

Methods for Monitoring Herbaceous Vegetation

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Funded by: Ecosystem Management and Restoration Research Program

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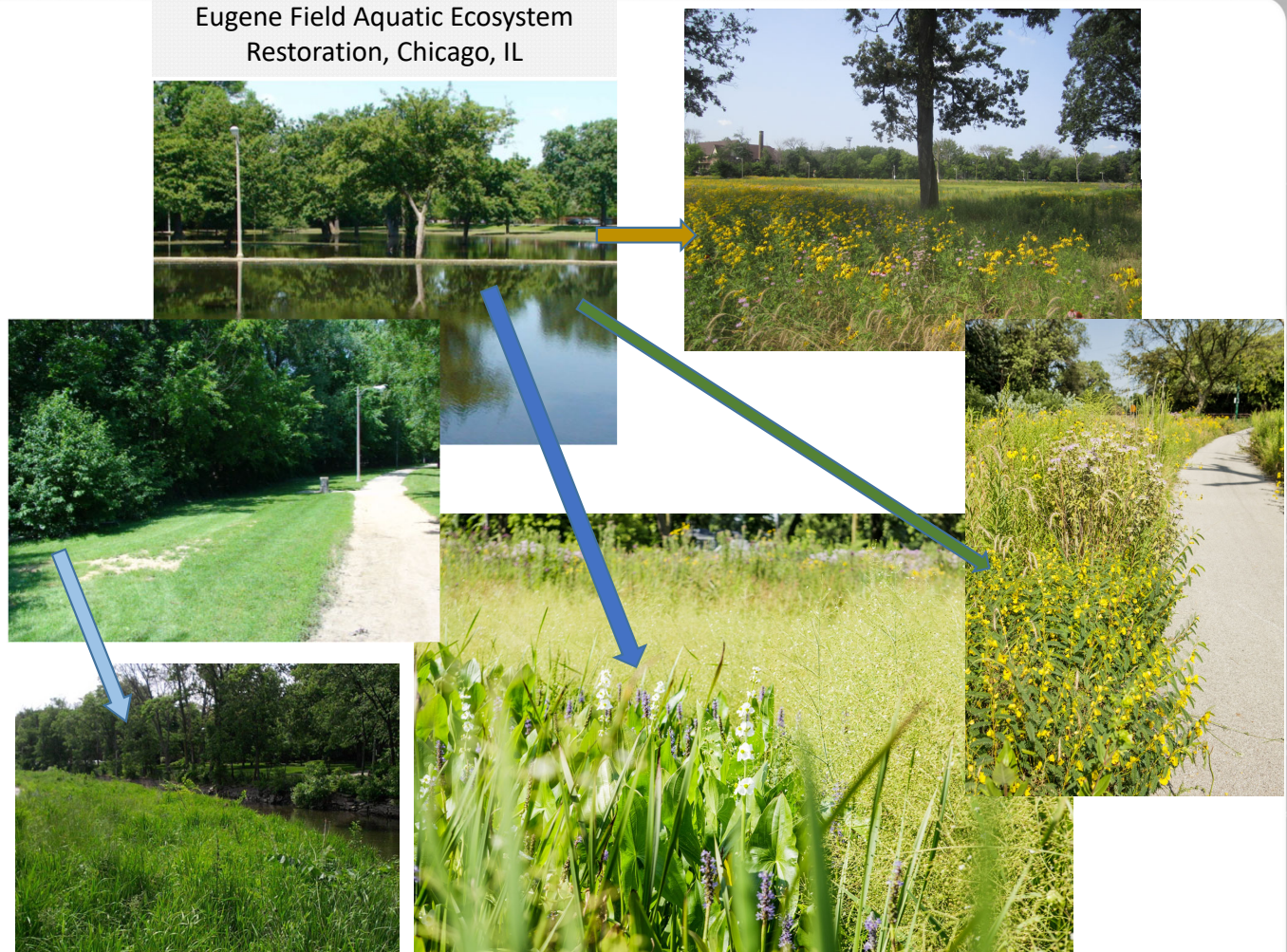


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Aquatic Ecosystem Restoration

- USACE's Prime Mission Areas
- Address Environmental Problems
- Invasive Species
- Habitat Fragmentation
- Threatened and Endangered Species

Eugene Field Aquatic Ecosystem
Restoration, Chicago, IL

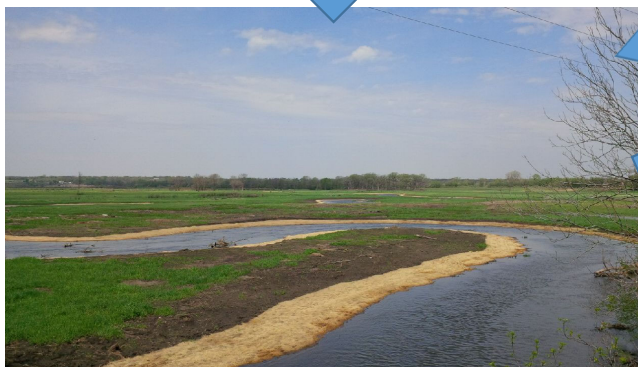


Monitoring Restoration Projects

Why?

- Determine Success
- Management Decisions
- Advance the Science – Pool and Compare Results
- Refine Restoration Techniques
- Reduce Restoration Costs
- Communication to Public

Nippersink Creek Aquatic Ecosystem
Restoration, McHenry, IL



Monitoring Restoration Projects

Challenges to Monitoring

- Time/Budget
- Developing an Effective Monitoring and Adaptive Management Plan
- Site Specifics (All Projects are Different)
- None/Few Standard Protocols
- Personal Biases
- Differences in Veg Structure

