
Black Spruce Saturated Forest Alliance	O'Brien Lake
Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance	Hunter's Lake
Leatherleaf Saturated Dwarf-Shrubland Alliance	South Branch Bog
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	Valley Road Prairie
Northern White Cedar Saturated Forest Alliance	McMaster's Bridge Bog
Red Pine Forest Alliance	O'Brien Lake

Table 3. Alliance representation by subsection and C/P RNA (continued).

Subsection Alliance	C/P RNA
Newaygo Outwash and Ice Contact	
Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance	Fry Lake Little Robinson Lake Opportunity Area Loon Lake
Black Spruce Saturated Forest Alliance	Pearl Lake
Cattail (Narrowleaf, Common) - (Bulrush) Semipermanently Flooded Herbaceous Alliance	Big South
Leatherleaf Saturated Dwarf-Shrubland Alliance	Alley Lake Big South Casin Lake North Branch White River
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	Indian Lake
Pondweed spp. - Hornwort spp. - Waterweed spp. Permanently Flooded Herbaceous Alliance	Casin Lake
Prairie Cordgrass Temporarily Flooded Herbaceous Alliance	Big South
Sedge spp. (Carex rostrata, C. utriculata) Seasonally Flooded Herbaceous Alliance	North Branch White River
Silver Maple Temporarily Flooded Forest Alliance	Big South
Tamarack Saturated Forest Alliance	Toft Lake
White Pine - Oak (White, Red) Wooded Herbaceous Alliance	Big South
Tawas Lake Plain	
Leatherleaf Saturated Dwarf-Shrubland Alliance	Vaughn Lake
Wiregrass Sedge Saturated Herbaceous Alliance	Perch Lake
Vanderbilt Moraines	
Northern White Cedar Saturated Forest Alliance	Blockhouse
White Pine - Oak (White, Red, Black) Forest Alliance	Honawan Lake Forest
White Pine Forest Alliance	Blockhouse
Wellston Outwash and Ice Contact	
Black Ash - Red Maple Saturated Forest Alliance	Bear Swamp (includes Yonker's Meadow) Hopper's Swamp
Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance	Timmerman Lake
Northern White Cedar Saturated Forest Alliance	Arquilla Creek Bear Swamp (includes Yonker's Meadow)
Prairie Cordgrass Temporarily Flooded Herbaceous Alliance	Bear Swamp (includes Yonker's Meadow)

Table 4. Results of Alliance Ranking Model.

Subsection / Alliance / C/P RNAs	EO Rank	Points	EO Size (acres)	Points	# of Rare Species	Points	Ownership	Points	*Total Points*	Subsection Rank
				Model Factors and Scoring						
Hart Outwash and Lake Sands										
Little Bluestem - (Sand Dropseed) Herbaceous Alliance										
White River (includes Sischo Prairie)	B	*1*	19	*3*	2	*1*	USFS	*2*	*7*	**1**
Skeel Creek Prairie	B	*1*	10	*3*	1	*1*	USFS and Private (50/50)	*1*	*6*	**2**
Knapp Prairie	C	*0*	1	*0*	1	*1*	USFS	*2*	*3*	**3**
White Pine - Oak (White, Red) Wooded Herbaceous Alliance										
Skeel Creek Prairie	B	*1*	179	*3*	1	*1*	Private	*0*	*5*	**1**
Knapp Prairie	C	*0*	4	*0*	1	*1*	USFS	*2*	*3*	**2**
Newaygo Outwash and Ice Contact										
Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance										
Little Robinson Lake Opportunity Area	B	*1*	576	*3*	9	*3*	USFS and Private (95/5)	*2*	*9*	**1**
Loon Lake	BC	*0*	600	*3*	2	*1*	USFS and Private (55/45)	*1*	*5*	**2**
Fry Lake		*0*	103	*0*	2	*1*	USFS and Private (90/10)	*2*	*3*	**3**

Table 4. Results of Alliance Ranking Model (continued).

Subsection / Alliance / C/P RNAs	Model Factors and Scoring: EO Rank	*Points*	EO Size (acres)	*Points*	# of Rare Species	*Points*	Ownership	*Points*	*Total Points*	Subsection Rank
Newaygo Outwash and Ice Contact (continued)										
Leatherleaf Saturated Dwarf-Shrubland Alliance										
Big South	B	*1*	71	*3*	1	*1*	USFS	*2*	*7*	**1**
Alley Lake	B	*1*	60	*3*	1	*1*	USFS and Private (50/50)	*1*	*6*	**2**
North Branch White River	BC	*0*	48	*2*	0	*0*	USFS and Private (30/70)	*1*	*3*	**3**
Casin Lake	B?	*1*	13	*0*	0	*0*	Private	*0*	*1*	**4**
Wellston Outwash and Ice Contact										
Black Ash - Red Maple Saturated Forest Alliance										
Bear Swamp	AB	*2*	340	*0*	0	*0*	USFS	*2*	*4*	**1**
Hopper's Swamp	B	*1*	597	*0*	1	*1*	USFS	*2*	*4*	**2**
Northern White Cedar Saturated Forest Alliance									*0*	
Bear Swamp	B	*1*	201	*3*	0	*0*	USFS	*2*	*6*	**1**
Arquilla Creek	AB	*2*	49	*0*	0	*1*	USFS	*2*	*5*	**2**

Table 5. Recommendations for future actions on C/P RNAs by MNFI and HMNF District staff. "X" indicates that both MNFI and District staff agree on recommendation. MNFI and District recommendations are indicated accordingly. Note that District staff have not had an opportunity to review MNFI recommendations in some cases and may decide to modify their original recommendations. Also note that C/P RNAs comprised of alliances that are better represented at other sites within a given subsection are likely to be removed from further consideration as C/P RNAs.

C/P RNA	Move forward with RNA process	Retain as C/P RNA but do not move forward with RNA establishment at this time	Designate as 8.1	Better representation elsewhere in subsection	Remove from consideration
Alley Lake				Big South C/P RNA	
Arquilla Creek				Bear Swamp C/P RNA	
Bear Swamp (includes Yonker's Meadow)	X				
Big South	X				
Black River Complex	X				
Blockhouse	X				
Brandy Creek Wetlands	X				
Casin Lake				Big South C/P RNA	
Fry Lake				Little Robinson Lake Opportunity Area and Loon Lake C/P RNAs	
Honawan Lake Forest				Hayes Tower RNA	
Hopper's Swamp				Bear Swamp C/P RNA	
Hunter's Lake	X				
Indian Lake			possibly in future in conjunction with Karner blue management	Newaygo Prairies RNA and Ore-Ida Prairie (RNA-equivalent)	
Knapp Prairie			X		
Little Robinson Lake Opportunity Area	MNFI	District	District		
Loon Lake	District	MNFI	MNFI	Little Robinson Lake Opportunity Area	
Loud Creek	X				

Table 5. Recommendations for future actions on C/P RNAs by MNFI and HMNF District staff (continued).

C/P RNA	Move forward with RNA process	Retain as C/P RNA but do not move forward with RNA establishment at this time	Designate as 8.1	Better representation elsewhere in subsection	Remove from consideration
McDonald Creek Forest	X				
McMaster's Bridge Bog	X				
North Branch White River	X				
O'Brien Lake	X				
Pearl Lake	X				
Perch Lake	MNFI				District
Pine Island Marsh	MNFI		District		
Skeel Creek Prairie		X			
South Branch Bog	X				
South Olga Bog	X				
Timmerman Lake	MNFI	District	District		
Toft Lake	X				
Trout Lake	X				
Valley Road Prairie	MNFI	District			
Vaughn Lake	X				
White River (includes Sischo Prairie)	MNFI	District	District		

Table 6. Alliance representation within C/P RNAs recommended by MNFI and/or District staff to move forward in RNA establishment process. "Recommend" indicates that both MNFI and District staff recommend that C/P RNA move forward in establishment process. "MNFI" indicates C/P RNA was recommended by MNFI but not by District staff. “District” indicates C/P RNA was recommended by District staff but MNFI recommended a different C/P RNA within subsection.

Subsection Alliance	C/P RNA	Status
Big Rapids Loamy Moraines		
Leatherleaf Saturated Dwarf-Shrubland Alliance	South Olga Bog	Recommend
Cadillac End Moraines		
Leatherleaf Saturated Dwarf-Shrubland Alliance	Brandy Creek Wetlands	Recommend
Northern White Cedar - Red Maple Saturated Forest Alliance	Brandy Creek Wetlands	Recommend
Northern White Cedar Saturated Forest Alliance	Brandy Creek Wetlands	Recommend
Tamarack Saturated Forest Alliance	Brandy Creek Wetlands	Recommend
Harrisville Moraines		
Great Lakes Wooded Dune and Swale Complex	Black River Complex	Recommend
Northern White Cedar - Red Maple Saturated Forest Alliance	Trout Lake	Recommend
Northern White Cedar Saturated Forest Alliance	Loud Creek	Recommend
White Pine Forest Alliance	McDonald Creek Forest	Recommend
Hart Outwash and Lake Sands		
Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance	Pine Island Marsh	MNFI
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	White River (includes Sischo Prairie)	MNFI
Silver Maple Temporarily Flooded Forest Alliance	White River (includes Sischo Prairie)	MNFI
Mio Outwash Plains		
Black Spruce Saturated Forest Alliance	O'Brien Lake	Recommend
Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance	Hunter's Lake	Recommend
Leatherleaf Saturated Dwarf-Shrubland Alliance	South Branch Bog	Recommend
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	Valley Road Prairie	MNFI
Northern White Cedar Saturated Forest Alliance	McMaster's Bridge Bog	Recommend
Red Pine Forest Alliance	O'Brien Lake	Recommend

Table 6. Alliance representation within C/P RNAs recommended by MNFI and/or District staff to move forward in RNA establishment process (continued).

Subsection Alliance	C/P RNA	Status
Newaygo Outwash and Ice Contact		
Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance	Little Robinson Lake Opportunity Area Loon Lake	MNFI District
Black Spruce Saturated Forest Alliance	Pearl Lake	Recommend
Cattail (Narrowleaf, Common) - (Bulrush) Semipermanently Flooded Herbaceous Alliance	Big South	Recommend
Leatherleaf Saturated Dwarf-Shrubland Alliance	Big South	Recommend
Prairie Cordgrass Temporarily Flooded Herbaceous Alliance	Big South	Recommend
Sedge spp. (Carex rostrata, C. utriculata) Seasonally Flooded Herbaceous Alliance	North Branch White River	Recommend
Silver Maple Temporarily Flooded Forest Alliance	Big South	Recommend
Tamarack Saturated Forest Alliance	Toft Lake	Recommend
White Pine - Oak (White, Red) Wooded Herbaceous Alliance	Big South	Recommend
Tawas Lake Plain		
Leatherleaf Saturated Dwarf-Shrubland Alliance	Vaughn Lake	Recommend
Wiregrass Sedge Saturated Herbaceous Alliance	Perch Lake	MNFI
Vanderbilt Moraines		
Northern White Cedar Saturated Forest Alliance	Blockhouse	Recommend
White Pine Forest Alliance	Blockhouse	Recommend
Wellston Outwash and Ice Contact		
Black Ash – Red Maple Saturated Forest Alliance	Bear Swamp (includes Yonker's Meadow)	Recommend
Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance	Timmerman Lake	MNFI
Northern White Cedar Saturated Forest Alliance	Bear Swamp (includes Yonker's Meadow)	Recommend
Prairie Cordgrass Temporarily Flooded Herbaceous Alliance	Bear Swamp (includes Yonker's Meadow)	Recommend

Table 7. Alliances occurring exclusively within C/P RNAs not recommended to move forward in RNA establishment process. Note that alliances listed below will not be represented within a network of established RNAs based on recommendations by District and/or MNFI staff. "X" indicates agreement between MNFI and District staff. "MNFI" indicates alliance occurs at a C/P RNA that was recommended to move forward by MNFI but not by District staff. "Retain" indicates C/P RNA was recommended to remain in C/P RNA status and not to advance toward RNA establishment at this time.

Subsection Alliance	C/P RNA	Recommendation
Harrisville Moraines		
Wiregrass Sedge Saturated Herbaceous Alliance	Perch Lake	MNFI
Hart Outwash and Lake Sands		
Big Bluestem (Indian Grass) Herbaceous Alliance	Knapp Prairie	X
Canada Bluejoint Seasonally Flooded Herbaceous Alliance	Knapp Prairie	X
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	Knapp Prairie	X
	White River	MNFI
	Skeel Creek Prairie	Retain
White Pine - Oak (White, Red) Wooded Herbaceous Alliance	Knapp Prairie	X
	Skeel Creek Prairie	Retain
Newaygo Outwash and Ice Contact		
Pondweed spp. - Hornwort spp. - Waterweed spp. Permanently Flooded Herbaceous Alliance	Casin Lake	X

Table 8. Alliance representation by subsection. Shaded cells indicate alliance is known to occur on USFS lands within the subsection. "-" indicates alliance is not represented within an established RNA, RNA-equivalent, or C/P RNA evaluated in this report. "RNA" and "RNAe" indicate alliance occurs within an established RNA or RNA-equivalent, respectively. Only B-ranked or higher RNA-equivalents are shown. "Rcmd" indicates alliance occurs within a C/P RNA that has been recommended to move forward in the RNA process by both MNFI and District staff. "MNFI" indicates alliance occurs within C/P RNA recommended by MNFI but not by District staff. Subsection labels are as follows (Keyes et al 1995): NOI = Newaygo Outwash and Ice Contact; MOP = Mio Outwash Plains; HOL = Hart Outwash and Lake Sands; TLP = Tawas Lake Plain; CEM = Cadillac End Moraines; VM = Vanderbilt Moraines; MOL = Manistee Outwash and Lake Sands; HM = Harrisville Moraines; BRM = Big Rapids Loamy Moraines; SLM = Southwest Lake Michigan Plains and Dunes; KM = Kalkaska Moraines; IM = Ionia Moraines; CLP = Cheboygan Lake Plain. Acreages of USFS lands within each subsection are listed at bottom of table along with statistics on alliance representation. Data and format was taken from Table 5 of the "RNA Framework" report (Faber-Langendoen et al. 2000).

Community Pattern / **Alliance**	**Subsections of the Huron Manistee National Forest**													
	NOI	**WOI**	**MOP**	**HOL**	**TLP**	**CEM**	**VM**	**MOL**	**HM**	**BRM**	**SLM**	**KM**	**IM**	**CLP**
Matrix Alliances														
Black Oak - White Oak Forest Alliance				-				-						
Eastern Hemlock - Yellow Birch Forest Alliance		-	-			-	-	-						
Eastern White Pine - Eastern Hemlock Forest Alliance		-			-		-							
Jack Pine (Red Pine) Wooded Herbaceous Alliance	-	-	-	-	-			-						
Jack Pine Forest Alliance	-	-	-	-	-		-	RNA		-				-
Little Bluestem - Indian Grass Herbaceous Alliance	RNA											-		
Quaking Aspen - Paper Birch Forest Alliance	-	-	-	-	-	-			-	-		-		
Red Pine Forest Alliance	-	-	RNAe Rcmd		-		-			-				
Sugar Maple - Yellow Birch - (American Beech) Forest Alliance		-	-	-		-	-	RNA		-		-		

Table 8. Alliances representation by subsection (continued).

Community Pattern / Alliance	Subsections of the Huron Manistee National Forest													
	NOI	**WOI**	**MOP**	**HOL**	**TLP**	**CEM**	**VM**	**MOL**	**HM**	**BRM**	**SLM**	**KM**	**IM**	**CLP**
Matrix Alliances (continued)														
White Oak - (Red Oak, Hickory species) Forest Alliance				-							RNAe			
White Pine - (Red Pine) - Quaking Aspen Forest Alliance			-		-									
White Pine Forest Alliance	-	-	-	-	-	-	RNAe Rcmd	-	Rcmd	-				
White Spruce - Balsam Fir - Aspen Forest Alliance		-	-		-	-	-	-						
White Spruce - Balsam Fir Forest Alliance					-			-						
Large Patch Alliances														
American Beachgrass Herbaceous Alliance								RNA						
Black Ash - Red Maple Saturated Forest Alliance	-	Rcmd		-		-		-	-	-		-		
Black Spruce - Tamarack Saturated Forest Alliance	-		-			-								
Black Spruce Saturated Forest Alliance	Rcmd		Rcmd		-	-	-	-						
Black Spruce Saturated Woodland Alliance			-		-	-	-	-						
Buttonbush Semipermanently Flooded Shrubland Alliance		-												
Canada Bluejoint Seasonally Flooded Herbaceous Alliance				-										

Table 8. Alliances representation by subsection (continued).

Community Pattern / Alliance	Subsections of the Huron Manistee National Forest													
	NOI	**WOI**	**MOP**	**HOL**	**TLP**	**CEM**	**VM**	**MOL**	**HM**	**BRM**	**SLM**	**KM**	**IM**	**CLP**
Large Patch Alliances (continued)														
Cattail (Narrowleaf, Common) - (Bulrush) Semipermanently Flooded Herbaceous Alliance	Rcmd	-	-	-		-				-				-
Cattail species - (Bulrush species, Rush species) Seasonally Flooded Herbaceous Alliance		-												
Few-seeded Sedge - Wiregrass Sedge Saturated Herbaceous Alliance	-	-	-	-	-	-	-	-						
Great Lakes Wooded Dune and Swale Complex (nonstandard type)									Rcmd					Rcmd
Green Ash - American Elm - Hackberry (Celtis occidentalis, C. laevigata) Temporarily Flooded Forest Alliance			-			-								
Herbaceous Dunes Sparse Vegetation					-			RNAe						
Jack Pine - Oak (Northern Pin, Black) Forest Alliance	-	-	-		-		-	-		-				
Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance		MNFI	Rcmd	-		-	-	-		-				
Leatherleaf Saturated Dwarf-Shrubland Alliance	Rcmd	-	Rcmd	-	Rcmd	Rcmd	-	-		Rcmd				-

Table 8. Alliances representation by subsection (continued).

Community Pattern / Alliance	Subsections of the Huron Manistee National Forest													
	NOI	**WOI**	**MOP**	**HOL**	**TLP**	**CEM**	**VM**	**MOL**	**HM**	**BRM**	**SLM**	**KM**	**IM**	**CLP**
Large Patch Alliances (continued)														
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	RNA		MNFI	MNFI	-					-				
Northern White Cedar Complex								-	-					RNAe
Northern White Cedar Forest Alliance		-		-	-									
Northern White Cedar - Red Maple Saturated Forest Alliance			-		-	Rcmd	-		Rcmd					
Northern White Cedar Saturated Forest Alliance	-	Rcmd	Rcmd	-	-	Rcmd	Rcmd		Rcmd	-				RNAe
Pondweed spp. - Hornwort spp. - Waterweed spp. Permanently Flooded Herbaceous Alliance	-	-												
Prairie Cordgrass Temporarily Flooded Herbaceous Alliance	Rcmd	Rcmd												
Red Oak - Sugar Maple - (White Oak) Forest Alliance				-			RNA	RNAe			RNAe	-		
Silver Maple Temporarily Flooded Forest Alliance	Rcmd	-		MNFI				-		-				
Speckled Alder Seasonally Flooded Shrubland Alliance	-	-	-	-	-	-		-		-				
Sugar Maple - White Ash - American Basswood Forest Alliance				-								-		

Table 8. Alliances representation by subsection (continued).

Community Pattern / Alliance	Subsections of the Huron Manistee National Forest													
	NOI	**WOI**	**MOP**	**HOL**	**TLP**	**CEM**	**VM**	**MOL**	**HM**	**BRM**	**SLM**	**KM**	**IM**	**CLP**
Large Patch Alliances (continued)														
Tamarack Saturated Forest Alliance	Rcmd	-	-		-	Rcmd		-						
Tussock Sedge Seasonally Flooded Herbaceous Alliance	-	-	-		-			-		-	RNAe			
White Oak - (Black Oak) Woodland Alliance	-	-	-	-	-		-	-		-				
White Pine - Oak (White, Red) Wooded Herbaceous Alliance	RNA Rcmd	-		-	-			-				-		
White Pine - Oak (White, Red, Black) Forest Alliance	RNA RNAe	-	-	-	-	-	RNA	-	-	-				
Small Patch Alliances														
(Jack Pine, Red Pine) Woodland Alliance	-		-		-	-	-	-		-				
Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance	Rcmd	-		MNFI							RNAe		-	
Big Bluestem (Indian Grass) Herbaceous Alliance				-										
Bog Birch - (Willow) Saturated Shrubland Alliance			-				-							
Common Juniper Shrubland Alliance								-						

Table 8. Alliances representation by subsection (continued).

Community Pattern / Alliance	Subsections of the Huron Manistee National Forest													
	NOI	**WOI**	**MOP**	**HOL**	**TLP**	**CEM**	**VM**	**MOL**	**HM**	**BRM**	**SLM**	**KM**	**IM**	**CLP**
Small Patch Alliances (continued)														
Eastern Hemlock Saturated Forest Alliance	-							-		-				
Northern Sea Rocket Sparsely Vegetated Alliance								-						
Open Bluff/Cliff Sparse Vegetation														-
Sand Flats Temporarily Flooded Sparse Vegetation								-	-					
Sedge spp. (Carex rostrata, C. utriculata) Seasonally Flooded Herbaceous Alliance	Rcmd	-	-	-	-	-		-		-				
Shrubby Cinquefoil - Sweetgale - (Wire Sedge) Saturated Shrubland Alliance								RNA						
Skunk Cabbage - Marsh Marigold Saturated Herbaceous Alliance	-		-		-	-			-	-				
Twig Rush Seasonally Flooded Herbaceous Alliance					-			-						
White Pine - (Red Maple) Saturated Forest Alliance		-	-		-	-				-				
Wiregrass Sedge Saturated Herbaceous Alliance		-		-	MNFI	-		-		-				

Table 8. Alliances representation by subsection (continued).

Community Pattern / Alliance	Subsections of the Huron Manistee National Forest													
	NOI	**WOI**	**MOP**	**HOL**	**TLP**	**CEM**	**VM**	**MOL**	**HM**	**BRM**	**SLM**	**KM**	**IM**	**CLP**
Small Patch Alliances (continued)														
Yellow Water Lily - White Water Lily Permanently Flooded Herbaceous Alliance	-	-	-	-	-	-	-	-	-	-		-		
Acres of USFS land within subsection	231,074	104,220	203,834	52,712	111,222	58,744	60,921	21,601	60,708	58,442	3,980	1,239	3,522	146
Number of Alliances reported on USFS land within subsections	30	33	32	28	32	25	21	35	11	24	0	8	1	5
Number of alliances represented at established RNAs and RNAe	4	0	1	0	0	0	3	6	0	0	0	0	0	0
Percent of alliances represented at RNAs and RNAe	13%	0%	3%	0%	0%	0%	14%	17%	0%	0%	0%	0%	0%	0%
Number of alliances represented at RNAs, RNAe, and recommended C/P RNAs	12	3	5	0	1	4	4	5	4	1	0	0	0	1
Number of alliances lacking representation within RNAs, RNAe, and recommended C/P RNAs (Gaps)	18	30	27	28	31	21	17	30	7	23	0	8	1	4
Percent of alliances represented within RNAs, RNAe, and recommended C/P RNAs	40%	9%	16%	0%	3%	16%	19%	14%	36%	4%	0%	0%	0%	20%

Table 9. Size, status, and numbers of alliances and EOs (plant, animal, community, and other) for each C/P RNA. Note that a C/P RNA may contain multiple occurrences of the same element. "Recommend" indicates that both MNFI and District staff recommend that C/P RNA move forward in establishment process. "MNFI" indicates C/P RNA was recommended by MNFI but not by District staff. “District” indicates C/P RNA was recommended by the District but MNFI recommended a different C/P RNA within the subsection. "RNA" indicates site contains an alliance that is represented at an established RNA within the same subsection. "C/P RNA" indicates site contains alliances that are better represented at other C/P RNAs. “Retain” indicates C/P RNA was recommended to remain in C/P RNA status and not to advance toward RNA establishment at this time. "8.1" indicates the C/P RNA was recommended for 8.1 Management Area designation but not for RNA establishment. “MNFI / 8.1” indicates that District staff recommended 8.1 Management Area designation but MNFI recommended that C/P RNA move forward in RNA establishment process.

C/P RNA	Acres	Hectares	Number of Alliances	Number of EOs	Status
Little Robinson Lake Opportunity Area	3573	1446	1	16	MNFI / 8.1
Bear Swamp (includes Yonker's Meadow)	2136	865	3	7	Recommend
Indian Lake	2093	847	1	10	RNA
Big South	1841	745	5	7	Recommend
White River (includes Sischo Prairie)	1315	532	2	6	MNFI / 8.1
Brandy Creek Wetlands	1304	528	4	8	Recommend
Blockhouse	1180	478	2	2	Recommend
Pine Island Marsh	815	330	1	18	MNFI / 8.1
McDonald Creek Forest	621	251	1	2	Recommend
Hopper's Swamp	580	235	1	3	C/P RNA
Black River Complex	499	202	1	1	Recommend
North Branch White River	450	182	2	1	Recommend
Loon Lake	438	177	1	2	District
Honawan Lake Forest	406	164	1	2	RNA
Vaughn Lake	293	118	1	1	Recommend
Skeel Creek Prairie	195	79	2	4	Retain
Trout Lake	187	76	1	1	Recommend
Loud Creek	176	71	1	1	Recommend
Toft Lake	168	68	1	1	Recommend
O'Brien Lake	143	58	2	2	Recommend
Alley Lake	107	43	1	2	C/P RNA
Fry Lake	103	42	1	0	C/P RNA
South Olga Bog	102	41	1	1	Recommend
South Branch Bog	83	33	1	1	Recommend
McMaster's Bridge Bog	75	30	1	1	Recommend
Timmerman Lake	69	28	1	1	MNFI / 8.1
Perch Lake	44	18	1	1	MNFI
Arquilla Creek	44	18	1	1	C/P RNA
Casin Lake	42	17	2	2	Private
Valley Road Prairie	30	12	1	2	MNFI / 8.1
Hunter's Lake	30	12	1	1	Recommend
Pearl Lake	28	11	1	1	Recommend
Knapp Prairie	26	11	4	5	8.1

DISCUSSION

Knapp Prairie

By following the protocols used to evaluate C/P RNAs for this report, MNFI could have recommended that the Knapp Prairie C/P RNA move forward in the RNA establishment process. The Knapp Prairie C/P RNA contains a high quality (B-ranked) occurrence of mesic sand prairie, a globally rare natural community, and the community and its corresponding alliance are not represented elsewhere within the subsection. However, the total acreage of mesic sand prairie is less than 5 acres and closer inspection of its landscape context reveals that the community occurs as several long, thin ecotones that separate northern wet meadow from dry sand prairie and oak-pine barrens. MNFI has not recommended RNA establishment for Knapp Prairie because the natural communities at the site are very small and the mesic sand prairie consists of a series of narrow ecotones rather than a contiguous patch.

Differences in Recommendations between MNFI and District Staff

Differences between MNFI and the District staff recommendations on the future course of action for the C/P RNAs discussed in this report result from a variety of factors, many of which are detailed below. MNFI has based its decisions to a large extent on the quality of the community EOs and associated alliances, the uniqueness of their occurrences, and their perceived abilities to meet RNA requirements with future land acquisitions and adequate protections from off-trail ORV use and other illegal activities. While the District staff also recognizes the need for representation of a diverse set of high quality alliances within future RNAs, they are charged with administering their establishment, maintenance, and long-term protection. Thus, differences in recommendations on future actions for the C/P RNAs between MNFI and the District Offices are very understandable.

Little Robinson Lake Opportunity Area

The Little Robinson Lake Opportunity Area C/P RNA contains a series of rare coastal plain marshes that support at least 9 rare species. The alliance represented by coastal plain marsh, Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance, also occurs at the Loon Lake C/P RNA.

Due to a computer malfunction during the meeting in which recommendations on future actions were discussed, MNFI was not able to provide information to District staff on the number of rare species occurring at the Little Robinson Lake Opportunity Area C/P RNA. After further review of the numbers of rare elements associated with the C/P RNA and comparisons with the Loon Lake C/P RNA (e.g., see Model Results in Table 4) it is clear that the Little Robinson Lake Opportunity Area C/P RNA is the best location for representation of the alliance. Therefore, MNFI recommends moving forward with RNA designation for the Little Robinson Lake Opportunity Area.

District staff expressed concerns over moving forward with RNA establishment because the C/P RNA receives heavy ORV use and is widely used for camping during the hunting season. In addition, trash is often dumped in the area. Furthermore, a powerline and ORV trail run through the eastern portion of the area and at present, the C/P RNA contains numerous roads. The District would prefer to designate the newly modified boundary as an 8.1 Management Area to protect the rare natural features and refrain from moving forward with RNA designation at this time.

Loon Lake

As mentioned above, the Loon Lake C/P RNA also contains a coastal plain marsh that represents the same alliance as found at Little Robinson Lake. Due to a computer malfunction during a meeting where recommendations for future actions were discussed, MNFI was unable to provide the District with critical information for making an informed decision on future actions for both the Loon Lake and Little Robinson Lake Opportunity Area C/P RNAs. Comparisons between the two C/P RNAs as illustrated in Table 4 clearly show that the alliance is best represented at Little Robinson Lake Opportunity Area.

The Little Robinson Lake C/P RNA supports 5 rare plant species and 1 rare animal species that are not known from Loon Lake. In addition, nearly half of the coastal plain marsh EO at Loon Lake is in private ownership. The coastal plain marsh at Loon Lake is also a high quality occurrence and worthy of strong protection and management efforts. However, if it is possible to protect the Little Robinson Lake C/P RNA from illegal ORV use, it is a better site for representation of coastal plain marsh than Loon Lake.

Perch Lake

The Perch Lake C/P RNA contains a series of northern fens that occur in small depressions and along the shores of several lakes. The Perch Lake C/P RNA contains the only occurrence of northern fen within the Tawas Lake Plain Subsection and is the only occurrence of this community type (and its associated alliance) on any C/P RNA discussed in this report. Thus, Perch Lake is the best place for representation of this alliance within the subsection and possibly within the HMNF. The highest quality portion of the community, which represents the Wiregrass Sedge Saturated Herbaceous Alliance, occurs on USFS land just east of Slab Lake. Possible boundaries for the C/P RNA include the snowmobile trail to the north, the section line along the west side, and Ford Road and the private property boundary on the south side. This boundary would encompass the highest quality portion of the wetland.

District staff raised concerns over several issues associated with the Perch Lake C/P RNA and expressed a desire to exclude the site from RNA consideration. District staff voiced concerns that a portion of the northern fen EO is in currently in private ownership. In addition, heavy illegal ORV use has significantly degraded portions of the C/P RNA in the past and District staff question the current quality of the northern fen EO. They also noted that a road divides the higher quality northern fens at Slab Lake from those at Perch and Goose Lakes. Lastly, the community EO occupies a relatively small area (44 acres). However, northern fens are frequently very small and 44 acres is considered large for this type of community.

Pine Island Marsh

The Pine Island Marsh C/P RNA supports coastal plain marsh, a globally rare natural community, and 11 rare plant species, and 4 rare animal species, including a federally threatened species. In addition to providing critical habitat for a large number of rare species, the site also contains the only known occurrence for coastal plain marsh and its corresponding alliance within the Hart Outwash and Lake Sands Subsection. Because few other sites in Michigan provide habitat more than a dozen rare species and also support a globally rare natural community, the Pine Island Marsh C/P RNA holds significant ecological value both locally and state-wide. Thus, MNFI recommends that Pine Island Marsh move forward in the RNA establishment process. The boundary included in this report contains several private parcels and 40 acres of state-owned land that should be considered as a high priority for acquisition. If possible, lands adjacent to the boundary should also be acquired, especially within the northeast quarter of T12N, R16W section 24.

