Kettle Moraine Waters

Master Plan and Environmental Analysis: KMSF-Mukwonago River Unit and Lulu Lake State Natural Area

Approved by the Natural Resources Board
August 2018

Wisconsin Department of Natural Resources
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Chapter One– Introduction

Location and Access

The Kettle Moraine State Forest – Mukwonago River Unit, Lulu Lake State Natural Area and Eagle Spring Boat launch properties are located in Waukesha and Walworth counties, Wisconsin and are comprised of approximately 2,200 acres of fee title lands and 740 acres of easement acres. These lands are owned and managed by the Wisconsin Department of Natural Resources (DNR). The properties are situated about 25 miles west of Milwaukee, near the Village of Mukwonago. The region surrounding these properties is primarily rural with an abundance of forests, farms, and scattered residential development. County Highways J, LO, and E run nearby, providing easy access from urban centers.

The Planning Process

The planning process began in 2013 with the gathering of background and resource information. During this planning process, DNR staff hosted three public information meetings/listening sessions with individuals, special interest groups, and government officials. Staff also personally contacted and/or attended meetings with local and state officials. The draft vision, property goals and a range of four alternative proposals covering expansion, management, use, and development of the forest and natural area were provided to public participants, local governing bodies and elected officials for review and comment.

State Forest Management, Development, and Use

The state forest will provide for low-to-moderate recreation developments while protecting the Mukwonago River. These recreation developments will provide for full access to the forest with day use and overnight camping opportunities. The plan recommends improved access to both Rainbow Springs Lake and the Mukwonago River along with hiking trails. Vegetative management will enhance the recreation experience while providing for habitat management opportunities and natural resource protection.

State Natural Area Management, Development, and Use

The goal of the State Natural Areas Program is to protect outstanding examples of Wisconsin's native landscape of natural communities, significant geological formations, and archeological sites. The plan recommends the continued protection of the Lulu Lake State Natural Area to preserve and protect the unique natural communities. The primary emphasis will perpetuate native community protection both passively and utilizing targeted management activities. Primitive to light recreation developments will allow the public to continue to utilize the property.

The Public Involvement Process

Public involvement has been crucial to the development of this plan. A variety of tools were used to provide information on the planning process and solicit public input. These included news releases, newspaper articles, mailings, radio interviews, and a website. In addition, several public open house meetings and listening sessions were held at various stages throughout the planning process. Generally, the public has expressed support for a low to moderate level of

facility development that preserves the natural, scenic character, ecological resources and geologic features of the land and waterbodies.

Chapter Two – Management, Development and Use

This master plan is for the management, development and use of the Kettle Moraine State Forest – Mukwonago River Unit, Lulu Lake State Natural Area and the Eagle Spring Boat Launch as shown in Map B-1: DNR and Other Lands. While the state forest and natural area have a different focus, they are managed as complementary partner properties. This chapter is organized into four sections, which follow the combined vision and goals for the properties.

Section One – Kettle Moraine State Forest – Mukwonago River Unit: This section details the management, development and use specific to the state forest property. The focus is on providing opportunities for hiking, boating, fishing, nature study, and picnicking in a relatively undeveloped setting as well as natural resource management.

Section Two – Lulu Lake State Natural Area: This section details the management, development and use specific to the natural area. The focus for this property is on habitat preservation and natural community restoration.

Section Three – Eagle Spring Lake Boat Launch: This section details the management, development and use specific to the Eagle Spring Lake boat launch.

Section Four- Common Management Elements: This section covers management, development and use elements common to all properties.

Vision for the Properties

Together, the Mukwonago River Unit of the Kettle Moraine State Forest and the Lulu Lake State Natural Area conserve and protect the outstanding collection of scenic, scientific, biological, and cultural features and values as part of the Mukwonago River Watershed; preserve the benefits of the mostly natural, undeveloped Southern Kettle Moraine Waters for present and future generations while providing recreational connections to the surrounding community and public lands.

Management Goals

- Provide a rare opportunity to experience the land and waters of the Kettle Moraine landscape along with traditional passive outdoor recreation activities in a natural setting.
- Preserve the waters and associated glacial-shaped landscapes that support important ecological communities such as Oak Savanna, wetlands, dry prairies, and cold-water fisheries.
- Protect and maintain the unique natural landscape features and rare natural communities, habitats, and plant and animal species.
- These lands and waters offer interpretive and educational opportunities focusing on natural and human history. Provide opportunities for learning about and appreciation of the rich story about the Mukwonago River and the surrounding landscapes while enhancing outdoor recreation skills.

- Provide and maintain appropriate opportunities for safe public access to the properties' public lands and waters.
- Be an important conduit for recreation and conservation opportunities, serving a key link connecting the Kettle Moraine landscape to the surrounding communities.

Section One: Kettle Moraine State Forest - Mukwonago River Unit

Property Description

Existing Fee Acres:	**959.04**
Existing Project Boundary:	978.72 acres
New Project Boundary:	1,008.14 acres
New Acquisition Goal:	996 acres

The Kettle Moraine State Forest- Mukwonago River Unit (MRU) is located approximately five miles west of the Village of Mukwonago in Waukesha and Walworth counties. The property consists of 959 acres owned in fee title by DNR and two acres of easements. Rainbow Springs Lake is located on the property and is 35 acres with a maximum depth of 16 feet. A majority of the lake is 2-4 feet in depth. Hogan Lake is also partially located on the property and is adjacent to the northern tip of Rainbow Springs Lake. It is predominantly a shallow wetland system with eight acres of open water and a maximum depth of three feet. Purchased in 2008, the MRU of the Kettle Moraine State Forest possesses an abundance of natural resources and is an important location for providing recreational opportunities in southeast Wisconsin. This state forest is only 35 miles west of Milwaukee, and about five million people live within 100 miles of the property. A key feature on this property is the Mukwonago River which is located along the northern boundary of the MRU. The Mukwonago River supports 59 species of fish, and is one of the most biologically rich mussel habitats in Wisconsin. The frontage along the Mukwonago River is classified as an outstanding water resource and a Class II trout stream. This property is anticipated to be popular with a variety of age groups and recreational interests.

The Mukwonago River, WDNR 2017.

The MRU offers exceptional outdoor recreation benefits for public enjoyment. The ongoing restoration and development of recreational access will result in all-season access to the unique property and is anticipated to be popular with a variety of age groups and recreational interests.

Property Designation and Authority

The Kettle Moraine State Forest – MRU is designated as a southern state forest as defined in Wis. Admin. Code Ch. NR 45.03(21). Southern state forests are administered by the Bureau of

Parks and Recreation Management. The authority to acquire and manage land within the MRU is described in Sections 23.09, 23.11, 23.14, and 27.01, Wis. Stats.

Land Management Classifications

The MRU is classified as a Recreation Management Area, Habitat Management Area and Natural Community Management Area. The department's land management classifications are defined in Chapter NR 44.06 and 44.07, Wis. Admin. Code.

The majority of the Recreation Management Area has a Type 3 Recreational Use Setting. The campground has a Type 4 Recreational Use Setting (see Map B-6). Natural Community Management Areas are immediately adjacent to the Mukwonago River and the Habitat Management Areas include the grasslands, wetlands and forested areas of the property. Past development and land use practices have varied on this property, so the western half and eastern half differ in existing vegetation. As such, resource management objectives will vary somewhat based on the management emphasis of each. The emphasis on the eastern half will be on grasslands; the emphasis on the western half will be on oak woodlands.

Table 1: Land Management Classifications – MRU

NR 44 Land Management Classification	Acres	% of State Forest
Recreation Management Area - Type 3 Recreational Use Setting	424	42%
Recreation Management Area - Type 4 Recreational Use Setting	20	2%
Habitat Management Area	483	48%
Native Community Management Area	81	8%

Recreation Management Area Classification-RMA (444 acres total)

The focus of a Recreation Management Area is to provide and maintain land and water areas and facilities for outdoor public recreation or education. The land management classifications describe the primary, overall management focus or use for a property or a management area within a property. The management classification is not necessarily an exclusive purpose for the property or management area. Other compatible management objectives and benefits may be, and often are, managed for as well. Vegetative management of this portion of the forest emphasizes native vegetation and the maintenance of an attractive, safe recreational environment. See map B-6 for MRU RMA areas.

<u>Type 3 Recreational Use Setting (424 acres)</u>

The objective of this setting is to provide readily accessible areas with modest recreational facilities offering opportunities at different times and places for a variety of dispersed

recreational uses and experiences. Landscapes within the setting may vary from natural-appearing to highly altered.

Type 4 Recreational Use Setting (20 acres)
The objective of this setting is to provide areas offering opportunities for intensive recreational use activities and experiences. Facilities, when present, may provide a relatively high level of user comfort, convenience and environmental protection.

Recreation Management
The recreation management settings for MRU are to provide a predominantly natural–appearing setting offering opportunities for several types of recreation while conserving the adjacent natural resources. The level of recreational facility development will be like other units of the Kettle Moraine State Forest and is limited to facilities that provide the public recreational access. See Map B-2 for existing and future recreation infrastructure.

General Management Objectives:

- Provide opportunities for recreation on an interconnected network of primitive to lightly developed trails.
- Provide for a pass-through snowmobile trail connecting to regional networks.
- Provide camping opportunities that have a rustic feel while offering some modern campground amenities.
- Provide day-use recreational activities, including picnicking, boating and fishing.
- Pursue water quality improvement initiatives for the wetlands and streams on the property.
- Allow for timber management/timber cuts to help manage the wooded areas on the property.
- Manage vegetation throughout the RMA classification area with a balanced approach between user aesthetics and native vegetation/resource health.
- Give aesthetic and recreational value preference when making decisions on timber and other vegetation management and time management actions to minimize negative visual and audio impacts on recreational users.
- Take precautions to protect the Mukwonago River corridor from construction site runoff and other sources of potential pollution (sedimentation, temperature increases, etc.)
- Control non-native invasive and native aggressive vegetation to provide for an optimal user experience and ecosystem health.

General Management Prescriptions:

- Construct up to 11.2 miles of recreational trails (see trails section below) and utilize existing snowmobile trail on the property.
- Construct rustic and modern camping facilities on the property (see camping section below).
- Construct day use and picnic areas in addition to a small watercraft boat launch that also serves as a fishing pier (see day use section below).
- Mange the ditch/pond system to restore natural hydrologic conditions where possible on the property. This may include removing tiles and culverts and changing flow from main-made ponds and channels to avoid contributing warm water to the Mukwonago River system.

- Trees and shrubs may be selectively managed (removed/ planted) for the development or redevelopment of designated public use areas or sites. Planting and maintenance of native trees and shrubs may be done on these sites for screening for scenic, wildlife, or recreational enhancement of the site.
- Conduct single tree selection or small group harvests to restore oak woodlands throughout the property. Any harvests should emphasize retaining bur, white, black oaks and other typical oak woodland canopy tree species. Oak woodland ground flora can be augmented by planting appropriate native species.
- To maintain or restore scenic values, conduct salvage harvests and take other actions as necessary to restore sites following natural disturbances.
- Utilize water quality Best Management practices pre-and post-construction or with vegetation management actions to prevent sedimentation and untreated runoff from entering the Mukwonago River, wetlands, or tributaries.
- Prescribed burns can be used to manage all vegetated habitat types.
- Manage non-native invasive and aggressive native species with integrated pest management principles. Techniques can include manual, mechanical, pesticides, and biological controls. Care should be taken with pesticide/herbicide use near wetlands and waterways. Appropriately labeled and registered pesticide products should be utilized near sensitive resources like these.
- Public areas may be mowed.

<u>Vegetation Management Objectives:</u>

Eastern Half- Former Golf Course Area

- Maintain surrogate grassland areas and enhance with native vegetation as resources allow.
- Expand surrogate grassland areas where feasible.
- Maintain utility corridor within the utility easement area.
- Transition oak areas to oak woodlands.
- Restore wetland hydrology in areas where feasible.

Western Half

- Continue to manage and restore oak woodlands.
- Reduce the appearance of a conifer plantation on the property. At final rotation age, convert select conifer plantation areas to oak woodlands where feasible.
- Convert surrogate grasslands to native prairie plantings.
- Maintain open access in the utility corridor easement area.
- Convert brush areas to a more suitable native plant community where feasible.
- Restore wetland hydrology in areas where feasible. Enhance existing wetlands for native plant diversity.

<u>Vegetation Management Prescriptions:</u>

Eastern Half- Former Golf Course Area

- Surrogate grasslands will be maintained as grasslands in the short term but will eventually be transitioned to native warm season grasses and forbs.

- Convert upland brush areas to surrogate grassland. Clear brush mechanically and/or with the use of appropriate herbicides. Use similar techniques to manage vegetation in the utility easement area.
- Remove existing conifer trees and convert into grasslands.
- Evaluate wetlands for suitability for restoration. Many of the wetlands are in a disturbed or filled state in this part of the property.

Western Half

- Prioritize the order by which the oak-dominated stands will be restored.
- Thin the oak canopies, manipulate the understory and use shrub control techniques via harvest, brushing or fire to mimic natural disturbance patterns. Augmentation of the ground layer will only add species that historically have been found on site. Utilize seeds or plugs from local genetic material.
- Evaluate conifer plantations for long-term management potential based on stand health, aesthetics, and proximity to other cover types. Decide on a management plan and implement. For conifers that will remain, manage for large trees and selectively cut areas to reduce the appearance of a plantation.
- Evaluate upland brush areas and convert to grassland or oak woodland as appropriate. Proceed with utilizing burning, mowing or chemical means to accomplish conversion.
- Evaluate wetlands for suitability for restoration and/or enhancement. Proceed with restoration (i.e. controlling invasives, restoring hydrology, adding native wetland vegetation) as resources allow.
- Allow for vegetation control by mechanical or herbicide means in the utility corridor easement area.

Designated Trails

Management and development prescriptions describe the use, classification, and location of trails. Trail classifications are based upon Ch. NR 44, Wis. Adm. Code. The plan establishes a combined total of trails that are up to 11.2 miles. The final “on the ground” exact alignment of the new or redeveloped trails will be determined during the facility design process and will be included in the DNR’s Capital Development Program Statement site plans. In addition, the key stakeholder groups will be consulted as appropriate during on the ground design and construction.

<u>Trail Management Objectives:</u>

- Provide up to 11.2 miles of trails for hiking, ungroomed snowshoeing and cross-country skiing.
- Accommodate up to a 1.5-mile snowmobile pass-through trail in locations which do not conflict with the primary uses of the property.
- Provide opportunities for road biking on the main roads of the property.