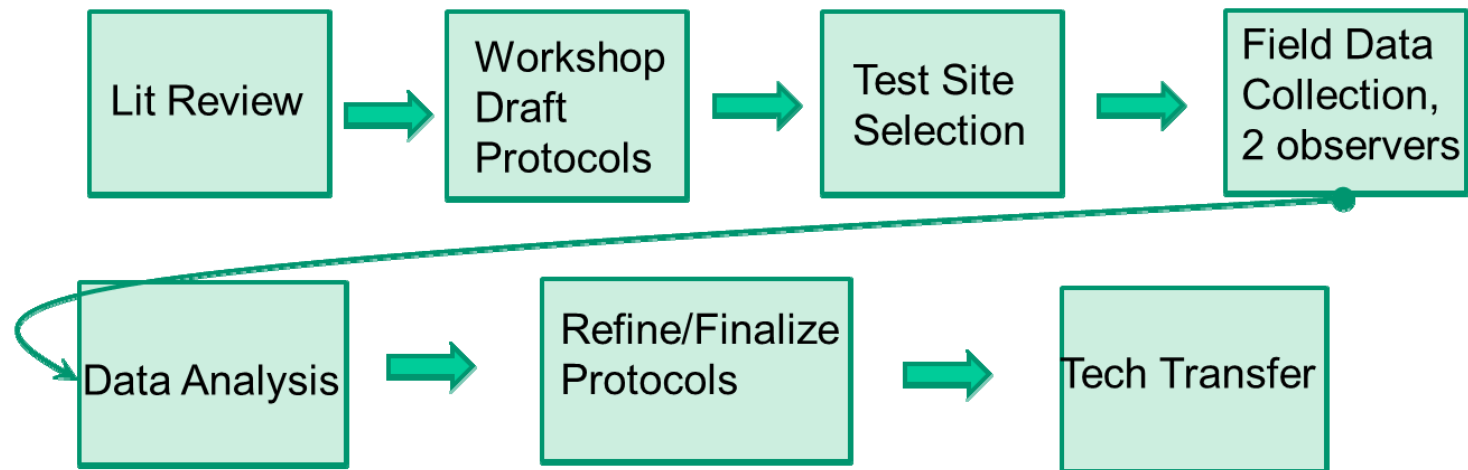


Methods Objectives

- Provide methods for standard data collection and reporting
- Use nationwide in different veg types (e.g., oak savanna, coastal salt marsh)
- Flexible to accommodate different budgets and management questions
- Ability to compare results across sites and between years
- Attempt to minimize for personal biases
- Improve ability to communicate results of restoration projects



Methods Development Approach



Project Schedule

Product	Completion Date
Literature Review	March 2017
Workshop - Develop Testable Version	April 2017
Test Site Selection	June 2017
Draft Protocols Documentation	July 2017
Test Year 1 Summer	July/August 2017
Test Year 2 Spring	March/May 2018
Standard Reporting Metrics Review	June 2018
Test Year 2 Summer	July/November 2018
Data Analysis	January 2019
Finalize Protocols	May 2019
Tech/Knowledge Transfer	June/September 2019

Literature Review – Review of Current Standard Protocols

- Objective(s)
- Protocols
 - Plot size, number of plots, placement of transect and plots, periodicity
- Data Collected
 - Percent cover, frequency, inventory, etc.
- Metrics Reported
 - Quality, species richness, cover of non-native species, etc.

Critical Trends Assessment Program Monitoring Protocols

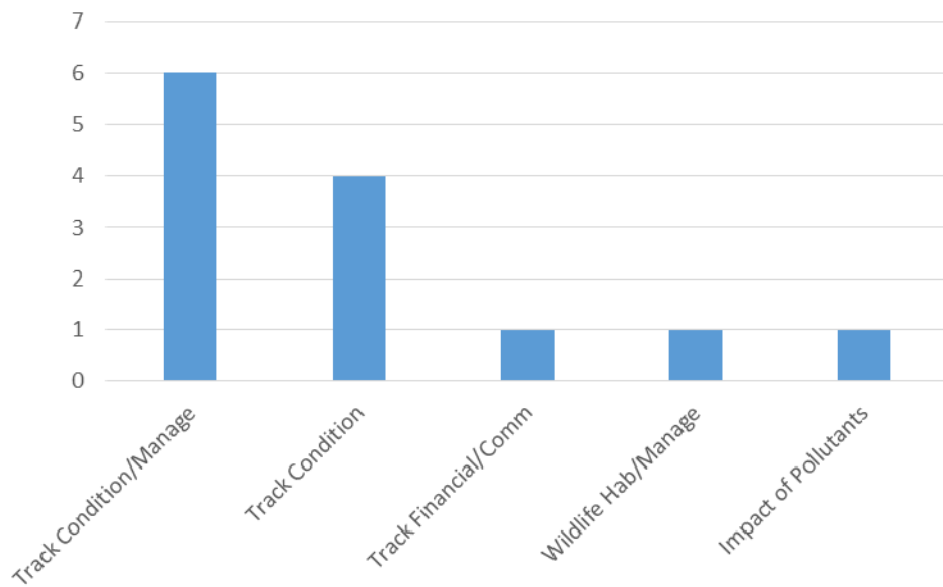


A Monitoring Protocol to Assess Tidal Restoration of Salt Marshes on Local and Regional Scales