District staff recognize the ecological significance of Pine Island Marsh but desire to protect the site and its rare natural features through a special management designation such as 8.1, rather than RNA establishment. District staff expressed concerns over moving forward with RNA establishment because significant portions of several coastal plain marshes at the site are currently in private ownership. In addition, the site's close proximity to a population center makes it very difficult for the District to prevent illegal ORV use at the site, which has significantly degraded portions of the C/P RNA. Lastly, a snowmobile trail traverses the C/P RNA.

Timmerman Lake

The Timmerman Lake C/P RNA contains an intermittent wetland that occurs north and east of Timmerman Lake. The community, which is represented by the Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance, is known to occur on USFS land in several other locations within the subsection. However, the other occurrences are low ranking (C-ranked) or very small (< 5 acres). Therefore, Timmerman

Lake is the best location for representation of this alliance within the subsection.

The District staff expressed concerns over moving forward with RNA establishment for Timmerman Lake at this time because the northern portion of the intermittent wetland EO is privately owned. They recommended that the site be designated as an 8.1 Management Area in order to protect the natural community and that the surrounding lands become part of Old Growth Designation, which borders the site to the south and east.

Valley Road

The Valley Road C/P RNA contains a dry sand prairie EO, which represents the Little Bluestem - (Sand Dropseed) Herbaceous Alliance. A dry sand prairie of similar size and rank also occurs on state-owned land at Shupac Lake but has not yet received special protection status. Thus, the Valley Road C/P RNA is the best known location for representation of this alliance within the subsection. Enlarging the boundaries to include all land within section 20 would allow for the roads along section lines to be used as boundaries and firebreaks for prescribed fire management.

District staff expressed concerns about moving forward with RNA designation at this time because the site is in a Kirtland's Warbler Management Area and they feel that RNA designation could impede their ability to manage for the species, which may include prescribed fire and other types of vegetation management. ORV use also occurs at this site. The District would like to retain the site as a C/P RNA but refrain from moving forward with RNA establishment at this time.

White River (includes Sischo Prairie)

The White River C/P RNA contains a high quality dry sand prairie EO that is comprised of numerous prairie openings within a matrix of oak barrens and dry-mesic northern forest. The C/P RNA also includes a small portion of a high quality southern floodplain forest EO, which occurs along the White River, immediately south of the C/P RNA. The opportunity to capture both natural community EOs within a single, large RNA, thus allowing for the maintenance of ecological processes and wildlife corridors, would be of great benefit to the region, especially considering the highly fragmented condition of much of the subsection. No other dry sand prairie EOs of similar size or rank are known from public lands within the subsection (see representation comments in Appendix 1). The White River C/P RNA is the best location for representation of the alliance represented by dry sand prairie within the subsection. Extending the southern boundary to the White River, where appropriate, will allow for a greater proportion of the southern floodplain forest EO to be included within the RNA and will provide long-term protection for critical wildlife corridors and ecological processes. District staff expressed a willingness to consider adding portions of the adjacent southern floodplain forest EO to the C/P RNA.

Concerns were raised by District staff over the potential for RNA designation to result in impediments to habitat management for Karner blue, which can include the use of prescribed fire and hand cutting. The C/P RNA is currently managed to provide habitat for Karner blue as part of the Muskegon Recovery Unit. In addition to concerns over impediments to Karner blue management, District staff are also hesitant to move forward with RNA establishment because the area is heavily used by ORVs and for horseback riding. The site is currently a Semi-primitive Non-motorized Area and the District has closed several roads within the C/P RNA in the past but have difficulty in preventing illegal ORV use. The District staff would prefer to designate the site as an 8.1 Management Area and refrain from moving forward with RNA establishment at this time.

Conflicts with RNAs Establishment

As noted by MNFI in a previous report (Comer 1995b) and by District staff, the Baldwin-White Cloud District seems to face the greatest difficulty in identifying and protecting suitable RNAs because of the fractured pattern of USFS ownership, abundant inholdings, and rampant, illegal use of ORVs on USFS lands. The habitat of a federally endangered species has been degraded as the result of illegal use of ORVs at four C/P RNAs within the Baldwin-White Cloud District (Appendix 1). In addition, globally rare (G1, G2) natural communities have

experienced significant detrimental impacts as a result of illegal ORV use at 2 C/P RNAs in the Baldwin White Cloud District, Little Robinson Lake Opportunity Area and Pine Island Marsh (Appendix 1). It is important to note that while the Baldwin-White Cloud District appears to be most heavily impacted by illegal ORV use, C/P RNAs throughout the Forest have been detrimentally impacted as well (Appendix 1). Despite the challenges faced by the Baldwin-White Cloud District they have made very significant progress on ecosystem representation within the Newaygo Outwash and Ice Contact Subsection, where 40% of the known alliances are represented at established RNAs, RNA-equivalents, and C/P RNAs recommended by MNFI and District staff (Table 8). This is especially important because the HMNF manages more land within the Newaygo Outwash and Ice Contact Subsection than in any other subsection in northern Lower Michigan (Table 8).

In several Districts, staff voiced concerns that RNA establishment would impede habitat management for federally endangered species. These concerns should be adequately addressed so that the types of habitat management for theses species that utilizes ecological processes such as prescribed fire can be conducted on RNAs without overly burdensome administrative requirements.

The Karner blue butterfly and Kirtland's warbler both occur on fire-dependent natural communities within the HMNF. Management for these types of communities and their associated flora and fauna require natural disturbances, like prescribed fire, to maintain long-term viability. While RNA guidelines allow for the use of prescribed fire, they also state that portions of the RNA should be permanently set aside from burning (USDA 1994). For RNAs composed entirely of fire-dependent communities, setting aside portions as permanent refugia from fire may not be practical or ecologically sound. The requirement for permanent refugia from fire should be removed from the RNA guidelines so that the prescribed fire can be used as a management tool for maintaining ecological processes, diversity, and ecosystem structure. In place of permanent refugia, the guidelines could recommend that in any given year in which prescribed burning is implemented, a portion of the RNA should be protected from fire to provide a refuge for fire-sensitive species, thus facilitating their recolonization of recently burned areas. Suitable experimental control areas that have not been managed using prescribed fire are likely to be abundant on adjacent parcels or other public lands within the subsection.

Prioritizing Gaps in Alliance Representation

Over all, 37 alliances lack representation within established RNAs, RNA-equivalents, and C/P RNAs recommended by both MNFI and District staff. Gaps in alliance representation for each subsection range from more than 20 alliances in 7 subsections to less than 10 alliances in 5 subsections (Table 8). Because many subsections have numerous gaps in alliance representation and some alliances represent community types that are rare or unique, or form the matrix community types over large areas, it will be important to prioritize alliances for representation.

In setting priorities for representation on the Superior National Forest, the staff placed a priority on representation of matrix and large patch alliances, and reserved representation of small patch alliances to those that possessed unique qualities or were considered rare (Leuelling et al. 2000). The three categories of matrix, large patch, and small patch alliances are described in the "RNA Framework" report and can be used to help conceptualize the spatial patterning of alliances within a landscape (Faber-Langendoen 2000). Matrix alliances represent community types that typically cover expansive areas ranging from 1,000 to many thousands of acres such as northern mesic forest. Large patch alliances represent more restricted community types such as southern floodplain forest, poor conifer swamp, and rich conifer swamp, and typically occur in patches ranging from 50 to 1000 acres in size. Small patch alliances represent community types such as northern fen and coastal plain marsh and typically occur in patches less than 50 acres.

A similar approach to that used on the Superior National Forest for prioritizing alliances can be applied to the HMNF. The following considerations are recommended for

prioritizing alliances for subsectional representation within RNAs on the HMNF.

1) Alliances that represent rare communities should be given highest priority.

This recommendation is meant to include alliances from all three groups of community patterning (e.g., matrix, large patch, and small patch alliances). Protection of rare community types through RNA establishment will greatly contribute to the long-term maintenance of biodiversity in northern Lower Michigan and provide important opportunities for research. Alliances that represent rare community types are listed in Table 10.

2) Alliances that represent unique communities should be given second priority.

Communities that are considered unique are typically associated with natural processes or environmental conditions that are restricted in their distribution such as calcareous groundwater seeps and ice-block depressions, or rely on natural disturbance regimes that have been greatly altered. Community types considered to be unique are listed in Table 10 and include northern fen, coastal plain marsh, intermittent wetland, bog, northern wet-mesic prairie, dry sand prairie, pine barrens, oak-pine barrens, interdunal wetlands, open dunes, and Great Lakes barrens. Note that most communities considered to be unique are also rare. Representation of these unique community types within established RNAs allows for the long-term study of their ecological processes and species, and offers tremendous potential for education on a wide variety of ecosystems. In addition, these communities represent unique elements of the region's biodiversity and their long-term protection through RNA establishment will significantly contribute to the maintenance of biodiversity in northern Lower Michigan.

3) Representation of matrix and large patch alliances should be given priority over small patch alliances that are not considered rare or unique.

A region's overall vegetation cover is formed by community types that represent matrix and large patch alliances. Because these alliances represent the dominant vegetation types for large regions, their inclusion within RNAs is critically important to protection of biodiversity. In addition, representation of matrix and large patch alliances allows these dominant vegetation types to be studied, used as outdoor classrooms, and available to land managers seeking to better understand the long-term effects of their management treatments. The matrix and large patch alliances known from each subsection are listed in Table 8.

Meeting Goals of Alliance Representation

Meeting the goal of ecosystem representation will require a diversity of approaches to RNA selection and establishment. The HMNF contains a wide range of natural communities that occur in a variety of community patterns (e.g., matrix, large patch, small patch) (Table 8). Representing high quality examples of each of the alliances within the subsections where they occur will greatly enhance protection of biological diversity in northern Lower Michigan and provide an excellent base for long-term study and adaptive management. Devising a strategy for achieving the goals of ecosystem representation should include the following components:

1) Further systematic inventory for underrepresented, high priority natural communities and alliances on the HMNF.
2) Further mapping and ranking of communities and alliances on established RNAs and C/P RNAs.
3) Establishing large RNAs when feasible.
4) Working cooperatively with the MDNR and TNC to support inventory and mapping efforts for high quality natural communities and their associated alliances on State Natural Areas and TNC preserves, which can then serve as RNA-equivalents.

Focused Inventory for Underrepresented, High Priority Alliances

While MNFI has conducted inventory for natural communities on the HMNF in the past and documented occurrences of numerous high quality natural communities, additional inventory efforts that are focused on underrepresented, rare and unique community types and matrix alliances are likely to result in

new occurrences for a variety of natural community types and alliances. Based on previous inventory efforts, many of the remaining high quality natural communities on the HMNF are likely to be wetlands and several will probably occur as part of large upland-wetland complexes that support multiple alliances and are of sufficient size and quality to be considered as future C/P RNAs. Documenting the remaining high quality natural communities and associated alliances will also provide the HMNF with useful information for planning and land management.

Mapping and Ranking Communities and Alliances on Established and C/P RNAs

Several of the larger C/P RNAs recommended for advancement in this report likely contain additional alliances that have not yet been documented. For example, the large non-forested wetlands that occur within the newly proposed boundary of the Blockhouse C/P RNA may represent a high quality occurrence of an alliance that is currently listed as a gap in representation for the Vanderbilt Moraines Subsection. Further inventory to map and rank natural communities and alliances on established RNAs and C/P RNAs that contain large buffer areas around previously documented community EOs may help fill gaps in representation for some subsections, especially when these buffer areas include wetlands.

Establishing Large RNAs

Northern Lower Michigan supports a complex and dynamic landscape where a wide variety of upland and wetland natural communities are frequently juxtaposed. Relatively small areas of the northern Lower Peninsula typically contain several different upland and wetland natural communities. Because of the region's high habitat heterogeneity, meeting the goals of representation for many subsections can be accomplished most easily by establishing RNAs that are greater than 1,000 acres. Designating large RNAs (e.g., > 1000 acres) will provide representation for a variety of natural communities, each of which will be well buffered. In addition, the dynamic nature of the region's landscape and the ecological processes that support species and ecosystem diversity will also be protected and available for education and long-term study. Because the HMNF harbors many community types that typically occupy relatively small areas (e.g., northern fens, coastal plain marsh, bog, intermittent wetland) it may not always be feasible to capture these types within large RNAs. However, in many locations, alliance representation goals can be most easily met by including these unique community types within larger RNAs as was accomplished at the Big South C/P RNA.

Working with Partners to Achieve Representation Goals

Filling gaps in alliance representation for each of the subsections can also be accomplished by supporting natural community inventory and mapping efforts on State Natural Areas and TNC preserves. Documenting high quality occurrences of natural communities on State Natural Areas or TNC preserves may help meet representation goals because these areas serve as RNA-equivalents.

Table 10. Alliances that represent unique community types on the HMNF. The table is sorted by rarity (G Rank). Note that because the US National Vegetation Classification is hierarchical an alliance may represent several different community types. Also note that the crosswalk between communities and alliances may result in a community being representing by several different alliances.

Alliance	Community Type	G Rank	S Rank	Community Pattern
Big Bluestem (Indian Grass) Herbaceous Alliance	Northern wet-mesic prairie	G?	S1	Small Patch
Prairie Cordgrass Temporarily Flooded Herbaceous Alliance	Northern wet-mesic prairie	G?	S1	Large Patch
Jack Pine (Red Pine) Wooded Herbaceous Alliance	Pine barrens	G2	S2	Matrix
Jack Pine (Red Pine) Wooded Herbaceous Alliance	Great Lakes barrens	G2	S2	Matrix
Jack Pine Forest Alliance	Great Lakes barrens	G2	S2	Matrix
Big Bluestem (Indian Grass) Herbaceous Alliance	Mesic sand prairie	G2	S1	Small Patch
White Pine - Oak (White, Red) Wooded Herbaceous Alliance	Oak-pine barrens	G2?	S2	Large Patch
Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance	Coastal plain marsh	G2?	S2	Small Patch
Little Bluestem - (Sand Dropseed) Herbaceous Alliance	Dry sand prairie	G2G3	S2	Large Patch
Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance	Intermittent wetland	G3	S3	Large Patch
Wooded Dune and Swale Complex	Wooded dune and swale complex	G3	S3	Large Patch
White Oak - (Black Oak) Woodland Alliance	Oak barrens	G3	S2	Large Patch
Tamarack Saturated Forest Alliance	Relict conifer swamp	G3	S3	Large Patch
Prairie Cordgrass Temporarily Flooded Herbaceous Alliance	Wet prairie	G3?	S2	Large Patch
Twig Rush Seasonally Flooded Herbaceous Alliance	Interdunal wetland	G3?	S2	Small Patch
Northern Sea Rocket Sparsely Vegetated Alliance	Sand/gravel beach	G3?	S3	Small Patch
American Beachgrass Herbaceous Alliance	Open dunes	G3G5	S3	Large Patch
Wiregrass Sedge Saturated Herbaceous Alliance	Northern fen	G4G5	S3	Small Patch
Leatherleaf Saturated Dwarf-Shrubland Alliance	Bog	G5	S4	Large Patch

CONCLUSION

Of the 33 C/P RNAs evaluated in this report, 18 are recommended to advance in the RNA process by both District and MNFI staff and an additional 5 are recommended by MNFI only and not by District staff (Table 5). The C/P RNAs recommended by both District and MNFI staff contain 16 different alliances and help fill gaps in alliance representation for 9 subsections (Tables 6 and 8). In total, 40% (25/62) of the alliances reported from the HMNF are represented on established RNAs, RNA-equivalents, or C/P RNAs recommended by both District and MNFI staff. While several subsections have little or no representation within RNAs, RNA-equivalents, or recommended C/P RNAs, representation goals appear within reach for the Newaygo Outwash and Ice Contact, and Harrisville Moraines subsections (Table 8).

A strategic approach is recommended for filling gaps in alliance representation that includes the following three criteria: 1) alliances representing rare communities should be given highest priority; 2) alliances representing unique communities should be given second priority; 3) matrix and large patch alliances should be given priority over small patch alliances that are not considered rare or unique. This approach will ensure the protection of biodiversity, provide opportunities for research and education on a wide range of species, ecosystems, and natural processes, and offer land managers and others the chance to make long-term comparisons among a variety of managed and unmanaged community types.

Representation of additional alliances may be accomplished by using a strategy that includes the following components. 1) Further inventory that is focused on underrepresented, high priority alliances, as outlined above, is likely to be a key factor in meeting ecosystem representation goals on the HMNF and will provide very useful information for Forest planners and land managers. 2) Further inventory for natural communities and alliance mapping within established RNAs and C/P RNAs will also help fill gaps in ecosystem representation for some subsections. The HMNF occurs in a diverse and dynamic landscape where a variety of natural communities are frequently juxtaposed. 3) Thus, representation of multiple communities and their associated alliances will be achieved most easily by establishing large RNAs, as they will almost certainly contain a variety of upland and wetland communities and alliances. 4) Lastly, filling gaps in alliance representation can also be achieved by supporting inventory and mapping efforts on State Natural Areas and TNC preserves, which can serve as RNA-equivalents.

By protecting high quality, representative examples of the ecosystems known to occur on the HMNF, RNAs represent a crucial component of any long-term protection strategy for biodiversity in northern Lower Michigan. They provide important sites for the study of long-term changes in communities, ecological processes, and plant and animal species and serve as outdoor classrooms for those seeking to better understand species interactions and ecosystems. Because RNAs facilitate comparisons between managed and unmanaged sites, they provide unique opportunities for land managers seeking to better understand the long-term effects of their management practices.

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I wish to extend my sincere thanks to the many HMNF District staff that provided very helpful information on each of the C/P RNAs and attended meetings in their Districts. Staff in each District provided useful written comments on management history and protection concerns for each C/P RNA. In addition, staff from each District attended meetings to give input on management and protection concerns, and provide recommendations on the boundaries and future status of each C/P RNA. Listed below are the HMNF that participated in meetings. In addition to those listed below, numerous HMNF staff stopped in during the meetings for a short time to help out on particular sites or issues.

Mio Ranger Station, February 10, 2003
Phil Huber and Greg Schmidt

Cadillac-Manistee Ranger Station, February 11, 2003
Barb Heidel, Jerry McKain, Patty O'Connell, and Chris Schumacher

Huron Shores Ranger Station, February 12, 2003
Chuck Andrina, Carl Racchini, Becky Riegle, and Greg Schmidt

Baldwin-White Cloud Ranger Station, February 21, 2003
Russ Bacon, Stephen Hatting, Joe Kelly, Susan McGowan-Stinski, Kurt Pindell, Pat Ruta, Leslie Russell, and Diane Walker

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Appendix 1. Site summaries and maps for each C/P RNA. "pRNA" indicates site is a Potential Candidate Research Natural Area or Unique Area under study but not identified in the Forest Plan. "cRNA" indicates site is a Candidate Research Natural identified in the Forest Plan.

Alley Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
107 acres 43 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-2-1-1 Pitted outwash plain

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Bog	-	B	-	-	G3	S3
Potamogeton bicupulatus	Waterthread Pondweed	B	-	T	G4?	S2

Ecological Description
The pRNA contains a leatherleaf-dominated bog and small lake. Scattered black spruce and tamarack occur throughout the bog. For more information see community and plant EORs, and Albert et al. 1991.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Richmond Lake	Bog	AB
Whelan Lake	Bog	B

Representation Comments
Two other bogs EOs are documented from the subsection, with one, Whelan Lake, occurring within the Big South cRNA. The alliance is better represented at other sites within the subsection such as Whelan Lake.

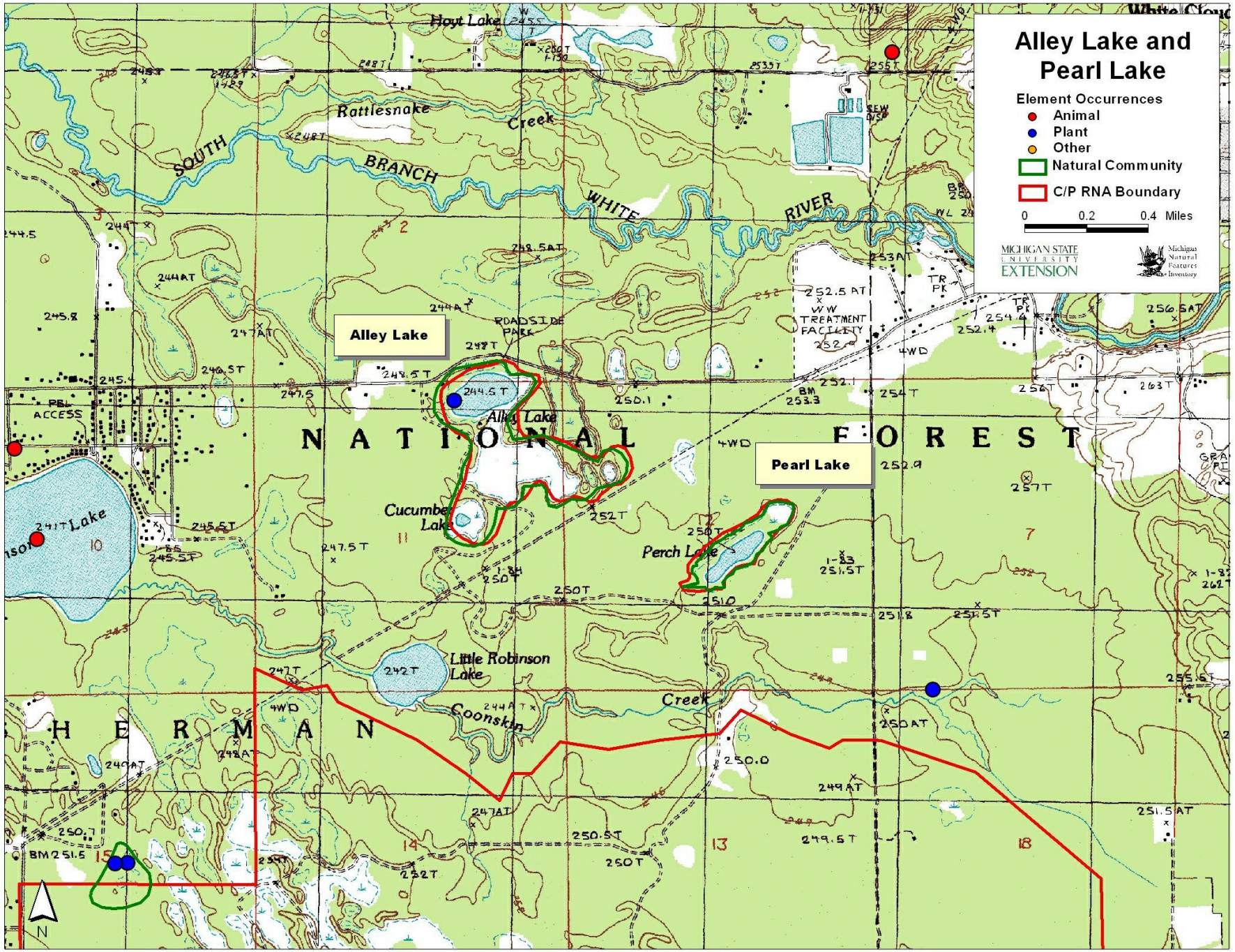
Alley Lake (continued)

Administrative and Management Concerns

The pRNA borders several private residences and a small lake with a public fishing pier and picnic area along its north side. A well traveled, paved county road borders the north side of the pRNA, just north of Alley Lake.

Boundary Description

The pRNA boundary closely matches the natural community boundary.


Alley Lake and Pearl Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.2 0.4 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Alley Lake
Pearl Lake
Hoyt Lake
Rattlesnake Creek
SOUTH BRANCH WHITE RIVER
ROADSIDE PARK
WW TREATMENT FACILITY
PBL ACCESS
Alley Lake
Cucumber Lake
Perch Lake
Little Robinson Lake
Coonskin Creek
N A T I O N A L F O R E S T
H E R M A N
N

Arquilla Creek

Status
Potential Candidate Research Natural or Unique Areas Under Study But Not Identified in the Forest Plan

Size
44 acres 18 hectares

Subsection
Wellston Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Manistee

Alliance

Scientific Name	Common Name
Thuja occidentalis Saturated Forest Alliance (I.A.8.N.g)	Northern White Cedar Saturated Forest Alliance

Association

Scientific Name	Common Name
Thuja occidentalis - (Picea mariana, Abies balsamea) / Alnus incana Forest	Northern White Cedar - (Black Spruce, Balsam Fir) / Speckled Alder Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Rich conifer swamp	-	AB	-	-	G4	S4

Ecological Description
The pRNA contains a portion of a rich conifer swamp EO that is dominated by northern white cedar, white pine, and sphagnum mosses. Peat depths vary from 1 to 6.5 feet. In 1987, northern white cedar was aged to approximately 176 years. For more information see community and animal EORs, and Albert et al. 1991 .

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Representation Comments
The Bear Swamp cRNA, which occurs within the same subsection, also contains a rich conifer swamp element occurrence that represents the same alliance. Representation of the alliance is best served at the Bear Swamp cRNA where it is well buffered and occurs in conjunction with several other high quality natural communities.

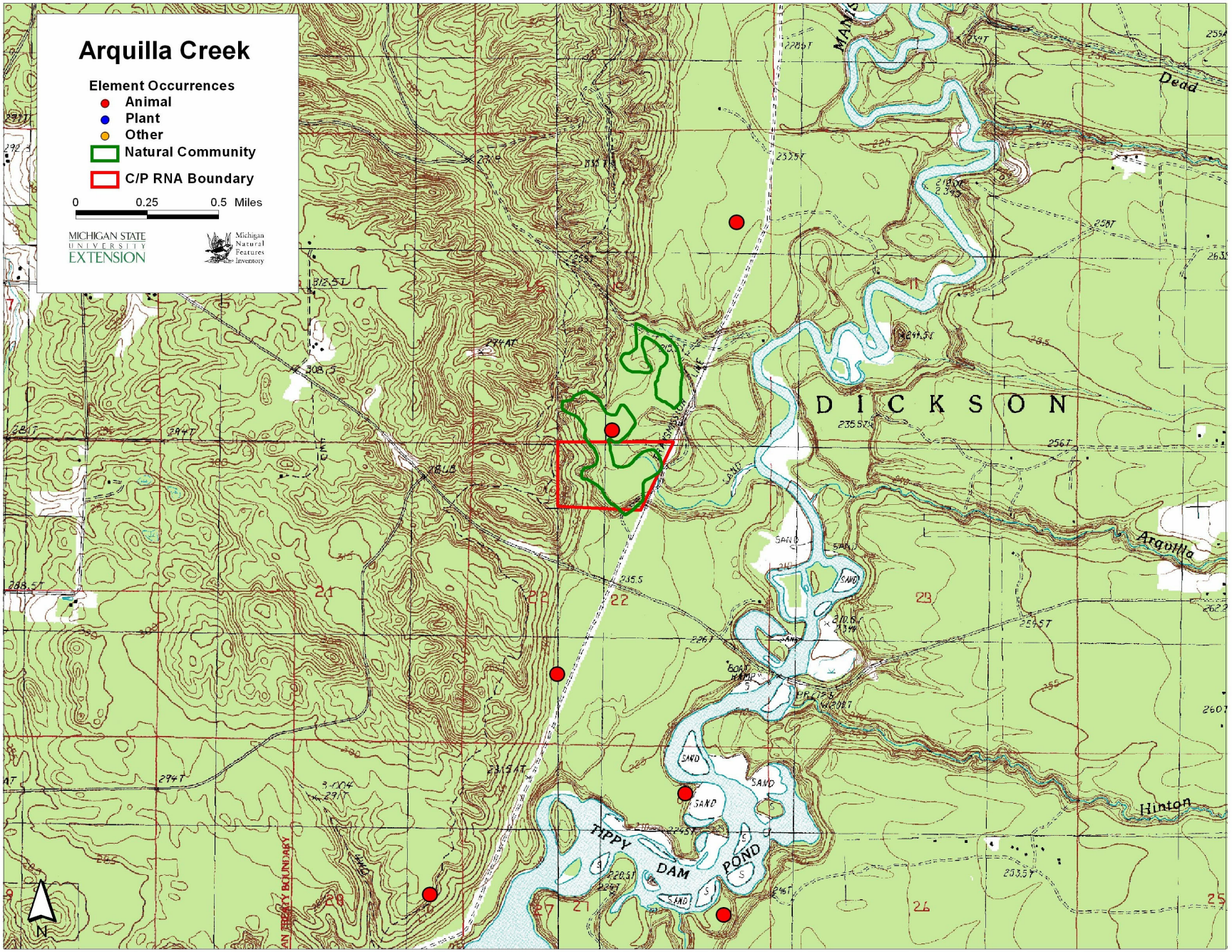
Arquilla Creek (continued)

Administrative and Management Concerns

The District staff recommend that area be included in Old Growth Plan.

Boundary Description

The boundary was modified at meeting with District Staff on 2-10-03. The current proposed boundary leaves out much of originally proposed pRNA and rich conifer swamp element occurrence. An alternative boundary to consider would utilize the utility right of way and road on the east, and the roads and trails that surround the site to the north, south, and west.


Arquilla Creek
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
DICKSON
Arquilla
Hinton
Dead
TIPPY DAM POND
SAND
BOAT RAMP
N

Bear Swamp (includes Yonker's Meadow)

Status
Candidate Research Natural Area

Size
2,136 acres 865 hectares

Subsection
Wellston Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN

LTA 5-2-1-1 Pitted outwash plain

LTA 1-2-1-1 Moraine ridges; many kettle lakes

LTA 5-1-4-9 Broad, flat outwash plain; very poorly drained peat or muck

LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Manistee

Alliance

Scientific Name	Common Name
Fraxinus nigra - Acer rubrum Saturated Forest Alliance (I.B.2.N.g)	Black Ash - Red Maple Saturated Forest Alliance
Spartina pectinata Temporarily Flooded Herbaceous Alliance (V.A.5.N.J.)	Prairie Cordgrass Temporarily Flooded Herbaceous Alliance
Thuja occidentalis Saturated Forest Alliance (I.A.8.N.g)	Northern White Cedar Saturated Forest Alliance

Association

Scientific Name	Common Name
Acer rubrum - Fraxinus spp. - Betula papyrifera / Cornus canadensis Forest	Red Maple - Ash Species - Paper Birch / Canadian Bunchberry Forest
Spartina pectinata - Carex spp. - Calamagrostis canadensis - Lythrum alatum - (Oxypolis rigidior) Herbaceous Vegetation	Prairie Cordgrass - Sedge Species - Bluejoint - Winged Loosestrife - (Common Water-dropwort) Herbaceous Vegetation
Thuja occidentalis - (Picea mariana, Abies balsamea) / Alnus incana Forest	Northern White Cedar - (Black Spruce, Balsam Fir) / Speckled Alder Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Southern swamp		AB			G3	S3
Intermittent wetland	Infertile Pond/marsh, Great Lakes Type	B	-	-	G3	S2
Rich conifer swamp	-	B	-	-	G4	S4
Buteo lineatus	Red-shouldered Hawk	-	-	T	G5	S3S4
Eleocharis engelmannii	Engelmann's Spike-rush	C	-	SC	G4?	S2S3

Bear Swamp (includes Yonker's Meadow) (continued)

Juncus vaseyi	Vasey's Rush	AB	-	T	G5?	S1S2
Rotala ramosior	Tooth-cup	C	-	SC	G5	S3

Ecological Description

The cRNA contains three natural communities rich conifer swamp, southern swamp, and intermittent wetlands. For more information see Draft Establishment Record for Bear Swamp (HMNF 1999), Albert et al. 1991, Albert 1986, and plant, animal, and community EORs.

