



2017

# Fermilab Ecological Land Management Plan



2020

## Executive Summary: Fermilab ELM Plan 2017 - 2020

*Consistent with the Charter of the ELM Committee, we offer this executive summary of the Fermilab ELM Plan to the Directorate for review and approval.*

The 6,800-acre Fermilab campus provides adequate land and facilities to accommodate the science mission. Most of this land is relatively undeveloped, and Fermilab's effective land management is based on ecological science and stewardship values that enhance the environment and community of the Fermilab campus. Not only does this approach contribute to the ecological integrity of the land, but it also offers a positive sense of doing the "right thing" for the environment to employees, users, and our neighbors.

The Fermilab Ecological Land Management (ELM) Committee is a Directorate-approved, chartered organization. The purpose is to provide sound ecological advice to the laboratory and an ELM Plan to deliver recommendations on land management to Fermilab. This addresses Department of Energy (DOE) requirements to manage federal lands as valued national resources and provides input for work plans that to be carried out by the Roads and Grounds Department as an integral part of their task of managing the grounds of the laboratory.

While part of the function of the ELM Committee is to provide a plan for enhancing the natural resources of the Fermilab site, the process is bound by two very important constraints. The first is the Fermilab physics mission, the needs of which always must take precedence over other competing considerations. The second constraint is that Fermilab's mission,

including ecological management, is always subject to the availability of budget and other resources. Resources may be supplemented from time to time by other partners, including the not-for-profit organization Fermilab Natural Areas.

Natural resource management on federal land is mandated in part by an array of statutes, Executive Orders, and DOE orders. Overarching stewardship of natural resources fulfills many of the outcomes intended by directives and regulatory action, such as clean air and water, wetland protection, and migratory bird and pollinator habitat preservation.

Stewardship values do not stop at Fermilab boundaries. The site is a valued natural asset for our neighbors and the region as a whole. DOE and Fermilab are members of the Chicago Wilderness partnership and support their Biodiversity Recovery Plan for the region. The ELM Committee includes land managers, biologists and experts from other federal agencies, state and county government, not-for-profits and private companies. The ELM Plan complements the Fermilab Campus Master Plan as well as several other site plans and management systems. It is a dynamic document based on four Guiding Principles:

- Support Global Initiatives
- Protect Ecologically Sensitive Areas
- Promote Conservation and Restoration
- Encourage Ecology Research

The ELM Plan consists of a number of goals, approved by the ELM Committee, which embody the Guiding Principles. Each goal gives rise to one or more specific objectives. Each objective specifies a definite result that can be achieved within a reasonable time frame and with available resources. The ELM Plan describes Fermilab ecology and identifies relevant ecological concepts used to formulate the

plan. It is supplemented by a number of maps and reference documents.

Derived from the Guiding Principles, the following goals and objectives are recommended to Fermilab by the Ecological Land Management Committee for the FY 2017-20 ELM Plan:

## Goal 1

**Manage Fermilab lands in ways that sustain and restore biodiversity, promote ecosystem services, and mitigate the effects of climate change.**

### Objective 1.1

*Maintain a minimum floristic quality index (FQI) target of fifty (50) in all land management units (LMU) in active restoration and collect baseline FQI data on all other LMUs before FY20.*

### Objective 1.2

*To improve genetic diversity, increase number of populations and abundances of rare plant species (coefficient of conservatism  $\geq 8$ ) in all habitat community types before FY21.*

### Objective 1.3

*Assess and recommend ecosystem services that may be better incorporated into land management decisions before FY19.*

### Objective 1.4

*Recommend best management practices related to carbon sequestration and floodwater storage on agricultural lands before FY20.*

### Objective 1.5

*To promote drought-tolerant, sustainable landscaping, change Fermilab policies and guides to reflect a goal of using 100% native plants in all new and redesigned landscaped areas before FY19.*

## Goal 2

**Educate Fermilab community about ecologically sensitive areas.**

**Objective 2.1** - *Each year, provide updates to the Ecologically Sensitive Areas map using all available biological data, and participate in the Environmental Review process.*