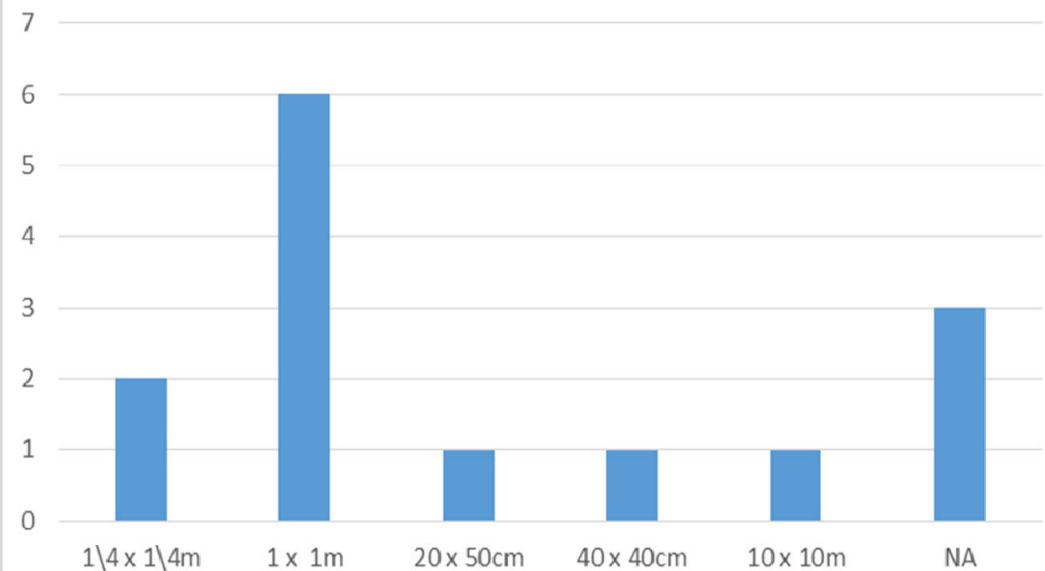


Literature Review – Review of Current Standard Protocols

Monitoring Objectives

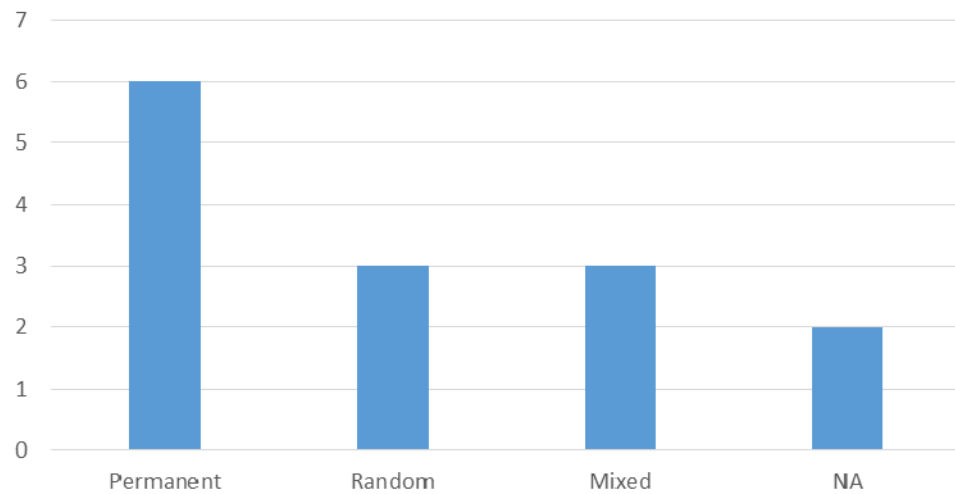


Recommended Plot Size

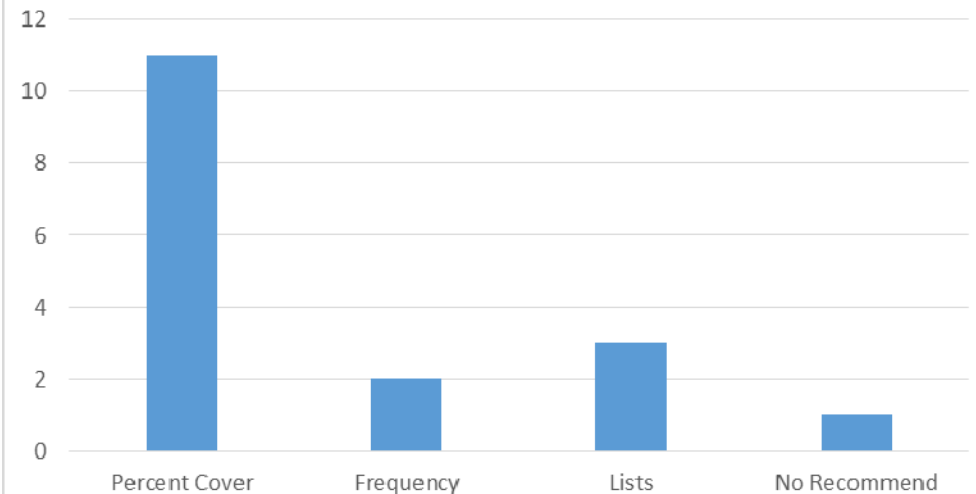


Literature Review – Review of Current Standard Protocols

Transect and Plot Placement



Data Collected



ERDC TR-XX-DRAFT



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Ecosystem Management and Restoration Research Program