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Hopper's Swamp	Southern swamp	B

Representation Comments

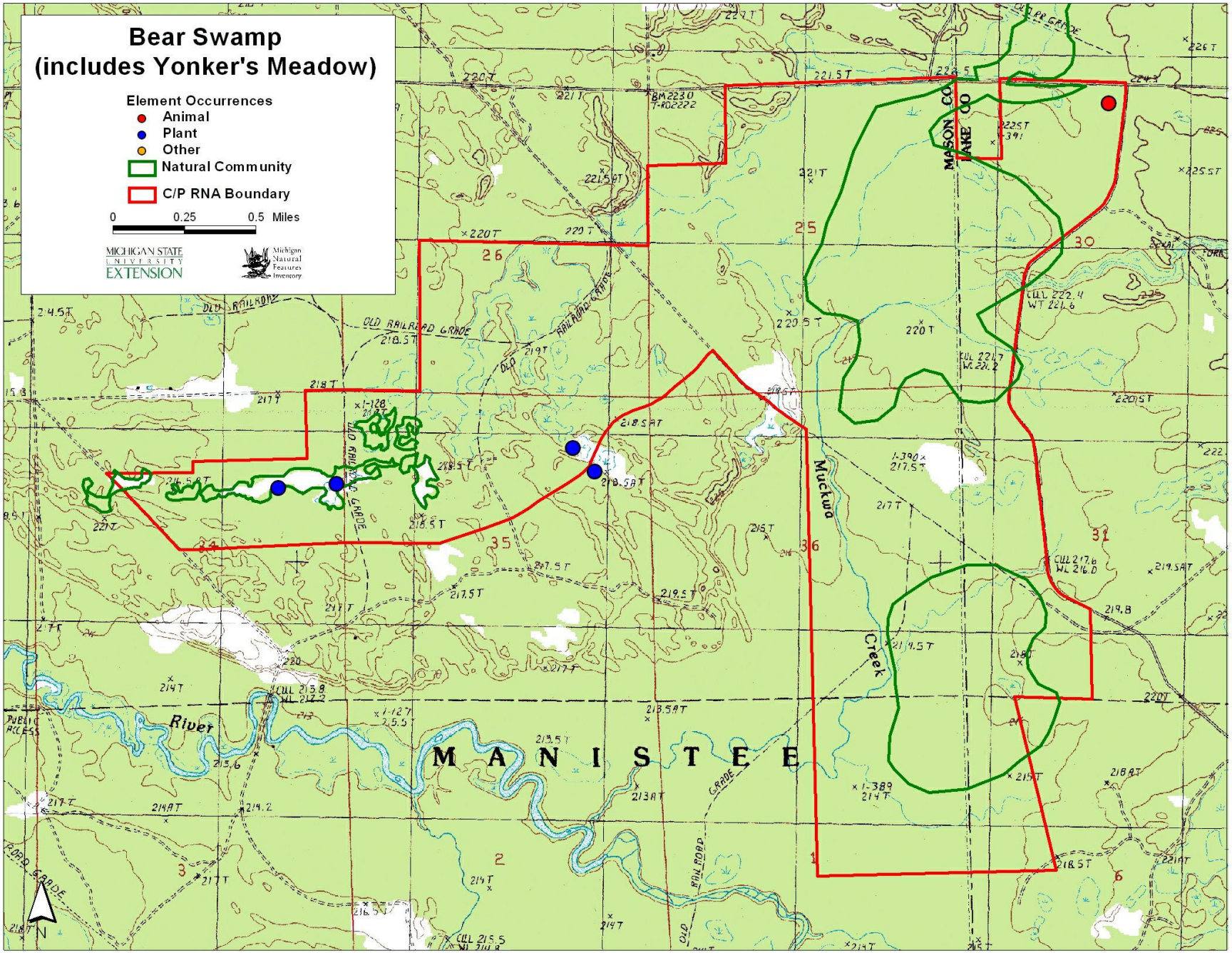
The Hopper's Swamp pRNA occurs in the same subsection and also contains a southern swamp that represents the same alliance. Representation of the alliances is best served at the Bear Swamp cRNA where it is well buffered and occurs in conjunction with several other high quality natural communities.

Administrative and Management Concerns

The rich conifer swamp serves as a deer yard. A snowmobile trail and access roads to private land cut through cRNA. Illegal ORV use occurs in intermittent wetlands on west end of cRNA. The area currently has 8.1 management designation. Concerns were raised by the District Wildlife Biologist over potential loss of aspen stands.

Boundary Description

The current boundary is consistent with establishment report, which modified the originally proposed boundary by Albert (1986).


Bear Swamp
(includes Yonker's Meadow)
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
MANISTEE
Muckwa Creek
River
OLD RAILROAD GRADE
MASON CO
LAKE CO
PUBLIC ACCESS
N

Big South

Status
Candidate Research Natural Area

Size
1,841 acres 745 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN

LTA 5-5-4-2 Narrow outwash channel

LTA 1-1-2-1 Moraine ridges; few kettle lakes

LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Acer saccharinum Temporarily Flooded Forest Alliance (I.B.2.N.d)	Silver Maple Temporarily Flooded Forest Alliance
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance
Pinus strobus - Quercus (alba, rubra) Wooded Herbaceous Alliance (V.A.6.N.f)	White Pine - Oak (White, Red) Wooded Herbaceous Alliance
Spartina pectinata Temporarily Flooded Herbaceous Alliance (V.A.5.N.J.)	Prairie Cordgrass Temporarily Flooded Herbaceous Alliance
Typha (angustifolia, latifolia) - (Schoenoplectus spp.) Semipermanently Flooded Herbaceous Alliance (V.A.5.N.I)	Cattail (Narrowleaf, Common) - (Bulrush) Semipermanently Flooded Herbaceous Alliance

Association

Scientific Name	Common Name
Acer saccharinum - Ulmus americana - (Populus deltoides) Forest	Silver Maple - American Elm - (Eastern Cottonwood) Forest
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland
Pinus strobus - Quercus alba - (Quercus velutina) / Andropogon gerardii Wooded Herbaceous Vegetation	Eastern White Pine - White Oak - (Black Oak) Big Bluestem Wooded Herbaceous Vegetation
Spartina pectinata - Carex spp. - Calamagrostis canadensis - Lythrum alatum - (Oxypolis rigidior) Herbaceous Vegetation	Prairie Cordgrass - Sedge Species - Bluejoint - Winged Loosestrife - (Common Water-dropwort) Herbaceous Vegetation
Typha spp. - Schoenoplectus acutus - Mixed Herbs Midwest Herbaceous Vegetation	Cattail Species - Hardstem Bulrush - Mixed Herbs Midwest Herbaceous Vegetation

Big South (continued)

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Bog	-	B	-	-	G3	S3
Intermittent wetland	Infertile Pond/marsh, Great Lakes Type	AB	-	-	G3	S2
Oak-pine barrens	-	C	-	-	G3	S2
Southern floodplain forest	-	BC	-	-	G3?	S3
Haliaeetus leucocephalus	Bald Eagle	-	PS:LT,PD	T	G4	S4
Cirsium hillii	Hill's Thistle	C	-	SC	G3	S3
Emergent marsh		C			G5	S4

Ecological Description

The Big South cRNA contains portions of several community element occurrences including bog, intermittent wetland, oak-pine barrens, southern floodplain forest, and emergent marsh. For more information see Albert et al 1991, and plant, animal, and community EORs.

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
40th Street	Oak-pine barrens	C
Alley Lake	Bog	B
Casin Lake	Oak-pine barrens	C
Pere Marquette Main and South Branch	Southern floodplain forest	B

Representation Comments

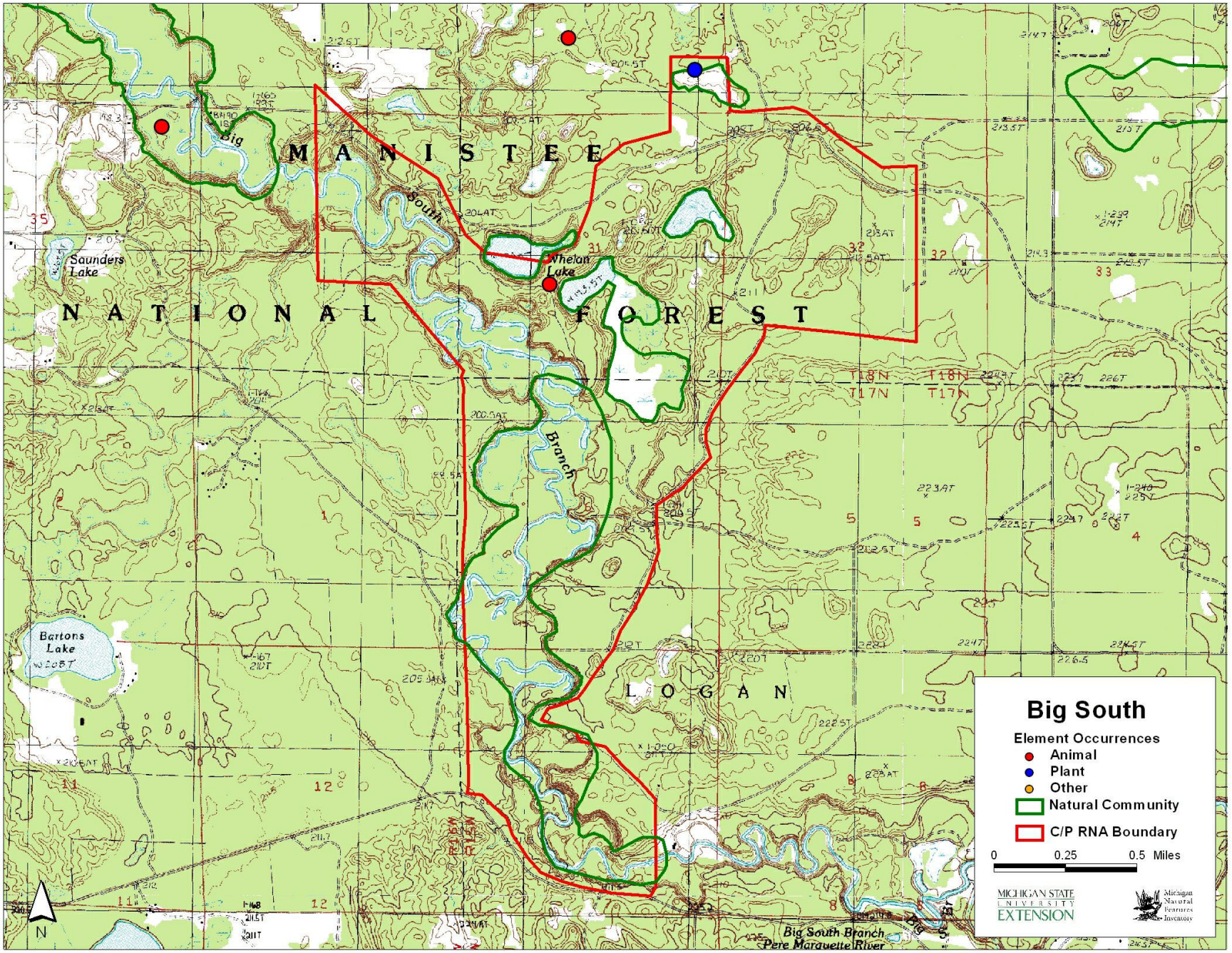
While the Big South cRNA contains portions of five community EOs, notable occurrences of several of these community types are found on public land elsewhere within the subsection. Bog occurs on USFS lands at Richmond Lake and Alley Lake. Similarly ranked but larger occurrences of oak-pine barrens are located on USFS land at Casin Lake, and on MDNR land at 40th Street. The community is also thought to occur within the Newaygo Prairies RNA. Southern floodplain forest occurs on USFS land and MDNR land at Pere Marquette Main and South Branch. Representation of most of these communities alliances and their associated alliances is best served at the Big South cRNA, where connectivity between high quality natural communities and suitable buffer areas can be incorporated into the RNA.

Administrative and Management Concerns

The area is widely used for recreation. It is designated as a non-motorized area but enforcement is currently not being implemented. The area is designated as a Semi-primitive Area and included in Old Growth Plan.

Boundary Description

The boundary was modified at a meeting with District staff on 2-21-03 to incorporate a suitable buffer along the Big South Branch of the Pere Marquette River and to include portions of the oak-pine barrens and emergent marsh community EOs.


MANISTEE
NATIONAL FOREST
LOGAN
Big South Branch
South Branch
Saunders Lake
Whelan Lake
Bartons Lake
Big South Branch Pere Marquette River
T18N
T17N
N
Big South
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory

Black River Complex

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
499 acres 202 hectares

Subsection
Harrisville Moraines

Land Type Association
SUB-SUBSECTION VII.6.3: CHEBOYGAN

LTA 6-1-4-9 Flat lake plain; very poorly drained peat or muck

LTA 6-3-4-1 Dune and swale or transverse dunes in embayment

Administrative District
Huron Shores

Alliance

Scientific Name	Common Name
Great Lakes Wooded Dune and Swale Complex (nonstandard type)	Great Lakes Wooded Dune and Swale Complex

Association

Scientific Name	Common Name
Great Lakes Wooded Dune and Swale Complex	Great Lakes Wooded Dune and Swale Complex

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Wooded dune and swale complex	-	BC	-	-	G3	S3

Ecological Description
The pRNA occurs along the Lake Huron shoreline and contains a wooded dune and swale complex EO. The wooded dune and swale complex consists of a series of low ridges (1 to 2 m in height) that are separated by wet swales. Second growth upland forests of paper birch, red maple, red ash and aspen dominate the ridges. The swales are dominated by a sparse canopy of alder and black ash, and support a diverse ground layer. Soils are medium textured sand and organic depths in swales average 25 cm. Large burned stumps of northern white cedar and white pine are common and indicate that post logging era fires impacted community in past. See Comer 1991, and community EOR for more information.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Black River Complex (continued)

Representation Comments

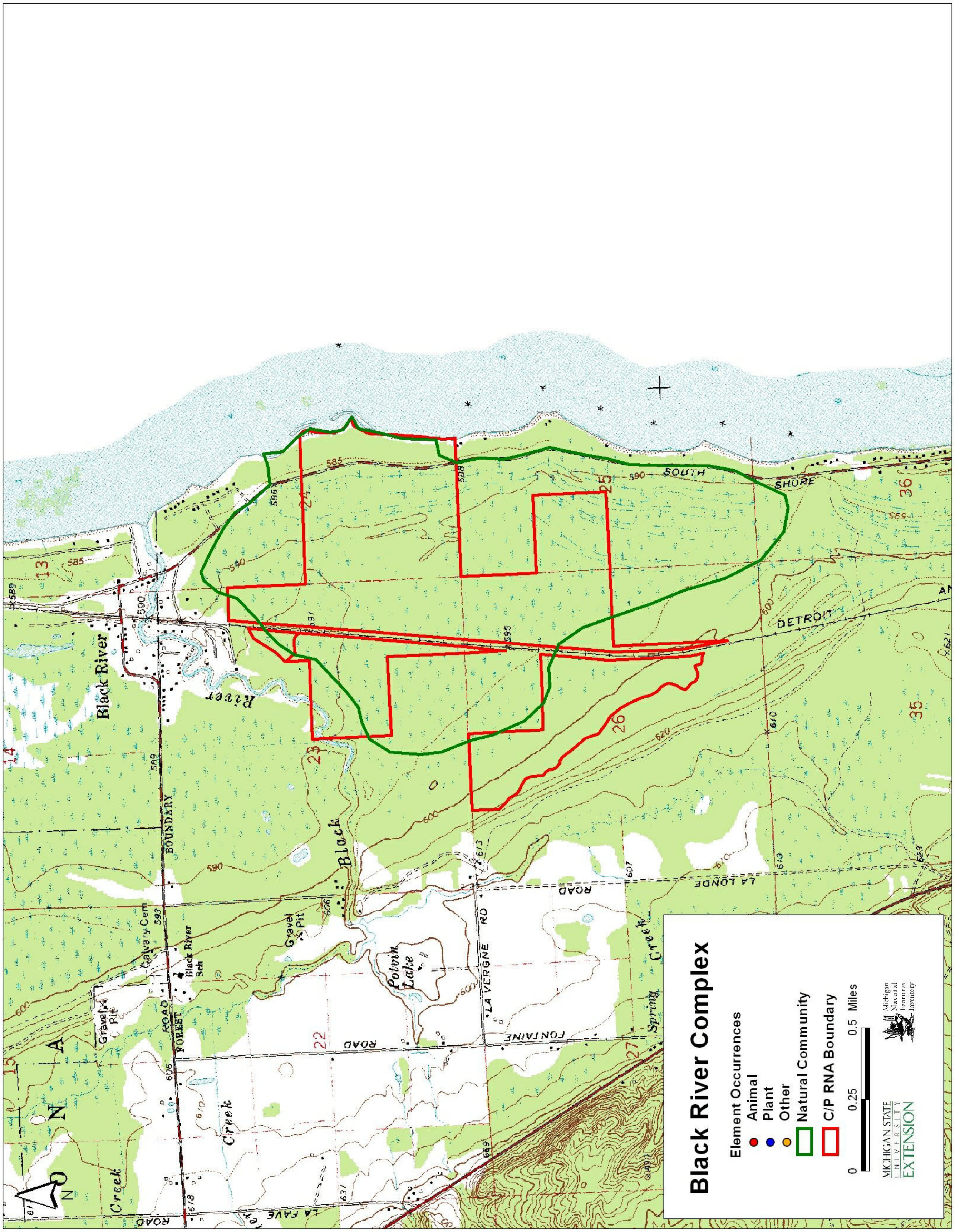
This is the only wooded dune and swale complex EO within the subsection and therefore the best location for representation of the community.

Administrative and Management Concerns

Forest Service does not own railroad right of way, which bisects western portion of pRNA. A large portion of the community EO has multiple private land owners. ORV trails and unauthorized roads occur within pRNA. Area has 8.1 designation. District has concerns about being able to adequately protect pRNA because it is disjunct from other USFS lands.

Boundary Description

The boundary was modified at a meeting with District staff on 2-12-03 to include all USFS land within the community EO and buffer land to the west, where feasible.


Black River Complex
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
Michigan Natural Features Inventory
MICHIGAN STATE UNIVERSITY EXTENSION
Black River
Potvin Lake
SOUTH SHORE
DETROIT
LA VERGNE RD
FONTAINE ROAD
LA LONDE ROAD
FOREST BOUNDARY ROAD
Calvary Cem
Gravel Pit
Spring Creek

Blockhouse

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
1,180 acres 478 hectares

Subsection
Vanderbilt Moraines

Land Type Association
SUB-SUBSECTION VII.2.2: GRAYLING OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Mio

Alliance

Scientific Name	Common Name
Pinus strobus Forest Alliance (I.A.8.N.b)	White Pine Forest Alliance
Thuja occidentalis Saturated Forest Alliance (I.A.8.N.g)	Northern White Cedar Saturated Forest Alliance

Association

Scientific Name	Common Name
Pinus strobus / Vaccinium spp. Forest	Eastern White Pine / Blueberry Species Forest
Thuja occidentalis - (Picea mariana, Abies balsamea) / Alnus incana Forest	Northern White Cedar - (Black Spruce, Balsam Fir) / Speckled Alder Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Mesic northern forest		C			G4	S4
Rich conifer swamp	-	B	-	-	G4	S4

Ecological Description
The Blockhouse pRNA contains a rich conifer swamp EO and a small, low ranking (C-ranked) mesic northern forest EO. The rich conifer swamp is dominated by second growth northern white cedar with occasional big-toothed aspen, paper birch, red maple, and black ash also occurring within the canopy. Balsam fir is common in the understory, occasionally forming thickets. Ground layer diversity is high. Occasional stumps of white pine occur throughout the EO. Water depths vary, with several higher elevation, drier spots also occurring within the swamp. The mesic northern forest EO is small (32 acres) but contains old growth white pine and occasional red pine. Red oak, red maple, paper birch, and balsam fir occur within the understory. The mesic northern forest EO grades into swamp to the west and occurs on low, hummocky topography. The pRNA represents several different community types and alliances and harbors a riparian corridor. See community EORs for more information.

RNA-equivalents
Pigeon River Pines - State Natural Area

Blockhouse (continued)

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Pigeon River Pines	Dry-mesic northern forest	B
Green Swamp	Rich conifer swamp	B

Representation Comments

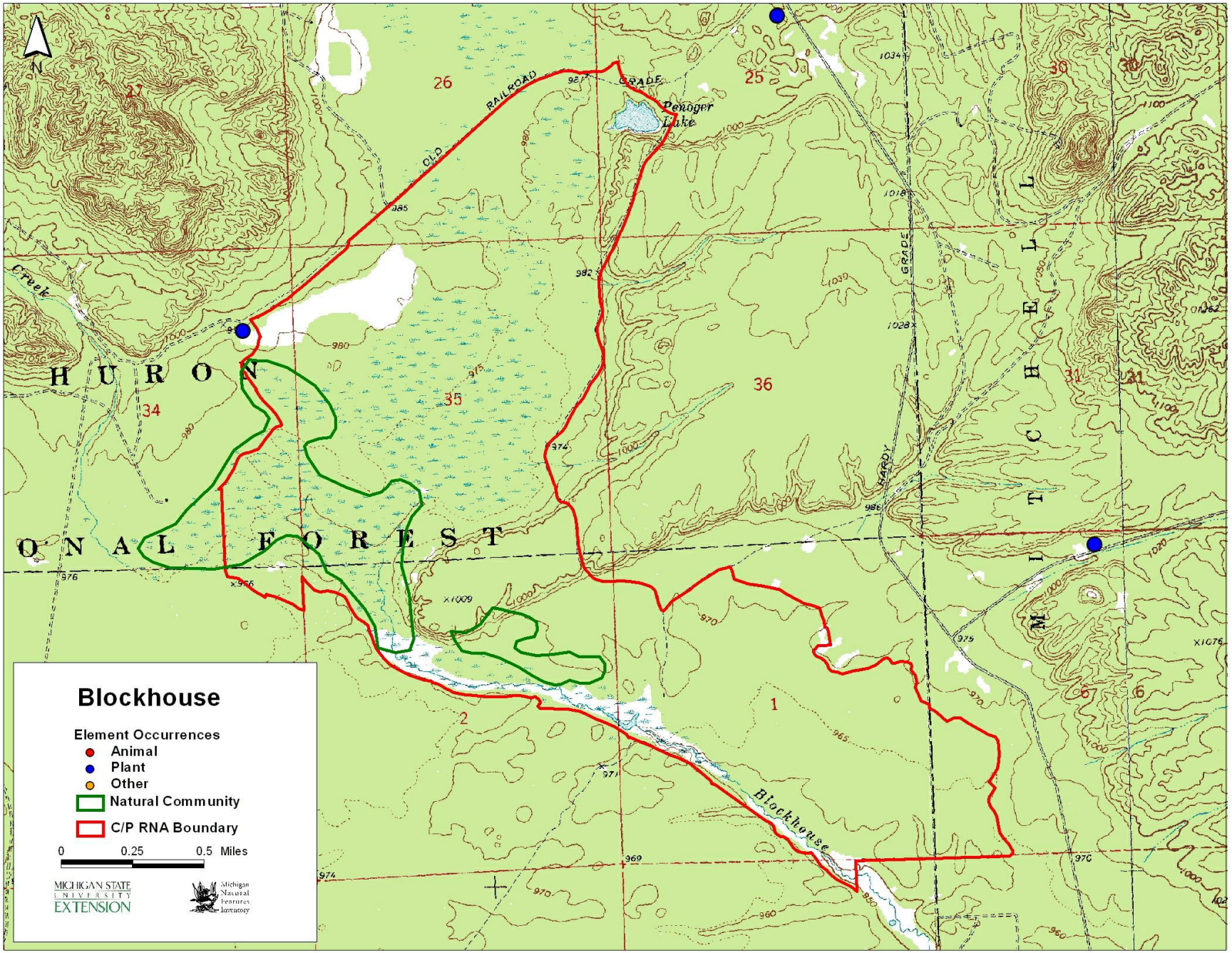
The pRNA contains several different natural communities and alliances. A large EO of rich conifer swamp occurs on State land within the subsection at Green Swamp, but does not have special protection status. Therefore, at this time, Blockhouse is the best location for representation of the community and its corresponding alliance within the subsection. The small inclusion (32 acres) of mesic northern forest increases the diversity and habitat heterogeneity of the C/P RNA. However, the community and its corresponding alliance (White Pine Forest Alliance) are also represented at the Pigeon River Pines State Natural Area, which can serve an RNA-equivalent for this portion of the RNA. Because the White Pine Forest Alliance represents less than 3% of the Blockhouse pRNA, the Pigeon River Pine State Natural Area should not serve as an RNA-equivalent for the entire Blockhouse pRNA.

Administrative and Management Concerns

The pRNA shown here is bounded by USFS roads, but includes several spur roads that enter the area and end at the wetland. If spur roads to the interior are closed, access to the interior will likely be raised as a concern by hunters, especially by black bear hunters. The area is surrounded by areas managed for the Kirtland's warbler. The current pRNA boundary presents an opportunity to designate a large roadless area.

Boundary Description

Using existing roads and railroad lines wherever possible, the boundaries were modified at a meeting with District and MNFI staff on 2-10-03 to include a large portion of the rich conifer swamp EO and all of the mesic northern forest EO, as well as significant buffer areas. The District has since modified these boundaries, resulting in the removal of portions of the mesic northern forest EO and upland buffer. The modified boundary is not included in this report.


Blockhouse
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
HURON
NATIONAL FOREST
MITCHELL
Penoger Lake
RAILROAD GRADE
Blockhouse
Creek

Brandy Creek Wetlands

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
1,304 acres 528 hectares

Subsection
Cadillac End Moraines

Land Type Association
SUB-SUBSECTION VII.2.1: CADILLAC
LTA 5-2-1-1 Pitted outwash plain
LTA 5-1-4-9 Broad, flat outwash plain; very poorly drained peat or muck

Administrative District
Manistee

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance
Larix laricina Saturated Forest Alliance (I.B.2.N.g)	Tamarack Saturated Forest Alliance
Thuja occidentalis - Acer rubrum Saturated Forest Alliance (I.C.3.N.d)	Northern White Cedar - Red Maple Saturated Forest Alliance
Thuja occidentalis Saturated Forest Alliance (I.A.8.N.g)	Northern White Cedar Saturated Forest Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland
Larix laricina / Alnus incana Forest	Tamarack / Speckled Alder Forest
Picea mariana / Chamaedaphne calyculata / Sphagnum spp. Dwarf-shrubland	Black Spruce / Leatherleaf / Peatmoss Species Dwarf-shrubland
Thuja occidentalis - (Picea mariana, Abies balsamea) / Alnus incana Forest	Northern White Cedar - (Black Spruce, Balsam Fir) / Speckled Alder Forest
Thuja occidentalis - Fraxinus nigra Forest	Northern White Cedar - Black Ash Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Bog	-	B	-	-	G3	S3
Hardwood-conifer swamp	-	BC	-	-	G4	S3
Landscape complex	-	B	-	-	GU	SU
Muskeg	Scrub Bog, Upper Midwest Type	AB	-	-	G4	S4

Brandy Creek Wetlands (continued)

Poor conifer swamp	-	AB	-	-	G4	S4
Rich conifer swamp	-	B	-	-	G4	S4
Haliaeetus leucocephalus	Bald Eagle	-	PS:LT,PD	T	G4	S4
Pandion haliaetus	Osprey	-	-	T	G5	S4

Ecological Description

The pRNA is located on poorly drained glacial outwash sands and includes a diverse array of wetland communities, five of which are consider high quality natural communities. For more information see the Establishment Record (Comer 1995a), Albert et al. 1991, and community EORs.

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank

none

Representation Comments

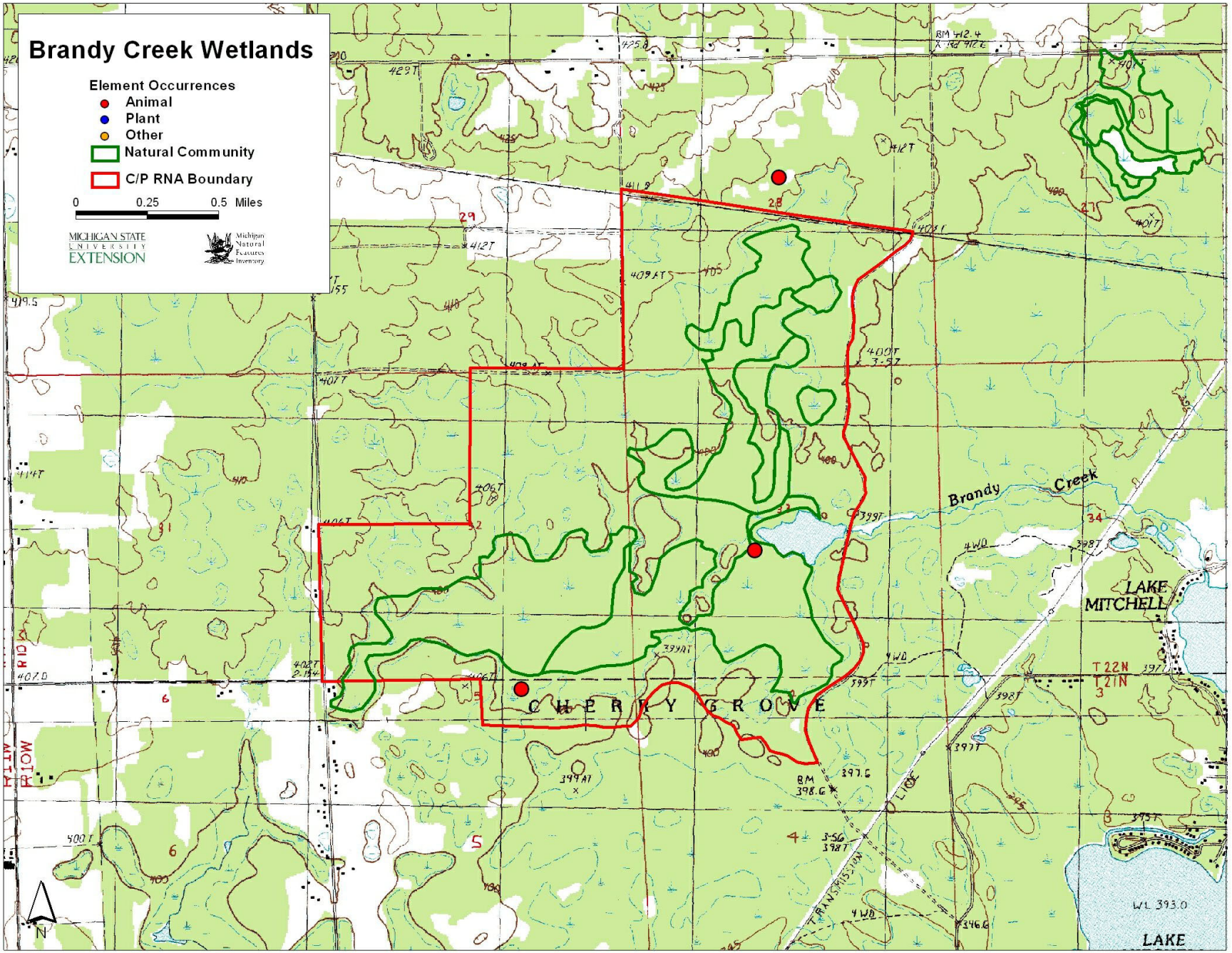
The pRNA includes 5 different alliances. No high quality EOs of these alliances are known to occur elsewhere on public lands within subsection. Thus, Brandy Creek represents the best location to conserve and protect these alliances within the subsection.