## Goal 3

**Reduce the threat of invasive species.**

### Objective 3.1

*Each year, record population sizes and maintain control of teasel, purple loosestrife, giant reed grass, spotted knapweed, poison hemlock, and ornamental bittersweet site wide.*

### Objective 3.2

*Evaluate open and moving water habitats for aquatic invasive species before FY19.*

### Objective 3.3

*Inventory all landscaped areas across the site to determine location of invasive ornamental species before FY19 and begin a coordinated replacement initiative before FY20.*

### Objective 3.4

*Control rampant invasive plant species to less than 5% total cover in targeted LMUs (Green Snake Marsh, Kingnut Woods and Marsh, and Site 29 Woods West) before FY21.*

## Goal 4

**Monitor, manage and possibly introduce threatened and endangered species at Fermilab.**

### Objective 4.1

*Review best practices and summarize adaptive man-*

agement strategies for listed bird species, including: upland sandpiper, common moorhen, loggerhead shrike, black-crowned night heron, king rail, yellow-headed blackbird, black-billed cuckoo, and least bittern before FY19.

#### **Objective 4.2**

Explore feasibility of introducing threatened and endangered species into suitable habitat communities with low likelihood of development and no negative impact to site operations before FY21. Species of interest include: eastern prairie fringed orchid, Blanding's turtle, Eryngium stem borer moth, and American brooklime.

### **Goal 5**

**Expand buffer habitat around sensitive areas and create wildlife corridors to connect off-site natural areas and isolated remnants with core Fermilab habitat.**

#### **Objective 5.1**

Map remnant habitats and prioritize ecological restoration before FY18.

#### **Objective 5.2**

Provide 10-year strategy for creating habitat corridors and buffers before FY19.

### **Goal 6**

**Improve the condition and function of existing wetlands and waterways.**

#### **Objective 6.1**

Recommend wetland management strategies that ensure habitat for wading and shore birds before FY18.

#### **Objective 6.2**

Establish sampling methodology and collect baseline

data on sediment, salt, phosphorus, and nitrate delivery from surface water run-off and via drain tiles to creeks, lakes and ponds flowing off site before FY21.

### **Goal 7**

**Improve structural diversity in habitat communities to meet wildlife needs.**

#### **Objective 7.1**

Designate appropriate fire return interval as dictated by habitat type and time since restoration (restorative fire vs. maintenance fire) for all LMUs in prescribed burn program before FY18.

#### **Objective 7.2**

Remove woody vegetation from core grassland bird habitat in Eola Road Grassland Northeast before FY19 and measure bird response before FY21.

#### **Objective 7.3**

Create six native shrub areas at least 1 acre each throughout Arbor Day LMUs before FY21.

### **Goal 8**

**Evaluate new methods of land management for potential improvements in biodiversity trends.**

#### **Objective 8.1**

Establish at least one conservation hay field on existing old-field grassland to gauge applicability on a larger scale before FY18.

#### **Objective 8.2**

Summarize existing research of patch-burn-grazing management and provide recommendations before FY19 to determine feasibility, economics, and potential wildlife benefits of conservation grazing using cattle.

**Objective 8.3**

Explore and pursue ways to manage agricultural lands that optimize ecological health, revenue generation, and positive relations with the surrounding community before FY20.

**Goal 9**

Focus wildlife conservation efforts on Chicago Wilderness priority species found at Fermilab, including smooth green snake, little brown bat, red-headed woodpecker, rusty-patched bumblebee, and monarch butterfly.

**Objective 9.1**

Each year, survey for smooth green snakes in known location and provide data summary and recommended action(s).

**Objective 9.2**

Conduct bat surveys across the site for three years to develop a baseline census before FY18.

**Objective 9.3**

Recommend best management practices and monitoring strategy for red-headed woodpeckers before FY19.

**Objective 9.4**

Survey remnant-dependent insects at Fermilab, especially in prairie and wetland habitat before FY19.

**Goal 10**

Encourage ecological research at Fermilab.

**Objective 10.1**

Establish and maintain list of ecology research needs before FY18 and review National Environmental Research Park (NERP) proposals as needed.