Draft Monitoring Protocols for Herbaceous Vegetation

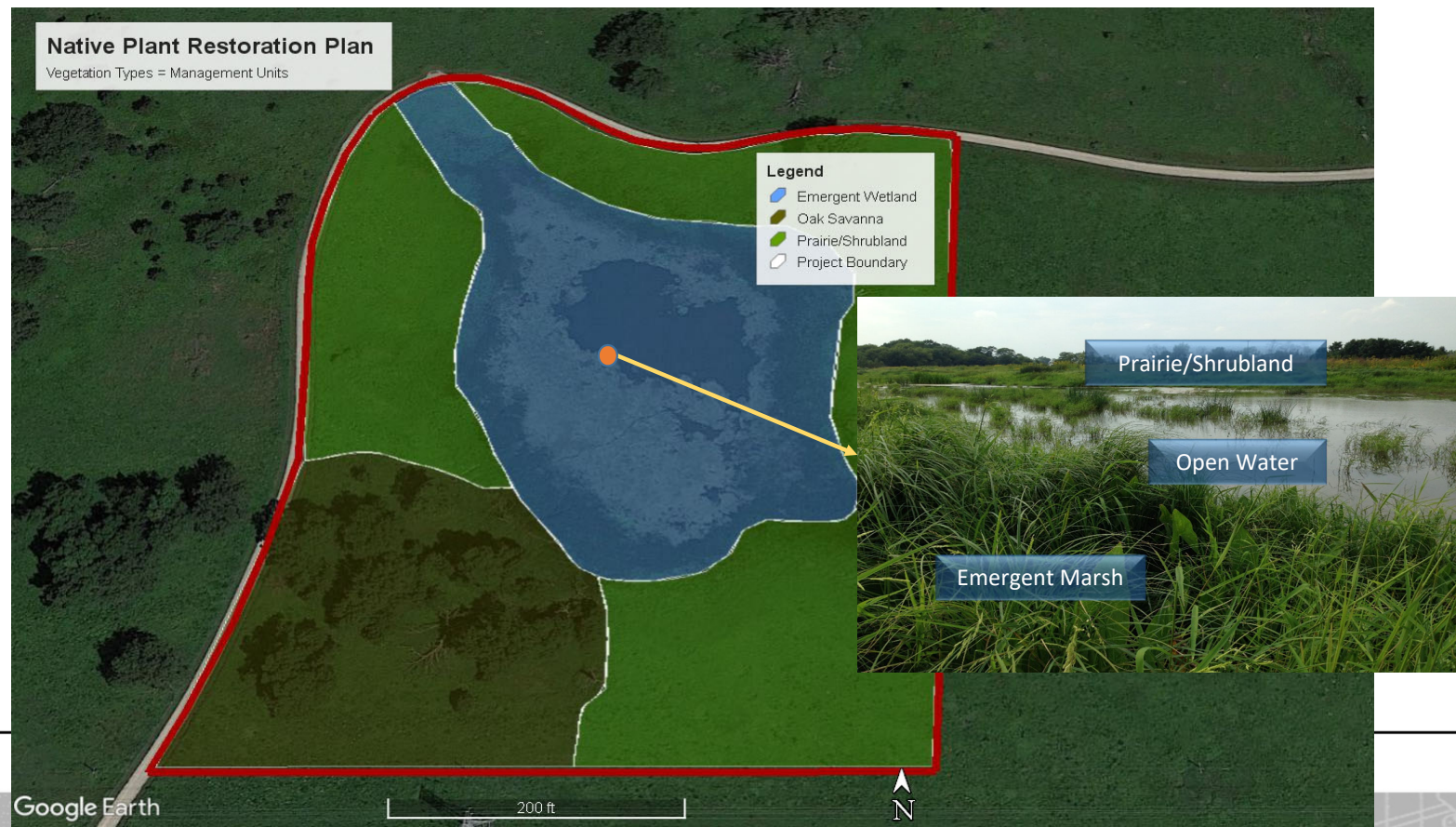
Brook D. Herman



May 2018

Methods for Herbaceous Vegetation

- Recommend Quantitative and Qualitative Protocols
- 1st : Must Select/Map Management Units (Habitat Types)



Plot Size/Shape - Quantitative



Placement of Transects and Plots - Quantitative

Standard Baseline:

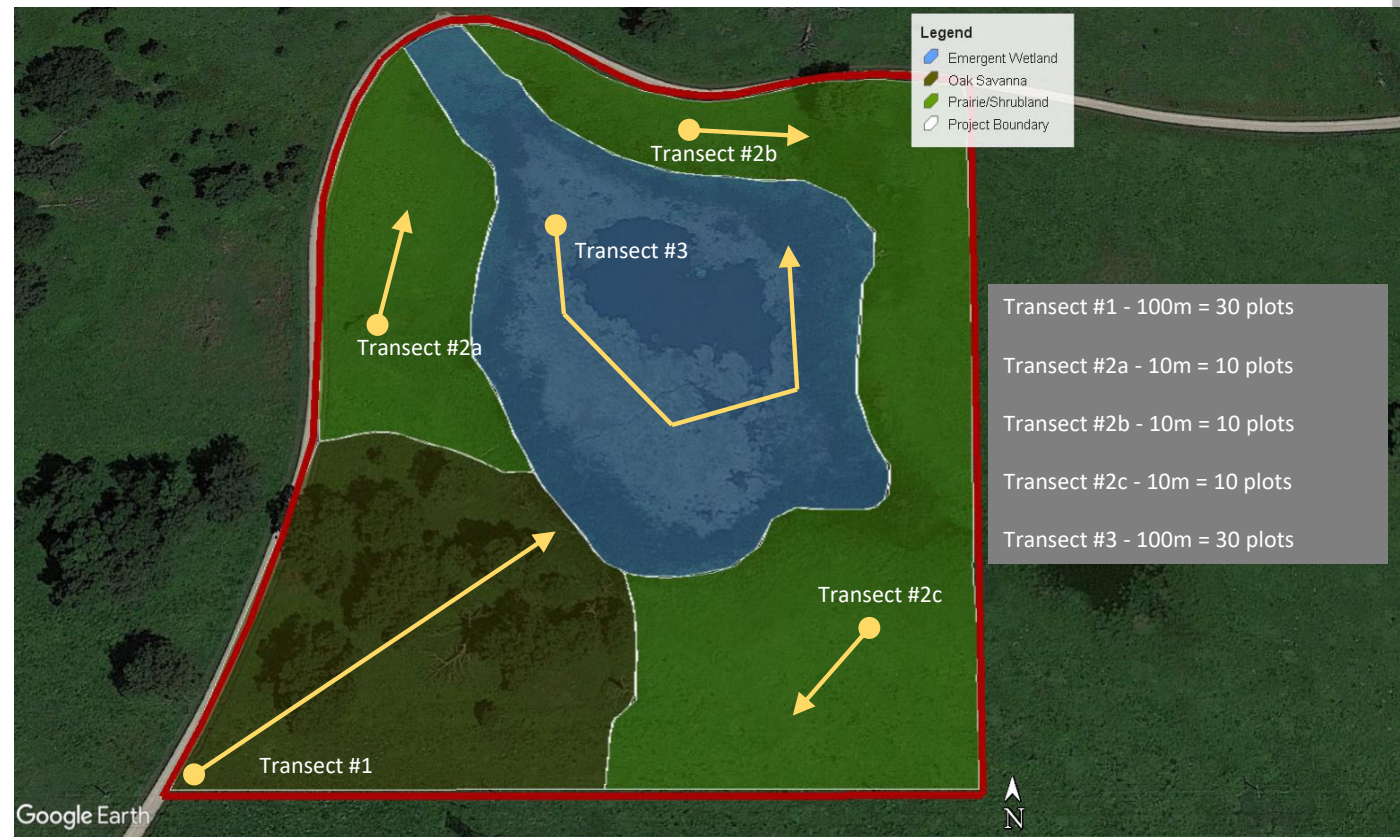
- 1 Transect per Management Unit
- 30 Plots per Management Unit

Placement is Flexible:

- Site Conditions

Placement is Scalable:

- Site Complexity/Data Scrutiny



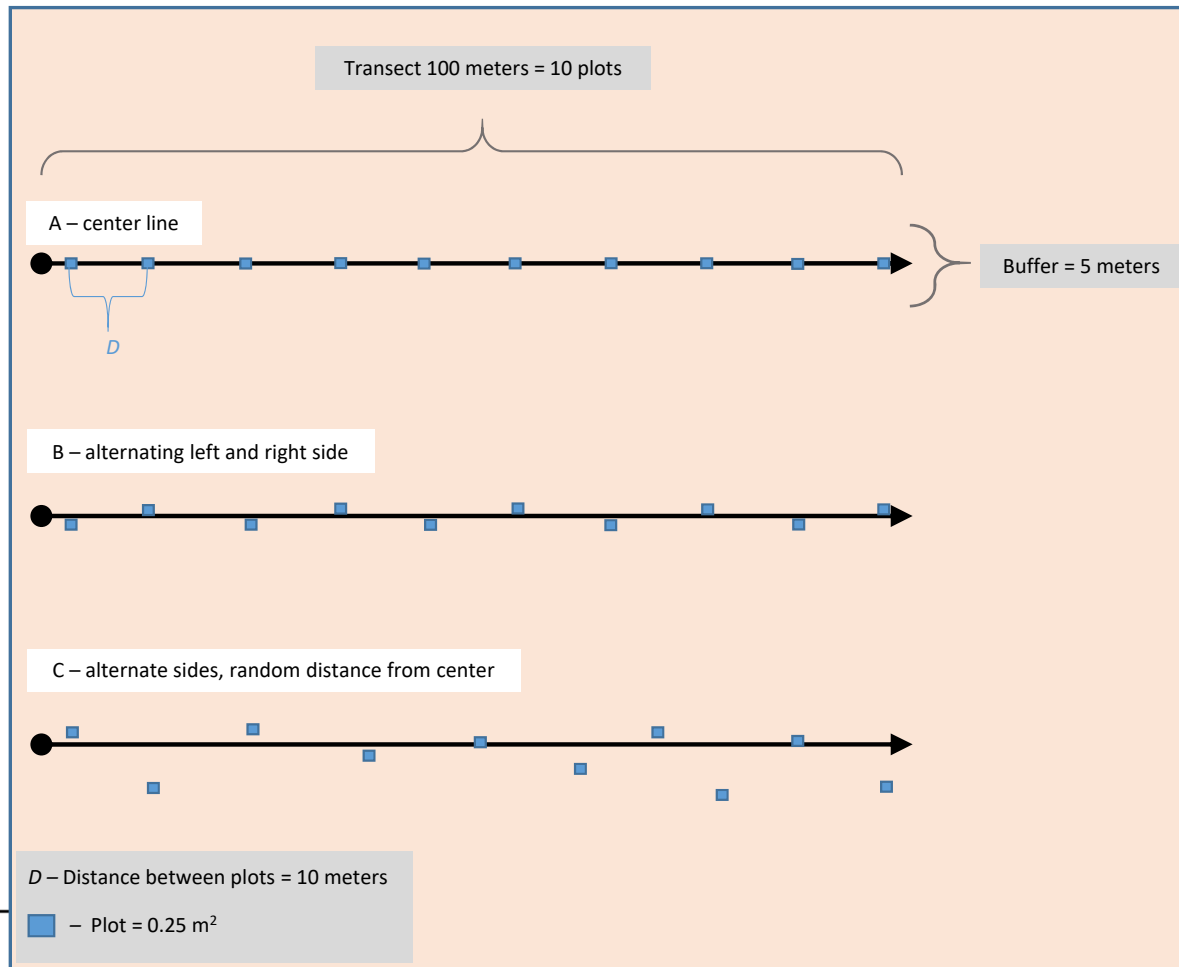
Placement of Transects and Plots - Quantitative

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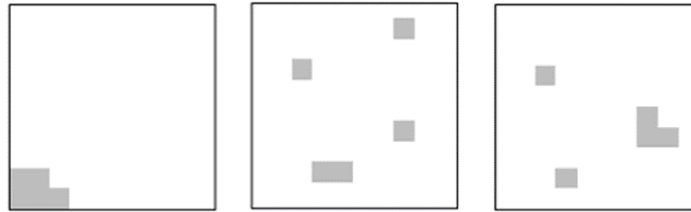
Development Center

Type of Data Recorded - Quantitative

Standard Baseline:

- Percent Cover (%) per Species in Plot
- 5% increments (1%, 5%, 10%, etc.)

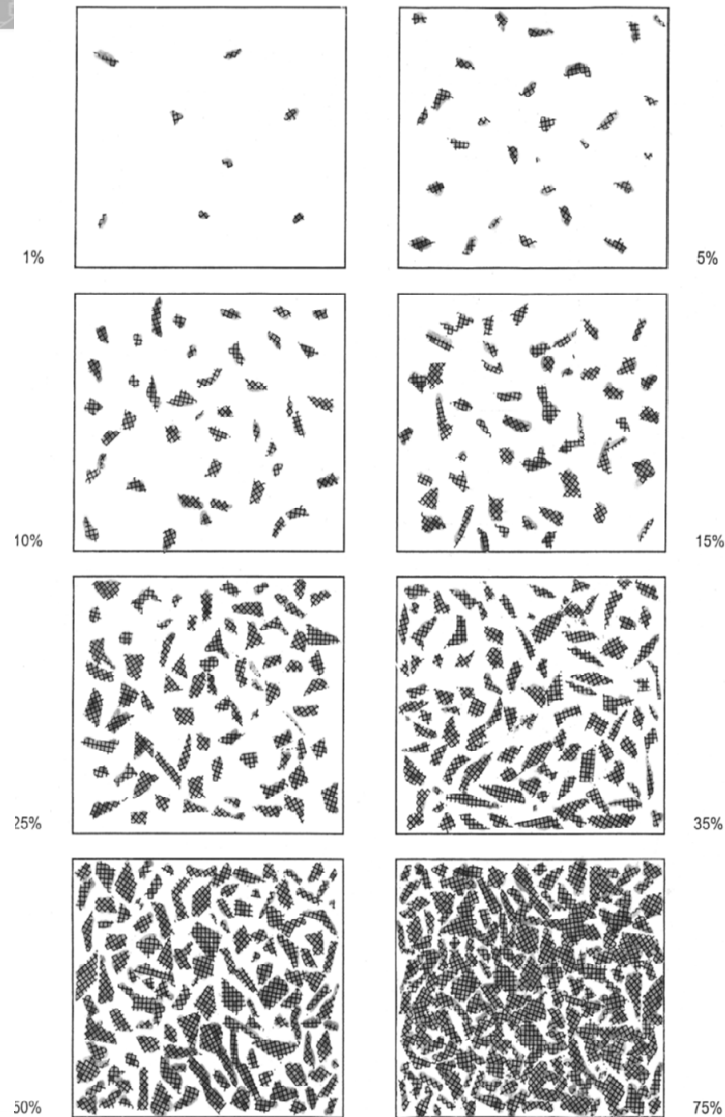
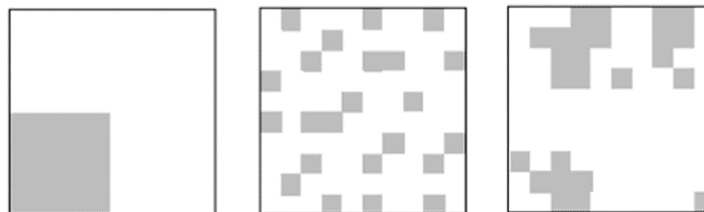
1% to 5%: These are all 5% cover