Administrative and Management Concerns

The area serves as a winter deer yard and black bear are abundant here. Area is designated as an 8.1 Management Area. Wildlife biologist expressed desire to manage aspen for deer. Much of areas is included in Old Growth Plan. Wildlife biologist would like to maintain water control structures on east side of pRNA.

Boundary Description

The northwest and southeast boundaries were adjusted at a meeting of District and MNFI staff on 2-11-03 to reflect concerns over continued flexibility to actively manage for early and mid-successional habitats for wildlife species.


Brandy Creek Wetlands
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Brandy Creek
CHERRY GROVE
LAKE MITCHELL
T22N
T21N
WL 393.0
LAKE
N

Casin Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
42 acres 17 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance
Potamogeton spp. - Ceratophyllum spp. Elodea spp. Permanently Flooded Herbaceous Alliance (V.C.2.N.a)	Pondweed spp. - Hornwort spp. - Waterweed spp. Permanently Flooded Herbaceous Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland
Potamogeton spp. - Ceratophyllum spp. Midwest Herbaceous Vegetation	Pondweed Species - Coontail Species Midwest Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Bog	-	B?	-	-	G3	S3
Submergent marsh	-	B?	-	-	GU	S4?

Ecological Description
The pRNA contains a narrow lake basin that supports EOs of submergent marsh and bog. In addition, several other wetland types occur along the margin of lake including small areas of emergent marsh, northern wet meadow, and poor conifer swamp. For more information see Albert et al. 1991, and community EORs.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Alley Lake	Bog	B

Casin Lake (continued)

Richmond Lake	Bog	AB
Whelan Lake	Bog	B

Representation Comments

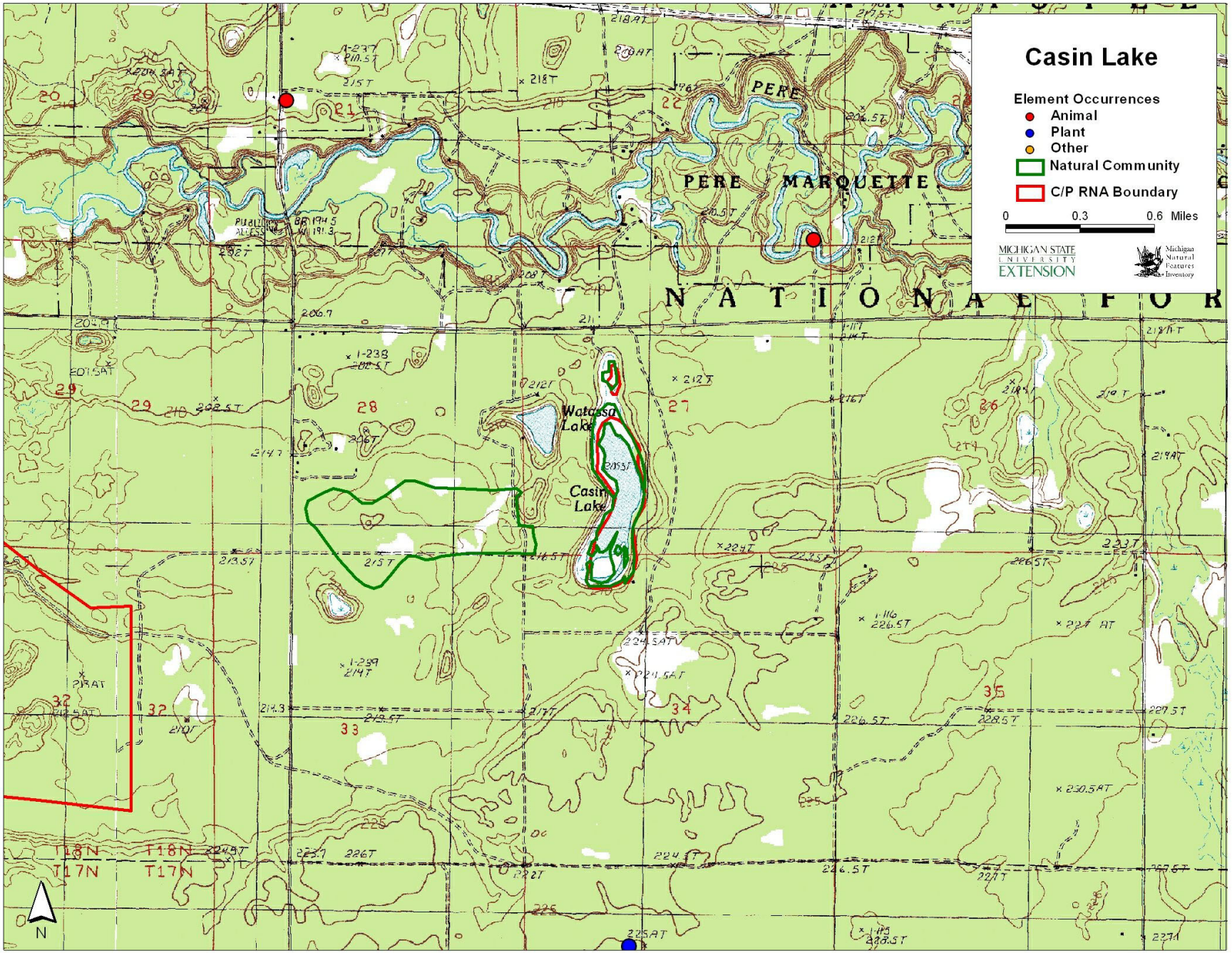
Several other larger bog EOs occur within the subsection. The alliance is best represented at Whelan Lake within the Big South cRNA. No other submergent marsh EOs are known from the subsection but this community type has not been well inventoried.

Administrative and Management Concerns

The pRNA occurs entirely on private land.

Boundary Description

The boundary was not modified because pRNA occurs entirely on private land.


Casin Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.3 0.6 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
PERE MARQUETTE
Watussa Lake
Casin Lake
T18N T17N
T18N T17N
N

Fry Lake

Status
Candidate Research Natural Area

Size
103 acres 42 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Rhynchospora spp. - Panicum (rigidulum, verrucosum) - Rhexia virginica Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance

Association

Scientific Name	Common Name
Rhynchospora capitellata - Rhexia virginica - Rhynchospora scirpoides - Schoenoplectus hallii Herbaceous Vegetation	Northern Beaksedge - Virginal Meadow-beauty - Longbeak Beaksedge - Hall's Bulrush Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
none	-	-	-	-	-	-

Ecological Description
The cRNA contains a coastal plain marsh that occurs on peaty sands along the shores of a shallow lake with fluctuating water levels.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Little Robinson Lake Opportunity Area East	Coastal plain marsh	BC
Little Robinson Lake Opportunity Area Northwest	Coastal plain marsh	
Little Robinson Lake Opportunity Area West	Coastal plain marsh	B
Loon Lake	Coastal plain marsh	BC

Fry Lake (continued)

Representation Comments

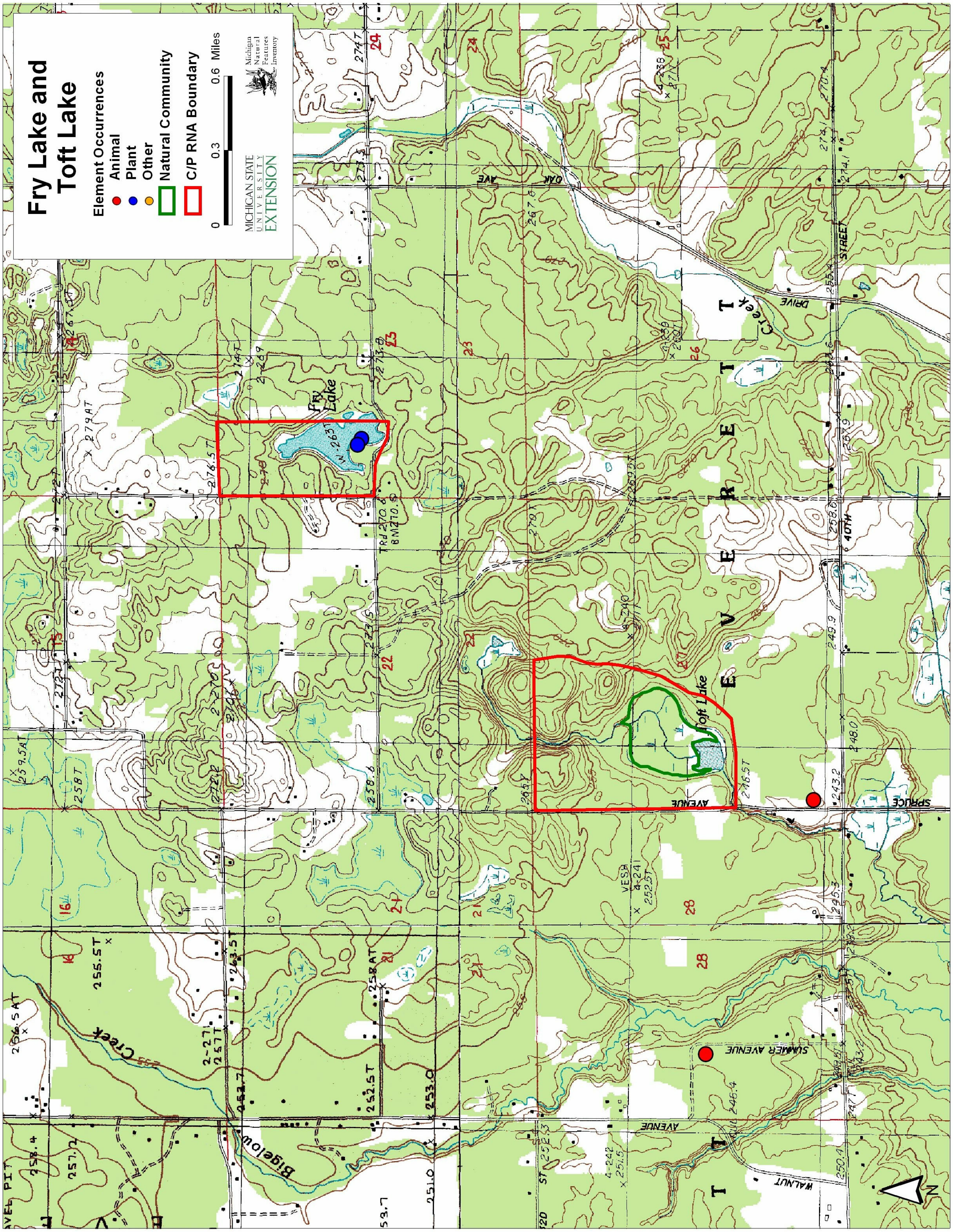
Several larger coastal plain marshes that support greater numbers of rare species are known from the subsection including Loon Lake and Little Robinson Lake Opportunity Area East and West. The alliance is best represented at these other locations.

Administrative and Management Concerns

The cRNA is entirely bordered by private land except for a part of north side.

Boundary Description

The cRNA boundary was modified to include only USFS land in section 23.


Fry Lake and Toft Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0
0.3
0.6 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Fry Lake
Toft Lake
Bigelow Creek
Creek
SPRUCE AVENUE
SUMMER AVENUE
WALNUT
OAK AVE
40TH STREET
DRIVE
EVERETT

Honawan Lake Forest

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
406 acres 164 hectares

Subsection
Vanderbilt Moraines

Land Type Association
SUB-SUBSECTION VII.2.3: VANDERBILT MORAINES
LTA 1-1-1-1 Moraine ridges; few kettle lakes

Administrative District
Huron Shores

Alliance

Scientific Name	Common Name
Pinus strobus - Quercus (alba, rubra, velutina) Forest Alliance (I.C.3.N.a)	White Pine - Oak (White, Red, Black) Forest Alliance

Association

Scientific Name	Common Name
Pinus strobus - (Pinus resinosa) - Quercus rubra Forest	Eastern White Pine - (Red Pine) - Northern Red Oak Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Dry-mesic northern forest	-	B	-	-	G4	S4
Emys blandingii	Blanding's Turtle	-	-	SC	G4	S3

Ecological Description
The pRNA contains Honawan Lake and a dry-mesic northern forest EO that occurs on a medium-textured end moraine with sandy loam soils. The terrain is hilly with scattered large red pine occurring on the hills and small wetlands and lakes occupying the depressions. Mature red pine have formed a super canopy above smaller white oak, black oak, sugar maple, red maple, and young red pine. White pine was removed from the site during the logging era. Hazelnut, maple-leaved arrow-wood, and round-leaved dogwood occur within the understory. Common ground layer species include Canada blueberry, Pennsylvania sedge, Canada mayflower, and wild sarsaparilla. See Comer 1991, and community and animal EORs for more information.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Hayes Tower RNA	Dry-mesic northern forest	B

Honawan Lake Forest (continued)

Representation Comments

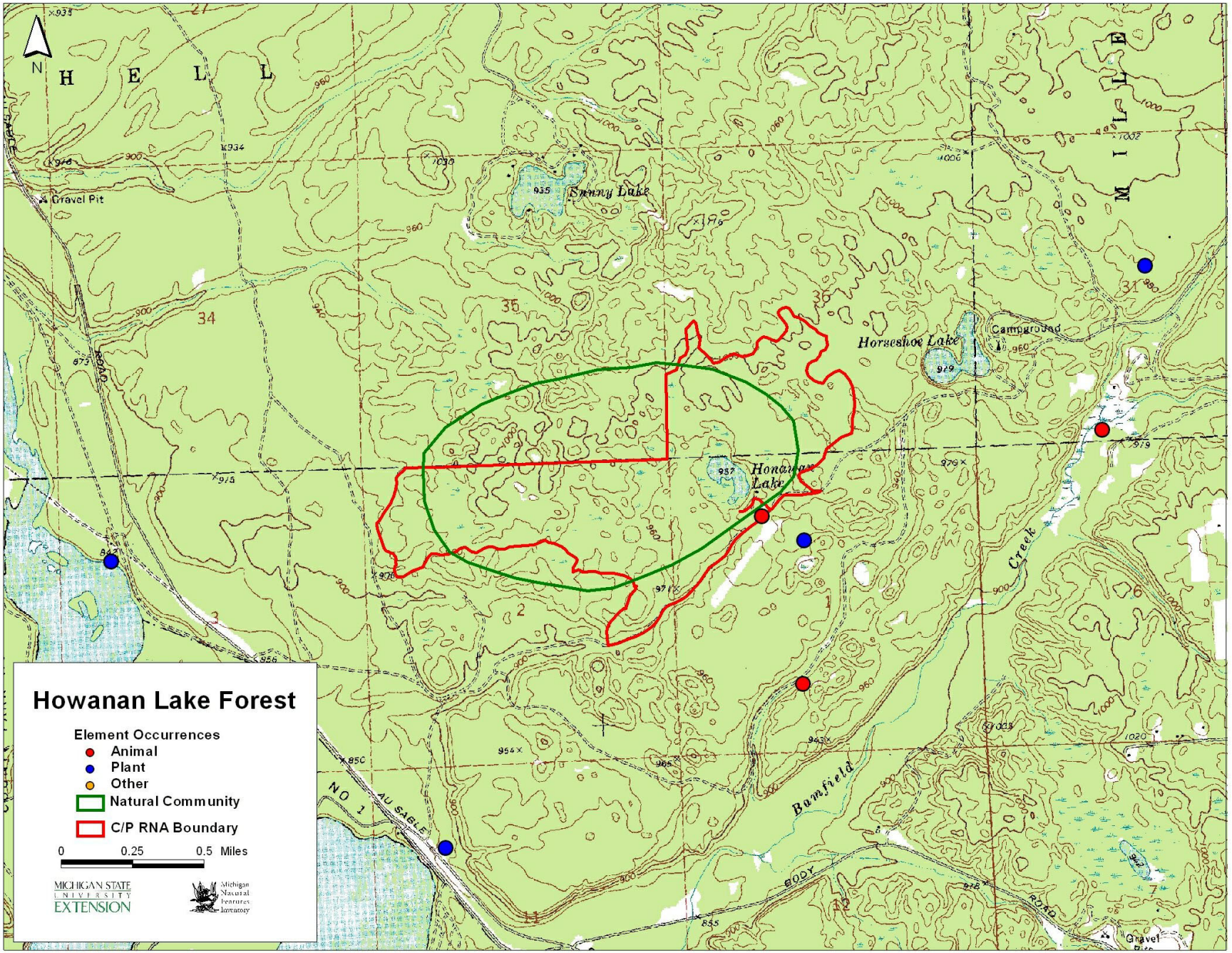
The Hayes Tower RNA also contains a dry-mesic northern forest EO that represents the same alliance as is found at the Honawan Lake Forest pRNA. The two occurrences differ in several respects and were originally crosswalked to different associations. However, because the USNVC is hierarchical, they represent the same alliance. The Hayes Tower RNA is much drier than the Honawan Lake Forest pRNA, which contains numerous depressions that support small lakes and wetlands. Although the two occurrences differ in several respects, the alliance is well represented at the Hayes Tower RNA.

Administrative and Management Concerns

The area has been used as a place for the Rainbow Gathering in the past. An old abandoned homestead occurs on the south side of Honawan Lake. Road closure to lake has been repeatedly violated. The road along south side of Honawan Lake will be closed in the future. Management in future may involve prescribed fire to maintain oak and pine. Privately owned multiple ownerships occur to the north, otherwise pRNA is surrounded by USFS land.

Boundary Description

The pRNA boundary was modified using stand boundaries at a meeting with District and MNFI staff on 2-12-03.


Howanan Lake Forest
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
N
H E L L
MILE
Gravel Pit
Sunny Lake
Horseshoe Lake
Campground
Howanan Lake
Creek
Bamfield
AU SABLE
NO 1
ROAD
Gravel

Hopper's Swamp

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
580 acres 235 hectares

Subsection
Wellston Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-1-4-9 Broad, flat outwash plain; very poorly drained peat or muck

Administrative District
Manistee

Alliance

Scientific Name	Common Name
Fraxinus nigra - Acer rubrum Saturated Forest Alliance (I.B.2.N.g)	Black Ash - Red Maple Saturated Forest Alliance

Association

Scientific Name	Common Name
Acer rubrum - Fraxinus spp. - Betula papyrifera / Cornus canadensis Forest	Red Maple - Ash Species - Paper Birch / Canadian Bunchberry Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Southern swamp	-	B	-	-	G3	S3
Buteo lineatus	Red-shouldered Hawk	-	-	T	G5	S3S4
Great blue heron rookery	Great Blue Heron Rookery	-	-	-	GNR	SU

Ecological Description
The pRNA supports an old second-growth hardwood swamp dominated by silver maple and black ash that occurs on organic soil. The site lacks cedar, tamarack, and elms, which were originally noted by General Land Office surveyors in thThe pRNA supports an old second-growth hardwood swamp dominated by silver maple and black ash that occurs on organic soil. The site lacks cedar, tamarack, and elms, which were originally noted by General Land Office surveyors in the 1800s. For more information see Albert et al. 1991, and community and animal EORs. e 1800s. For more information see Albert et al. 1991, and community and animal EORs.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Bear Swamp	Southern swamp	AB

Hopper's Swamp (continued)

Representation Comments

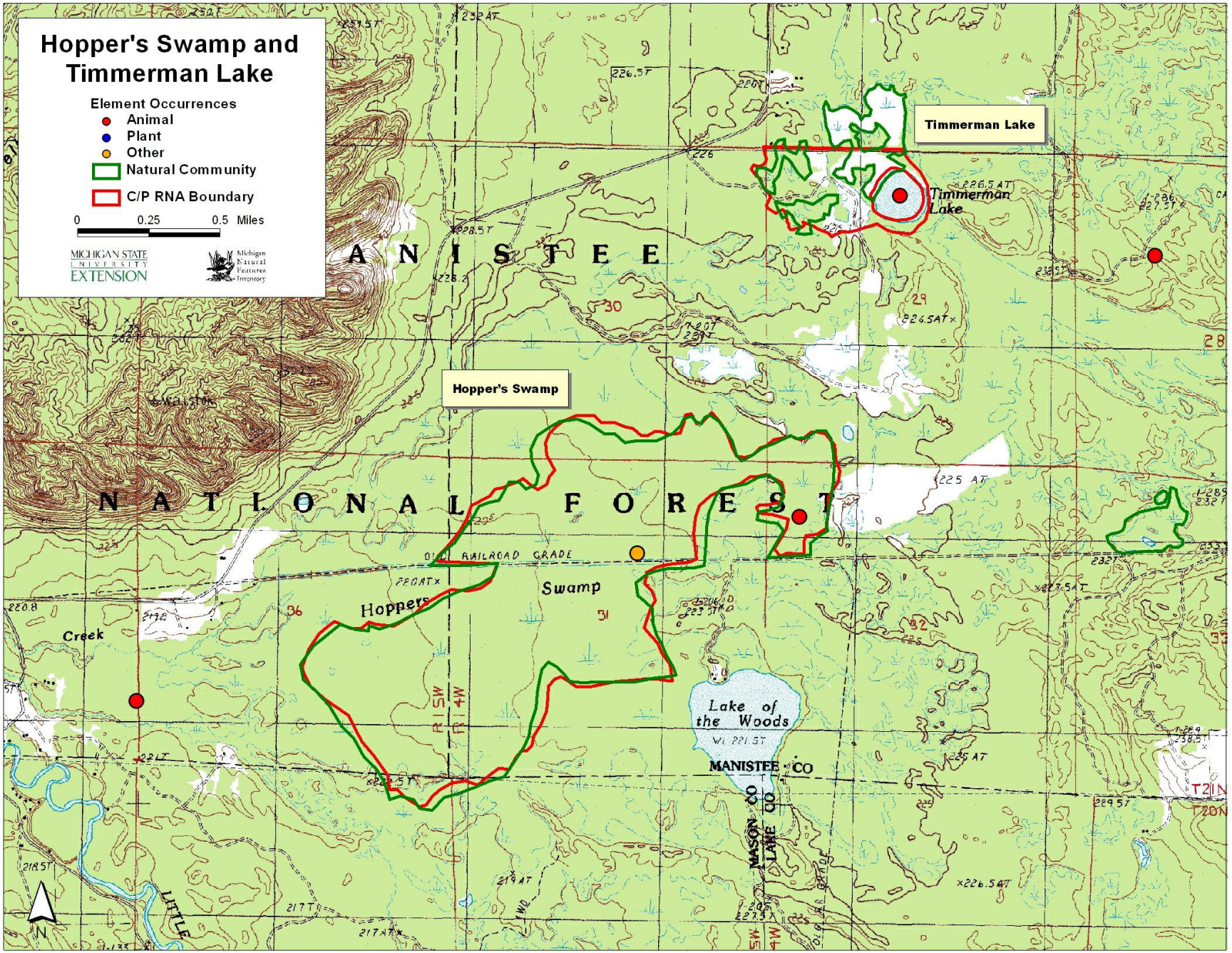
The Hopper's Swamp pRNA represents the same alliance as a portion of the Bear Swamp cRNA. Both pRNAs support large areas of southern swamp. However, the alliance is best represented at Bear Swamp, where it occurs in conjunction with several other community EOs, which will also be protected and available for long-term study through RNA establishment.

Administrative and Management Concerns

ORV use occurs on old railroad grade that bisects the site. Entire pRNA is included in Old Growth Management Plan.

Boundary Description

pRNA boundary closely matches natural community boundary


Hopper's Swamp and Timmerman Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Timmerman Lake
Hopper's Swamp
ANISTEE
NATIONAL FOREST
Timmerman Lake
Hoppers Swamp
Creek
Lake of the Woods
MANISTEE CO
MASON CO
OLD RAILROAD GRADE
LITTLE
R15W
R14W
T21N
T20N

Hunter's Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
30 acres 12 hectares

Subsection
Mio Outwash Plains

Land Type Association
SUB-SUBSECTION VII.2.2: GRAYLING OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Mio

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata - (Kalmia angustifolia) Seasonally Flooded Dwarf-Shrubland Alliance (IV.A.1.N.f)	Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge / Peatmoss Species Dwarf-shrubland

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Intermittent wetland	Infertile Pond/marsh, Great Lakes Type	B	-	-	G3	S2

Ecological Description
The pRNA occurs on a sandy outwash plain and contains a shallow lake basin that supports an intermittent wetland with fluctuating water levels. Jack pine dominates the sandy uplands surrounding the basin. See community EOR for more information.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Hunter's Lake (continued)

Representation Comments

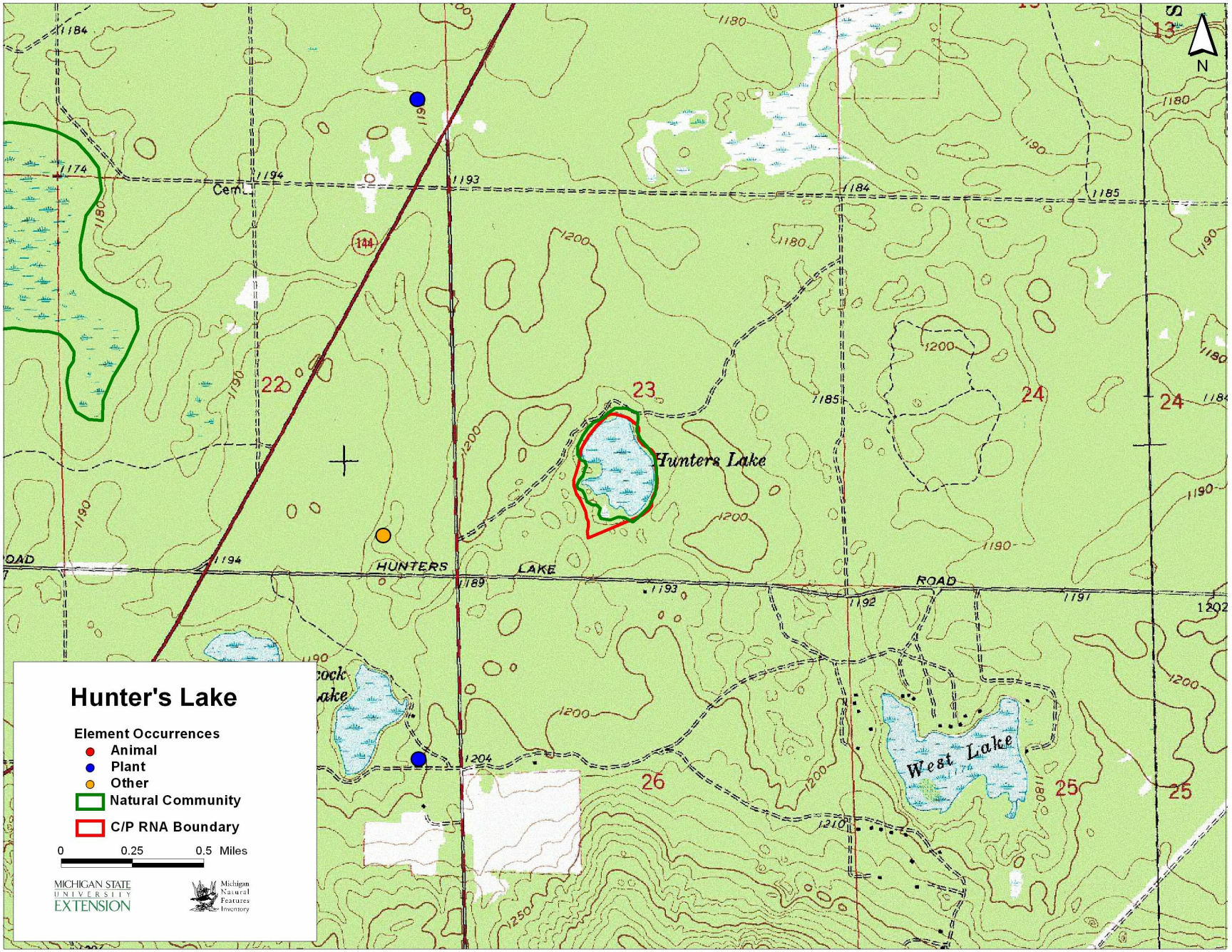
This is among the few large, un-manipulated intermittent wetlands within the Mio District and the only B-ranked or higher EO of this type within the subsection. Therefore, this site is the best known location to represent this alliance within the subsection.

Administrative and Management Concerns

pRNA occurs within a Kirtland's warbler management area.

Boundary Description

The boundary was slightly modified by District staff to include a thin upland buffer around the wetland.


Hunter's Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Hunters Lake
West Lake
HUNTERS LAKE ROAD
Cem.
144
22
23
24
25
26
N

Indian Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
2,093 acres 847 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
- **LTA** 5-2-1-1 Pitted outwash plain
- **LTA** 1-2-1-1 Moraine ridges; many kettle lakes
- **LTA** 1-1-1-1 Moraine ridges; few kettle lakes

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Schizachyrium scoparium - (Sporobolus cryptandrus) Herbaceous Alliance (V.A.5.N.c)	Little Bluestem - (Sand Dropseed) Herbaceous Alliance

Association

Scientific Name	Common Name
Schizachyrium scoparium - Danthonia spicata - Carex pensylvanica - (Viola pedata) Herbaceous Vegetation	Little Bluestem - Poverty Oatgrass - Pennsylvania Sedge - (Birdfoot Violet) Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Dry sand prairie	Dry Sand Prairie, Midwest Type	A	-	-	G3	S2
Lycaeides melissa samuelis	Karner Blue	F	LE	T	G5T2	S2
Lycaeides melissa samuelis	Karner Blue	F	LE	T	G5T2	S2
Lycaeides melissa samuelis	Karner Blue	F	LE	T	G5T2	S2
Cirsium hillii	Hill's Thistle	D	-	SC	G3	S3
Cirsium hillii	Hill's Thistle	C	-	SC	G3	S3
Cirsium hillii	Hill's Thistle	C	-	SC	G3	S3
Cirsium hillii	Hill's Thistle	BC	-	SC	G3	S3
Cirsium hillii	Hill's Thistle	CD	-	SC	G3	S3
Geum triflorum	Prairie-smoke	B	-	T	G5	S2S3

Ecological Description
The pRNA consists of a series of shallow depressions that support dry sand prairie on pitted outwash. For more information see Albert et al. 1991, Comer 1995b, and plant, animal, and community EORs.