Approved:



Nigel Lockyer, Fermilab Director

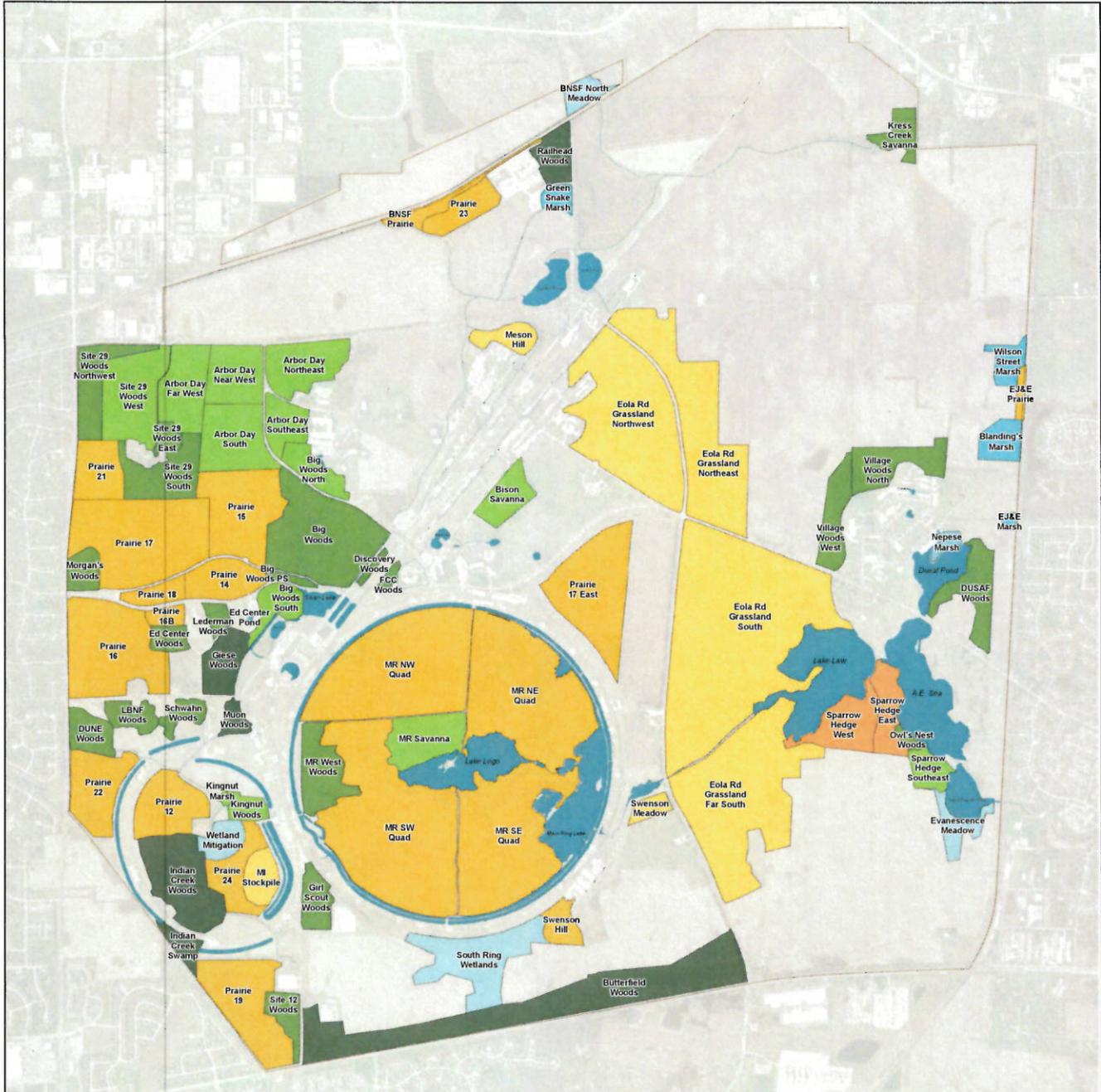
Date: 8/3/17



Tim Meyer, Fermilab Chief Operating Officer

Date: 8/7/17

# Map 1: Land Management Units



- Prairie
- Shrubland
- Grassland
- Marsh
- Forest
- Woodland
- Savanna
- Sedge Meadow