<u>Trail Management Prescriptions:</u>

- Construct up to 11.2 miles of trails for hiking, ungroomed snowshoeing and cross-country skiing.
- Utilize the existing snowmobile trail on the west side of Rainbow Springs Lake.
- Ensure a road biking and pedestrian lane are incorporated into the main forest road design and construction.

Trail Uses

Hiking
Establish and develop up to 11.2 miles of looped hiking trails within the property. These trail loops will offer a variety of trail experiences and will accommodate ungroomed snowshoeing and cross-country skiing in winter. A trail connecting from the Lulu Lake State Natural Area parking area to the Mukwonago River day use location will be established. Three loops will be established that include circling Rainbow Springs Lake and providing multiple access points along Mukwonago River.

Biking
On-road biking is a popular activity at all parks and southern forests. All forest roads are open to bicycle use. With the redevelopment of the forest entrance road, wider road shoulder widths will be used to meet this need.

Snowmobile
There is an existing 15-foot wide snowmobile trail which transitions from the Lulu Lake SNA into the MRU along County Highway E. This 1.5-mile trail will be retained as a pass-through connection for the regional snowmobile trail system. This trail will be maintained by the local snowmobile clubs. All snowmobiles utilizing this trail will be required to have an annual state snowmobile pass.

Table 2: Summary of MRU Designated Trails

Trail Use	Miles (approx. to be built)	NR44 Trail Classification
Hiking/ungroomed snowshoe and skiing	8.0	Primitive to lightly developed
Bike (on road/path)	1.7	Fully developed
Snowmobile	1.5	Lightly developed
Totals	**11.2**	

Camping
General objectives and prescriptions for a campground located on the property near Rainbow Springs Lake are listed below. Prior to specific campground plan development, a campground planning team will convene to review the ecological conditions onsite and potential/ recreation facility locations. A floodplain analysis will also be completed as a part of the site ecological assessments. This approach was selected in lieu of proposing specific campsite locations because the development may be years in the future and up-to-date data will be required for campground site plans. The campground team will consist of a forest superintendent, property manager, district park supervisor, Natural Heritage Conservation ecologist, parks ecologist (or similar staff person) and a landscape architect. Site-specific campground plans will be drafted by the team after an on-site analysis of ecological resources and recreational potential is completed. A public meeting, public notice and/or public comment period will occur as a part of the campground planning and finalization process.

Campground Management Objectives:

- Provide opportunities for modern camping as defined in Wisconsin Administrative Code Chapter NR 44.07(7) (5b). This may include the construction of a sanitary dump station and shower facilities.
- Provide opportunities for rustic walk/cart-in tent camping in a quiet, natural setting (Rustic camping is defined in Wisconsin Administrative Code Chapter NR 44.07(7) (4b)).
- Provide an accessible camper cabin.
- Avoid and minimize potential impacts to the natural resources and topography when planning for recreational developments on the site.

Campground Management Prescriptions:

- Develop a campground loop or campground loops with 25-50 total sites (includes both modern and rustic).
- Design part of the campground loop(s) to provide a modern family camping experience with electricity up to 80% of the sites. This campground will have a combination of pull-through campsites and spaced spur-type campsites.
- Construct restroom facilities to meet the need of the number of campsites developed.
- A centrally located shower facility may be constructed.
- Develop walk/cart-in camping opportunities at a minimum of five campsites for a more secluded, quiet experience.
- Utilize the existing roads on the property as much as possible for campground accessibility. Snowmobile trail use and potential user conflicts on the gravel road on the west side of Rainbow Springs Lake should be taken into consideration if additional recreational uses are planned in that area.
- Construct campground areas in portions of the property that will be the least detrimental to the surrounding natural communities.
- Create a centrally located lake access trail or point for campground sites that may be adjacent to Rainbow Springs Lake. This is to discourage recreational users from creating separate trails that lead to the lake which could increase erosion or slope destabilization in the near-shore area. Design, location and construction of a central access point and/or trail will be at the discretion of the park manager.
- Utilize appropriate water quality erosion control best management practices during construction. Incorporate post-construction erosion control measures into the campground development plans and implement onsite. This is to protect and preserve the water resources and wetlands found on this property.
- Develop a sanitary dump station (if warranted with the number of RV sites) for the efficient disposal of wastes from holding tanks of recreational vehicles. Placement of the dump station may be along the main entrance road leading to the campground loop(s). Design will be in accordance with the standards in Wisconsin Administrative Code SPS 382. 37.

Day Use, Picnic Areas, And Water Access

Management Objective:
Provide high-quality opportunities for water access and day use recreation.

Rainbow Springs Lake Day Use Area
A day-use area will be created for Rainbow Springs Lake. The associated facilities will include a small picnic area, vault restroom, parking, an accessible fishing pier and carry-in boat landing. This day-use area will be in the area previously developed/disturbed, open lakeside area on the east/northeast side of Rainbow Springs Lake.

Rainbow Springs Lake Picnic Area
This lightly developed picnic area [standards defined by NR 44.07(e)3] will include; a rustic styled open-air picnic/interpretive group shelter and up to four separate picnic sites (two disabled accessible). These four picnic sites will be developed, separated by at least 100-feet, placed on pervious aggregate surfacing, or pervious pavement/pavers, have a picnic table and optional grill unit and be surrounded by native plantings. Signs will be provided near the picnic area describing the native plantings and their benefits for the property.

Rainbow Springs Lake Fishing Platform and Canoe/Kayak Access
A disabled accessible fishing platform and carry-in canoe/kayak launch will be constructed for this day use area. The fishing portion of the platform will accommodate two wheelchair users. A five-foot wide handicap compliant moderately developed trail of compacted aggregate will link the fishing platform to the Day Use Picnic Area. Motorized boats will not be used on Rainbow Springs Lake due to the shallow water depths.

Rainbow Springs Day Use and Picnic Area Parking Lot
A day use parking area will be constructed to serve both the picnic area and fishing platform/canoe launch. The parking lot will be surfaced with a pervious pavement (preferably) or compacted, stable aggregate or asphalt to accommodate up to 20 vehicles, with five of these parking stalls accommodating trailers.

Table 3: Summary of MRU Facilities

Facility	Number
Rainbow Springs Day Use Area	1
Canoe Landings / Kayak Access	2
Picnic Shelter (fits 8-12 picnic tables)	1
Picnic Areas (two are ADA accessible)	4
Vault Restroom (ADA accessible)	1
Fishing Platform	1
Parking lot (20 stalls, 5 accommodate trailers)	1
Rainbow Spring Lake Campground	1
Camping Sites (standard, walk/cart in and cabin)	25-50
Sanitary Dump Station	1
Restrooms	5-20
Shower Facility with Flush Restrooms (one shower, one bathroom stall ADA accessible)	1
Cabin- available for reservations (ADA accessible)	1
Hiking trail	.5-1 mile
General Facilities	
Dog Training Area (Class 2), 25 acres	1
Public Entrance- Visitor Services Area	1
Entrance Road, Miles	1.6
Trails (multi-use: hiking, biking, snowmobiling, snowshoeing)	11.2 miles
Parking Lots for Dog Training Area and Visitor Services Stations	2

Other Supporting Recreational Topics/Infrastructure

Entrance Road

The primary entrance/exit road will be established from County Highway LO. This road will utilize portions of the old entrance road establishing a road network that will connect all southern forest developments. In total, up to 1.6 miles of paved road will be established. As part of the road development, a small pull-out area will be developed near the Mukwonago River for canoe/kayak/fishing access.

Public Entrance- Visitor Services Area

An entrance area for visitors will be constructed for visitors to receive information on the property and for fee exchange. A visitor parking area will be constructed for up to six standard vehicles, one ADA accessible van stall and two pull-through RV, school bus or car with trailer stalls.

Administrative/Maintenance Area

An administrative/maintenance area may be established. Currently, the property utilizes an existing structure that was a former golf course clubhouse to store equipment. This structure is oversized, within a floodplain and not configured correctly for shop/property operations. It is currently in poor condition. Removing this structure is a high priority. In the short term, this building may be utilized for limited storage and may be removed at the property manager's discretion.

Mukwonago River Unit Canoe/Kayak Access

Access to the Mukwonago River are part of the day use opportunities offered at this site. Users can access the Mukwonago River via a parking lot from a carry-in/cart-in site located in the day use area. Best management practices for erosion control and runoff management will be implemented as a part of this development.

Dog Training Area (Class 2)

Dog training refers to any teaching or exercising activity involving sporting dogs in which the primary purpose is to enhance field and/or water performance. Sporting dogs are utilized for hunting game birds and game mammals and include breeds such as pointers, setters, retrievers and hounds. See Map 2 for training area.

A series of manmade ponds located towards the northeastern side of the property are well suited for a Class 2 water retriever dog training area. Up to 25 acres will be designated for this use. A parking area surfaced with a compacted, stable aggregate or asphalt that accommodates up to 12-15 vehicles will be constructed. Other facilities include a rustic styled one-unit unisex restroom building and a lockable service gate for the parking area.

Regulations governing the training of sporting dogs vary according to what species the dogs are being trained with and where the training takes place. Signage will be included on pet waste disposal and site rules.

Signage

A forest-wide signage system will be developed and implemented that meets current state forest design standards as well as the standards of NR44 for each recreational use setting, provides the necessary “way-finding” and has a unified aesthetic character that is harmonious with the area’s natural surroundings. Signs covered by the plan include directional signs to the forest entrance and facilities, native/sensitive plantings, trail markers, regulation signs, directional and informational signs.

Forest Entrance Sign

A rustic styled forest entrance monument/sign will be constructed with native plantings. This will be located on County Highway LO and will be visible for vehicles approaching from both directions. The forest entrance monument will provide a sense of arrival and establish the distinct architectural/aesthetic character that will be carried throughout the forest in other structures and signage. The monument/sign will be constructed with stone masonry, wood, and other rustic or native materials.

Motorized Vehicle Access

A 1.6-mile paved moderately or fully developed entrance road will be built from County Highway LO as shown on Map B-4. This road will be plowed in winter to the Rainbow Springs Day Use parking lot that will allow for year-round visitor access.

Interpretation/Education Program

The goal of all interpretive services is to increase each visitor's enjoyment and understanding of the parks and to allow visitors to care about the parks on their own terms. Because state forests belong to all of us, the Park System has a responsibility to protect this forest and lands for future

generations. Understanding the forest's importance to our natural and cultural world is the first step toward this preservation.

The following facilities/displays will be developed:

- Display kiosks and signage at the day use areas
- Signage at the canoe launches and fishing pier on invasive species identification and prevention, catch and release fishery information, freshwater mussel regulations and Mukwonago River watershed information.
- Select hiking trails can have interpretive signs on watershed characteristics, geology, fisheries and wildlife topics.

These developments will be outlined further in a property-wide interpretative plan that will be developed with input from the forest and natural area staff. Recommended interpretive themes for the forest should include the social and ecological significance of the unique watershed, geology topography, and ecological features in and near the forest.

Hunting and Trapping

Most of the forest is open to the hunting opportunities and seasons as defined by state administrative code (NR 10 and s. NR 45.09). The primary species hunted are white-tailed deer and turkey. The property offers opportunities for small game hunting and trapping. Other popular game species, such as Ring-necked Pheasant and Ruffed Grouse can be found on the property but in limited numbers due to habitat limitations. Care will be taken to avoid user conflicts and potential safety concerns for other property users. Property signage will clearly indicate hunting areas and seasons.

Fisheries Management

Rainbow Springs Lake

It is recommended that Rainbow Springs Lake is managed as a catch and release opportunity fishery. Rainbow Springs Lake is categorized as a spring lake with 35 surface acres of water and is 16 feet deep. The lake is predominantly groundwater and surface water fed with a continuously flowing outlet of the Mukwonago River. With the potential development of the campground, recreational use may be strong in this area. Catch and release only fishing regulations will ensure a quality angling experience for visitors. Rainbow Springs Lake currently has a naturally reproducing population of largemouth bass and sunfish. No fish stocking is recommended as Rainbow Springs Lake has excellent habitat and is self-sustaining given the catch and release fishing regulations.

Hogan Lake

Hogan Lake is another small spring lake immediately adjacent to Rainbow Springs Lake and is too shallow to support a sustainable fish population. Hogan Lake has tremendous wetland habitat that supports excellent wildlife viewing opportunities for recreational users of the property.

Mukwonago River

The section of the Mukwonago River within the MRU is designated as Class II brook trout stream. Since 1988, brook trout have been stocked nearly annually into the Mukwonago River,

but do not show significant signs of breeding, perhaps due to water temperatures which are often above optimal. Restoration work will continue within this section of the river along with annual stocking. Trout fishing regulations will be reviewed on a periodic basis to ensure a healthy fishery. Numerous rare freshwater mussels and fish are found in the Mukwonago River. The harvesting of all freshwater mussels in inland rivers is prohibited in Wisconsin.

Habitat Management Area Classification (483 acres total)

Habitat management areas (HMA) are to provide or enhance habitat, whether upland, wetland or aquatic, to support specific species of plants or animals. See Map B-6 for MRU HMA areas.

General Habitat Management Objectives:

- Manage in accordance with the general wildlife, fisheries, and forestry habitat management objectives found in the following general resource management objectives and prescriptions in Section Four of this plan.
- Continue to manage and restore oak woodlands.
- At final rotation age, convert conifer plantations to oak woodlands.
- Convert surrogate grasslands into native prairie plantings.
- Implement invasive species management based on property-wide priorities.
- Utility corridor management may also occur as needed within the utility easement area.
- Take precautions to protect the Mukwonago River corridor from construction site runoff and other sources of potential pollution (sedimentation, temperature increases, etc.)

General Habitat Management Prescriptions:

- Follow the applicable general wildlife, fisheries, and forestry prescriptions and management prescriptions by cover type as provided in Section Four of this plan.
- Thin the oak canopies, manipulate the understory and use shrub control techniques via harvest, brushing or fire to mimic natural disturbance patterns. Augmentation of the ground layer will only add species that historically have been found on-site. Utilize seeds or plugs from local genetic material.
- Evaluate conifer plantations for long-term management potential based on stand health, aesthetics, and proximity to other cover types like oak woodland where feasible. Decide on a management plan and implement. For conifers that will remain, manage for large trees and selectively cut areas to reduce the appearance of a plantation.
- Evaluate upland brush areas to determine if conversion to either grassland or woodland oak woodland is most appropriate. Implement recommendation for conversion.
- Allow aspen-typed wetland to convert to Shrub-Carr or open wetland.
- Mange the ditch/pond system to restore natural hydrologic conditions where possible on the property. This may include removing tiles, and culverts, and changing flow from man-made ponds and channels to avoid contributing warm water to the Mukwonago River system.

Native Community Management Area Classification (81 acres)

Native community management areas are designated to provide for opportunities to restore or enhance ecological community groups.