Indian Lake (continued)

RNA-equivalents
Ore-Ida Prairie - TNC Preserve

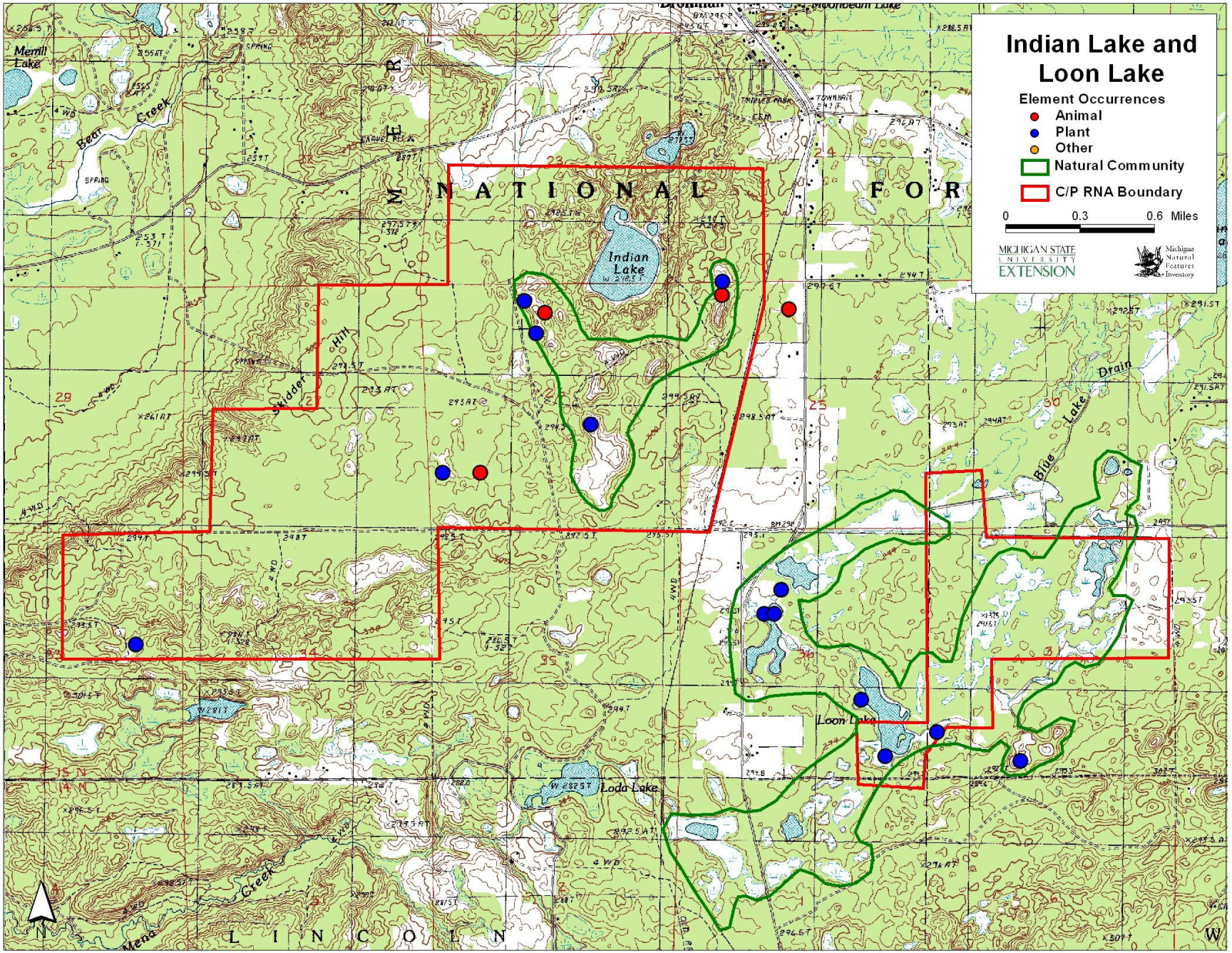
Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Finger Prairie - RNA	Dry sand prairie	A
Newaygo Prairie - RNA	Dry sand prairie	C
Ore-Ida Prairie - RNA-equivalent	Dry sand prairie	B
Section 27 Bowl Prairie	Dry sand prairie	A
Tussing Prairie	Dry sand prairie	B

Representation Comments
The alliance represented by dry sand prairie is known from several other sites within the subsection including the Newaygo Prairies RNA and Ore-Ida Prairie, which is owned by The Nature Conservancy.

Administrative and Management Concerns
Area is presently managed as Karner blue habitat. Trails within boundary of pRNA are used by ORVs.

Boundary Description
The pRNA boundary was not modified


Indian Lake and Loon Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.3 0.6 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Indian Lake
Loon Lake
Loda Lake
Merrill Lake
Bear Creek
Blue Lake Drain
LINCOLN

Knapp Prairie

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
26 acres 11 hectares

Subsection
Hart Outwash and Lake Sands

Land Type Association
SUB-SUBSECTION VII.4: MANISTEE
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Manistee

Alliance

Scientific Name	Common Name
Andropogon gerardii - (Sorghastrum nutans) Herbaceous Alliance (V.A.5.N.a)	Big Bluestem (Indian Grass) Herbaceous Alliance
Calamagrostis canadensis Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Canada Bluejoint Seasonally Flooded Herbaceous Alliance
Pinus strobus - Quercus (alba, rubra) Wooded Herbaceous Alliance (V.A.6.N.f)	White Pine - Oak (White, Red) Wooded Herbaceous Alliance
Schizachyrium scoparium - (Sporobolus cryptandrus) Herbaceous Alliance (V.A.5.N.c)	Little Bluestem - (Sand Dropseed) Herbaceous Alliance

Association

Scientific Name	Common Name
Andropogon gerardii - Sorghastrum nutans - Schizachyrium scoparium - Aletris farinosa Herbaceous Vegetation	Big Bluestem - Yellow Indian grass - Little Bluestem - Northern White Colicroot Herbaceous Vegetation
Calamagrostis canadensis - Phalaris arundinacea Herbaceous Vegetation	Bluejoint - Reed Canary Grass Herbaceous Vegetation
Pinus strobus - Quercus alba - (Quercus velutina) / Andropogon gerardii Wooded Herbaceous Vegetation	Eastern White Pine - White Oak - (Black Oak) Big Bluestem Wooded Herbaceous Vegetation
Schizachyrium scoparium - Danthonia spicata - Carex pensylvanica - (Viola pedata) Herbaceous Vegetation	Little Bluestem - Poverty Oatgrass - Pennsylvania Sedge - (Birdfoot Violet) Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Dry sand prairie	Dry Sand Prairie, Midwest Type	C	-	-	G3	S2
Mesic sand prairie	Moist Sand Prairie, Midwest Type	B	-	-	G1?	S1

Knapp Prairie (continued)

Northern wet meadow	Wet Meadow, Upper Midwest Type	C	-	-	G4	S4
Oak-pine barrens	-	C	-	-	G3	S2
Lycaeides melissa samuelis	Karner Blue	C	LE	T	G5T2	S2

Ecological Description

The pRNA contains several small, narrow lakes that are ringed by natural comminutes, which include northern wet meadow, mesic sand prairie, dry sand prairie, and oak-pine barrens. For more information see Albert et al. 1991, Comer 1995b, and animal and community EORs.

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Sischo Prairies	Dry sand prairie	B
Skeel Creek Prairie	Dry sand prairie	B

Representation Comments

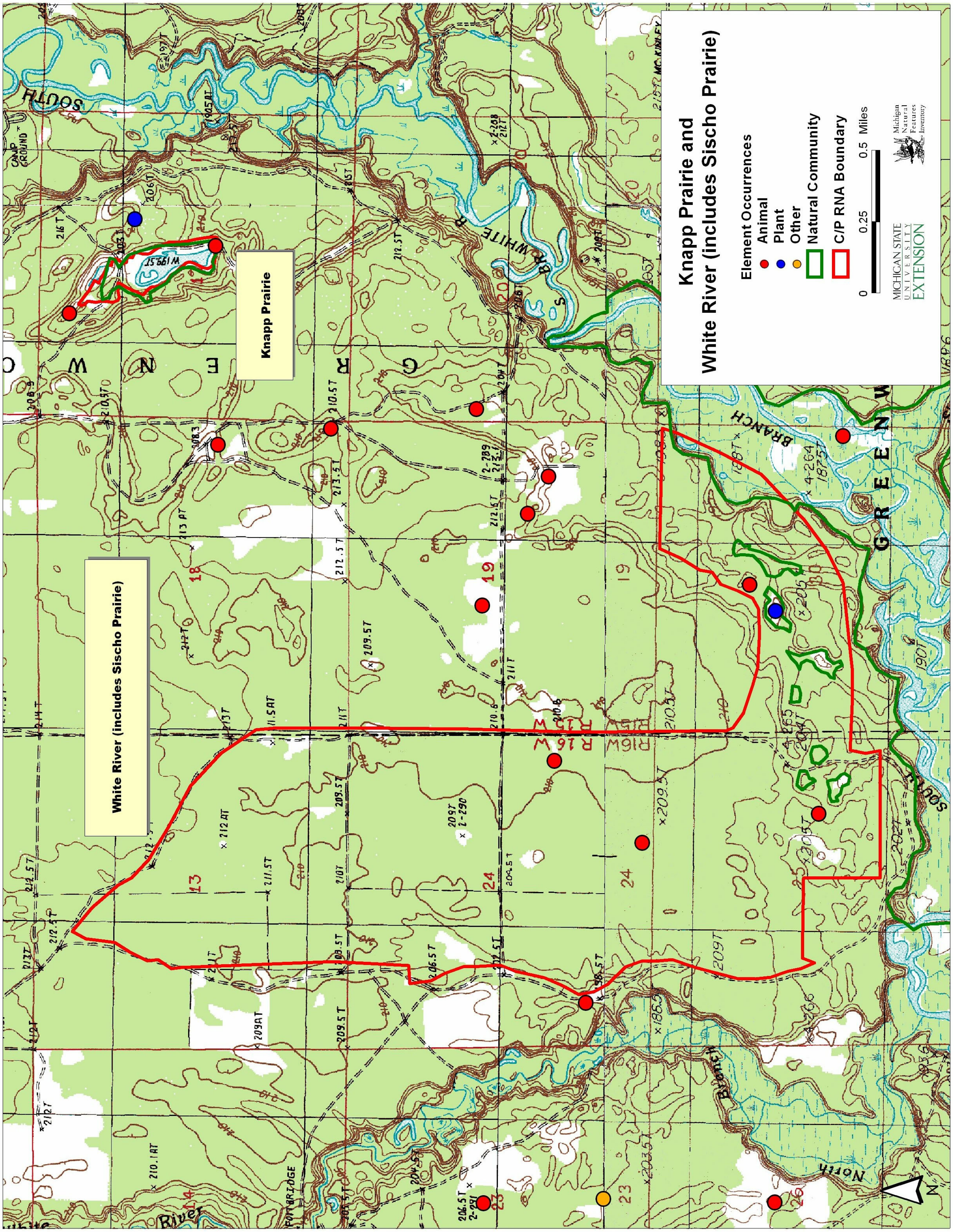
While two additional dry sand prairie EOs occur on public lands within the subsection, no other occurrence of mesic sand prairie, northern wet meadow, or oak-pine barrens are known to occur on public lands within the subsection. The Knapp Prairie pRNA represents the best known location for the protection of these other alliances within the subsection.

Administrative and Management Concerns

Area is presently managed as Karner blue habitat and is part of the Recovery Unit Management Plan. District desires to continue management focus on Karner blue and feels it will not harm the pRNA's natural features. District plans to designate pRNA as an 8.1 Management Area.

Boundary Description

The pRNA boundary was not modified.


Knapp Prairie and
White River (includes Sischo Prairie)
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0
0.25
0.5 Miles
Knapp Prairie
White River (includes Sischo Prairie)

Little Robinson Lake Opportunity Area

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
3,573 acres 1,446 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-2-1-1 Pitted outwash plain
LTA 1-2-2-2 Moraine ridges; many kettle lakes

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Rhynchospora spp. - Panicum (rigidulum, verrucosum) - Rhexia virginica Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance

Association

Scientific Name	Common Name
Rhynchospora capitellata - Rhexia virginica - Rhynchospora scirpoides - Schoenoplectus hallii Herbaceous Vegetation	Northern Beaksedge - Virginal Meadow-beauty - Longbeak Beaksedge - Hall's Bulrush Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Coastal plain marsh	Infertile Pond/marsh, Great Lakes Type	BC	-	-	G2	S2
Coastal plain marsh	Infertile Pond/marsh, Great Lakes Type	B	-	-	G2	S2
Lycaeides melissa samuelis	Karner Blue	E	LE	T	G5T2	S2
Eleocharis melanocarpa	Black-fruited Spike-rush	AB	-	SC	G4	S3
Eleocharis melanocarpa	Black-fruited Spike-rush	-	-	SC	G4	S3
Eleocharis tricostata	Three-ribbed Spike-rush	-	-	T	G4	S2
Eleocharis tricostata	Three-ribbed Spike-rush	A	-	T	G4	S2
Polygala cruciata	Cross-leaved Milkwort	AB	-	SC	G5	S3
Polygala cruciata	Cross-leaved Milkwort	-	-	SC	G5	S3
Rhexia virginica	Meadow-beauty	C	-	SC	G5	S3
Rhexia virginica	Meadow-beauty	AB	-	SC	G5	S3

Little Robinson Lake Opportunity Area (continued)

Rhynchospora macrostachya	Tall Beak-rush	AB	-	SC	G4	S3S4
Rhynchospora macrostachya	Tall Beak-rush	-	-	SC	G4	S3S4
Rotala ramosior	Tooth-cup	-	-	SC	G5	S3
Rotala ramosior	Tooth-cup	-	-	SC	G5	S3
Scirpus torreyi	Torrey's Bulrush	C	-	SC	G5?	S2S3

Ecological Description

The pRNA contains several large coastal plain marsh EOs that occupy depressions in a sandy outwash plain. The coastal plain marshes support numerous rare plant species. For more information see Albert et al. 1991, and plant, animal, and community EORs.

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Little Robinson Lake Opportunity Area East	Coastal plain marsh	BC
Little Robinson Lake Opportunity Area West	Coastal plain marsh	B

Representation Comments

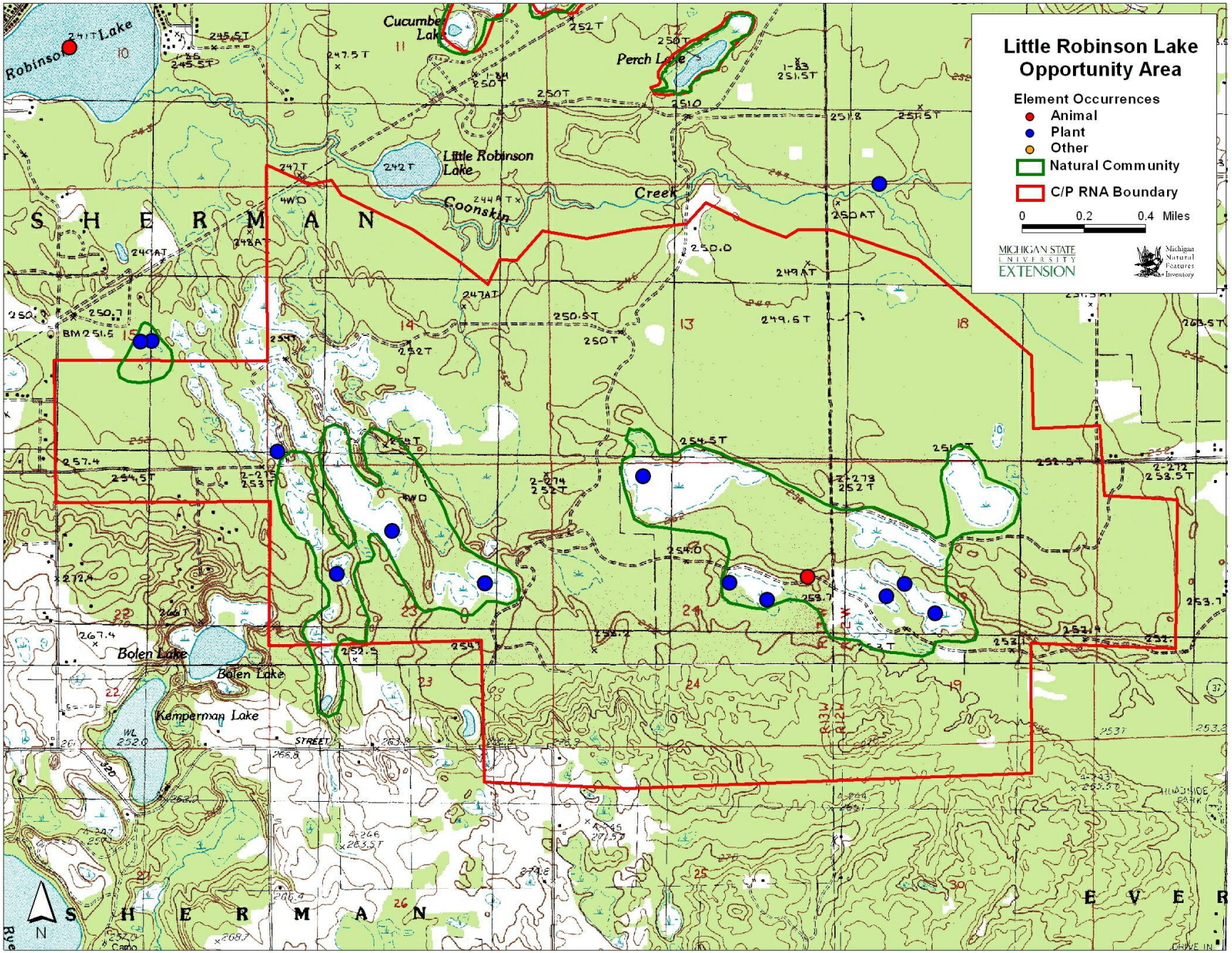
Coastal plain marsh also occurs at Loon Lake. However, the Little Robinson Lake pRNA supports 5 rare plant and 1 rare animal species that do not occur at Loon Lake. If it is possible to protect the Little Robinson Lake pRNA from ORVs and prevent illegal dumping, this site represents the best location to conserve and protect coastal plain marsh and its associated rare species within the subsection.

Administrative and Management Concerns

The pRNA receives heavy ORV use. Area is also used for camping during the hunting season and trash is often dumped in area. A powerline ownership and ORV trail run through the eastern most coastal plain marsh. At present the pRNA contains numerous roads. District plans to designate newly modified boundary as an 8.1 Management Area.

Boundary Description

The pRNA boundary was modified at a meeting with District and MNFI staff on 2-21-03. The newly modified boundary was created for purposes of 8.1 Management Area designation.


Little Robinson Lake Opportunity Area
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.2 0.4 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Robinson Lake
Cucumber Lake
Perch Lake
Little Robinson Lake
Coonskin Creek
Bolen Lake
Kemperman Lake
SHERMAN
EVER
N

Loon Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
438 acres 177 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-2-1-1 Pitted outwash plain
LTA 1-2-1-1 Moraine ridges; many kettle lakes

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Rhynchospora spp. - Panicum (rigidulum, verrucosum) - Rhexia virginica Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance

Association

Scientific Name	Common Name
Rhynchospora capitellata - Rhexia virginica - Rhynchospora scirpoides - Schoenoplectus hallii Herbaceous Vegetation	Northern Beaksedge - Virginal Meadow-beauty - Longbeak Beaksedge - Hall's Bulrush Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Rhexia virginica	Meadow-beauty	A	-	SC	G5	S3
Rhynchospora macrostachya	Tall Beak-rush	CD	-	SC	G4	S3S4

Ecological Description
The pRNA occurs on sandy outwash and contains numerous wet depressions, several of which support coastal plain marsh. For more information see Albert et al. 1991, and plant and community EORs.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Loon Lake	Coastal plain marsh	BC

Loon Lake (continued)

Representation Comments

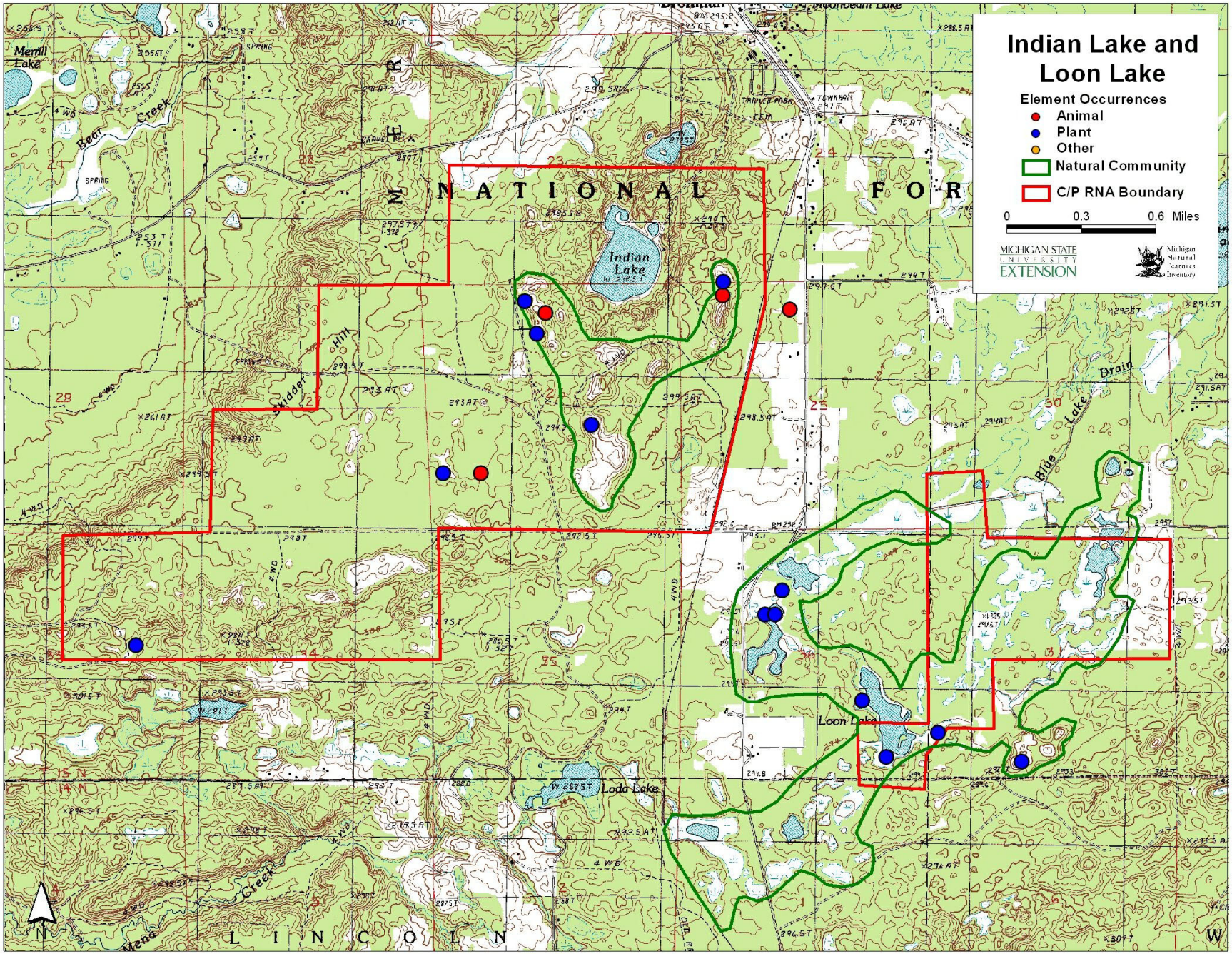
Coastal plain marsh also occurs at the Little Robinson Lake pRNA. The Little Robinson Lake pRNA supports 5 rare plant and 1 rare animal species that are not known from Loon Lake. If it is possible to protect the Little Robinson Lake pRNA from ORV damage and stop illegal dumping, it is a better site to represent coastal plain marsh than Loon Lake.

Administrative and Management Concerns

Ownership of natural feature is split between USFS and multiple private owners.

Boundary Description

Boundary was modified at meeting with District and MNFI staff on 2-21-03 to include only USFS lands north of 6 Mile Rd.


Indian Lake and Loon Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.3 0.6 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Indian Lake
Loon Lake
Loda Lake
Merrill Lake
Bear Creek
Blue Lake Drain
LINCOLN
N

Loud Creek

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
176 acres 71 hectares

Subsection
Harrisville Moraines

Land Type Association
SUB-SUBSECTION VII.2.3: VANDERBILT MORAINES
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Huron Shores

Alliance

Scientific Name	Common Name
Thuja occidentalis Saturated Forest Alliance (I.A.8.N.g)	Northern White Cedar Saturated Forest Alliance

Association

Scientific Name	Common Name
Thuja occidentalis - (Picea mariana, Abies balsamea) / Alnus incana Forest	Northern White Cedar - (Black Spruce, Balsam Fir) / Speckled Alder Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Rich conifer swamp	-	B	-	-	G4	S4

Ecological Description
The pRNA contains a rich conifer swamp that is dominated by northern white cedar. The rich conifer swamp occurs within a narrow outwash channel of Loud Creek, which runs through the center of the pRNA. See Comer 1991, and community EOR for more information.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Minnehaha Creek	Rich conifer swamp	B

Representation Comments
Two other rich conifer swamp EOs occur within the subsection, one on state-owned land at Minnehaha Creek in the far northwest corner of the subsection, and a smaller occurrence (57 acres) on USFS land at Jewel Lake. While Minnehaha Creek is much larger in size (866 acres in state ownership), it does not have special protection status.

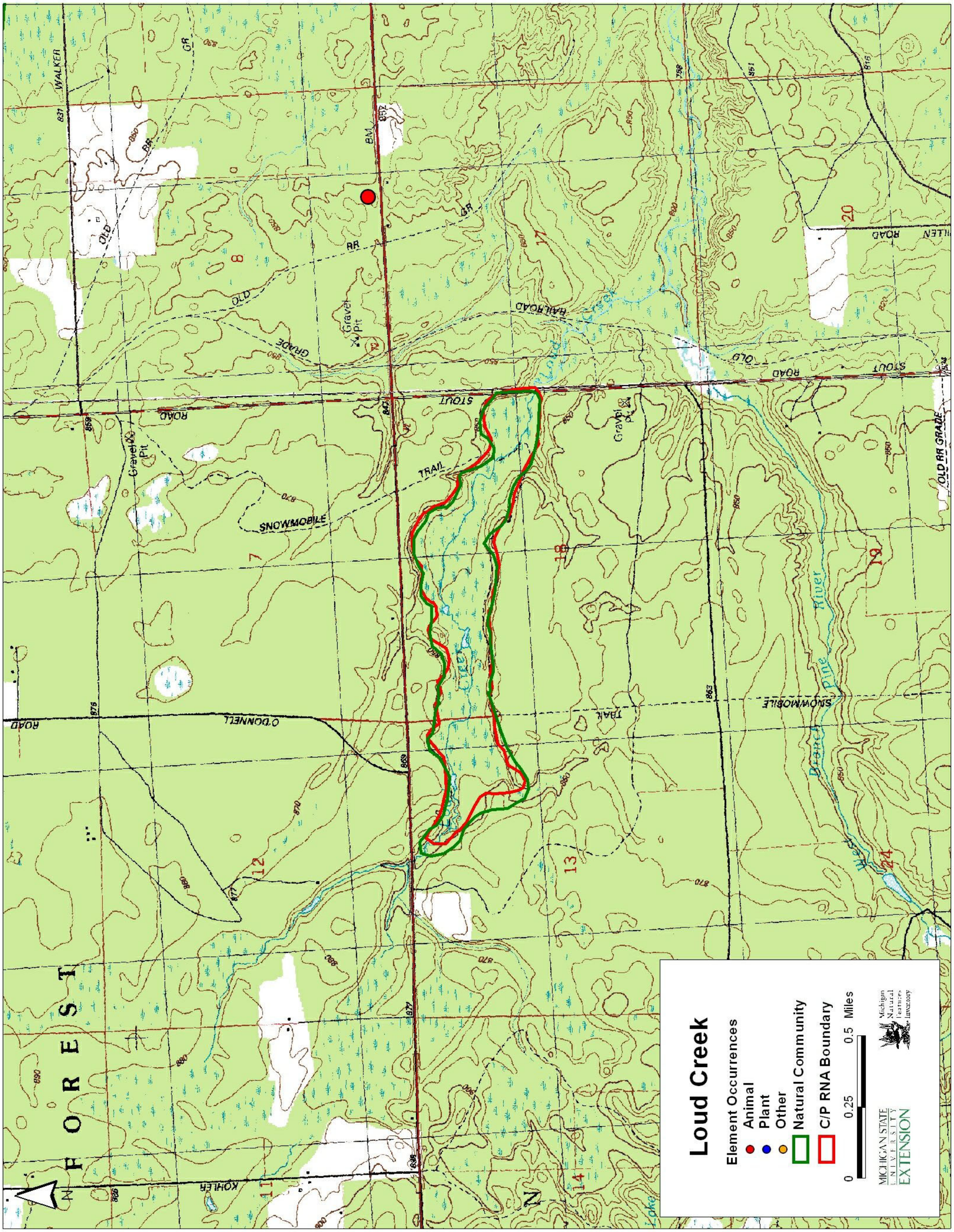
Loud Creek (continued)

Administrative and Management Concerns

The District has plans to install fish structures in the river. A sediment basin plan was designed but never implemented. Aspen was recently harvested northeast of pRNA. Beaver flooded past efforts to plant cedar, spruce, and white pine in adjacent areas.

Boundary Description

Boundary was slightly modified to better match boundaries of natural feature at meeting of District and MNFI staff on 2-12-03.


Loud Creek
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0
0.25
0.5
Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
FOREST
STOUT ROAD
SNOWMOBILE TRAIL
O'DONNELL ROAD
OLD RAILROAD GRADE
OLD RR GRADE
Gravel Pit
Loud Creek
West Branch Pine River
KOHLER
WALKER

McDonald Creek Forest

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
621 acres 251 hectares

Subsection
Harrisville Moraines

Land Type Association
SUB-SUBSECTION VII.6.1: ONAWAY
LTA 2-1-3-4 Flat moraine or till plain

Administrative District
Huron Shores

Alliance

Scientific Name	Common Name
Pinus strobus Forest Alliance (I.A.8.N.b)	White Pine Forest Alliance

Association

Scientific Name	Common Name
Pinus strobus / Vaccinium spp. Forest	Eastern White Pine / Blueberry Species Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Dry-mesic northern forest	-	BC	-	-	G4	S4
Haliaeetus leucocephalus	Bald Eagle	-	PS:LT,PD	T	G4	S4

Ecological Description
The pRNA contains a dry-mesic northern forest with mature white pine and red pine. See Comer 1991, and community EOR for more information.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Representation Comments
This pRNA contains the only EO of dry-mesic northern forest within the subsection and is therefore the best location to represent the community and its corresponding alliance within the subsection.