6% to 10%: These are all 10% cover



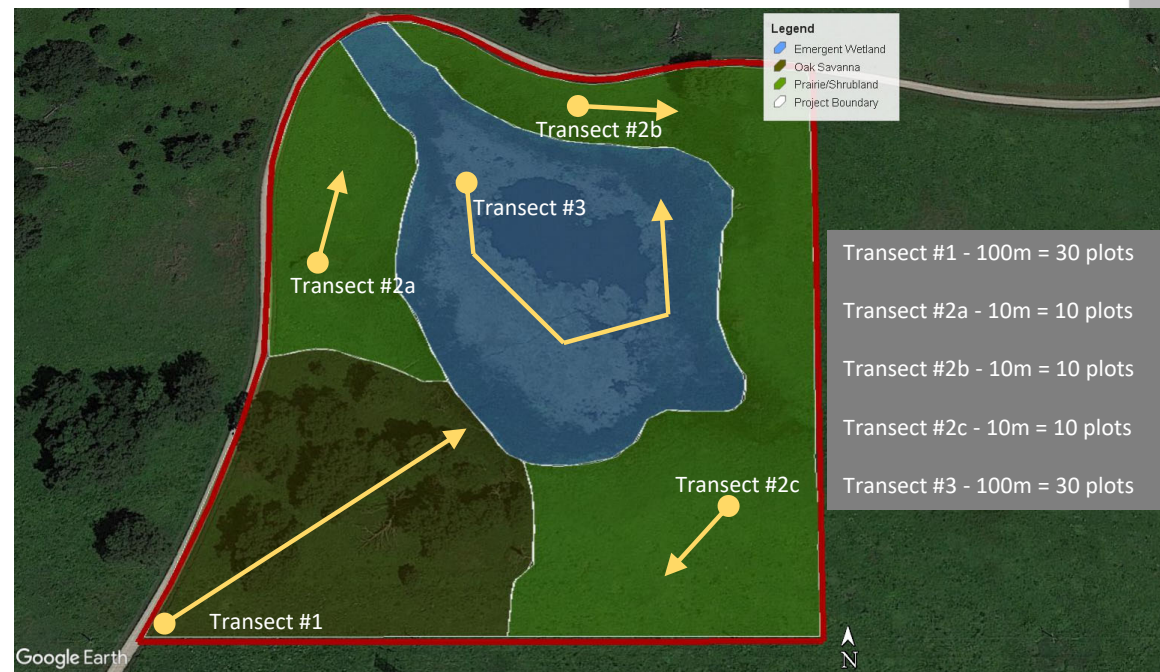
11% to 25%: These are all 25% cover



Meander Routes – Qualitative (always in combination with Transects/Plots)

Standard Baseline:

- Timed Searches per Management Unit
- 30 Minutes, add 20 Minute Increments
- Pause time for Sp. Identifications & Walking between Management Units/Meander Routes
- Roughly Map Routes
- Score each Sp.: rare (1-5%), uncommon (5-20%), common (20-45%) or dominant (45-100%)
- Permanent Photo Stations: arrow indicates direction of photo



Frequency and Seasonality – Quantitative & Qualitative

Standard Baseline:

Frequency

- 1X year during early restoration (1-5 up to 10 years),
- then every 3-5 years

Timing

- Peak Growing Season: July – October
- Spring or Fall seasons in addition to peak season if needed (e.g., spring blooming species)



Data Records and Management – Quantitative & Qualitative

Information	Notes
Date	day, month, year
Name(s) of Monitor	Even though it may be your notebook, and you will know who recorded the data, the person that takes over for you once you leave or retire from the position may need to know this information.
Site	Project name.
Management Unit or Locale	Specific type of vegetation or unique management unit name.
Transect Number and Description	Unique name or label of transect, start location of the transect (GPS coordinates), how far the start is from the edge of management unit, compass bearing/direction toward end, length of transect, location of end (GPS coordinates), rules of plot placement, etc.
No. of Plots	Expected number of plots to be sampled from transect.

July 24/17 11am
Orland Grassland
MU = Orland Tract Grassland
Mesic Prairie
B. Herman
Orland Park, IL

Transect: Northside, moving east to west
Start: 41°35.1325'N 87°51.3683'W
End: 41°35.1355'N 87°51.6249'W
30 plots, 10 m down, alt hgt 9 ft.