Management Objectives:

- Manage in accordance with the general wildlife, fisheries, and forestry habitat management objectives found in the following general resource management objectives and prescriptions in Section Four of this plan.
- Promote the essential hydrological structure and function of the Mukwonago River, as well as facilitate the maintenance of wetland and wildlife habitat within the river corridor.
- Protect, preserve, and expand (where possible) riparian buffer widths along the Mukwonago River to retain or improve water quality benefits (infiltration, temperature control, species diversity) within the river corridor.
- Manage non-native invasive species and native aggressive species based on property wide priorities.
- Restore/enhance wetlands as resources allow and opportunities arise.
- Allow for trail access for a viewing area of the Mukwonago River.

Management Prescriptions:

- Follow the applicable general wildlife, fisheries, and forestry prescriptions and management prescriptions by cover type as provided in Section Four of this plan.
- Maintain a 100-foot-wide (as measured from the ordinary high-water mark) riparian management vegetated buffer adjacent to the Mukwonago River. Manage native vegetation passively in this area. Manage for invasive plants in this buffer area by utilizing herbicides, hand-pulling and selective burn techniques as needed.
- Where feasible, restore hydrology that has been previously been altered in wetland and riparian areas. This may include removing tiles, adjusting drainage outfalls or drainage patterns, and/or removing culverts.
- Pursue wetland, waterway and native plant restoration projects through partners including wetland in lieu fee fund project recipients, and other conservation partners.
- Ensure trail development is in accordance with water quality best management practices and is constructed in a way that does not impact runoff to the Mukwonago River, its tributaries or wetlands. Short-term construction site erosion control and long term post-construction erosion control will be implemented in trail development areas.

Section Two: Lulu Lake State Natural Area

Property Description

The Lulu Lake State Natural Area (SNA) is a 1,234-acre property approximately seven miles west of Mukwonago, WI in Waukesha and Walworth counties. Lulu Lake is a 95-acre 40-foot maximum depth, hardwater drainage kettle lake fed by the Mukwonago River. The property is comprised of dry prairie areas, wetlands, open water, and oak openings. This master plan applies only to the department fee title owned lands of the SNA.

Existing Fee Acres:	1234.77
Existing Easement Acres:	741.36
Existing Project Boundary:	2368.61 acres
New Project Boundary:	2298.30 acres
New Acquisition Goal:	2239.69 acres

Property Designation and Authority

Lulu Lake State Natural Area (Lulu Lake) is designated as a State Natural Area. State Natural Areas are managed in accordance with Wis. Stat. s. 23.27. State Natural Areas are defined and authorized in ss. 23.27-23.29 and NR 1.32 as “an area of land or water which has educational or scientific value or is important as a reservoir of the state’s genetic or biological diversity and includes any buffer area necessary to protect the area’s natural value”. Section 23.27(1) defines natural areas as "reserves for native biotic communities...habitat[s] for endangered, threatened, or critical species...or areas with highly significant geological or archaeological features". Section 23.28(1) provides authority to designate areas as State Natural Areas and Section 23.29 provides authority to legally dedicate and protect State Natural Areas in perpetuity. State Natural Areas are administered by the Bureau of Natural Heritage Conservation. The statutory authority to acquire and manage land within Lulu Lake is described in Section 23.27 Wis. Stats.

View of Lulu Lake, Warwick, 2017.

Land Management Classification

The Lulu Lake SNA is classified as a Native Community Management Area. Native Community Management Areas are managed to perpetuate plant and animal communities typical of pre-settlement landscapes and protect the biological diversity of these native upland, wetland, and aquatic ecosystems. Areas that initially do not have the desired community conditions but have a reasonable potential to be restored may be included in this classification. All the traditional recreational uses (e.g., hunting, fishing, trapping, and nature enjoyment) are allowed except if an area needs to be closed during breeding season. The land management classifications are further defined in Chapter NR 44.06 and 44.07 of the Wisconsin Administrative Code. Note: There are areas of the Habitat Management Classification within the Lulu Lake State Natural Area Project Boundary (i.e. areas that are not currently owned by the state or TNC and are not a part of the Lulu Lake SNA but are in the project boundary and could be in the future). *Note: There are small areas of Habitat Management Area within the Lulu Lake State Natural Area as shown on map B-6. These areas are owned by The Nature Conservancy and this master plan does not apply to those areas.*

Resource Management

The primary focus of vegetative management is to provide preservation, protection, and restoration to natural communities in a wooded, wetland and open grassland environment.

General Property Management Objectives:

- Manage as a reserve for dry prairie, Calcareous Fen, and oak opening, as an aquatic preserve and wetland protection site, and as an ecological reference area.
- Allow for a shifting mosaic of emergent marsh, southern sedge meadow, and Shrub-Carr with dry prairie, Oak Savanna and southern dry-mesic forest.
- Natural processes, including prescribed fire, alongside an active invasive species control program, will determine the structure of the site's natural communities.
- Provide opportunities for low-impact to the resource research and education on the highest quality fens, native prairies, and oak openings.
- Protect the ecological values and high quality of the Mukwonago River and its corridor.

General Property Management Prescriptions:

- The ecological characteristics of the site will be primarily shaped by an intensive fire management program implemented across all fire-dependent communities. As such, prescribed fire will be an integral tool to maintain high site quality, burning areas at recommended intervals. Restoration and highly degraded areas may be burned more frequently during the establishment and recovery phases. Existing paths and trails may be maintained as firebreaks. New firebreaks may also be developed and maintained.
- Actively manage native communities through tree/shrub control using tree harvest, brushing and especially fire to mimic natural disturbance patterns. Occasional fire-tolerant woody species may be retained at relatively low densities (e.g., oaks, hickories,

and native shrubs such as hazelnut in the prairie; native wetland conifers such as tamarack).

- Other allowable activities throughout the site include control of invasive non-native and aggressive native species following integrated pest management principles, augmentation of native prairie species after careful review and preference for local genotype material, and access to suppress wildfires. Salvage of trees after a major wind event can occur if the volume of woody material inhibits fire prescriptions.
- To maintain and enhance the essential hydrological structure and function of the Mukwonago River, protect and expand (where possible) riparian buffer widths along the river to retain or improve water quality benefits (infiltration, temperature control, species diversity) within the river corridor.
- Avoid impact to rare species on the property. Follow Incidental Take Protocols for listed species when necessary.
- Encourage research projects for maintaining/improving ecosystem health and educational partnering on state owned fee title lands.
- Utility corridor management may occur sporadically within the utility easement area.

The Nature Conservancy and the Lulu Lake SNA

The Nature Conservancy (TNC) made its first acquisition at Lulu Lake in 1986 and owns 553 acres. TNC has expanded their work in this area to include the entire Mukwonago River Watershed. TNC has an office and staff in the East Troy area and is working cooperatively with many different public and private partners to accomplish the following:

Protect the water quality of and natural areas within the Mukwonago River Watershed.

Manage their preserves to maintain rare natural communities and provide habitat for fish, mussels, amphibians and reptiles. This includes removing Eurasian water-milfoil and other aquatic invasive species.

Work with individuals and organizations concerned with the health of the watershed to help balance watershed protection with human needs and economic health.

Provide recreational opportunities that include hunting, hiking, cross-country skiing and snowshoeing.

Management by Community Type

Wetland and Aquatic Communities (Southern Sedge Meadow, Emergent Marsh, Calcareous Fen, Shrub-Carr, Northern Wet Forest, Bog Relict, Inland Lake, Coldwater Stream)

Management Objectives:

- Protect the existing wetland communities within the state natural area.
- Maintain a high-quality wetland community complex of Emergent Marsh, Sedge Meadow, Calcareous Fen and Shrub-Carr. Note: Calcareous Fen wetland type is detailed in a separate section below. Maintain isolated Bog Relicts and Northern Wet Forest community types.
- Maintain the diverse, native aquatic communities for the benefit of native freshwater fish, mussels, invertebrates and other aquatic-dependent life.

- Evaluate wetlands for suitability for restoration from their current type to an alternate type (e.g., Shrub-Carr to Southern Sedge Meadow). Otherwise, maintain shrub-dominated wetlands as Shrub-Carr and open wetlands in an open condition.
- Maintain or restore the fish and mussel communities and the natural processes within Lulu Lake and the Mukwonago River and its tributaries.
- Manage/control invasive aquatic plant species within the inland lake aquatic plant community.

Spiny Softshell Turtle (Apalone spinifera) found on Lulu Lake, -WDNR 2016

Management Prescriptions:

- On sites that are to be maintained as open Sedge Meadow or Emergent Marsh, largely free from shrub encroachment or stands of monotypic invasive species (e.g., reed canary grass) where feasible, use prescribed fire, mowing, mechanical brushing, and herbicide treatments to maintain the open character and reduce competition to the native vegetation.
- Control invasive aquatic plant species as necessary to maintain a diverse submergent and emergent aquatic plant community.

<u>Calcareous Fen</u>

Calcareous Fen have much in common with Sedge Meadow, Wet Prairie, and Wet-Mesic Prairie communities. However, fens have attributes such as unique plant species that are supported by the special hydrological conditions that set them apart. Only 87 Calcareous Fens have been identified in Wisconsin and they cover less than 1,000 acres statewide. The statewide gap analysis conducted by the State Natural Areas Program indicates there is a need to protect and manage fens for future generations and scientific inquiry.

The primary threats to Calcareous Fens are disruption of hydrology and invasion by woody species and other non-woody invasive species. Narrow-leaved cattail, giant reed grass, and purple loosestrife are among the potential offenders. Grazing, vehicular traffic, and overuse by hikers or recreationists can physically damage the surface and destroy sensitive vegetation. The lack of fire in the present landscape has contributed to the encroachment of woody species on open fen habitat, with the consequent suppression or loss of the more light-demanding herbaceous species.

Management Objectives:

- Maintain and restore the fen community type on all sites where it occurs as practicable.
- Protect sensitive habitat areas from overuse and invasive species encroachment.

Management Prescriptions:

- Manage the surrounding lands and groundwater resources to preserve the hydrologic function.
- Use brushing, hand cutting, herbicide (including aerial spraying) and fire management to control encroaching woody species and invasive species. Woody vegetation should be kept short in stature or removed. Prescribed burns should be used to mimic natural disturbance patterns and achieved desired compositional and structural characteristics.
- Use signage to direct recreational users away from sensitive plants species and centralize an access location rather than having multiple access points for use of the area. Consider closing off the area to public use if negative impacts to the area are documented by the district ecologist.

<u>Forested Uplands and Associated Communities</u>
(Oak Opening, Oak Woodland, Dry Prairie, Southern Dry-Mesic Forest, and Conifer Plantations)

Management Objectives:

- Maintain and restore the high-quality upland community continuum of fire-dependent upland communities of Oak Openings and Oak Woodlands with scattered embedded patches of Dry Prairie.
- Remove any remaining conifer plantations and convert into appropriate native community types.
- Restore closed canopy oak-dominated stands and other degraded woodlands to Oak Woodland.
- Restore or enhance Oak Openings with an emphasis on excluding non-native invasive and aggressive native species.
- Expand the size of dry prairie openings to maintain conditions favorable to native prairie vegetation.
- Increase the diversity and abundance of native prairie and savanna vegetation and associated animal species with emphasis on rare species.
- Remove existing individual conifer and hardwood trees and conifer plantations. Convert conifer plantations into appropriate native community types.

Management Prescriptions:

- Primarily use an intensive fire management program to shape the Dry Prairie, Oak Opening, and Oak Woodland communities. Limited thinning of the canopy, understory manipulation, and shrub control may also be used to mimic natural disturbance patterns. The mostly passive approach will determine the ecological characteristics of the oak habitat types.
- As needed, use single tree selection and small group harvests to restore Oak Woodlands. Harvests should emphasize retaining bur, white and black/red oaks and other typical oak woodland canopy tree species. Oak W ground flora may be augmented by planting appropriate native species.
- In Southern Dry-Mesic forest areas (primarily on north slopes of kettles) use natural processes and passive canopy management to determine the structure of the forest. Active management may be used to control invasive non-native and undesirable aggressive native species (such as box elder and red maple), and low-moderate intensity prescribed fire may also be used.

- Thin conifer plantations on an accelerated schedule, depending on site-specific needs. (Thinning will allow for the continued harvest of merchantable timber while encouraging a slow conversion to a more native oak ecotype.) Appropriate native species may be planted to supplement natural regeneration. At final rotation age, convert conifer plantations into appropriate native community types. Plant appropriate native species, the composition of which will depend on the individual plantation location, soils, aspect, etc.

Non-Forested Uplands
(Surrogate Grasslands, Restored Dry Prairie, Old Field and Agricultural Lands)

Management Objectives:

- Maintain a large, open native warm season grassland complex grading into Oak Opening and Oak Woodland community types to benefit native grassland and savanna species.
- Convert and restore surrogate grasslands such as Old Fields, to native warm season grass and forb plantings.
- Maintain existing native warm season prairie plantings (Restored Prairie).

Management Prescriptions:

- Use prescribed fire to mimic natural disturbance patterns and to invigorate grasses and forbs, control invasive plants, and suppress the encroachment of woody species. Cutting, mowing, brushing and herbicides also may be used to remove invading trees and shrubs.
- Where it meets other site objectives, remove hedgerows, fence lines, and small conifer plantations to increase the size of unbroken grassland/prairie habitat.
- When converting surrogate grasslands to native prairie plant a diverse mixture of site appropriate graminoid and forb species with a strong preference toward using local genetic material.
- Sharecropping and other mechanical methods and pesticides may be used to prepare sites for conversion from surrogate to native grassland plantings.

Recreation Management

Lulu Lake SNA provides opportunities for a variety of wildlife-related and compatible rustic recreational uses in a setting with primitive to lightly developed facilities. Recreational uses that do not change the character of the natural area are acceptable, such as hiking, nature appreciation, photography, bird watching, fishing, hunting or trapping. Lulu Lake proper provides a place for visitors to access by boat, canoe or kayak.

Recreation Management Objectives:

- Provide opportunities for recreational activities that do not compromise the site's ecological integrity and are consistent with the primary designated purpose of the property. This may include recreational activities such as hiking, hunting, fishing, trapping, and wildlife viewing.
- Provide for a snowmobile trail that connects to a regional snowmobile network and MRU lands.

- Establish and monitor visitor use patterns to protect sensitive resources.

Recreation Management Prescriptions:

- Continue to provide a snowmobile trail as shown on Map B-2 that connects to a regional snowmobile network and the MRU. Future consideration for rerouting the current snowmobile trail to the eastern perimeter of Lulu Lake, or onto the MRU, may be explored in consultation with local snowmobile clubs and the department.
- Provide for opportunities for backcountry travel by hiking, cross-country skiing and snowshoeing from the designated parking lots. Permanent maintained hiking, cross-country skiing or snowshoeing trails will not be established within the natural area.
- Maintain the existing water access to Lulu Lake from the north via a channel connecting to Eagle Spring Lake which is considered adequate given current ownership and recreational use pressures.