## Land Management Units

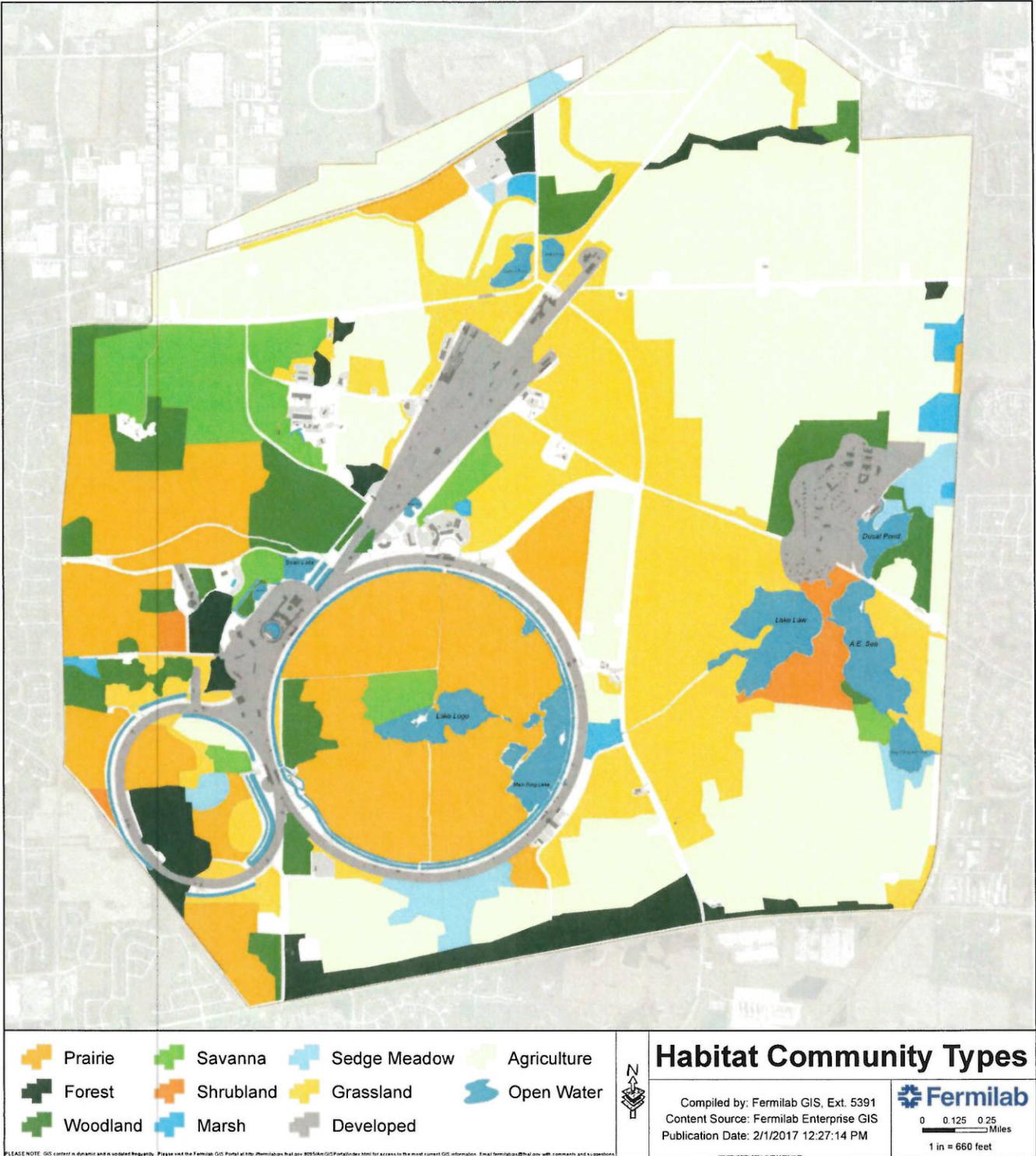
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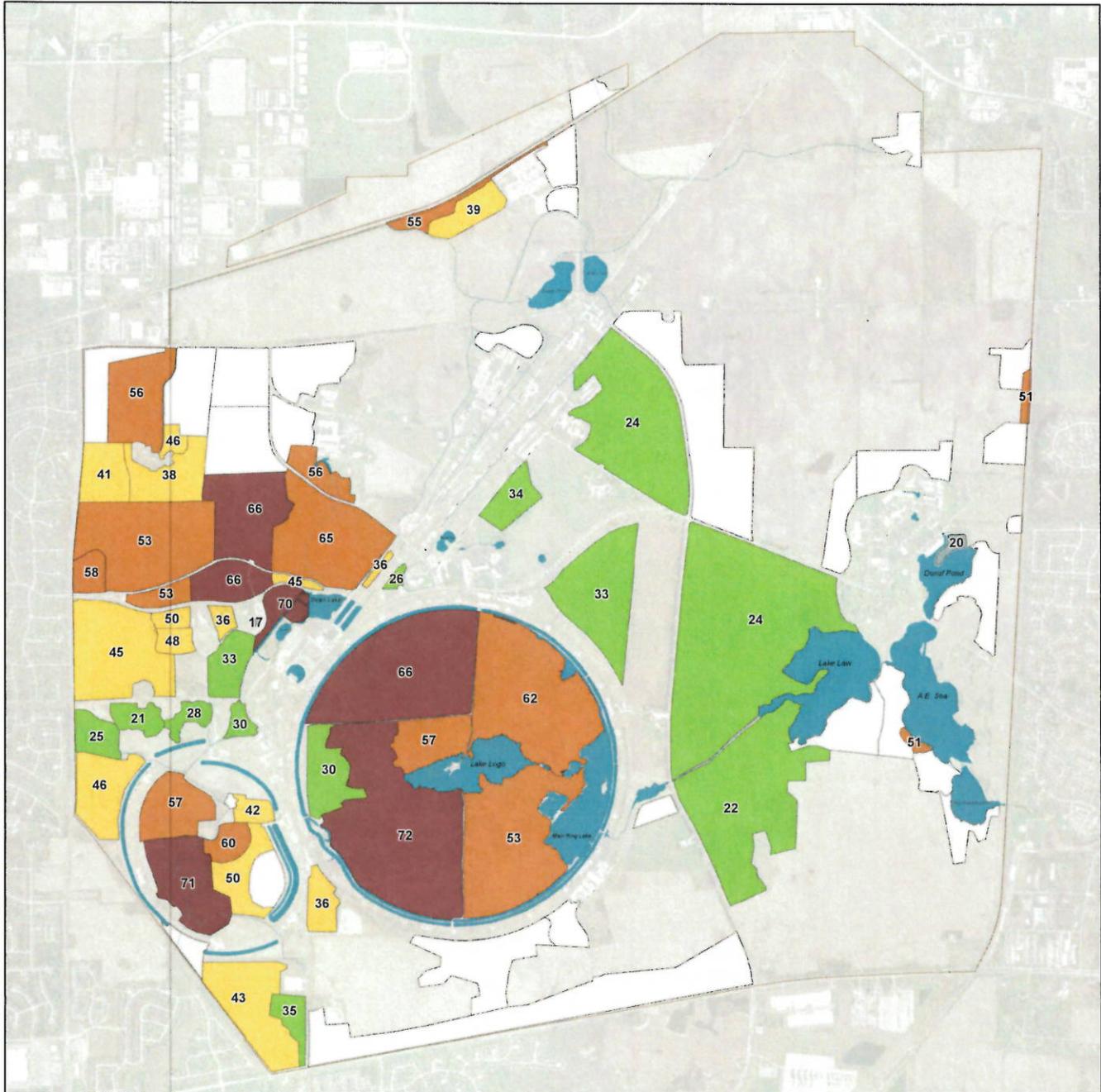
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## Map 2: Habitat Community Types



# Map 3: Floristic Quality Index



No Data	21 - 35 - Low	51 - 65 - High
< 21 - Very Low	36 - 50 - Medium	> 65 - Very High

North

## Floristic Quality Index

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# Map 5: Ecologically Sensitive Areas