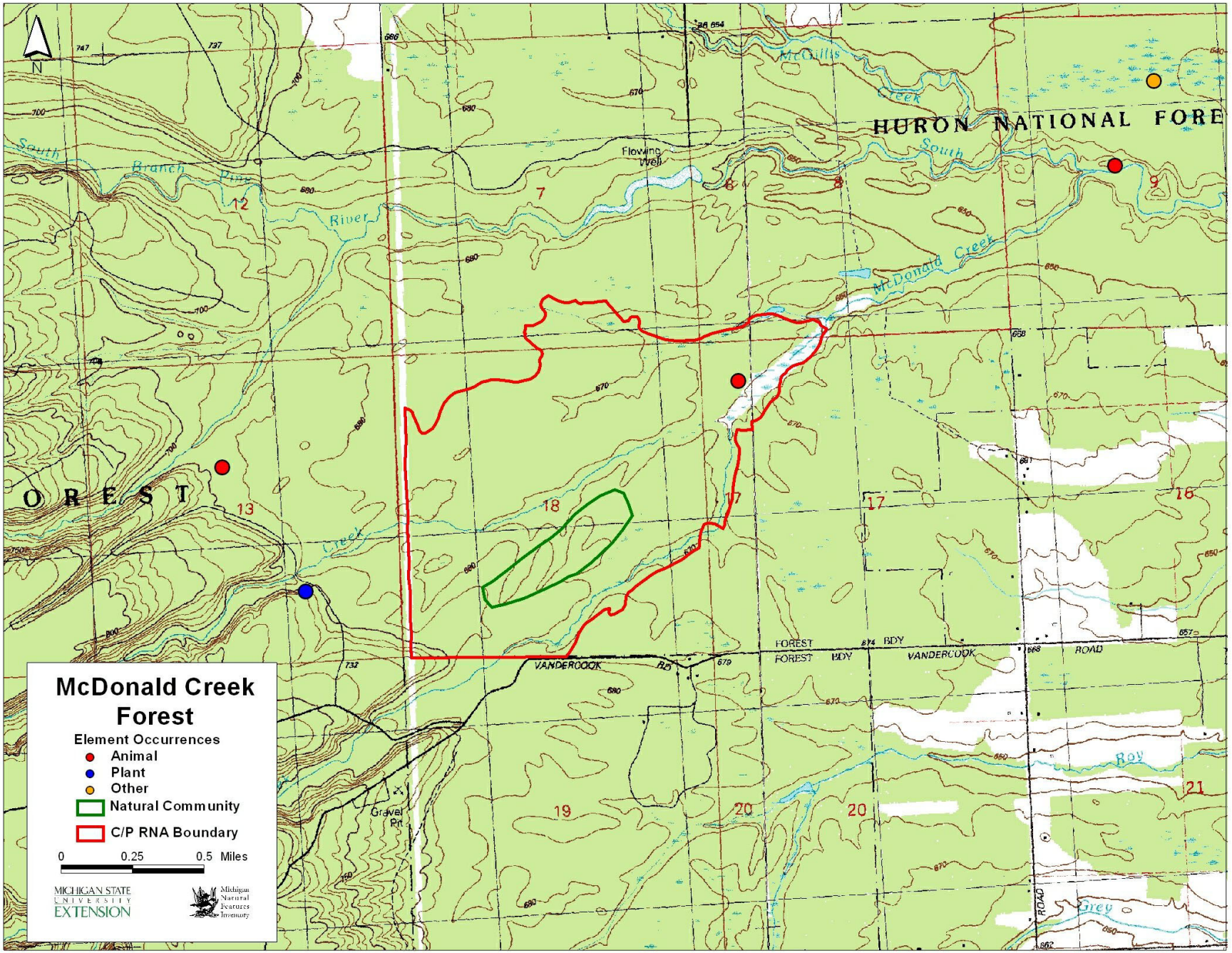
Administrative and Management Concerns
Electric power line borders area on west. pRNA borders Kirtland's warbler area. Entire area is within grouse management area. The only road within area is slated to be closed. Future management of the area may include

McDonald Creek Forest (continued)

prescribed fire.

Boundary Description

BouThe District has plans to install fish structures in the river. A sediment basin plan was designed but never implemented. Aspen was recently harvested northeast of pRNA. Beaver flooded past efforts to plant cedar, spruce, and white pine in adjacent areas.ndary was modified at meeting with District and MNFI staff on 2-12-03.


McDonald Creek Forest
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
N
HURON NATIONAL FORE
O R E S T
McDonald Creek
South Branch Pine River
McGillis Creek
South
Flowing Well
Creek
Roy
Grey
VANDERCOOK
FOREST BDY
ROAD
Gravel Pit
7
8
9
12
13
16
17
18
19
20
21

McMaster's Bridge Bog

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
75 acres 30 hectares

Subsection
Mio Outwash Plains

Land Type Association
SUB-SUBSECTION VII.2.2: GRAYLING OUTWASH PLAIN
LTA 3-1-1-1 Ice-contact ridges; few kettle lakes

Administrative District
Mio

Alliance

Scientific Name	Common Name
Thuja occidentalis Saturated Forest Alliance (I.A.8.N.g)	Northern White Cedar Saturated Forest Alliance

Association

Scientific Name	Common Name
Thuja occidentalis - (Picea mariana, Abies balsamea) / Alnus incana Forest	Northern White Cedar - (Black Spruce, Balsam Fir) / Speckled Alder Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Rich conifer swamp	-	B	-	-	G4	S4

Ecological Description
The pRNA contains a diverse, second growth rich conifer swamp with good cedar regeneration. Northern white cedar, black spruce, and tamarack form a canopy that varies from dense to patchy. The rich conifer swamp occurs in a narrow, poorly drained outwash channel between two lobes of end moraine with moderately steep slopes. Soils consist of 6 inches of muck over sand. For more information see community EOR.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Boardwalk	Rich conifer swamp	B
McKinley Swamp	Rich conifer swamp	B

Representation Comments
Two other rich conifer swamp EOs are documented on USFS lands within the subsection at Boardwalk and McKinley Swamp. However, the rich conifer swamp at McMaster's Bridge Bog pRNA is larger than the other two swamps and is therefore the best site for representation of this alliance within the subsection.

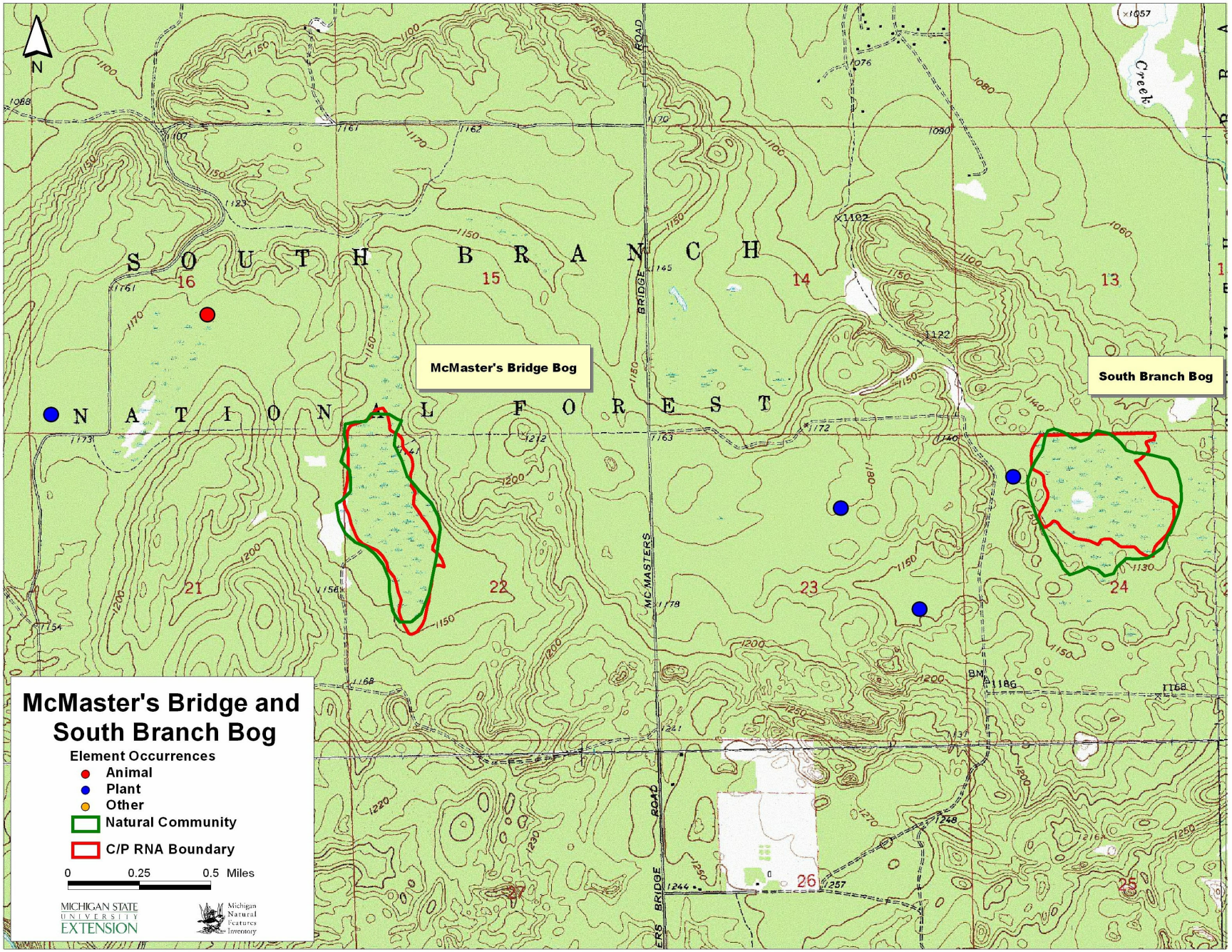
McMaster's Bridge Bog (continued)

Administrative and Management Concerns

Uplands adjacent to site have been clearcut. A watering hole was established for wildlife on the east side of swamp. Area is used by bear and deer hunters. Swamp may also provide habitat for spruce grouse.

Boundary Description

Boundary was slightly modified at meeting of District and MNFI staff on 2-10-03 to better match boundaries of community.


McMaster's Bridge Bog
South Branch Bog
SOUTH BRANCH
NATIONAL FOREST
McMaster's Bridge and South Branch Bog
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory

North Branch White River

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
450 acres 182 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 1-4-2-1 Moraine ridges; many kettle lakes
LTA 1-2-2-2 Moraine ridges; many kettle lakes

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Carex (Rostrata, Utriculata) Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Sedge spp. (Carex rostrata, C. utriculata) Seasonally Flooded Herbaceous Alliance
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance

Association

Scientific Name	Common Name
Carex rostrata - Carex lacustris - (Carex vesicaria) Herbaceous Vegetation	Swollen-beak Sedge - Lake Sedge - (Inflated Sedge) Herbaceous Vegetation
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Northern wet meadow	Wet Meadow, Upper Midwest Type	BC	-	-	G4	S4

Ecological Description
A series of four northern wet meadows, three of which are captured by the pRNA, occur within an outwash channel of the North Branch of the White River where it dissects a course textured end moraine. The meadows are dominated by Carex lacustris and speckled alder and appear to be undergoing succession to northern shrub thicket (alder thicket) as a result of fire suppression and cessation of historic haying. The wet meadows occur on muck soils. The current boundary includes a very small (approx. 5 acres), low ranking (BC) bog that was originally identified as part of an EO that included 8 small bogs found in close proximity just south of the current pRNA boundary. For more information see Albert et al. 1991, and community EORs.

RNA-equivalents
none

North Branch White River (continued)

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Representation Comments

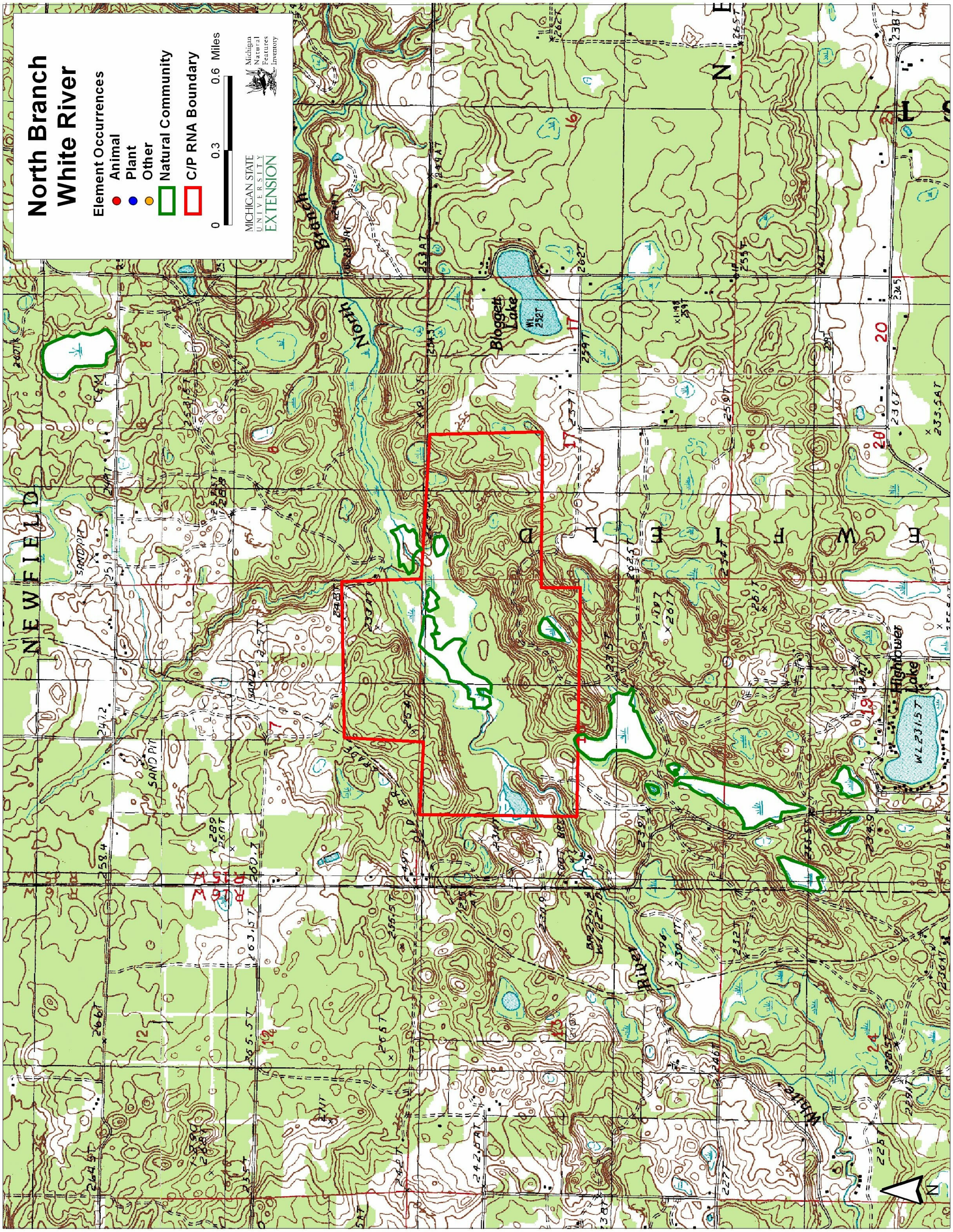
This is the only known occurrence of northern wet meadow within the subsection and therefore the best location for representation of this alliance. The alliance for bog is best represented at Whelan Lake within the Big South cRNA where it is well buffered and occurs in conjunction with several other high quality community EOs.

Administrative and Management Concerns

The area is surrounded by multiple private land owners.

Boundary Description

Boundary was modified at meeting with District and MNFI staff on 2-21-03 to include all USFS lands in sections 7 and 17, and the north half of section 18. This captures several of the northern wet meadows and provides for an adequate buffer. It may be worthwhile to consider extending the southern boundary to capture portions of several small bogs that occur in the southern half of section 18. The roads in the southwest and southeast portions of section 18, along with the section lines and private property lines, could serve as the southern boundary of the pRNA.


North Branch White River
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.3 0.6 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
NEWFIELD
Bloggett Lake
Hightower Lake
North Branch
White River

O'Brien Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
143 acres 58 hectares

Subsection
Mio Outwash Plains

Land Type Association
SUB-SUBSECTION VII.2.2: GRAYLING OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Mio

Alliance

Scientific Name	Common Name
Picea mariana Saturated Forest Alliance (I.A.8.N.g)	Black Spruce Saturated Forest Alliance
Pinus resinosa Forest Alliance (I.A.8.N.b)	Red Pine Forest Alliance

Association

Scientific Name	Common Name
Picea mariana / Alnus incana / Sphagnum spp. Forest	Black Spruce / Speckled Alder / Peatmoss Species Forest
Pinus resinosa / Vaccinium spp. Forest	Red Pine / Blueberry Species Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Dry-mesic northern forest	-	BC	-	-	G4	S4
Poor conifer swamp	-	B	-	-	G4	S4

Ecological Description
The pRNA contains a dry-mesic northern forest dominated by red pine and a poor conifer swamp dominated by black spruce. The poor conifer swamp occurs along the southern shore of O'Brien Lake and extends to the Au Sable River. The influence of groundwater on the conifer swamp likely increases as it nears the river and thus, the area may also contain pockets of rich conifer swamp as well. The dry-mesic northern forest has a relatively open canopy and contains red pines over 100 years old with DBH ranges of 56 to 58 cm and several white pines ranging from 95 to 116 cm DBH. For more information see Comer 1991, and community EORs.

RNA-equivalents
Crawford Red Pines - State Natural Area

Roscommon Red Pines - State Natural Area

O'Brien Lake (continued)

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Crawford Red Pines - RNA-equivalent	Dry northern forest	B
Roscommon Red Pines - RNA-equivalent	Dry northern forest	A

Representation Comments

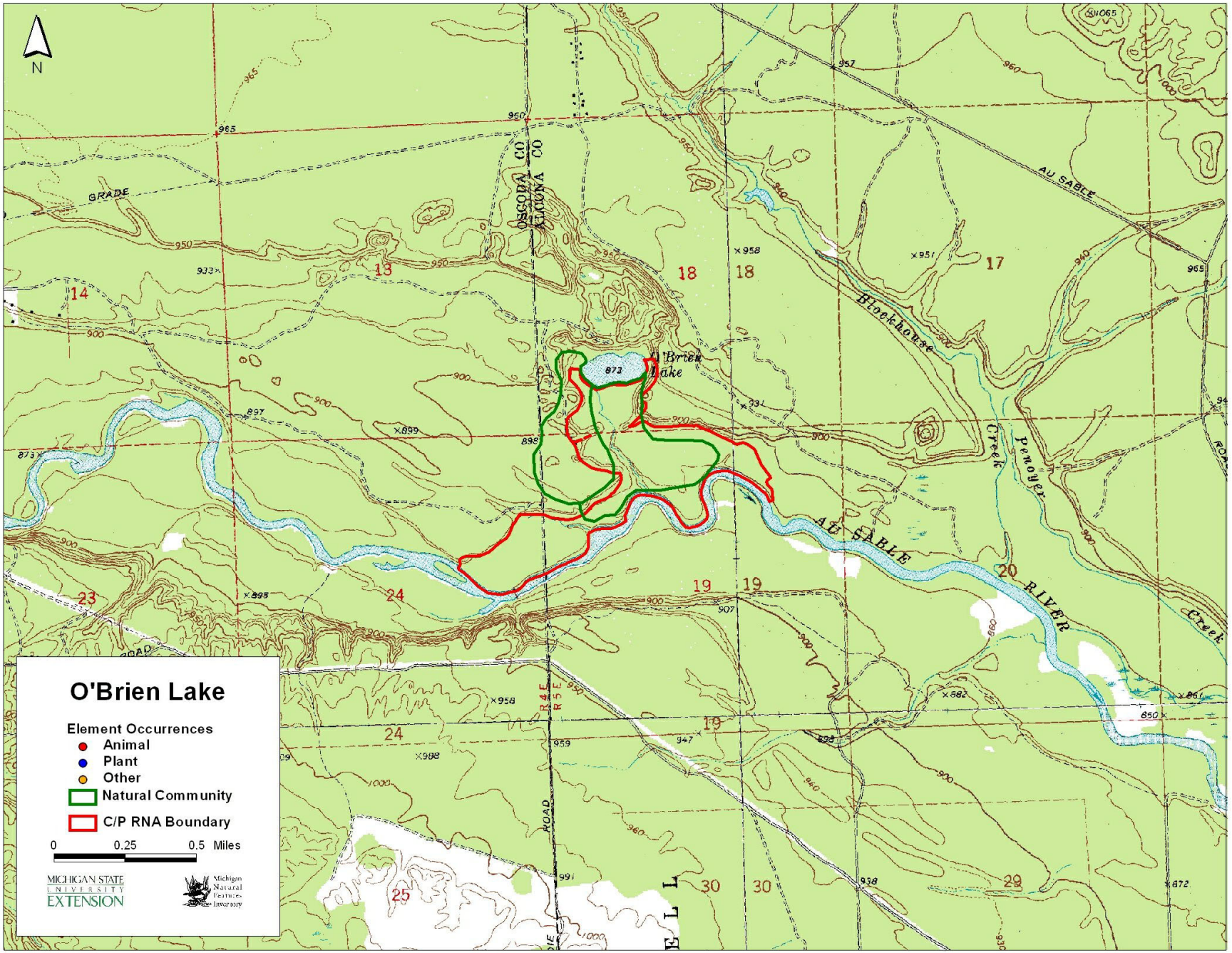
The pRNA contains a dry-mesic forest that represents the Red Pine Forest Alliance. This alliance is also present at two State Natural Areas, which can be considered as RNA-equivalents for this portion of the pRNA. In addition, the District's Wildlife Biologist suggests that the South Branch Semi-Primitive Area also supports a dry-mesic northern forest that may be of higher quality than that found at O'Brien Lake (BC-ranked). The South Branch site should be studied to determine if it represents a different alliance. The pRNA also contains a poor conifer swamp, which does not occur at either of the State Natural Areas. In fact, no other EOs of poor conifer swamp are known from the subsection. Therefore, this site is the best location for representation of the poor conifer swamp, and its corresponding alliance, within the subsection.

Administrative and Management Concerns

The DIstrict is trying to close the road on the northwest side of the pRNA. This section of the Au Sable River has been designated as a National Scenic River and is managed by the USFS as a Scenic River corridor under the Wild and Scenic Rivers Act. The entire pRNA occurs within the Scenic River corridor. The southwest side of the pRNA borders the Bear Island campground. A day use area and fishing pier occurs on the north side of O'Brien Lake.

Boundary Description

Boundary was modified at meeting of District and MNFI staff on 2-10-03 to include floodplain along Au Sable River. A fishing pier occurs along the northern edge of O'Brien Lake and so this area was removed from the pRNA.


N
O'Brien Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
GRADE
OSCODA CO
ALCONA CO
AU SABLE
Blockhouse
Brien Lake
Penoyer Creek
AU SABLE RIVER
ROAD
R4E
R5E
T25N

Pearl Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
28 acres 11 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-2-1-1 Pitted outwash plain

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Picea mariana Saturated Forest Alliance (I.A.8.N.g)	Black Spruce Saturated Forest Alliance

Association

Scientific Name	Common Name
Picea mariana / Alnus incana / Sphagnum spp. Forest	Black Spruce / Speckled Alder / Peatmoss Species Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Poor conifer swamp	-	B	-	-	G4	S4

Ecological Description
The pRNA contains a northern fen EO, which occurs within a series of depressions that run parallel to the Au Sable River on a sandy lakeplain. The community occurs along the shores of several small lakes that occupy the depressions. The depression north of Perch Lake contains a sedge meadow with shrubby cinquefoil. A dam north of Perch Lake has resulted in flooding of much of the former northern fen. The depression just east of Slab Lake was noted to be in pristine condition and very diverse at the time of the survey in 1993. Jack pine and red pine dominate the surrounding uplands. A pine plantation west of Perch Lake was recently clearcut. For more information see the community EOR.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Pearl Lake (continued)

Representation Comments

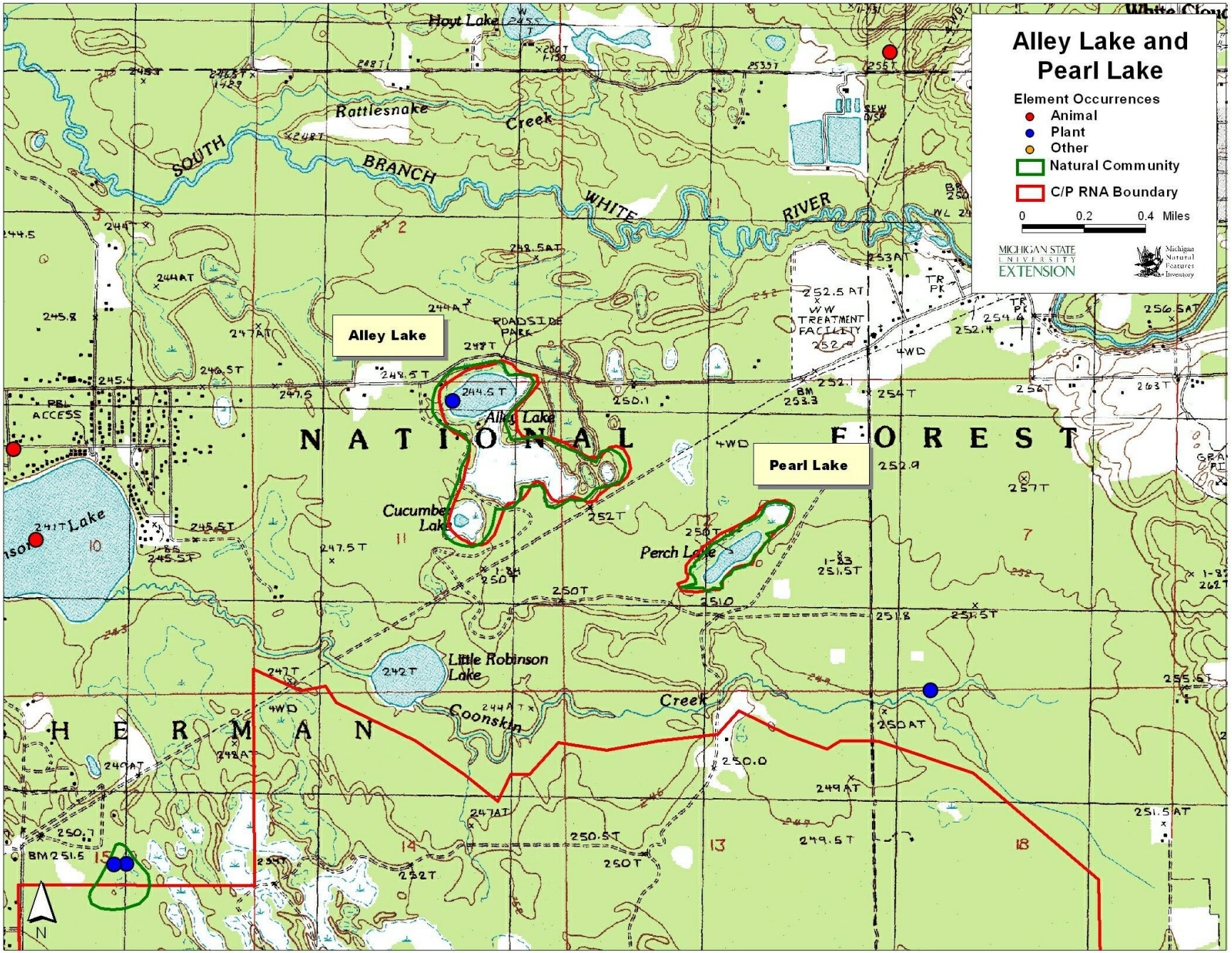
Several other EOs of poor conifer swamp are known from the subsection. However, each occur either entirely, or primarily on privately owned land. Thus, the Pearl Lake pRNA is currently the best site for representation of this alliance.

Administrative and Management Concerns

Lake was used as a walleye raring pond in past

Boundary Description

pRNA boundary closely matches natural community boundary.


Alley Lake and Pearl Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.2 0.4 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Alley Lake
Pearl Lake
Hoyt Lake
Rattlesnake Creek
SOUTH BRANCH WHITE RIVER
ROADSIDE PARK
WW TREATMENT FACILITY
Alley Lake
Cucumber Lake
Perch Lake
Little Robinson Lake
Coonskin Creek
NATIONAL FOREST
HERMAN
PBL ACCESS
4WD
BM 253.3
BM 251.5
N

Perch Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
44 acres 18 hectares

Subsection
Tawas Lake Plain

Land Type Association
SUB-SUBSECTION VII.1.1: STANDISH
LTA 5-4-1-1 Deltaic deposit

Administrative District
Huron Shores

Alliance

Scientific Name	Common Name
Carex lasiocarpa Saturated Herbaceous Alliance (V.A.5.N.m)	Wiregrass Sedge Saturated Herbaceous Alliance

Association

Scientific Name	Common Name
Carex lasiocarpa - Carex buxbaumii - Trichophorum caespitosum Boreal Herbaceous Vegetation	Wiregrass Sedge - Brown Bog Sedge - Deerhair Bulrush Boreal Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Northern fen		BC			G3	S3
	-	-	-	-	-	-

Ecological Description
The pRNA contains a northern fen EO, which occurs within a series of depressions that run parallel to the Au Sable River on a sandy lakeplain. The community occurs in depressions and along the shores of several small lakes that occupy the depressions. The depression north of Perch Lake contains a sedge meadow and shrubby cinquefoil. A dam north of Perch Lake has flooded a portion of the northern fen. The depression just east of Slab Lake was noted to be in pristine condition and very diverse at the time of the survey in 1993. Jack pine and red pine dominate the surrounding uplands. A pine plantation west of Perch Lake was recently clearcut. For more information see the community EOR.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Perch Lake (continued)

Representation Comments

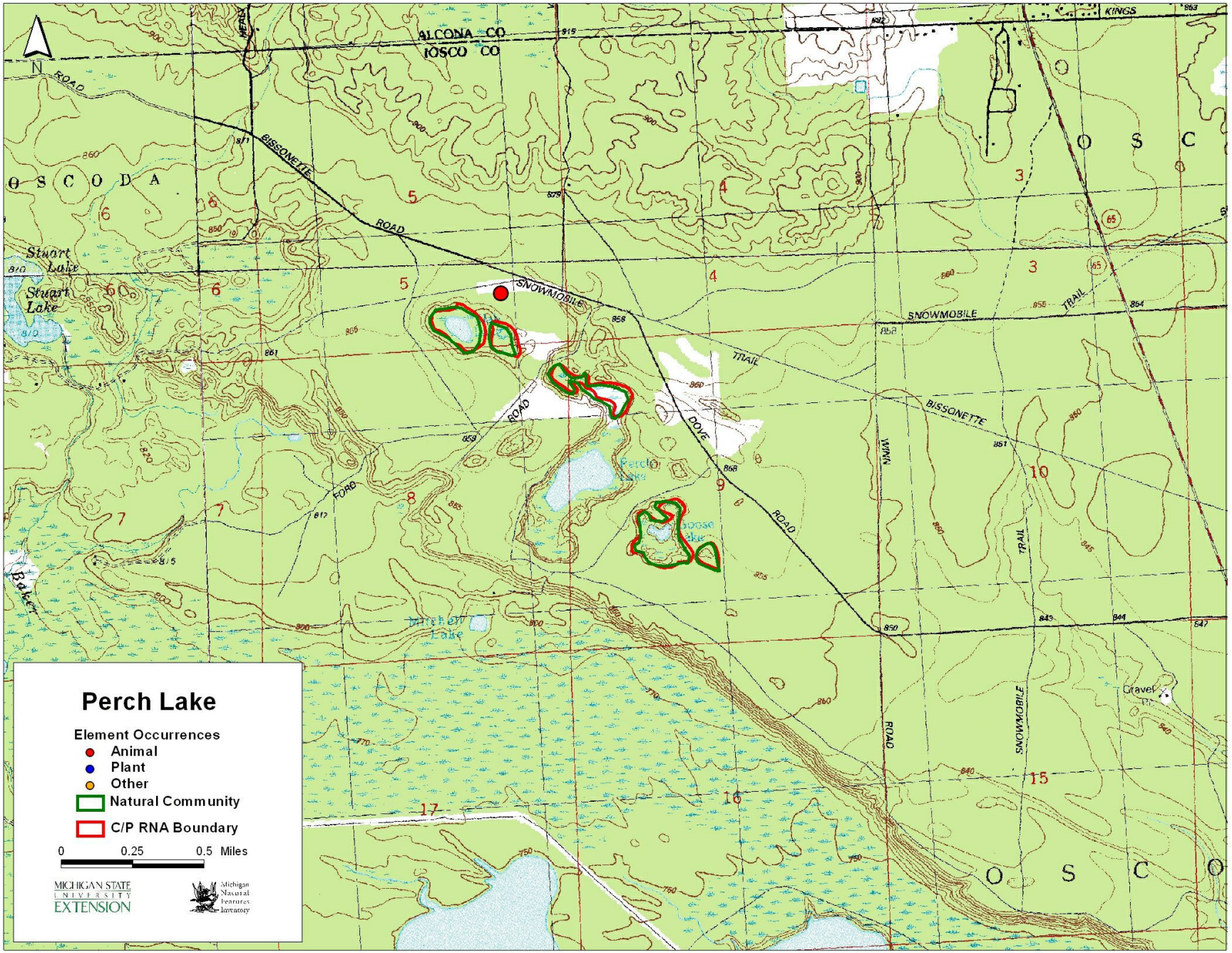
This is the only known occurrence for northern fen within the subsection and therefore the best location for representation of this alliance.