Other Recreational Use Considerations

Lulu Lake - Recreational Use Impact Management

Over the years there has been a growing concern regarding the use, and potential overuse, of Lulu Lake by recreational users. Recreational use by both motorized and non-motorized boaters continues to increase, with the boating traffic becoming quite heavy during the peak summer months, especially on weekends. Users come ashore to use the natural area for leisure and as a restroom, especially along the northeast stretch of shoreline where users most frequently congregate. This is an area where several rare and uncommon plant species exist, and overuse of this area has led to the trampling of the adjacent sensitive vegetation and subsequent degradation of the native communities in some locations there.

An action that potentially may reduce the impact to the shoreline wetlands is to place a portable public restroom near the lake shore close to the highest impact area. To evaluate the effectiveness and management practicality of this option, a two-year trial project will be conducted. A temporary/seasonal portable restroom will be established near the northeast corner of Lulu Lake at the base of the uplands (see Map B-2). Restroom use and changes in impact on sensitive shoreline wetlands will be monitored over the trial period. The property manager may extend the trial period beyond two years if additional evaluation is needed.

Following the trial period, a public report summarizing the findings and recommendations will be submitted to the Division of Fish, Wildlife and Parks for consideration. Additional actions are authorized and may be taken that are appropriate to the recommendations made in the report. During this trial period, a primitive access road may be maintained to the restroom site. If a permanent restroom is installed, the primitive access road will be permanently maintained. See existing and future recreation Infrastructure Map B-2 for the suggested portable restroom location.

Eagle Spring Lake South Shore Parcel

Current access to the Lulu Lake SNA and Eagle Spring Lake is via water through the existing state-owned Eagle Spring Lake boat launch. Additionally, the department owns a small lakeside parcel on the southeast corner of Eagle Spring Lake along South Shore Drive.

After public review of various development options for this site, concerns were raised about possible traffic congestion with a boat launch, visitor use management issues and the lack of rare species or natural community types. Taking in to account the totality of these comments as well as addressing public use pressures, the preferred recommendation is that this parcel be considered for a public sale with a restrictive covenant for no residential or commercial development. This option will allow the department to divest of its ownership while maintaining the good faith agreement between previous buyer/seller's wishes to maintain the parcel as undeveloped.

Motorized Access

Motorized road access will be limited to the roads and parking lots as shown on Map B-4. As needed, maintenance and/or upgrades will be made to the four vehicle parking lots to accommodate up to 10 vehicles at each lot that are located on the periphery of the state natural area. These parking lots will not be plowed in the winter.

Fisheries Management- Lulu Lake

Lulu Lake has an abundant largemouth bass population, with "small" being considered the average size. Current management of Lulu Lake includes a protected slot size which encourages anglers to harvest bass less than 14 inches. This provides an excellent opportunity for anglers to harvest small bass for the dinner table, and subsequently, reduce the density of largemouth bass will contribute towards recruitment of panfish and northern pike. Primary consideration will be taken to protect the extensive aquatic diversity unique to the Mukwonago River and Lulu Lake.

Fisheries Management- Eagle Spring Lake

Common carp have historically been problematic on both Eagle Spring and Lulu lakes. Anglers are encouraged to remove carp, and fishing regulations are intended to protect large predators to limit reproduction of carp. In conjunction with these efforts, the Eagle Spring Lake Management District has conducted a "carp attack" program to encourage removal of carp.

Eagle Spring and Lulu Lake share the same fishing regulations as they are managed as one waterbody being connected by the Mukwonago River.

Fisheries Management Objectives – Lulu and Eagle Spring Lakes:

- Protect the extensive fish, mussel and overall aquatic diversity unique to the Mukwonago River and Lulu Lake.
- Passive management of the Mukwonago River and Lulu Lake fisheries.

Fisheries Management Prescriptions -Lulu and Eagle Spring Lakes:

- Stocking of fish to take place on Eagle Spring Lake only and will be implemented with considerations for secondary impacts to the fisheries of Lulu Lake and the Mukwonago River headwaters.

Note: Fishing regulations are not determined or established by this property plan. They are established by a separate rule making process.

Section Three: Eagle Spring Lake Boat Launch

Property Description

The department owns a one-acre public access parcel used as a public boat launch on the eastern shore of Eagle Spring Lake in Waukesha County. Eagle Spring Lake is an impoundment of the Mukwonago River and is located just west of the Village of Mukwonago. Eagle Spring Lake is approximately 279-acres and it has a maximum depth of 12 feet. Fish include panfish, largemouth bass and northern pike.

Existing Fee Acres:	1
Existing Easement Acres:	0
Existing Project Boundary:	1 acre
New Project Boundary:	1 acre
New Acquisition Goal:	1 acre

Property Designation and Authority

Public access boat landings are administered by the Bureau of Parks and Recreation Management. This property currently is designated as a statewide scattered acquisition authority property in the department's land records. This plan proposes naming the parcel "Eagle Spring Lake State Public Access" instead of the generalized non-specific property name "Statewide Public Access". The statutory authority to acquire and manage land for public waterway access is described in Sections NR 1.90 through NR 1.93, Wis. Adm. Code.

Management Objective

Provide opportunities for water access to Eagle Spring Lake.

Boat Access Parking

A department managed public boat launch is located on the eastern shore of Eagle Spring Lake as shown on Map B-2, and C-1-C-4. This popular single trailer launch has 14 vehicle/trailer paved parking stalls and is the only public boat launch on the lake. Once this parking lot is full, overflow occurs to adjacent roadways and neighboring private property.

To alleviate some of this overflow, three additional vehicle-only parking stalls may be added along with one additional vehicle/trailer parking stall. Congestion is common at this launch and the local lake management group has worked to post areas of CTH E as "no parking", but parking availability remains an active issue.

Section Four: Common Elements

Although they exist as separate management units, the MRU, Lulu Lake State Natural Area and Public Access boat launch parcel at Eagle Spring Lake share some common management objectives. The following management elements apply to all properties and management zones of these properties, excluding lands in private ownership and easement areas, unless otherwise stated below.

This part of the plan contains sections related to:

- Property-wide management policies
- Operations, administration, and development
- Real estate management
- Property boundary changes

General Property Management Policies and Activities

Vegetation Management

- Conduct periodic inspections to identify and control, as feasible, invasive exotic plant species such as spotted knapweed, purple loosestrife, non-native buckthorn species, and other invasive plants that may become problematic in the future.
- Cutting, girdling, application of herbicide or other methods may also be used in forest and natural area lands to control invasive/aggressive plant species.
- All management activities will be designed and carried out in ways that minimize soil erosion and emphasize protection of the water quality of all waters.

Wildlife Management

Wildlife surveys will be conducted on both the state forest and natural area, as needed or required, to monitor population trends of game, non-game, and endangered and threatened species.

Forestry Management

(Oak opening, oak woodland, dry prairie, southern dry-mesic forest, and conifer plantations)

- Maintain and restore the high-quality upland community continuum of fire-dependent upland communities of oak openings and oak woodlands with scattered embedded patches of dry prairie.
- Remove any remaining conifer plantations and convert into appropriate native community types.
- Restore closed canopy oak-dominated stands and other degraded woodlands to oak woodland.
- Restore or enhance oak openings with an emphasis on excluding non-native invasive and aggressive native species.

- Expand the size of dry prairie openings to maintain conditions favorable to native prairie vegetation.

- Increase the diversity and abundance of native prairie and savanna vegetation and associated animal species with emphasis on rare species.
- Remove existing individual conifer and hardwood trees and conifer plantations. Convert conifer plantations into appropriate native community types.
- Primarily use an intensive fire management program to shape the dry prairie, oak opening, and oak woodland communities. Limited thinning of the canopy, understory manipulation, and shrub control may also be used to mimic natural disturbance patterns. The mostly passive approach will determine the ecological characteristics of the oak habitat types.
- As needed, use single tree selection and small group harvests to restore oak woodlands. Harvests should emphasize retaining bur, white and black/red oaks and other typical oak woodland canopy tree species. Oak woodland ground flora may be augmented by planting appropriate native species.
- In southern dry-mesic forest areas (primarily on north slopes of kettles) use natural processes and passive canopy management to determine the structure of the forest. Active management may be used to control invasive non-native and undesirable aggressive native species (such as box elder and red maple), and low-moderate intensity prescribed fire may also be used.
- Thin conifer plantations on an accelerated schedule, depending on site-specific needs. (Thinning will allow for the continued harvest of merchantable timber while encouraging a slow conversion to a more native oak ecotype.) Appropriate native species may be planted to supplement natural regeneration. At final rotation age, convert conifer plantations into appropriate native community types. Plant appropriate native species, the composition of which will depend on the individual plantation location, soils, aspect, etc.

Fee Areas

A vehicular admission sticker or daily fee is required for access to the state forest. A sticker or fee is not required for the state natural area.

Access

For ecological integrity and environmental protection, close and restore all old roads and trails that are not sustainable or as designated in this plan for continued public use or management purposes.

Motorized Uses

- Public use of motor vehicles is limited to designated open roads (see Map B-4).

- Department staff and its contractors may use motorized vehicles, boats, and other equipment to conduct management and maintenance activities or for public safety purposes. Such activities, to the degree practicable, should be scheduled at times that will create the least disturbance of property visitors.

- The department may construct and use temporary roads as needed to conduct specific management actions, such as timber harvests. These roads will be abandoned after the management activity is completed and all short-term and long-term erosion control best management practices with be followed.

Trail Development
The specific footprint location and design of the designated trails will be determined by the facility design/development process during the initial plan implementation. Trails should be sited and designed to be sustainable over time. Old existing trails and roads should be evaluated for their suitability for the intended use; if they cannot be developed to be sustainable or if they cannot be readily developed to provide the intended user experience, then the trail should be developed on a new, suitable site. In the future, if any trail segments are found not to be sustainable under use they will be redeveloped to be sustainable or closed and relocated on a more suitable site. In either case, the design level as assigned in this plan will be maintained.

Refuse Management
Day-users in the state forest and natural area are required to carry out all refuse and recyclables they bring in. No trash receptacles are provided.

Transmission Line Corridor
Manage power line corridor in cooperation with American Transmission Company according to the "Memorandum of Understanding Between the American Transmission Company and the Department of Natural Resources" to create a feathered, natural appearing transition between forest and grassland corridor, to minimize the visual impacts and impacts to wildlife, and provide service access routes as described therein.

Operations and Administration

Funding Constraints
The ability to implement any master plan element will depend on the budgetary authorization granted to the Department of Natural Resources by the Wisconsin Legislature and the Governor of the State of Wisconsin, as well as the availability of state and federal funding sources.

Emergency Action Plan
Maintain an emergency action plan that describes staff response to natural disasters and outlines department coordination with other agencies. The suppression of fires at the properties is addressed in the emergency action plan for the properties. This plan should be reviewed on an annual basis for possible revision. Department responses to natural resource impacts resulting from natural disasters will be determined by specific interdisciplinary evaluations following such an event.

Response to Catastrophic Events
Events such as fire, disease, insect infestation, or timber blow-down will be managed on a case-by-case basis. Specific management options will be chosen after considering multiple factors including visitor safety. The normal response to a wildfire on the property will be to protect life, property, and natural resources by extinguishing the fire with an immediate attack.

Inspections of Designated Use Areas
All designated use areas must be inspected semiannually (Wis. Statutes s.23.115) with one of the inspections performed by a person trained in the identification of hazard trees. Vegetation

monitoring will pay attention to forest infestations that pose a serious threat to forest resources such as oak wilt, pine bark beetles, gypsy moth, forest tent caterpillar, two-lined chestnut borer, and emerald ash borer. Control measures will be performed as needed.

Protection of Historic and Archaeological Features
Approved future facility development sites (parking lots, buildings, etc.) will be inspected prior to construction to locate and evaluate any evidence of significant archaeological or historic material in compliance with federal laws and state guidelines on historic preservation.

Facility Development Standards
All approved future facilities, roads, and structures providing either public recreation or supporting public recreation activities or other administrative services will be designed and constructed in compliance with state building codes, DNR design standards and NR 44. All park facilities will be constructed with colors and materials that complement the aesthetic of the park. All new facilities and buildings, whether for use by the public or by employees, will comply with the Americans with Disabilities Act (ADA).

Public Communication Plan
The property managers will serve as the public contact official for these properties. Mailings, news releases, and other means may be used to notify the public of significant issues or events that occur on the property.

Yearly Management Assessment/Integrated Property Management Meeting
The property manager will coordinate, schedule, and lead a yearly meeting to document and assess progress on the management actions accomplished during the previous year and plan management activities for the upcoming year. A file documenting these yearly assessments is maintained for implementation of the Manual Code 9314.1(C), which calls for formal plans to determine progress on implementation and assess whether the plan is accomplishing the intended results.

Uniform Property-Wide Signage Plan
The DNR will develop and implement a property-wide signage system plan in compliance with the Sign Handbook (Manual Code 8672.05) and the Design Standards Handbook (Manual Code 8605.1). Signs will have a unified aesthetic character that is harmonious with the area's natural surroundings. Signs to be developed in this plan include property trail markers and regulatory, directional, informational, interpretive and boundary signs.

Real Estate Management

Real Estate Acquisition Policy
All property purchases are on a willing seller basis. The department is required by state and federal laws to pay "just compensation," which is the estimated market value of a property based on an appraisal by a certified general licensed appraiser. At times, it is in the interest of the department and the landowner for the department to acquire partial rights to a property in the form as an easement. The DNR has several easement alternatives available to address these situations. Landowners within the state park boundary will be contacted periodically by

department staff to explain the department's land acquisition program and to see if they have an interest in selling their property for forest or natural area use.

Aides in Lieu of Taxes

For all new properties purchased, the department makes an annual payment in lieu of real estate taxes to replace property taxes that will have been paid had the property remained in private ownership. The payment is made to the local taxing authority where the property is located. More detailed information on how the department pays property taxes may be found in a publication titled Public Land Property Taxes, PUB-LF-001.

Existing Easements

The department has a conservation easement on 550 acres of The Nature Conservancy-owned land within Lulu Lake SNA. The department does not manage that portion of the SNA; TNC's management goals are like those of the department and are consistent with the terms of the conservation easement. TNC and the department frequently conduct joint management activities on the SNA.