1	Pudhis	15	2	front pruvul	
	Solait	20		Ck 1 pell	
	Phacru	10		3 Solait	25
	Patpin	25		ziz cur	35
	Fra vir	20		Agr alb	20
	fesela	10		fesela	25
	Papra	5		lys num	15
	ziz cur	15		ppapra	5
	Solait	1		4 Puv pec	45
	Asplet	5		Solait	15
2	Pam ali			Ely can	10
					20

Data Records and Management – Quantitative & Qualitative

Unknown Species

- Track – Frob#1 or *Carex A*
- Describe, photo, take specimen (if possible)

Data Management

- Electronic Files (e.g., Excel spreadsheet)
- Manage Folders/Files



File Structure

A. Orland Tract Grassland sect 206

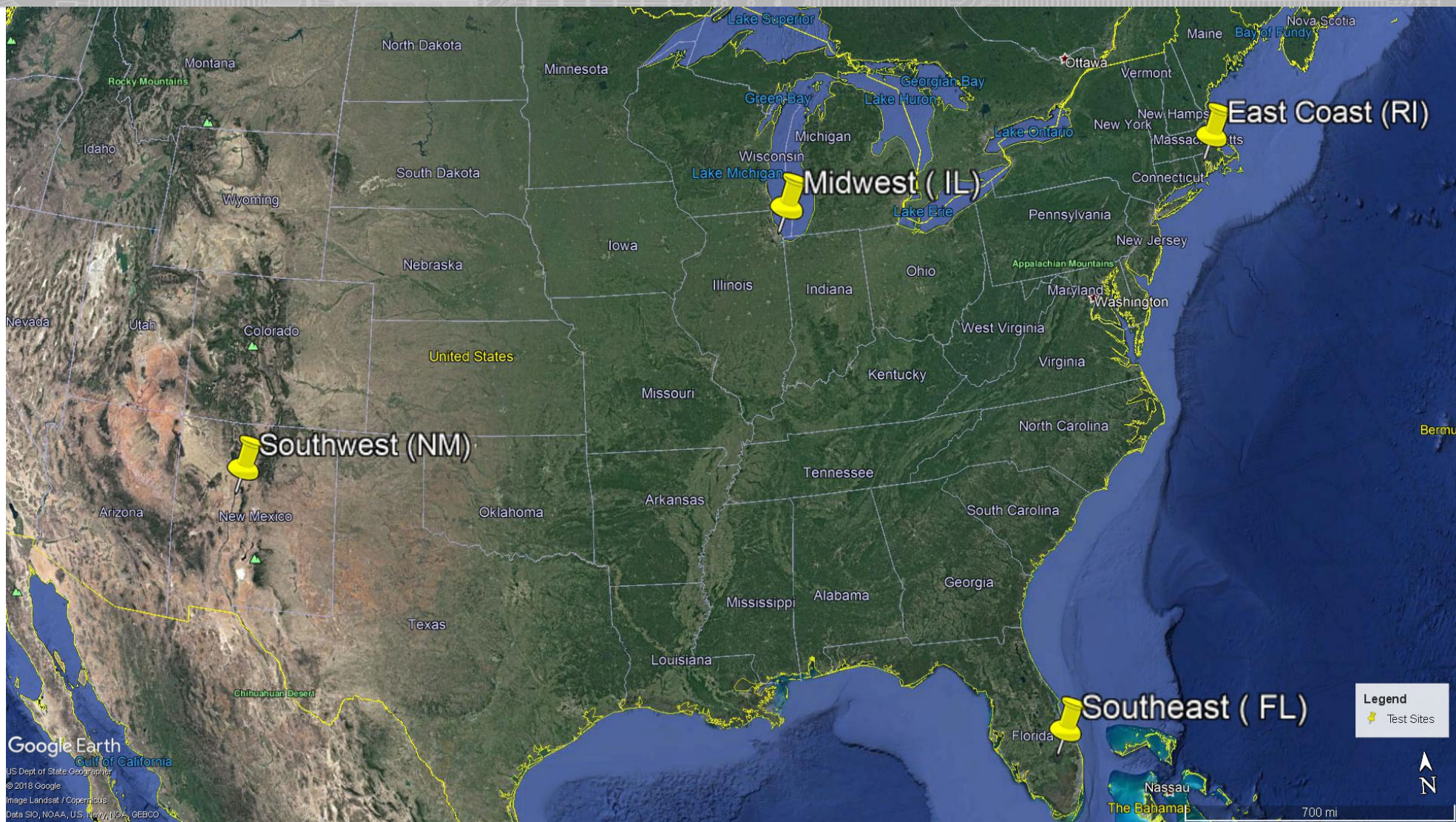
a. Monitoring

i. 2010

1. Wet Prairie

a. Transects

i. Orland_WetPraire_2010_T2.exl



Protocol Testing

Applicability:

- Four regions, multiple habitat types

Efficiency:

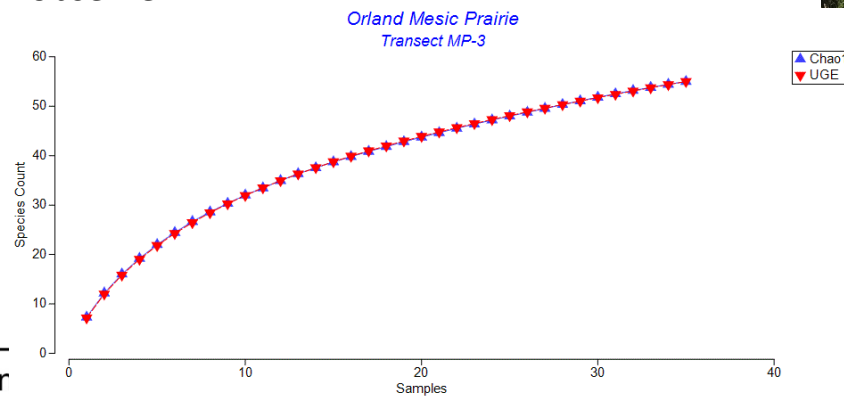
- Cost (Time) vs. Number of plots and number of species
- Species estimation (e.g., rarefaction)

Reporting:

- Appropriate success metrics

Bias:

- How many species were not detected by each observer (e.g., Pseudoturnover)
- Inform calibration process to minimize bias