Administrative and Management Concerns

A portion of the area is in private ownership. Heavy ORV use has significantly impacted portions of the pRNA in the past. A road divides the northern fens at Slab Lake from those at Perch and Goose Lakes. The District Office desires not to move forward with RNA establishment at this time because of ORV impacts, disjointed ownership, and small size of community EO.

Boundary Description

The pRNA boundary was not adjusted. Consider using adjacent roads and snowmobile trails that surround Slab Lake as new pRNA boundary as the community EOR indicates that the highest quality portion of the northern fen occurs just east of Slab Lake.


Perch Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
ALCONA CO
IOSCO CO
OSCODA
OSCO
BISSONETTE ROAD
SNOWMOBILE TRAIL
FORD ROAD
DOVE ROAD
WINN ROAD
Stuart Lake
Perch Lake
Goose Lake
Marshall Lake
Gravel Pit

Pine Island Marsh

Status
Candidate Research Natural Area

Size
815 acres 330 hectares

Subsection
Hart Outwash and Lake Sands

Land Type Association
SUB-SUBSECTION VII.4: MANISTEE
LTA 5-2-1-1 Pitted outwash plain

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Rhynchospora spp. - Panicum (rigidulum, verrucosum) - Rhexia virginica Seasonally Flooded Herbaceous Alliance (V.A.5.N.k)	Beakrush - Panic Grass (Panicum rigidulum, P. verrucosum) - Virginia Meadow-beauty Seasonally Flooded Herbaceous Alliance

Association

Scientific Name	Common Name
Rhynchospora capitellata - Rhexia virginica - Rhynchospora scirpoides - Schoenoplectus hallii Herbaceous Vegetation	Northern Beaksedge - Virginal Meadow-beauty - Longbeak Beaksedge - Hall's Bulrush Herbaceous Vegetation
Rhynchospora capitellata - Rhexia virginica - Rhynchospora scirpoides - Schoenoplectus hallii Herbaceous Vegetation	Northern Beaksedge - Virginia Meadow-beauty - Longbeak Beaksedge - Hall's Bulrush Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Rhynchospora macrostachya	Tall Beak-rush	A	-	SC	G4	S3S4
Rotala ramosior	Tooth-cup	BC	-	SC	G5	S3
Scirpus hallii	Hall's Bulrush	B	-	T	G2	S2
Scirpus hallii	Hall's Bulrush	-	-	T	G2	S2
Scleria pauciflora	Few-flowered Nut-rush	-	-	E	G5	S1
Scleria triglomerata	Tall Nut-rush	-	-	SC	G5	S3
Trichostema dichotomum	Bastard Pennyroyal	BC	-	T	G5	S2
Coastal plain marsh	Infertile Pond/marsh, Great Lakes Type	A	-	-	G2	S2
Lepyronia gibbosa	Great Plains Spittlebug	C	-	T	G3G4	S1S2

Pine Island Marsh (continued)

Lepyronia gibbosa	Great Plains Spittlebug	C	-	T	G3G4	S1S2
Lycaeides melissa samuelis	Karner Blue	F	LE	T	G5T2	S2
Oecanthus pini	Pinetree Cricket	-	-	SC	GNR	S1S2
Scudderia fasciata	Pine Katydid	-	-	SC	GNR	S1S3
Eleocharis melanocarpa	Black-fruited Spike-rush	B	-	SC	G4	S3
Fuirena squarrosa	Umbrella-grass	A	-	T	G4G5	S2
Hemicarpha micrantha	Dwarf-bulrush	-	-	SC	G4	S3
Polygala cruciata	Cross-leaved Milkwort	-	-	SC	G5	S3
Psilocarya scirpoides	Bald-rush	B	-	T	G4	S2

Ecological Description

The cRNA occurs on sandy, pitted outwash and contains numerous depressions that support coastal plain marsh. In addition, the cRNA supports 11 rare plant species and 4 rare animal species. For more information see Albert et al. 1991, Comer 1995b, and the numerous, community, plant, and animal EORs.

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank

none

Representation Comments

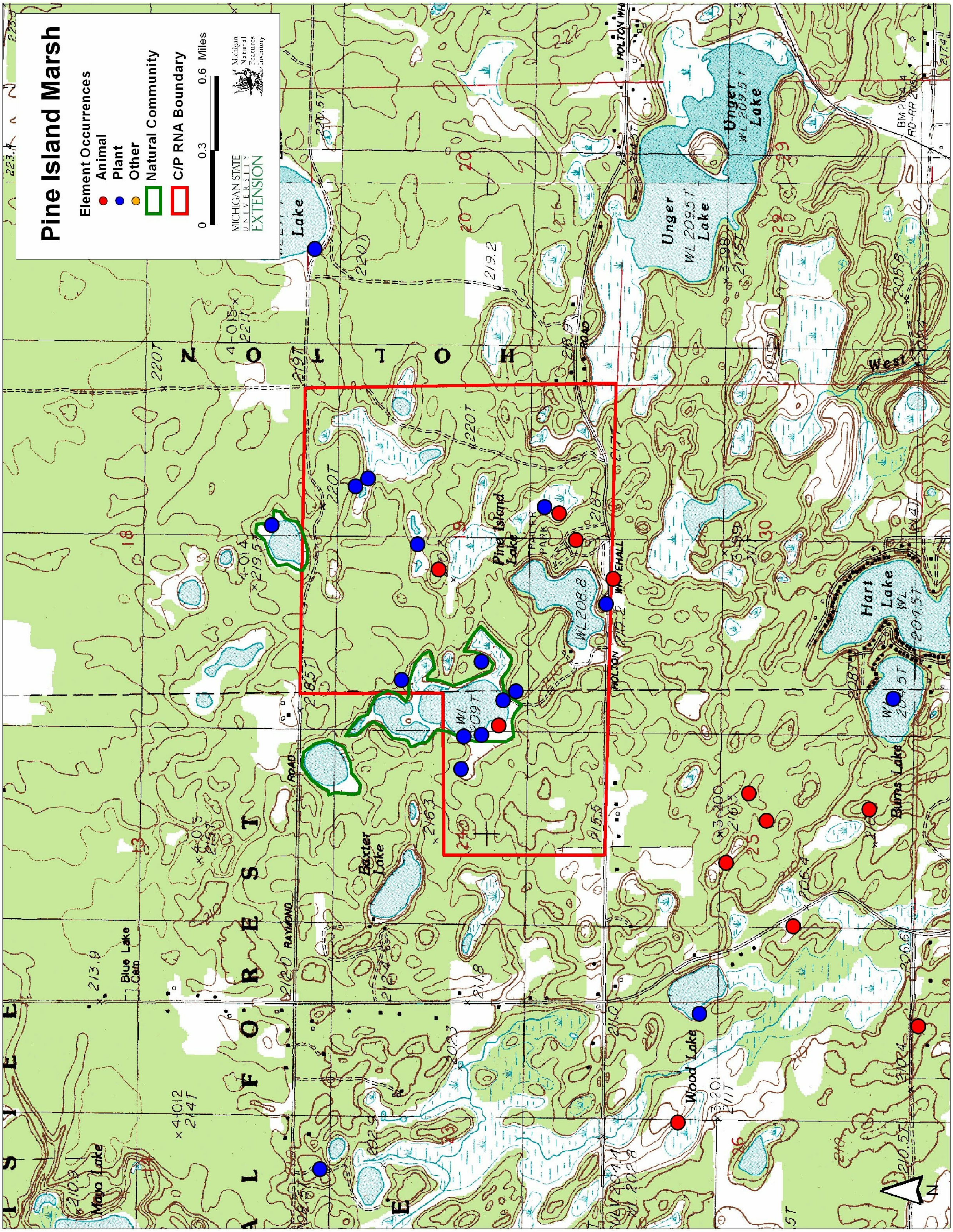
The Pine Island Marsh cRNA represents the only known occurrence of coastal plain marsh within the Hart Outwash and Lake Sands Subsection. The coastal plain marsh EO is high ranking (A-ranked) and contains numerous rare plant and animal species. This site is the best location for representation of coastal plain marsh and its corresponding alliance within the subsection.

Administrative and Management Concerns

The District has found it difficult to keep ORVs out of cRNA because of its close proximity to a population center. The coastal plain marsh EOs occurs on both USFS lands and private lands. Multiple private owners border the cRNA. A snowmobile trail traverses cRNA. District prefers to protect the site's natural features through 8.1 management designation rather than RNA establishment.

Boundary Description

The cRNA boundary included in this report was produced at a meeting with USFS and MNFI on 2/21/03. However, it includes several private parcels and 40 acres of state-owned land. The cRNA boundary that was recommended by MNFI and District staff included only USFS owned land in T12N, R15W sec. 19, and T12N, R16W sec. 24.


Pine Island Marsh
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0
0.3
0.6 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Pine Island Lake
Unger Lake
Hart Lake
Burns Lake
Wood Lake
Baxter Lake
Mayo Lake
Blue Lake Cem
N

Skeel Creek Prairie

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
195 acres 79 hectares

Subsection
Hart Outwash and Lake Sands

Land Type Association
SUB-SUBSECTION VII.4: MANISTEE
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Pinus strobus - Quercus (alba, rubra) Wooded Herbaceous Alliance (V.A.6.N.f)	White Pine - Oak (White, Red) Wooded Herbaceous Alliance
Schizachyrium scoparium - (Sporobolus cryptandrus) Herbaceous Alliance (V.A.5.N.c)	Little Bluestem - (Sand Dropseed) Herbaceous Alliance

Association

Scientific Name	Common Name
Pinus strobus - Quercus alba - (Quercus velutina) / Andropogon gerardii Wooded Herbaceous Vegetation	Eastern White Pine - White Oak - (Black Oak) Big Bluestem Wooded Herbaceous Vegetation
Schizachyrium scoparium - Danthonia spicata - Carex pensylvanica - (Viola pedata) Herbaceous Vegetation	Little Bluestem - Poverty Oatgrass - Pennsylvania Sedge - (Birdfoot Violet) Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Dry sand prairie	Dry Sand Prairie, Midwest Type	B	-	-	G3	S2
Oak-pine barrens	-	B	-	-	G3	S2
Lycaeides melissa samuelis	Karner Blue	F	LE	T	G5T2	S2
Prunus alleghaniensis var. davisii	Alleghany or Sloe Plum	D	-	SC	G4T3Q	S3

Ecological Description
The pRNA contains two community EOs, a dry sand prairie and oak-pine barrens. The dry sand prairie is small (10 acres) but contains 32 native plant species including little blue stem, poverty grass, and cylindrical blazing star. The oak-pine barrens is good size (178 acres) and is dominated by black oak, white oak, and white pine. The white oaks are large (up to 30 inches DBH) and one was aged to approximately 172 years. For more information see Albert et al. 1991, Comer 1995b, and plant, animals, and community EORs.

Skeel Creek Prairie (continued)

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Sischo Prairies	Dry sand prairie	B

Representation Comments

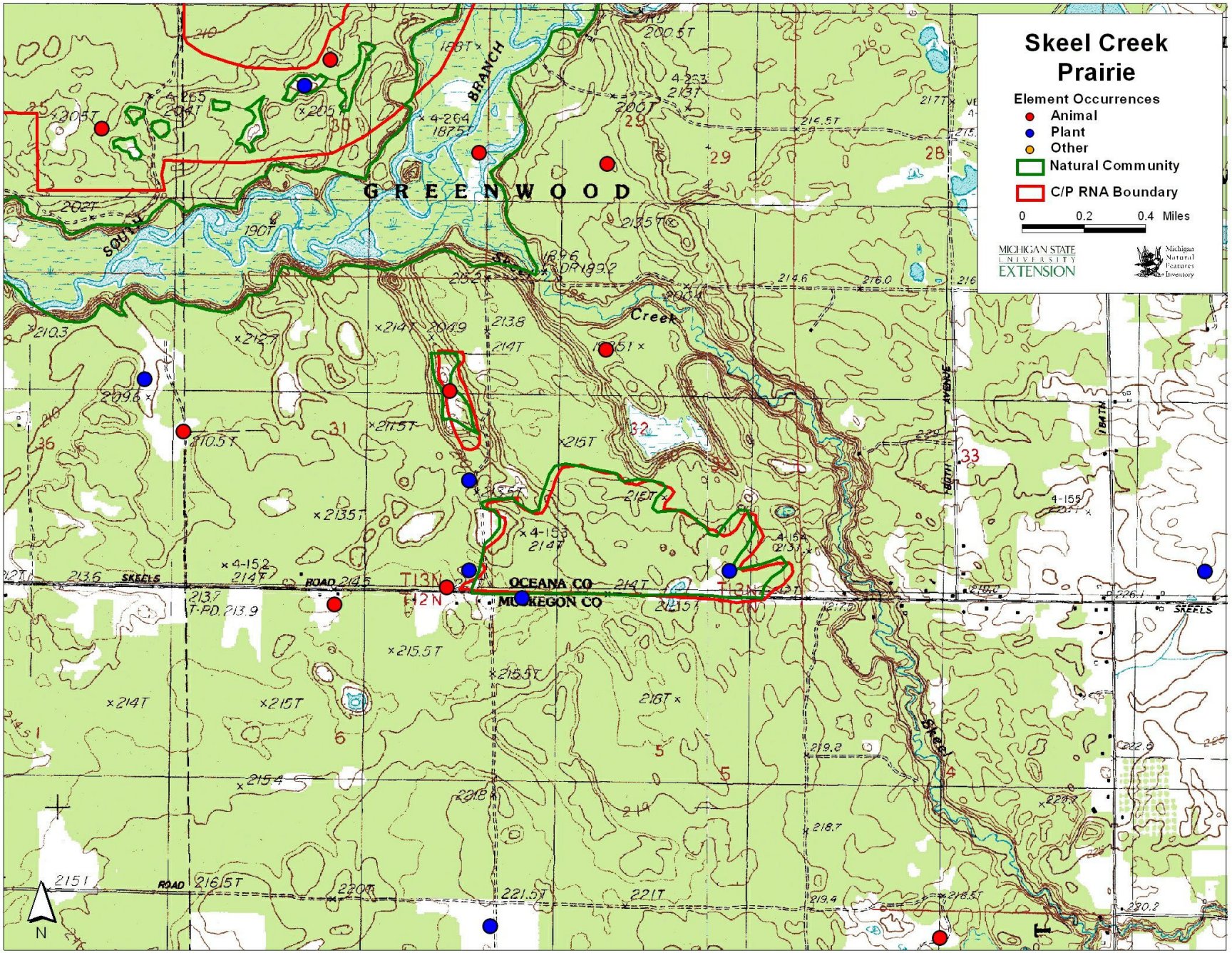
The alliance represented by dry sand prairie also occurs at Sischo Prairie within the White River pRNA. The alliance is best represented at the White River pRNA where it is well buffered and publicly owned. A much smaller (25 vs. 178 acres) and lower ranked (C-ranked) oak-pine barrens EO occurs on USFS land at Knapp Prairie. If the privately owned Skeel Creek oak-pine barrens can be acquired, it would be the best location within the subsection to representat the community and its corresponding alliance.

Administrative and Management Concerns

USFS ownership represents a small portion of the overall pRNA. The entire oak-pine barrens is privately owned as is nearly half of the dry sand prairie EO.

Boundary Description

The pRNA boundary was not adjusted.


Skeel Creek Prairie
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.2 0.4 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
GREENWOOD
SOUTH BRANCH
Creek
SKEELS
ROAD
OCEANA CO
MUSKEGON CO
T13N
T12N
N

South Branch Bog

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
83 acres 33 hectares

Subsection
Mio Outwash Plains

Land Type Association
SUB-SUBSECTION VII.2.2: GRAYLING OUTWASH PLAIN
LTA 3-1-1-1 Ice-contact ridges; few kettle lakes

Administrative District
Mio

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Bog	-	A	-	-	G3	S3

Ecological Description
The pRNA contains a large, high quality bog with good zonation. Abundant species include Carex oligosperma, sphagnum mosses, and leatherleaf. Black spruce and tamarack dominate a small area of the bog. For more information see the community EOR.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Representation Comments
South Branch Bog is the largest and highest ranked bog on publicly owned land within the subsection and therefore the best location for representation of this alliance.

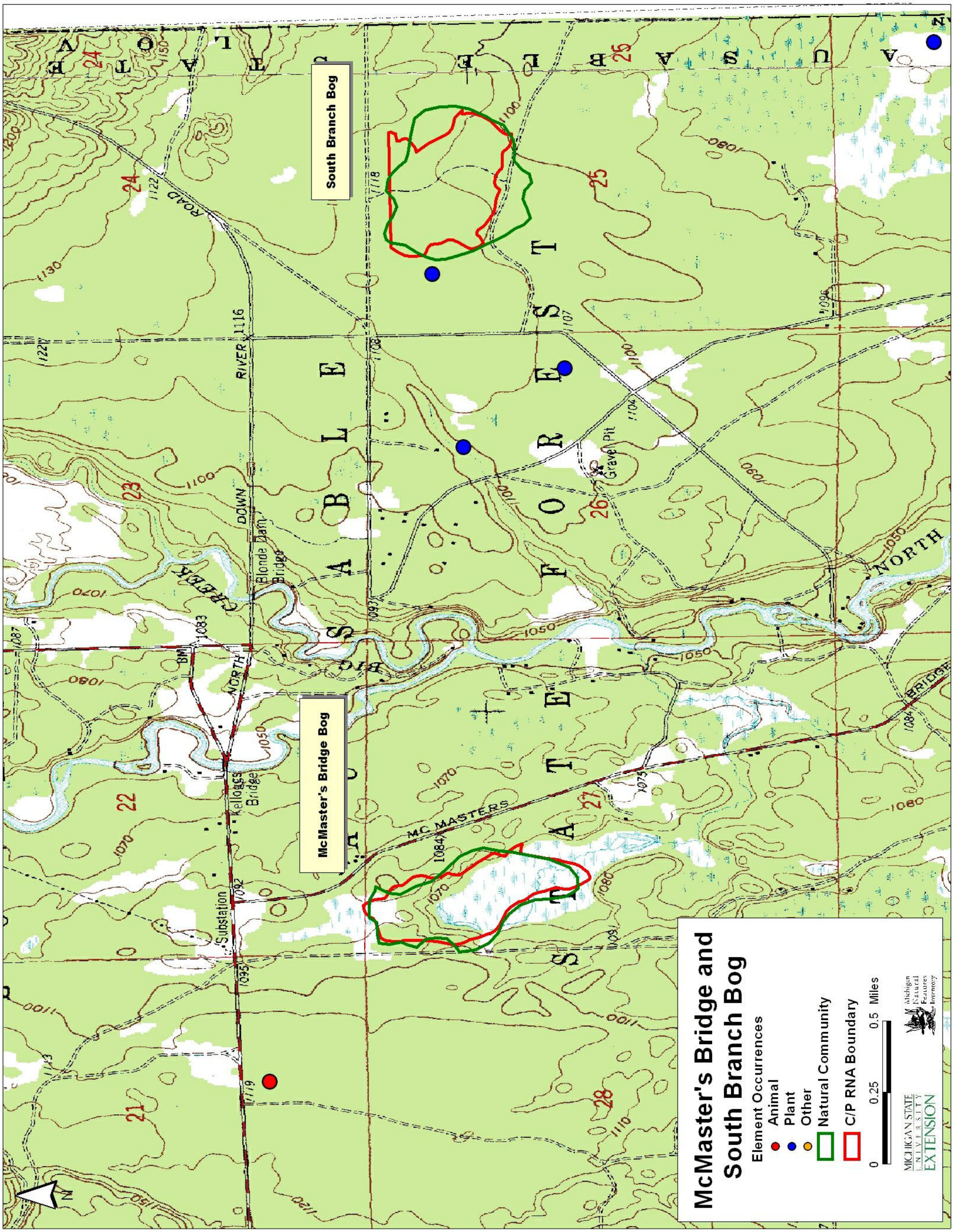
South Branch Bog (continued)

Administrative and Management Concerns

Area is used for hunting and occasionally by college classes. With the exception on an aspen stand, the site is surrounded by Old Growth designation.

Boundary Description

Boundary was modified at meeting with District and MNFI staff on 2-10-03.


McMaster's Bridge and South Branch Bog
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
South Branch Bog
McMaster's Bridge Bog

South Olga Bog

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
102 acres 41 hectares

Subsection
Big Rapids Loamy Moraines

Land Type Association
SUB-SUBSECTION VII.2.1: CADILLAC
LTA 5-2-1-1 Pitted outwash plain

Administrative District
Manistee

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Bog	-	B	-	-	G3	S3

Ecological Description
The pRNA contains a bog that occurs within a kettle depression. The bog contains several vegetation zones. Tamarack and black spruce are abundant along its margins. Leatherleaf, Carex oligosperma and sphagnum mosses dominate much of the interior and border small areas of open water within the southern portion of the bog. The aspen stand adjacent to the bog was cut in 1990 and is in a 50 year rotation. A red pine plantation occurs to the west and jack pine to the east. For more information see the community EOR.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Hughes Swamp	Bog	B

Representation Comments
Several other bogs occur within the Big Rapids Loamy Moraines Subsection, however, most are privately owned or lower in rank (C-ranked). The state owns a portion of a large wetland complex at Hughes Swamp that

South Olga Bog (continued)

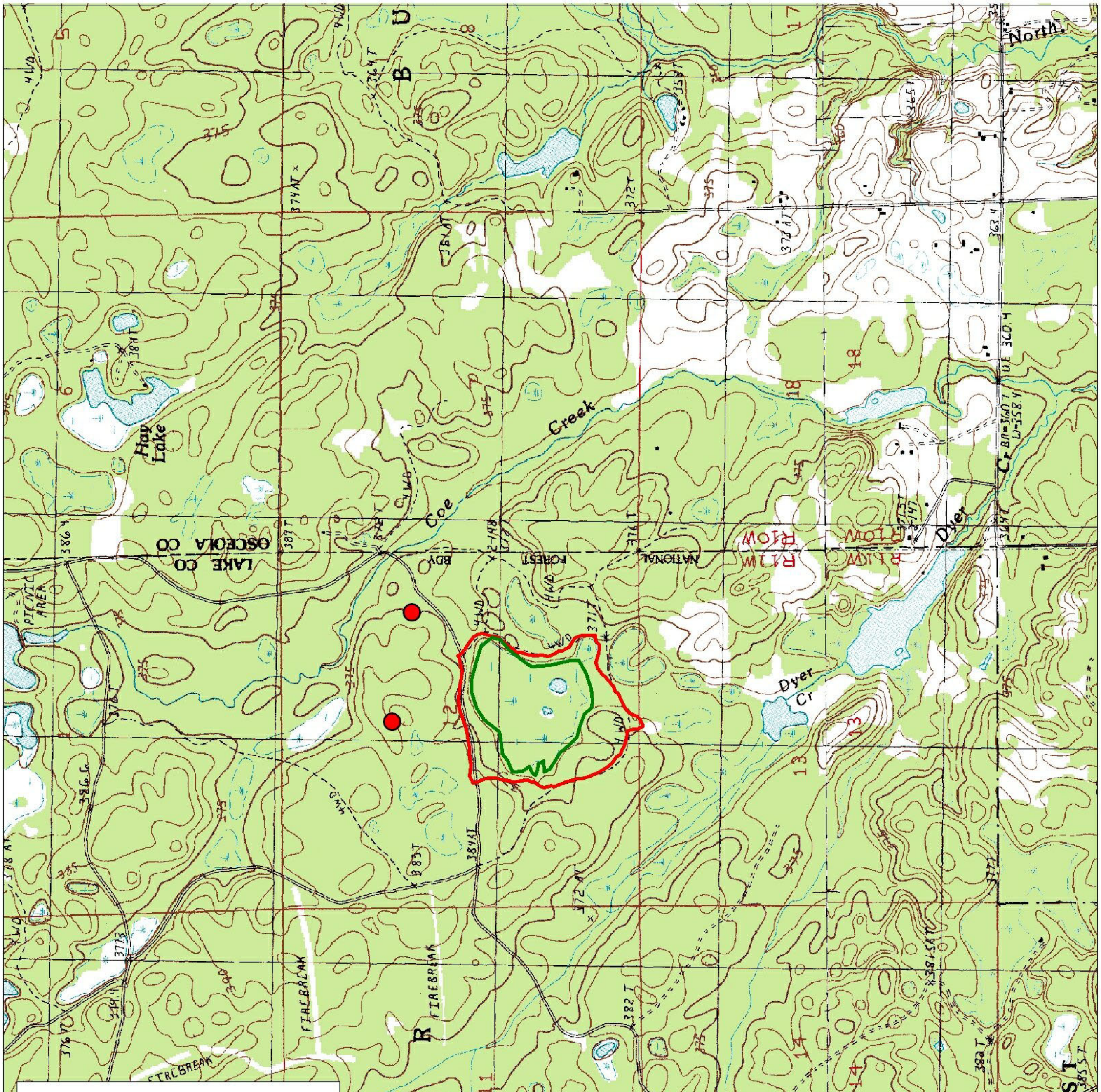
contains a B-ranked bog EO, but this site has not been given special protection status. Therefore, at this time the South Olga Bog represents the best location to conserve and protect this alliance within the subsection.

Administrative and Management Concerns

The pRNA is within a wildlife management area that supports a large deer population. The area is used for hunting bear, deer, and grouse. Pine martin are also known from area. Road to north is well traveled. Logging roads border other sides of bog.

Boundary Description

The boundary was modified at meeting with District and MNFI staff on 2-11-03 in an attempt to use roads that border the bog as a boundary for most of the pRNA.


South Olga Bog
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
Hay Lake
Coe Creek
Dyer Cr
LAKE CO
OSCEOLA CO
MANISTEE NATIONAL FOREST

Timmerman Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
69 acres 28 hectares

Subsection
Wellston Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-1-4-9 Broad, flat outwash plain; very poorly drained peat or muck
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Manistee

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata - (Kalmia angustifolia) Seasonally Flooded Dwarf-Shrubland Alliance (IV.A.1.N.f)	Leatherleaf - (Bog Laurel) Seasonally Flooded Dwarf-Shrubland Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge / Peatmoss Species Dwarf-shrubland

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Intermittent wetland		B			G3	S2
	-	-	-	-	-	-

Ecological Description
The pRNA contains an intermittent wetland that occurs north and east of Timmerman Lake on seasonally inundated sand. For more information see community EOR.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Duck Marsh	Intermittent wetland	B

Representation Comments
An intermittent wetland of similar size and rank occurs on USFS land at Duck Marsh. However, the Duck Marsh intermittent wetland likely represents a different type of alliance. Therefore, Timmerman Lake is the best

Timmerman Lake (continued)

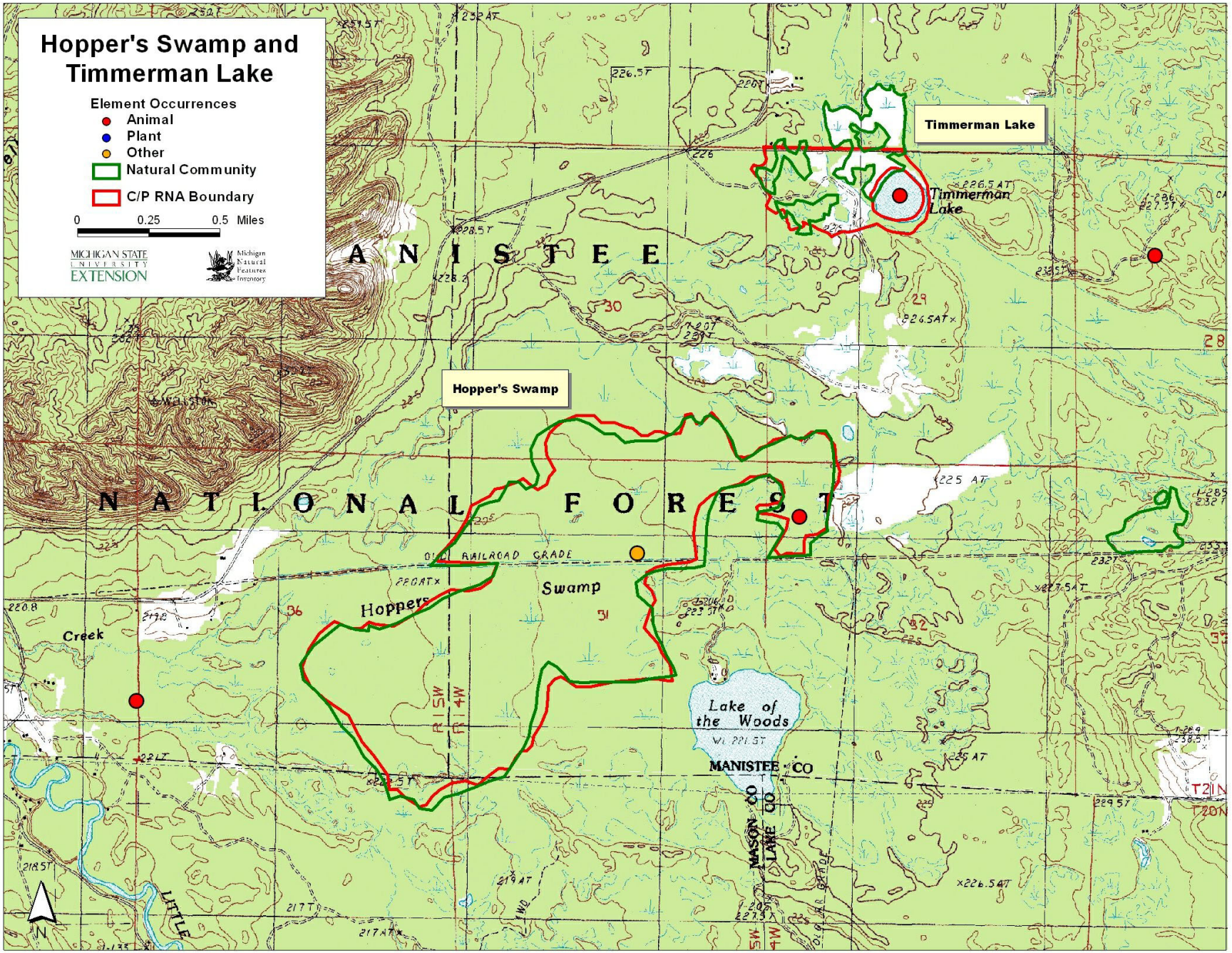
location for representation of this alliance within the subsection.