The properties are currently bisected by an electrical transmission line right-of-way corridor easement that extends east to west. This easement is owned by the American Transmission Company for power line management purposes. Vegetative management of this corridor may include both chemical and mechanical practices. Additionally, a DNR management access easement to Lulu Lake State Natural Area exists east of Nature Road, just north of Burr Oak Trail. Off County Highway J, Lulu Lake Drive includes co-owned and private easement segments of roadway, limited to DNR and private landowner use.

Restrictive Covenants

North American Wetlands Conservation Act Easement: In September 2010, the North American Wetlands Conservation Council approved a $1 Million North American Wetlands Conservation Act (NAWCA) grant to Ducks Unlimited (DU) for habitat conservation in the Mukwonago and Fox River Watersheds of Wisconsin. The grant provides matching funds to organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife.

As part of this match, the department has used state stewardship lands within the MRU. These 239 acres of "match" lands are shown on Map B-1 and B-6. The value of these match lands has been appraised at $1,080,000 which will be used to meet NAWCA grant obligations. The "match" lands are deed restricted with a conservation easement to support the values of NAWCA.

Statewide Scattered Acquisition Property Renaming

As part of the department's statewide acquisition authority property naming policy and Manual Code, the former property type of Statewide Public Access found in this plan at the Eagle Spring boat launch will be renamed to Eagle Spring Lake State Public Access under the authority of Manual Code (MC) 2281.1, the Natural Resources Board (NRB) has the authority to name a property not expressly named by the legislature. This Statewide Public Access parcel included in this master plan is a property type that was acquired under a statewide scattered acquisition authority. These parcels do not currently have a unique name identifying them. This creates

confusion for the public and department staff. The master plan team used MC 2281.1 as well as internal draft naming guidance to propose names for these property type. No changes with ownership will occur with this renaming and re-designation effort.

Department Lands Project Boundary Adjustments

Upon the original acquisition of the MRU, a designation of southern state forest was applied. During the planning process, it became apparent that "blurred lines" between the state forest, state natural area and fishery lands were creating management overlap, confusion over regulations, development/management responsibilities, and user access fees. In addition, it was important to have a consistent recreational use policy for the Mukwonago River as it passes through these properties. A boundary adjustment between department lands addresses many of these issues. Through a series of land exchanges, a total of 26.64 acres will be transferred from the fishery and state natural area to the state forest. See Table 4 below.

Lands designated as Statewide Habitat Area, Statewide Public Access and a small portion of the Lulu Lake State Natural Area lands will be redesignated as KMSF-Mukwonago River Unit lands. A total of 24.13 acres of acquisition goal will be transferred from Statewide Habitat Area to KMSF-MRU. A total of 2.14 acres of acquisition goal will be transferred from Statewide Public Access to KMSF- MRU. A total of 3.15 acres of acquisition goal will be transferred from Lulu Lake State Natural Area to the KMSF- MRU. See Map B-7 and Table 4 below.

MRU

For the MRU, the only project boundary adjustment will be 26.64 acres of department owned fishery and state natural area lands that will be re-designated as state forest. While some acres of this land are not contiguous to the MRU property, they do provide protection and public access to the Mukwonago River. With this addition, the new project boundary acreage will be 1008.14 acres.

Lulu Lake SNA

Several project boundary adjustments are approved in this plan for the state natural area that will reduce the project boundary acreage goal by 70.31 acres. It was discovered during the planning process that department ownership extended into Eagle Spring Lake presumably a result of land records dating back to the impoundment and creation of Eagle Spring Lake. In addition, one parcel along the western and northwestern edge of the property will be included to protect wetland communities, while another parcel will be removed. With these adjustments, the project boundary acreage will be 2298.30 acres.

Table 4: Project Boundary Acreage Goals for the MRU, State Natural Area and Public Access

Designation	Current Project Boundary (acres)	Project Boundary Adjustment (acres)	New Project Boundary (acres)
State Forest	978.72	+29.42	1008.14
State Natural Area	2368.61	-70.31	2298.30
***Public Access**	NA	NA	NA
Total	3347.33	-40.89	3306.44

*** Existing Eagle Spring Lake boat launch**

Chapter Three – Supporting and Background Information

A detailed analysis of the region and properties can be found in the Kettle Moraine State Forest – Mukwonago River Unit/Lulu Lake State Natural Area Regional and Property Analysis (WDNR 2013).

Regional Ecological Setting

According to the National Hierarchical Framework of Ecological Units classification of Land Type Associations (LTA), the landform in this region (East Troy Lakes LTA) is defined as rolling pitted outwash plain with many lakes. Soils are predominantly well-drained loam over calcareous gravelly sandy outwash. This area has some of the largest and highest quality Wet-Mesic Prairies and Calcareous Fens in the state. Spring ponds, spring runs, and headwater streams provide important habitat diversity.

The Mukwonago-Fox River Watershed Initiative in Kenosha, Milwaukee, Racine, Walworth, and Waukesha Counties is a 4,153-acre wetland protection and enhancement project. This project will protect and enhance critical wetland and riparian habitat and adjacent uplands within these watersheds to ensure their long-term conservation.

The Mukwonago Watershed

The Mukwonago Watershed is composed of the Mukwonago River and its major tributaries, as well as seven major lakes (Lulu Lake, Eagle Spring Lake, Lake Beulah, Upper Phantom Lake, Lower Phantom Lake, Army Lake, and Booth Lake) and seven minor lakes. The Mukwonago River Watershed Protection Plan notes that “the system is sustained by groundwater recharge, seepage from wetlands and moraines, and precipitation runoff from about a 74-square-mile watershed” (SEWRPC, 2010b).

Within the project boundary, the Mukwonago River system includes Lulu Lake, which is designated an Outstanding Resource Water under Chapter NR 102, Wis. Admin. Code. The Mukwonago River has been designated by the DNR as an Exceptional Water Resource and Class I brown trout fishery upstream from Lulu Lake and between Lulu Lake and Eagle Spring Lake. Downstream of Eagle Spring Lake, the river is designated as a Class II trout stream. Since 1988, brook trout have been stocked nearly annually into the Mukwonago River, but do not show significant signs of breeding, perhaps due to water temperatures which are often above optimal. SEWRPC describes the area around the lakes adjacent to or within the project boundaries (Eagle Spring Lake, Hogan Lake, Lulu Lake, Rainbow Springs Lake) as one of the primary environmental corridors which “represent a composite of the best remaining elements of the natural resource base, and contain almost all of the best remaining woodlands, wetlands, and wildlife habitat areas in the watershed.”

Descriptions of the Properties

Mukwonago River Unit (MRU)

As part of the Kettle Moraine State Forest, current state ownership of the Mukwonago River Unit encompasses a total of 978-acres as shown on Map B-1. The property surrounds Rainbow Springs Lake and is approximately 0.75 miles wide and 2.0 miles long. It extends north of the Mukwonago River and stretches southward. MRU spans across both Walworth and Waukesha Counties.

In the late 1960s, the property was partially developed as a golf course/resort facility. An incomplete hotel was destroyed by fire in 2003. The remainder of the property is relatively undeveloped with a mix of Oak Savanna, Oak Central Hardwood Forest, wetlands and Conifer Plantations as shown on Map B-5. In 2008, the state approved the acquisition of the property for resource protection and outdoor-based public recreation purposes.

According to the Land Acquisition of the Mukwonago River Unit (File # SF-1491), a recommendation from the Land Legacy report indicated that this basin is a priority area for preservation. The main property surrounding Rainbow Springs is in the Mukwonago River Watershed and contains many headwater springs supporting the high-water quality and species diversity found in the basin. Jericho Creek and Beulah outlet are the two significant tributaries that flow into the Mukwonago River. The inclusive portion of the Mukwonago River flows west to east downstream from Eagle Spring Lake, into Lower Phantom Lake and discharges into the Illinois Fox River. The Mukwonago River is one of the most biologically diverse systems supporting 58 different fish species and many mussel species. The Mukwonago River Watershed is surrounded by many wetlands with tall grass prairie and Oak Savanna. This region provides habitat for wetland-associated, migratory, and endangered bird species.

The proximity of the Mukwonago River Unit to Wisconsin population centers is of importance. The state forest is located only 35 miles west of Milwaukee and is accessible within 100 miles for about five million people. Upon acquisition, all interior roads were closed to public use and three parking lots were established along the edge of the property. The MRU is an important location for providing accessibility and possesses an abundance of natural resources. Through its healthy wetlands and river ecosystems, the MRU offers exceptional outdoor recreation benefits for public enjoyment and diverse of wildlife habitat.

Lulu Lake State Natural Area

The Lulu Lake SNA is in the Kettle Moraine region of southeast Wisconsin. The 1,848-acre property extends southward from the southern shore of Eagle Spring Lake surrounds Lulu Lake and extends west of Nature Road. Within the boundary, the department owns (fee title) and manages 1,235 acres and has a conservation easement on an additional 550 acres of Nature Conservancy owned lands within the SNA project boundary.

The Lulu Lake SNA property is bordered to the south and east by County Highways E and J. All interior roads are closed for public use with parking lots located along the edge of the property as shown on Map B-3. The Nature Conservancy owns two parcels of the Lulu Lake SNA that are west of Lulu Lake. The interconnected nature of The Nature Conservancy and DNR lands requires a high level of coordination in managing this combined natural area. Similarly, the

Mukwonago River flows from the Lulu Lake SNA through the Mukwonago River Unit providing a close relationship in terms of proximity and riverine connectivity. The Lulu Lake SNA spans across both Walworth and Waukesha County.

Lulu Lake SNA has been known as a significant research area for several decades and provided data for John Curtis' influential 1959 book "Vegetation of Wisconsin." Lulu Lake was designated a State Natural Area in 1977 due to the quality of the land as a habitat for the diverse wetland and upland wildlife communities which have been virtually eliminated from southeastern Wisconsin as shown on Map B-5. The 95-acre Lulu Lake is exceptionally clear and possesses an unusual number and diversity of fish species. Lulu Lake SNA contains Oak Savanna, an increasingly rare plant community in Wisconsin. Calcareous Fens, the rarest type of wetland in Wisconsin, provide a habitat for plants that tolerate the calcium and magnesium derived from the underlying dolomite bedrock, also are located on the property. Lulu Lake SNA also has good examples of Bog Relicts, Dry Prairies and Oak Forests. Altogether, Lulu Lake SNA provides an intermingled set of plant communities which are rare or uncommon and exist in a way which is unique in Wisconsin. Larger natural areas tend to be more self-sustaining and supportive of wildlife. The Lulu Lake SNA is highly functional in that regard and provides support for the Mukwonago River Unit, which affords recreational opportunities for thousands of Wisconsin citizens each year. With careful management, the Lulu Lake SNA will continue to support that recreation, as well as provide an excellent example of a native and natural Wisconsin for years to come.

Eagle Spring Lake Boat Launch/Public Access

As part of the Kettle Moraine State Forest, current state ownership of this public access site encompasses a total of one acre. This site is located off Wambold Road in the Town of Eagle. The site is managed as a public access area for recreational users of Eagle Spring Lake and has approximately 14 parking stalls, a concrete boat ramp, and a small grassy area.

References

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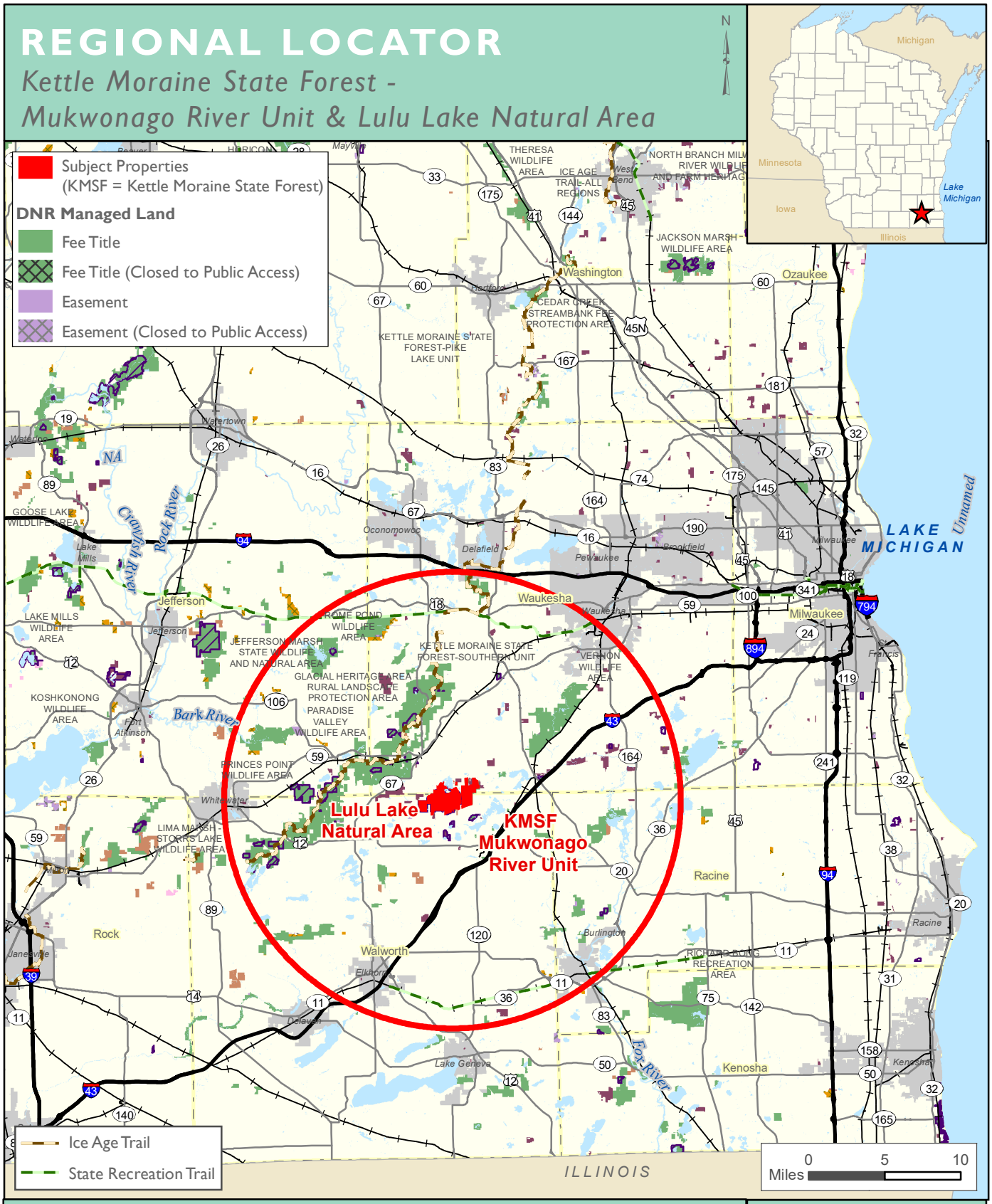
REGIONAL LOCATOR