Administrative and Management Concerns

Northern portion of intermittent wetland EO is privately owned. District recommends that site be designated as an 8.1 Management Area and that the surrounding lands become part of Old Growth Designaiton, which borders site to the south and east. District would prefer to acquire land to north before moving forward with RNA establishment.

Boundary Description

Boundary was modified at meeting with District and MNFI staff on 2-10-03.


Hopper's Swamp and Timmerman Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Timmerman Lake
Hopper's Swamp
ANISTEE
NATIONAL FOREST
Old Railroad Grade
Hoppers Swamp
Creek
Lake of the Woods
MANISTEE CO
MASON CO
LITTLE
R15W
R14W
T21N
T20N

Toft Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
168 acres 68 hectares

Subsection
Newaygo Outwash and Ice Contact

Land Type Association
SUBSECTION VII.3: NEWAYGO OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Larix laricina Saturated Forest Alliance (I.B.2.N.g)	Tamarack Saturated Forest Alliance

Association

Scientific Name	Common Name
Larix laricina - Acer rubrum / (Rhamnus alnifolia, Vaccinium corymbosum) Forest	Tamarack - Red Maple / (Alderleaf Buckthorn, Highbush Blueberry) Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Relict conifer swamp	Forested Bog, Central Midwest Type	B	-	-	G3	S3

Ecological Description
The Toft Lake pRNA contains a small lake and a relict conifer swamp EO. This wetland is strongly influenced by calcareous groundwater and contains numerous seeps and a variety of vegetation zones. White pine, tamarack, and red maple dominate the eastern portion of the wetland. The western portion, north of Toft Lake, supports a wet savanna of black spruce and tamarack with a ground layer of northern fen vegetation. An area of dense black spruce and tamarack also occur in this area of the wetland. For more information see the community EOR.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

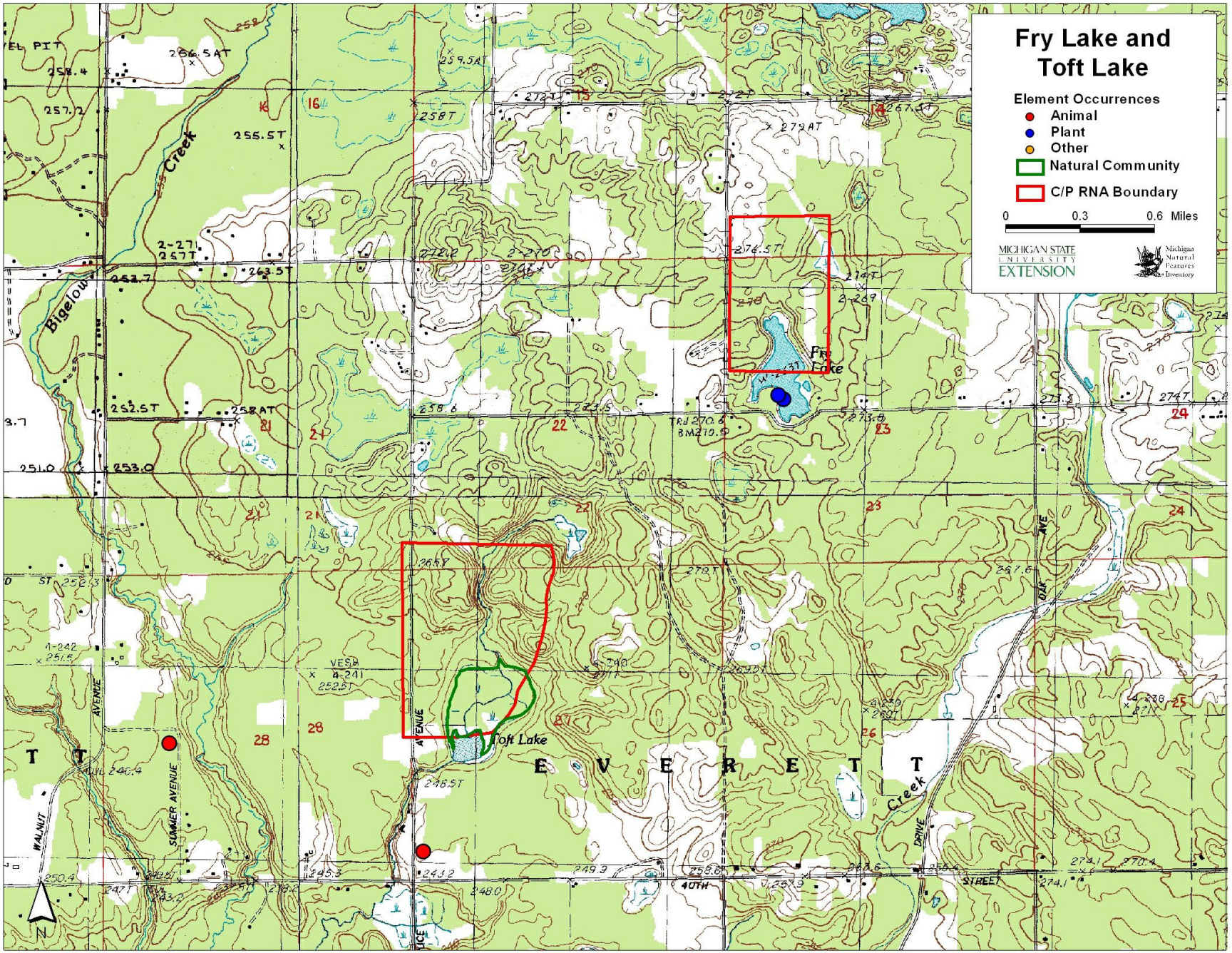
Representation Comments
The Toft Lake pRNA is the only known occurrence of this alliance within the subsection and therefore the best

Toft Lake (continued)

location for representation of this alliance.

Administrative and Management Concerns
Toft Lake is a Cultural Resource site.

Boundary Description
Boundary was modified at meeting with District and MNFI staff on 2-21-03 to allow for upland buffer around natural feature. Roads and sections lines were used to delineate boundary where feasible.


Fry Lake and
Toft Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0
0.3
0.6 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
Fry Lake
Toft Lake
EVERETT
Bigelow
Creek
WALNUT AVENUE
SUMMER AVENUE
40TH STREET
DRIVE
N

Trout Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
187 acres 76 hectares

Subsection
Harrisville Moraines

Land Type Association
SUB-SUBSECTION VII.2.3: VANDERBILT MORAINES
LTA 1-1-1-1 Moraine ridges; few kettle lakes

Administrative District
Huron Shores

Alliance

Scientific Name	Common Name
Thuja occidentalis - Acer rubrum Saturated Forest Alliance (I.C.3.N.d)	Northern White Cedar - Red Maple Saturated Forest Alliance

Association

Scientific Name	Common Name
Thuja occidentalis - Fraxinus nigra Forest	Northern White Cedar - Black Ash Forest

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Hardwood-conifer swamp	-	B	-	-	G4	S3

Ecological Description
The pRNA contains a hardwood-conifer swamp EO that is dominated by northern white cedar, black ash, balsam fir, and black spruce. Speckled alder is abundant in the understory. See Comer 1991, and community EOR for more information.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

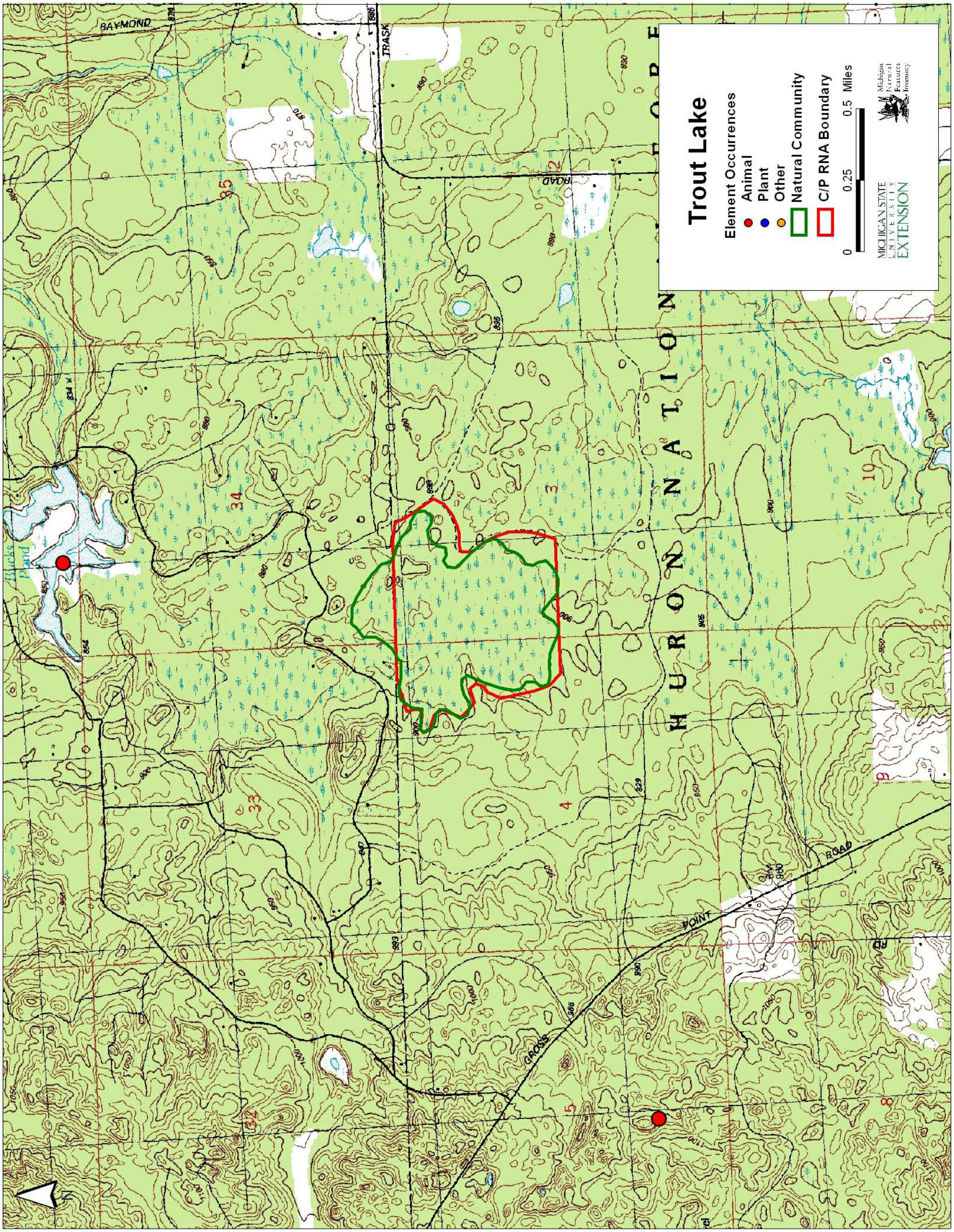
Representation Comments
The Trout Lake pRNA contains the only known occurrence for this alliance within the subsection and is therefore the best location for representation of this alliance.

Administrative and Management Concerns
The far northern portion (section 34) of the hardwood-conifer swamp community EO is privately owned.

Trout Lake (continued)

Boundary Description

Boundary was modified at meeting with District and MNFI staff on 2-12-03 to include only USFS lands. Road along east side of community EO was used for the eastern boundary. The site has 4.3 management designation and is managed for wildlife. Site is used for hunting and trapping, especially for deer, bear, and grouse.


Trout Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
H U R O N N A T I O N
RAYMOND
TRASK
ROAD
GROSS
POINT
ROAD
34
35
33
32
2
3
4
5
8
9
10

Valley Road Prairie

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
30 acres 12 hectares

Subsection
Mio Outwash Plains

Land Type Association
SUB-SUBSECTION VII.2.2: GRAYLING OUTWASH PLAIN
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Mio

Alliance

Scientific Name	Common Name
Schizachyrium scoparium - (Sporobolus cryptandrus) Herbaceous Alliance (V.A.5.N.c)	Little Bluestem - (Sand Dropseed) Herbaceous Alliance

Association

Scientific Name	Common Name
Schizachyrium scoparium - Danthonia spicata - Carex pensylvanica - (Viola pedata) Herbaceous Vegetation	Little Bluestem - Poverty Oatgrass - Pennsylvania Sedge - (Birdfoot Violet) Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Dry sand prairie	Dry Sand Prairie, Midwest Type	AB	-	-	G3	S2
Agoseris glauca	Prairie or Pale Agoseris	AB	-	T	G5	S2

Ecological Description
The pRNA contains a dry sand prairie EO. The prairie is centered in a narrow, shallow outwash channel. For more information see plant and the community EORs.

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Shupac Lake	Dry sand prairie	AB

Representation Comments
A dry sand prairie of similar size and rank occurs on state-owned land at Shupac Lake. However, the Shupac Lake site has not yet received special protection status. Therefore, the Valley Road pRNA is the best known location for representation of this alliance within the subsection.

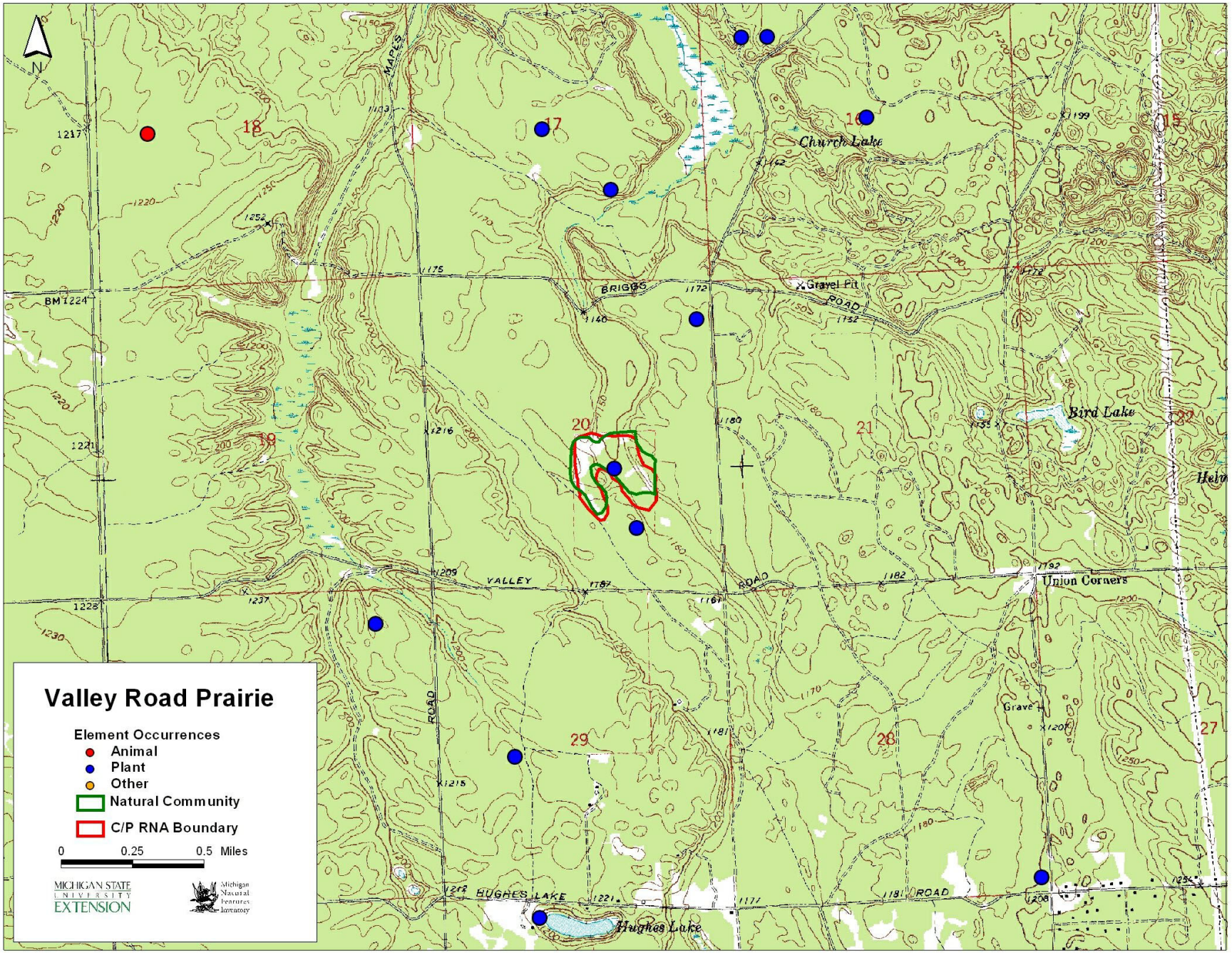
Valley Road Prairie (continued)

Administrative and Management Concerns

The site is currently is managed as a Kirtland's Warbler Management Area. ORV use occurs at site. Site is used for hunting. District is concerned that RNA establishment will impede their ability to manage for Kirtland's warbler, which may include the use of prescribed fire and other forms of vegetation management. District prefers to retain as pRNA but not move forward with RNA establishment at this time.

Boundary Description

The pRNA boundary was not adjusted. Consider expanding to include the entire section (section 20) and using roads along section lines for the boundary.


Valley Road Prairie
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
N
Church Lake
Bird Lake
Hughes Lake
Union Corners
Gravel Pit
BRIGGS ROAD
VALLEY ROAD
HUGHES LAKE ROAD
MAPLE ROAD
18
17
16
15
20
21
22
29
28
27

Vaughn Lake

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
293 acres 118 hectares

Subsection
Tawas Lake Plain

Land Type Association
SUB-SUBSECTION VII.1.1: STANDISH
LTA 3-4-1-1 Ice-contact ridges; many kettle lakes
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Huron Shores

Alliance

Scientific Name	Common Name
Chamaedaphne calyculata Saturated Dwarf-Shrubland Alliance (IV.A.1.N.g)	Leatherleaf Saturated Dwarf-Shrubland Alliance

Association

Scientific Name	Common Name
Chamaedaphne calyculata / Carex oligosperma - Eriophorum virginicum Dwarf-shrubland	Leatherleaf / Few-seed Sedge - Tawny Cottongrass Dwarf-shrubland

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Bog	-	B	-	-	G3	S3

Ecological Description
The pRNA contains a bog that is dominated by leatherleaf, bog birch, alder, and sphagnum moss. The bog occurs within a shallow basin of a sandy lakeplain. The basin contains a small area of open water and a small forested zone that is dominated by tamarack, black spruce, white pine, and red maple. The sandy uplands surrounding the bog support dry-mesic northern forest. For more information see the community EOR .

RNA-equivalents
none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
none		

Representation Comments
The bog at Vaughn Lake pRNA is the only known occurrence of this alliance within the subsection and therefore the best location for representation of this alliance.

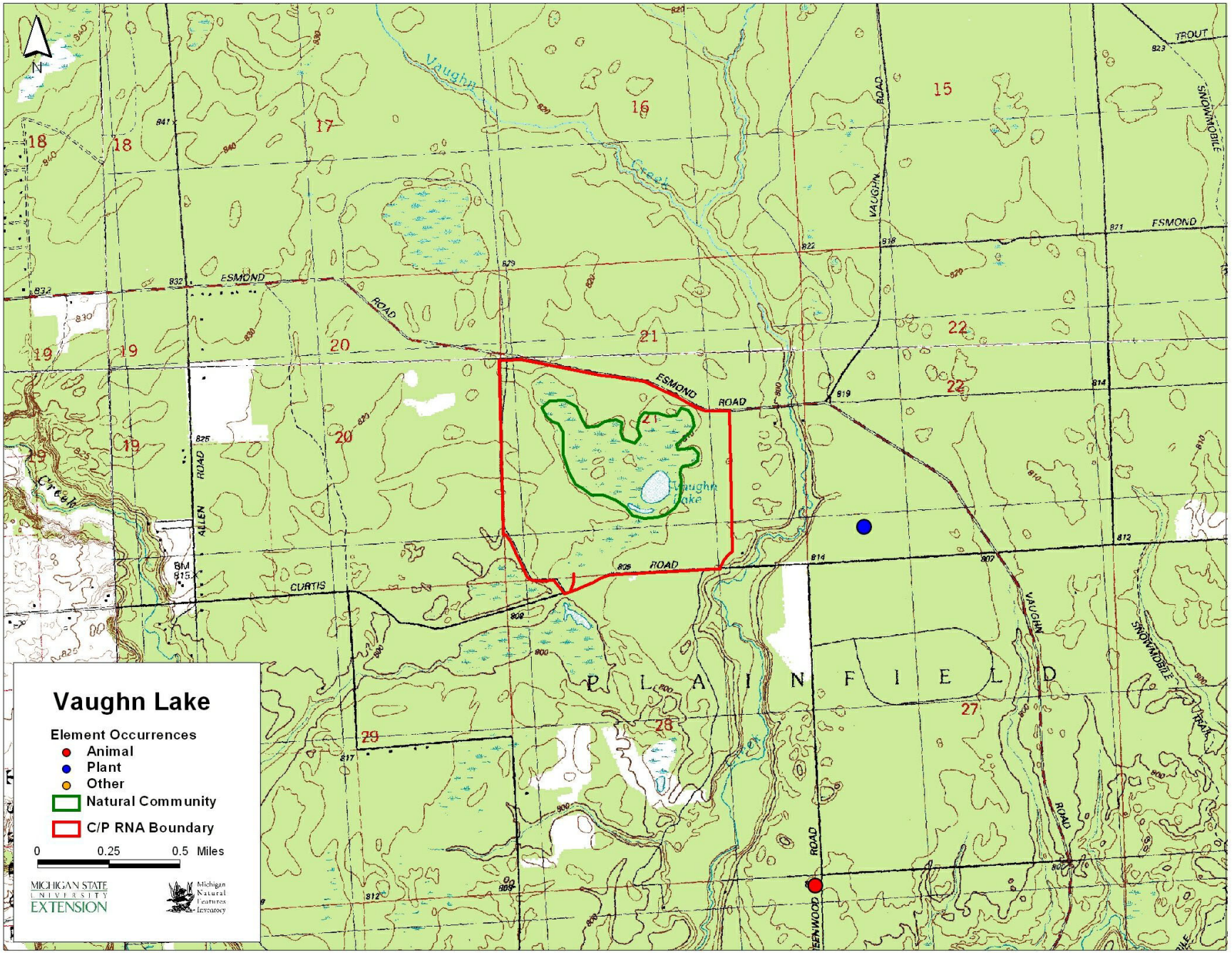
Vaughn Lake (continued)

Administrative and Management Concerns

A short access road leading to private land crosses the southeastern portion of pRNA. The access road could be used as a boundary for pRNA. The red pine stand located southeast of the bog EO was recently thinned.

Boundary Description

Boundary was modified at meeting with District and MNFI staff on 2-12-03 to allow for upland buffer around natural feature. Roads were used to delineate boundary where feasible. Eastern boundary extends to private land on east and private land access road in far southeast portion of the pRNA.


Vaughn Lake
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0 0.25 0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Michigan Natural Features Inventory
ESMOND ROAD
CURTIS ROAD
ALLEN ROAD
VAUGHN ROAD
FENWOOD ROAD
PLAINFIELD
Vaughn Creek
TROUT CREEK
SNOWMOBILE TRAIL
N

White River (includes Sischo Prairie)

Status
Potential Candidate Research Natural Area or Unique Area Under Study But Not Identified in the Forest Plan

Size
1,315 acres 532 hectares

Subsection
Hart Outwash and Lake Sands

Land Type Association
SUB-SUBSECTION VII.4: MANISTEE
LTA 5-5-3-1 Narrow outwash channel
LTA 5-1-1-1 Broad, flat outwash plain; few lakes or wetlands

Administrative District
Baldwin-White Cloud

Alliance

Scientific Name	Common Name
Acer saccharinum Temporarily Flooded Forest Alliance (I.B.2.N.d)	Silver Maple Temporarily Flooded Forest Alliance
Schizachyrium scoparium - (Sporobolus cryptandrus) Herbaceous Alliance (V.A.5.N.c)	Little Bluestem - (Sand Dropseed) Herbaceous Alliance

Association

Scientific Name	Common Name
Acer saccharinum - Ulmus americana - (Populus deltoides) Forest	Silver Maple - American Elm - (Eastern Cottonwood) Forest
Schizachyrium scoparium - Danthonia spicata - Carex pensylvanica - (Viola pedata) Herbaceous Vegetation	Little Bluestem - Poverty Oatgrass - Pennsylvania Sedge - (Birdfoot Violet) Herbaceous Vegetation

Element Occurrences

Scientific Name	Common Name	EO Rank	US Status	State Staus	G Rank	S Rank
Lycaeides melissa samuelis	Karner Blue	-	LE	T	G5T2	S2
Cirsium hillii	Hill's Thistle	D	-	SC	G3	S3
Dry sand prairie	Dry Sand Prairie, Midwest Type	B	-	-	G3	S2
Lycaeides melissa samuelis	Karner Blue	D	LE	T	G5T2	S2
Lycaeides melissa samuelis	Karner Blue	-	LE	T	G5T2	S2
Lycaeides melissa samuelis	Karner Blue	-	LE	T	G5T2	S2

Ecological Description
The pRNA contains several dry sand prairie openings that occur within shallow depressions on an outwash plain. Abundant species within the openings include little bluestem, Carex pensylvanica, hair grass (Deschampsia flexuosa), blazing star, and lupine. The openings are surrounded by oak barrens and dry-mesic

White River (includes Sischo Prairie) (continued)

northern forest. A southern floodplain forest EO occurs adjacent to the southern portion of the pRNA along the White River and is dominated by silver maple and red ash. For more information see Albert et al. 1991, Comer 1995b, and community and animal EORs.

RNA-equivalents

none

Similar community EOs on public land within subsection

Survey Site	Community	EO Rank
Skeel Creek Prairie	Dry sand prairie	B
White River - Camp Owassippe	Southern floodplain forest	B

Representation Comments

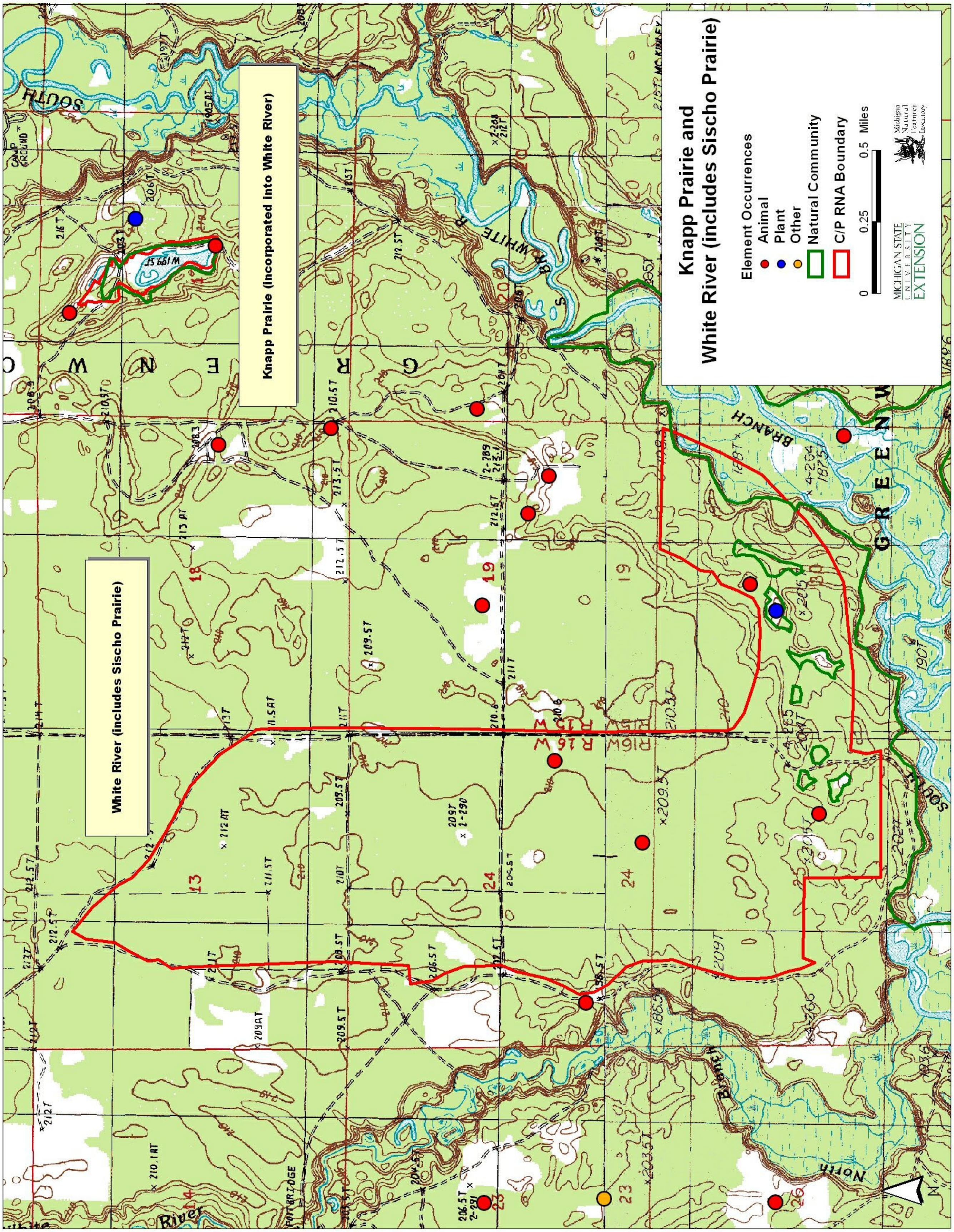
Two other dry sand prairie EOs occur on USFS lands within the subsection. A similarly ranked but smaller dry sand prairie EO occurs at the Skeel Creek Prairie pRNA, and a lower ranked (C-ranked) occurrence is located at the Knapp Prairie pRNA. However, because of its rank and size, the White River (Sischo Prairie) pRNA is the best location within the subsection to represent dry sand prairie and its corresponding alliance. Another southern floodplain forest EO of similar size and rank occurs partially on USFS land at White River - Camp Owassippe. While both floodplain forests are high quality EOs, the White River pRNA is the best location within the subsection to represent the community and its corresponding alliance because it will include a large upland buffer and protect critical wildlife corridors that link upland and wetland habitats.

Administrative and Management Concerns

The pRNA is part of the Muskegon Recovery Unit for the Karner blue. Concerns were raised by District staff regarding the potential for RNA designation to cause an impediment to management for the Karner blue, which can include use of prescribed fire and hand cutting. The area is heavily used by ORVs and for horseback riding. The District has closed several roads in pRNA and designated the site as a Semi-primitive Non-motorized Area but have difficulty in keeping them closed because of illegal ORV use. District would prefer to designate site as an 8.1 Management Area and refrain from moving forward with RNA establishment at this time. The District is willing to consider including the adjacent southern floodplain forest EO along the White River as part of the pRNA.

Boundary Description

The pRNA boundary was not adjusted. Consider using the White River as the southern boundary of the pRNA in order to include portions of the high quality southern floodplain forest EO and protect wildlife corridors and ecological processes.


Knapp Prairie and
White River (includes Sischo Prairie)
Element Occurrences
Animal
Plant
Other
Natural Community
C/P RNA Boundary
0
0.25
0.5 Miles
MICHIGAN STATE UNIVERSITY EXTENSION
Knapp Prairie (incorporated into White River)
White River (includes Sischo Prairie)