Kettle Moraine State Forest - Mukwonago River Unit & Lulu Lake Natural Area



Voluntary Public Access Land

U.S. Fish & Wildlife

Board of Commissioners of Public Land

Stewardship Grant Land

Private Conservation Land

State Natural Area

NRCS - WRP (Closed to public access)

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Bureau of Facilities and Lands

Oct 31, 2018

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MAP A

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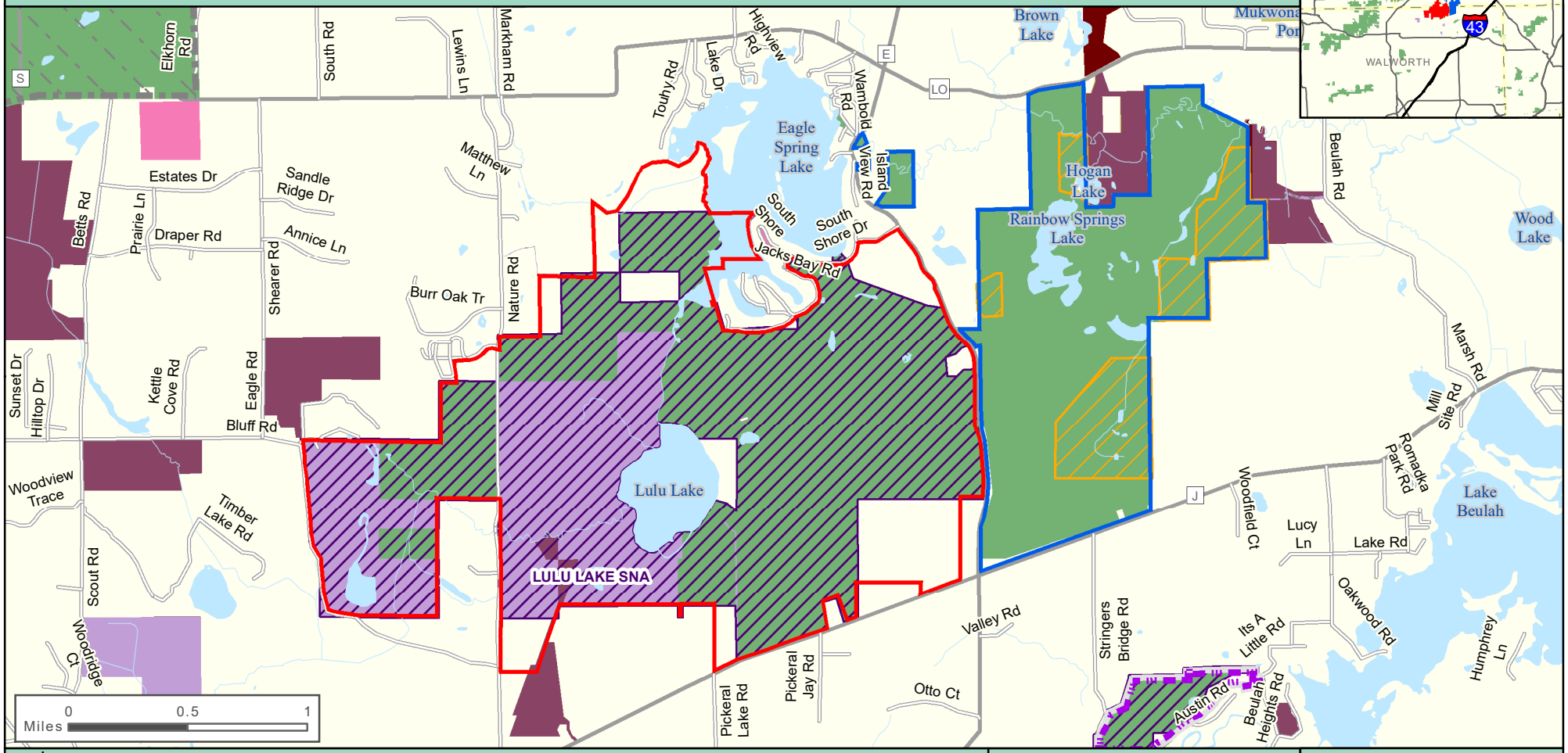
Kettle Moraine State Forest - Mukwonago River Unit, Lulu Lake Natural Area & Statewide Public Access

DNR & OTHER LANDS



MAP B-I

- DNR: Fee Title
- DNR: Easement
- DNR: Easement (Closed to Public Access)
- State Natural Area
- Stewardship Grant Lands Open to Public Access
- Waukesha County Land
- Waukesha County Land Conservancy Inc.
- Municipality Lands
- NAWCA
- State Natural Area Project Boundary

Project Boundary

- KMSF - Mukwonago River Unit
- Lulu Lake Natural Area
- KMSF - Southern Unit

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MAP B-I

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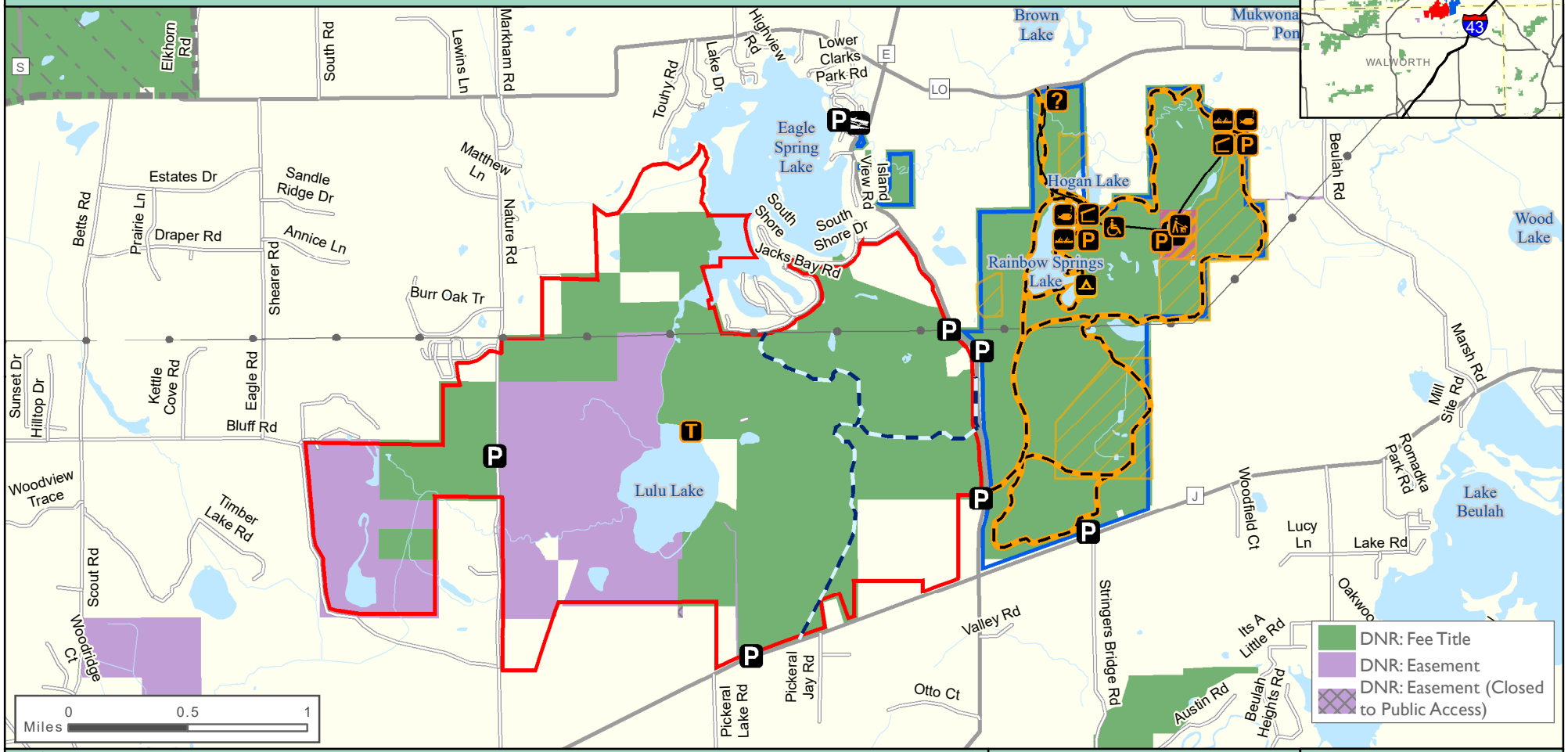
Kettle Moraine State Forest - Mukwonago River Unit, Lulu Lake Natural Area & Statewide Public Access

EXISTING & PLANNED RECREATION INFRASTRUCTURE



MAP B-2

Parking Lot

Boat Access

Planned Boat Access: Carry In

Planned Fishing Pier

Project Boundaries

KMSF - Mukwonago River Unit

Lulu Lake Natural Area

KMSF - Southern Unit

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Bureau of Facilities and Lands

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MAP B-2

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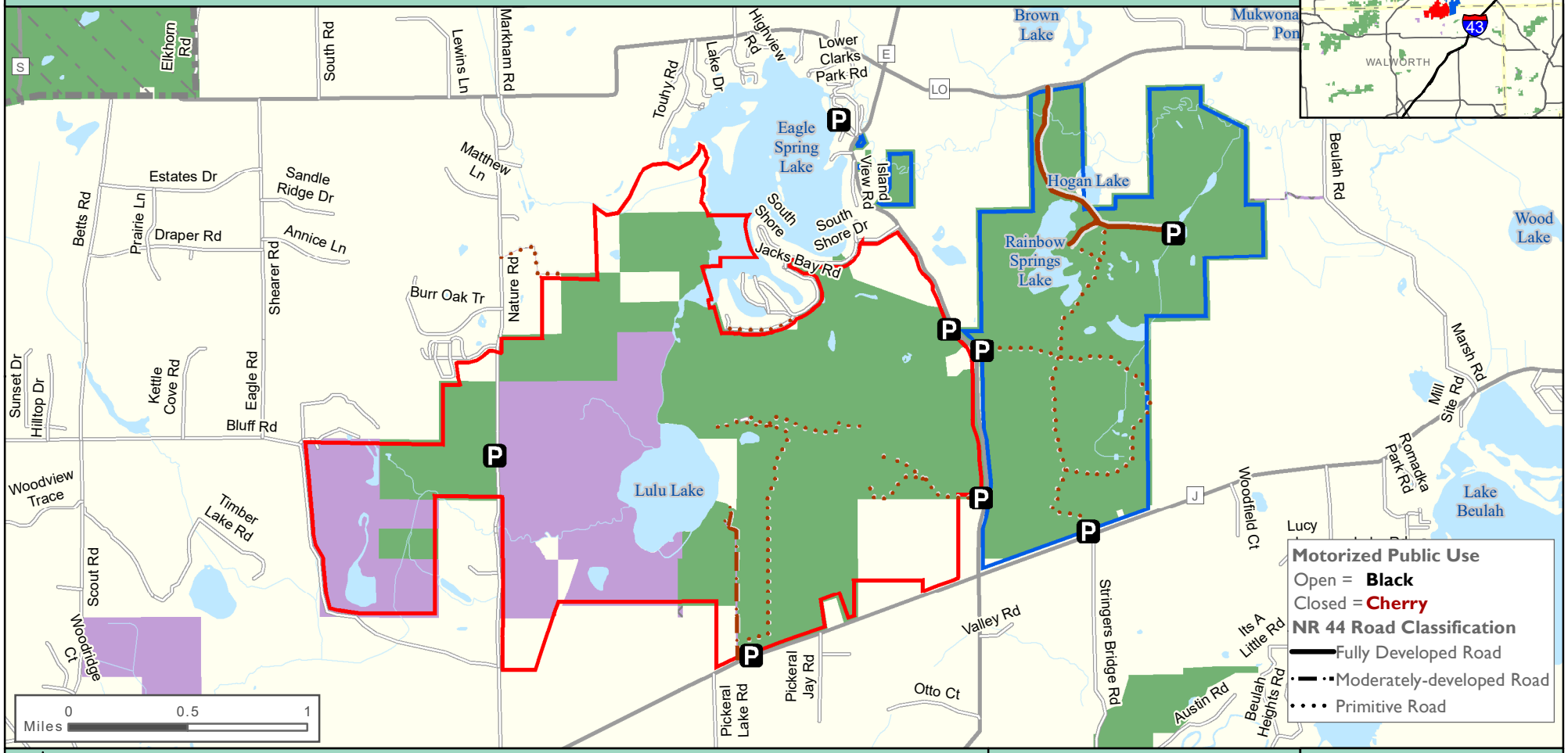
Kettle Moraine State Forest - Mukwonago River Unit, Lulu Lake Natural Area & Statewide Public Access

EXISTING ROAD INFRASTRUCTURE



MAP B-3

- DNR: Fee Title
- DNR: Easement
- DNR: Easement (Closed to Public Access)
- P Parking Lot

Project Boundaries

- KMSF - Mukwonago River Unit
- Lulu Lake Natural Area
- KMSF - Southern Unit

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MAP B-3

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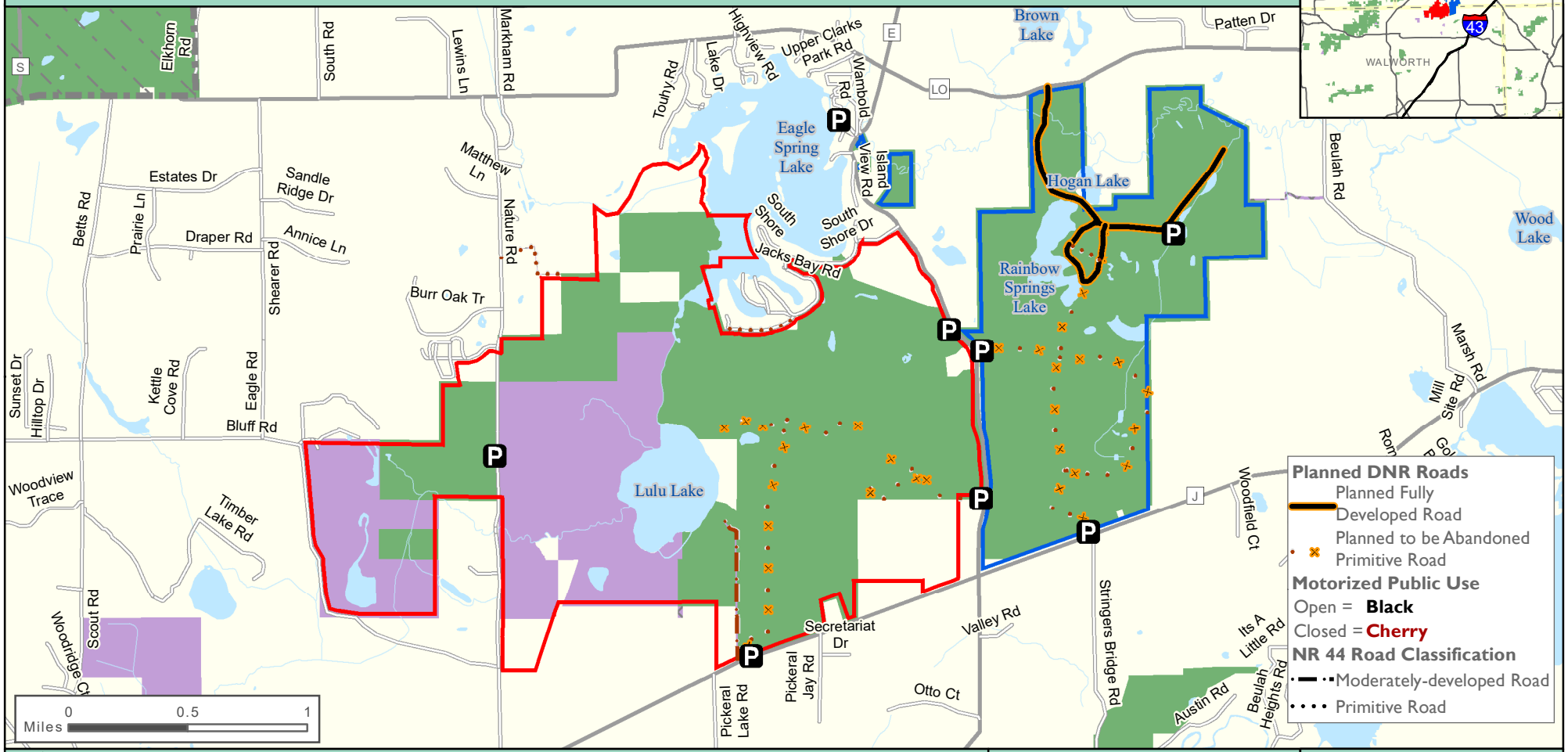
Kettle Moraine State Forest - Mukwonago River Unit, Lulu Lake Natural Area & Statewide Public Access

PLANNED ROAD INFRASTRUCTURE



MAP B-4

- DNR: Fee Title
- DNR: Easement
- DNR: Easement (Closed to Public Access)
- Parking Lot

Project Boundaries

- KMSF - Mukwonago River Unit
- Lulu Lake Natural Area
- KMSF - Southern Unit

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MAP B-4

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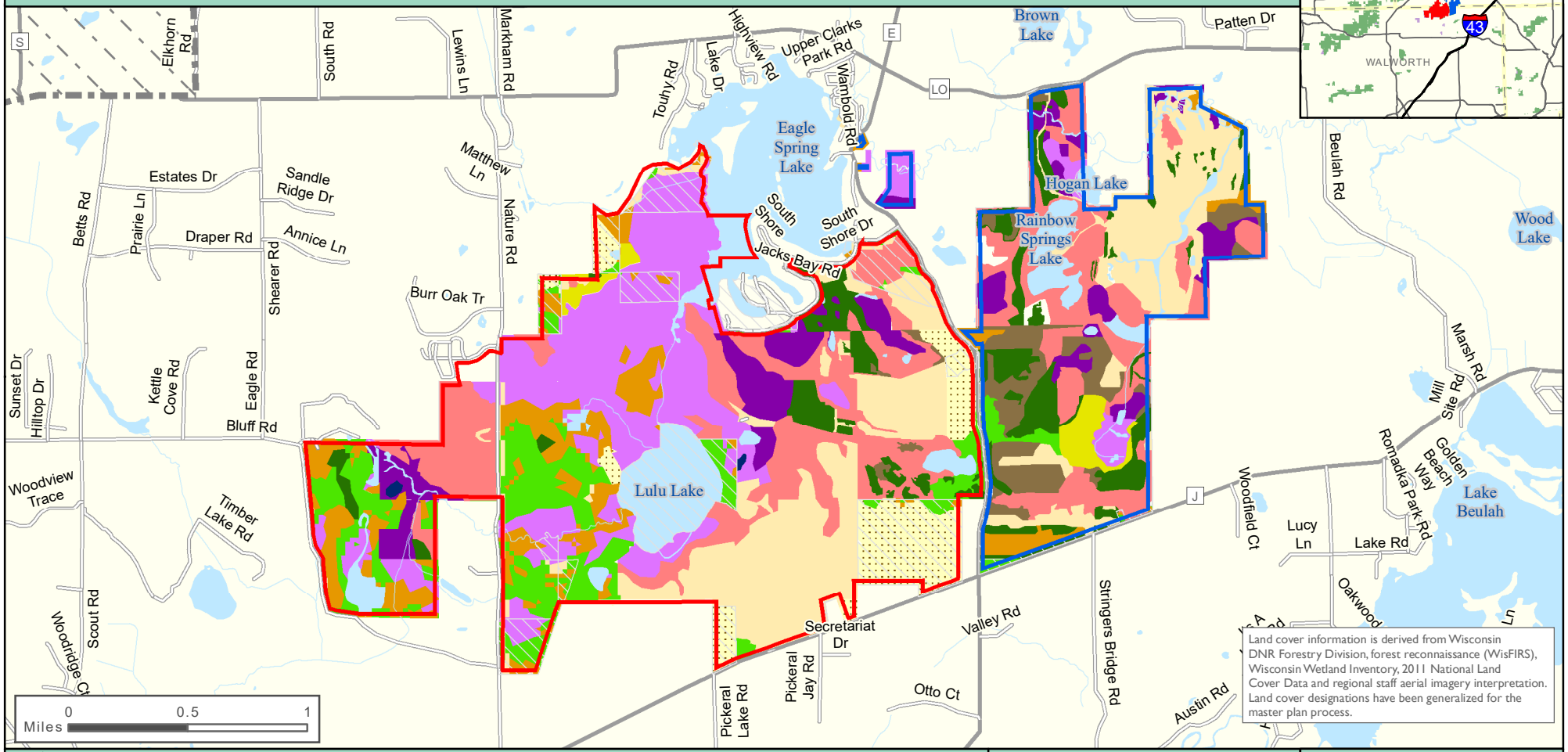
Kettle Moraine State Forest - Mukwonago River Unit, Lulu Lake Natural Area & Statewide Public Access

EXISTING LAND COVER



Land cover information is derived from Wisconsin DNR Forestry Division, forest reconnaissance (WisFIRS), Wisconsin Wetland Inventory, 2011 National Land Cover Data and regional staff aerial imagery interpretation. Land cover designations have been generalized for the master plan process.

MAP B-5

- No DNR Land Interest
- Agriculture
- Aspen
- Bottomland Hardwood
- Central Hardwood
- Emergent Vegetation
- Grassland
- Oak
- Shrub
- Swamp Conifer
- Upland Conifer
- Water
- Wetland-Non-Forested

Project Boundaries

- KMSF - Mukwonago River Unit
- Lulu Lake Natural Area
- KMSF - Southern Unit

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MAP B-5

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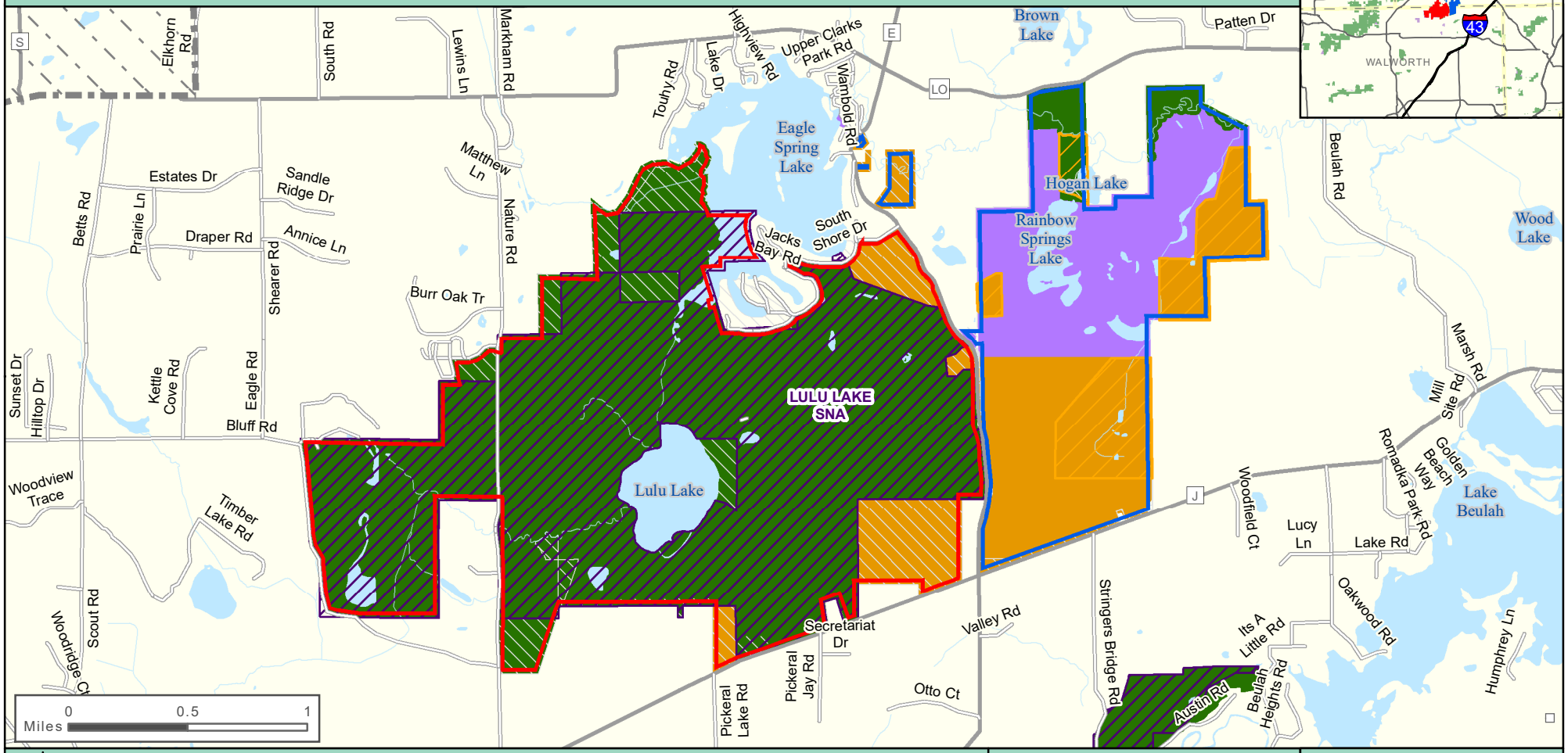
Kettle Moraine State Forest - Mukwonago River Unit, Lulu Lake Natural Area & Statewide Public Access

LAND MANAGEMENT CLASSIFICATIONS



MAP B-6

- Habitat Management Area
- Native Community Management Area
- Recreation Management Area
- State Natural Area
- NAWCA Easement
- No DNR Land Interest

Project Boundaries

- KMSF - Mukwonago River Unit
- Lulu Lake Natural Area
- KMSF - Southern Unit

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MAP B-6

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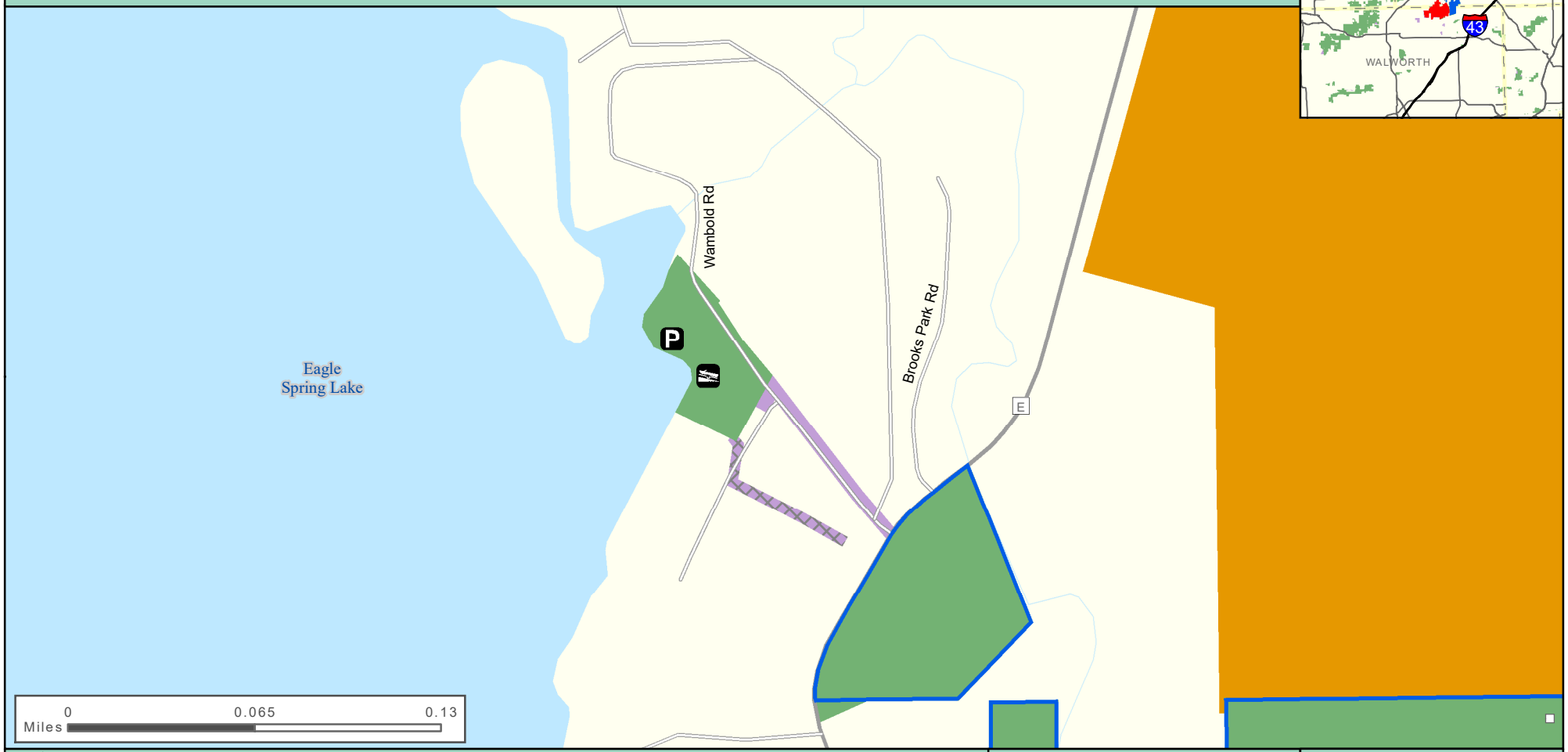
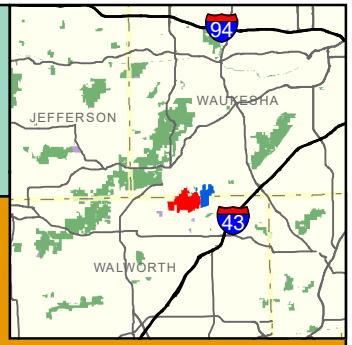
Statewide Public Access

DNR, OTHER LANDS, & RECREATION INFRASTRUCTURE





MAP C-1

- DNR: Fee Title
- DNR: Easement
- DNR: Easement (Closed to Public Access)
- The Nature Conservancy - Easement
- Parking Lot
- Boat Access

Project Boundary

- KMSF - Mukwonago River Unit

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Oct 31, 2018

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MAP C-1

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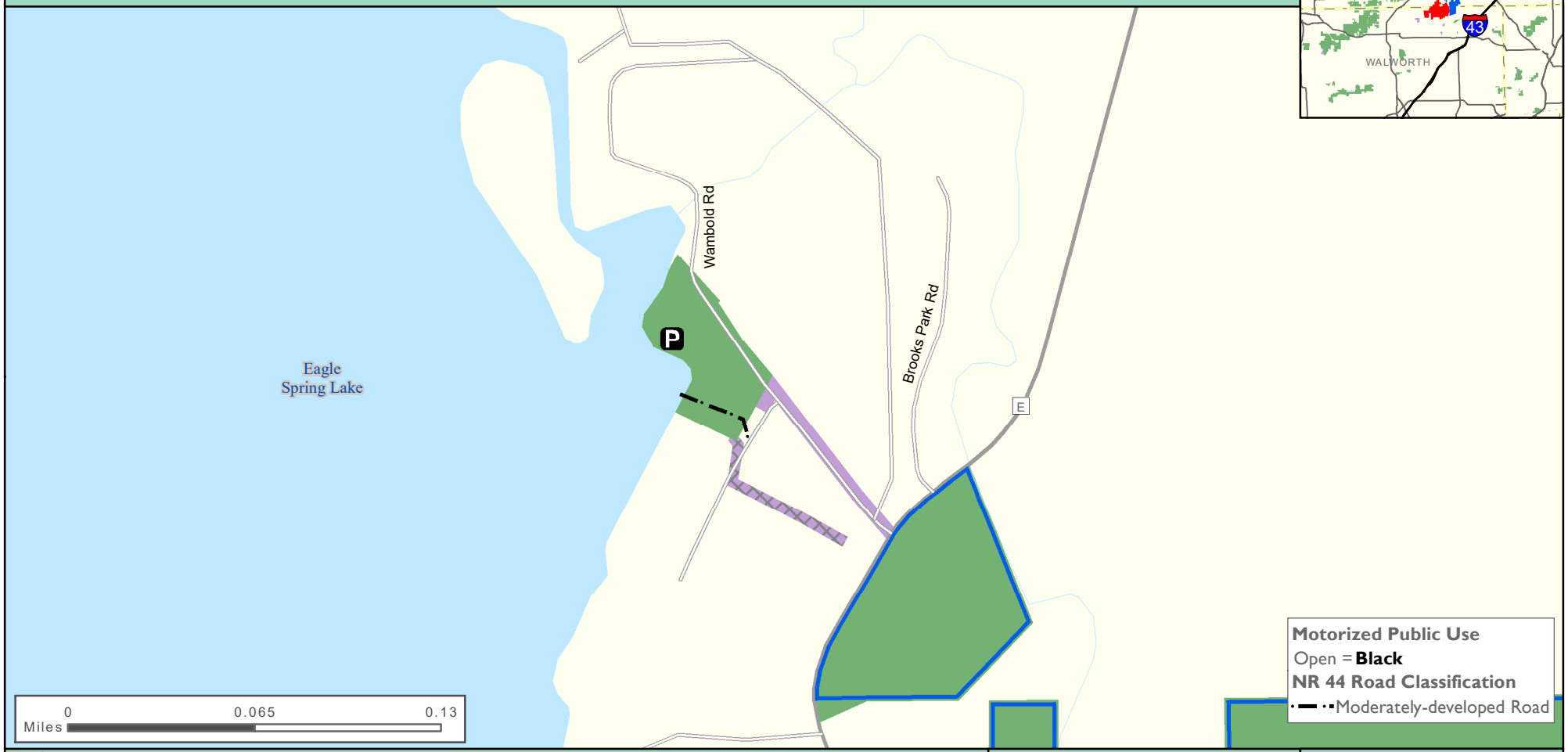
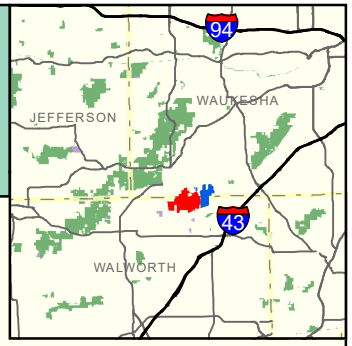
Statewide Public Access

EXISTING ROAD INFRASTRUCTURE





MAP C-2

- DNR: Fee Title
- DNR: Easement
- DNR: Easement (Closed to Public Access)
- Parking Lot

Project Boundaries

- KMSF - Mukwonago River Unit

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MAP C-2

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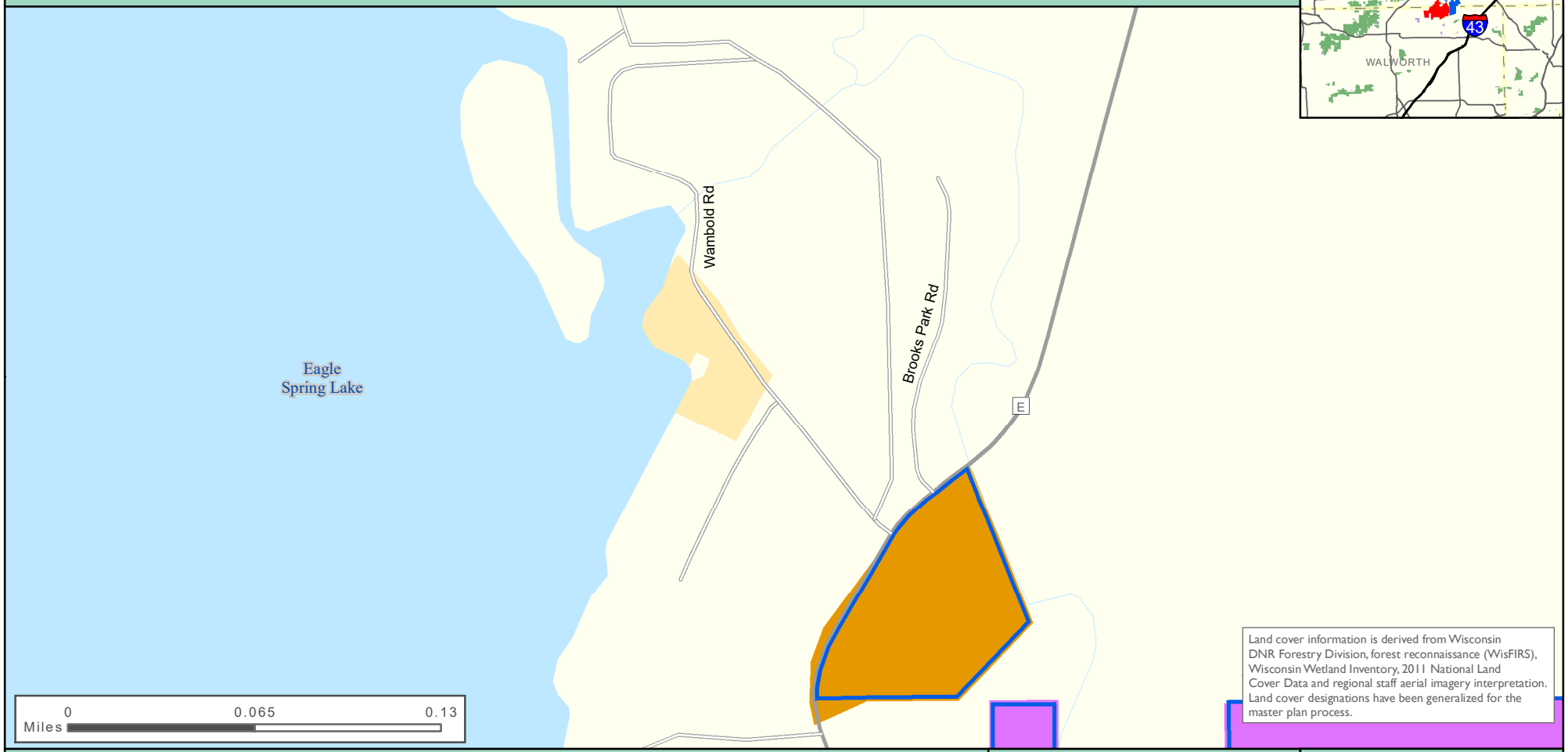
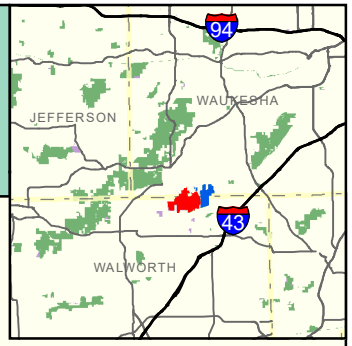
Statewide Public Access

EXISTING LAND COVER





Land cover information is derived from Wisconsin DNR Forestry Division, forest reconnaissance (WisFIRS), Wisconsin Wetland Inventory, 2011 National Land Cover Data and regional staff aerial imagery interpretation. Land cover designations have been generalized for the master plan process.

MAP C-3

- Bottomland Hardwood
- Emergent Vegetation
- Grassland

Project Boundaries

- KMSF - Mukwonago River Unit

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MAP C-3

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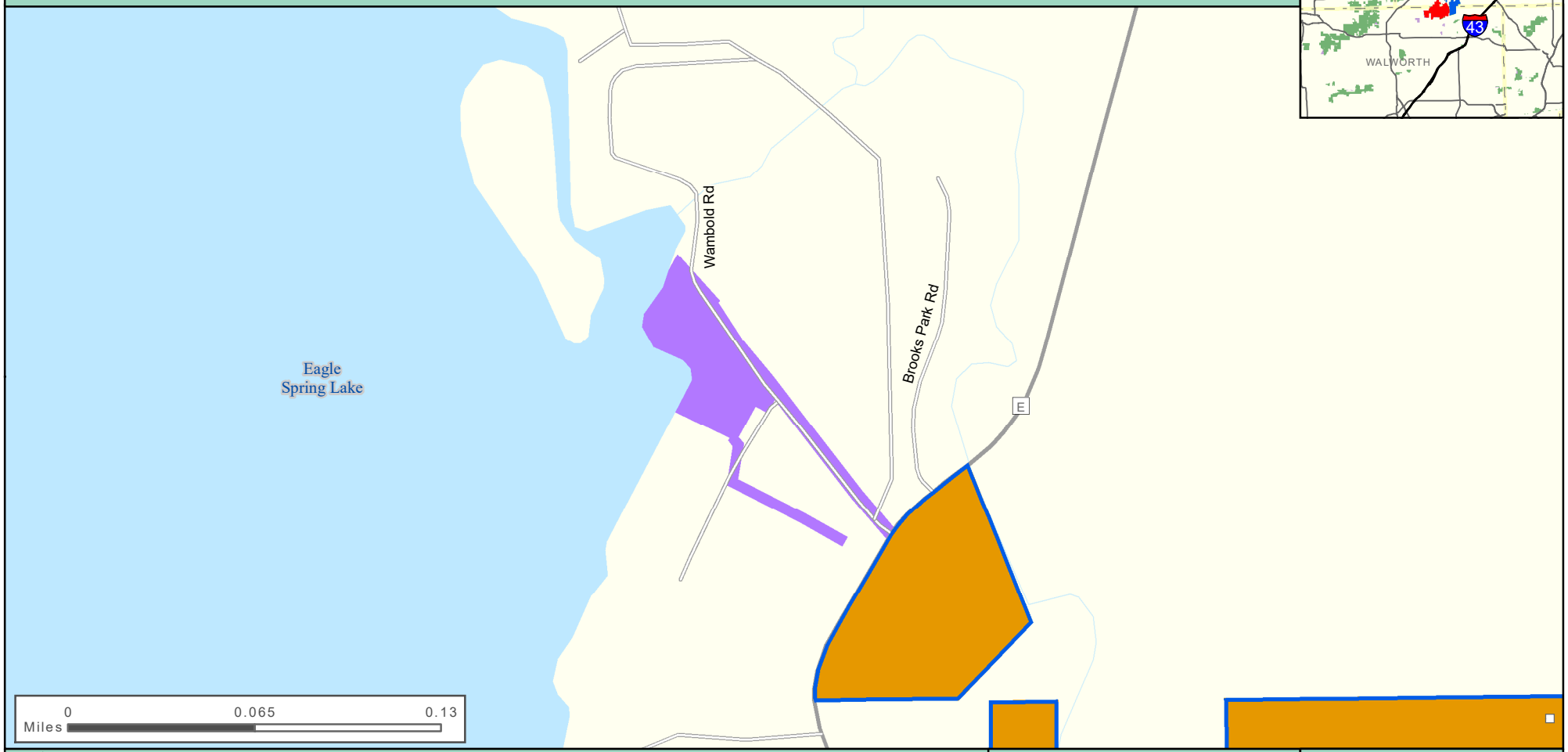
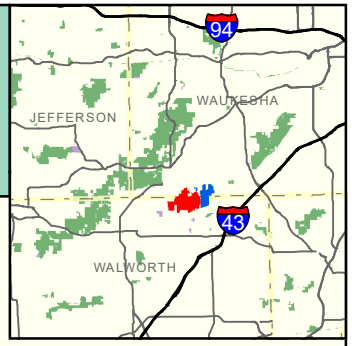
LAND MANAGEMENT CLASSIFICATIONS





MAP C-4

Habitat Management Area

Recreation Management Area

Project Boundary

KMSF - Mukwonago River Unit

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Bureau of Facilities and Lands

Oct 31, 2018

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MAP C-4

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