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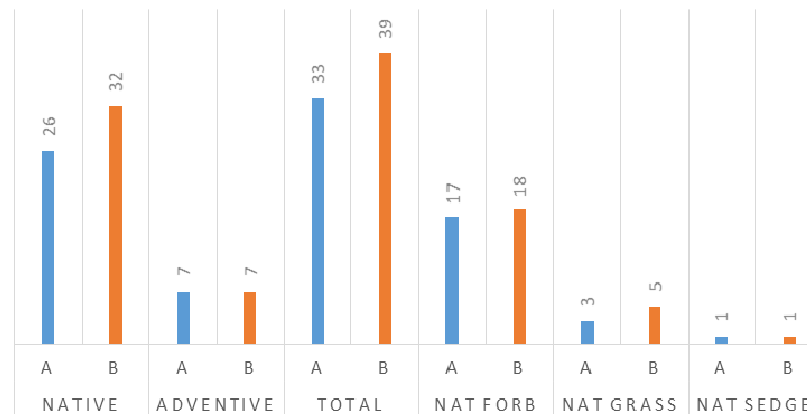


Burnham Prairie

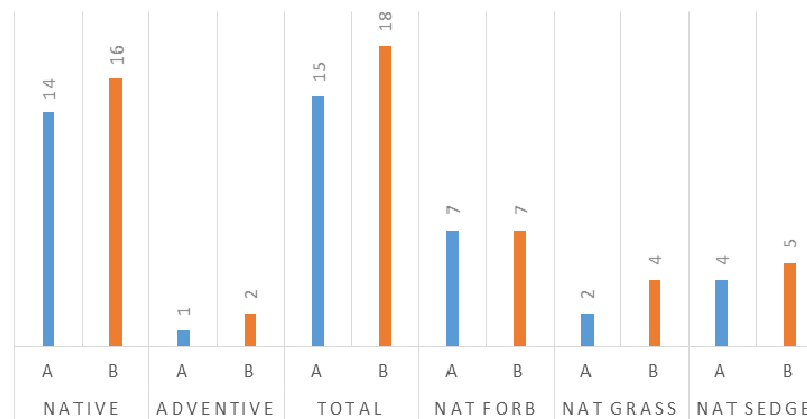
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Chicago District



BURNHAM - T3 - OAK SAVANNA



BURNHAM - T1 - WET PRAIRIE





Success Metrics

Floristic Quality Assessment Index

1. Each Species in Flora Assigned Value –
Coefficient of Conservatism (0-10)

Monarda fistulosa (Bergamot) = 4

Plantanthera psycodes (Purple
fringed orchid) = 10

2. List of Species from Area of Concern
Calculates Metrics

Mean Coefficient of Conservatism (Mean C)

$$\text{Mean } C = \bar{C} \ n$$

$$\text{Mean } C = (4+10)/2 = 7$$

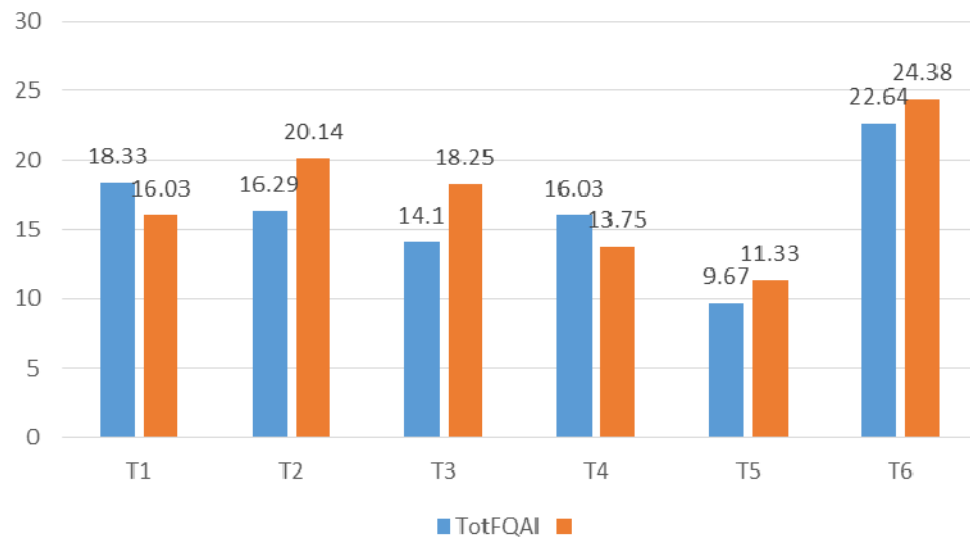
Floristic Quality Assessment Index (FQI or FQAI)

$$FQI = \bar{C} \sqrt{n}$$

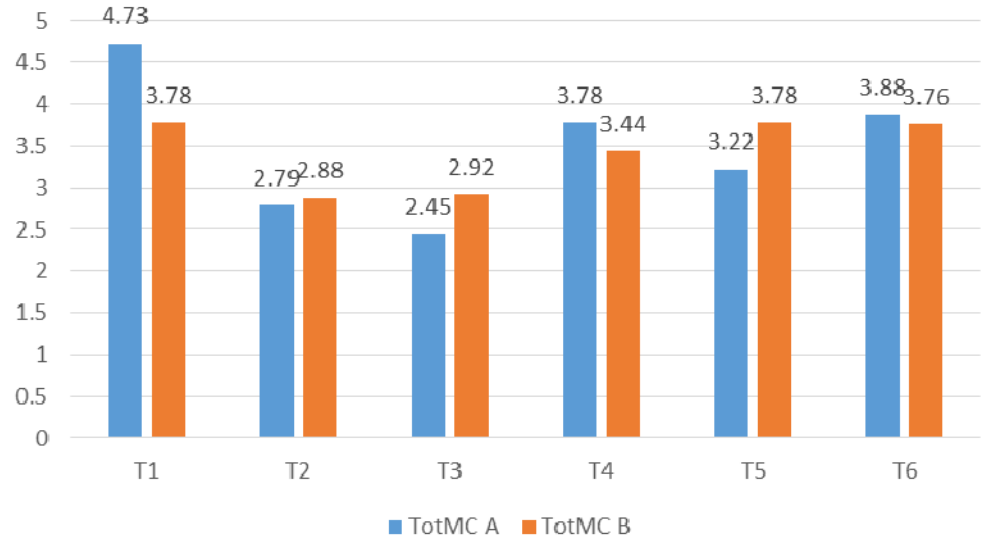
$$FQI = (7) \sqrt{2} = 9.9$$

<https://universalfqa.org/>

Burnhan - Total FQAI



Burnham - Total Mean C



T1 - Wet Prairie



T3 - Oak Savanna



Acknowledgements

- U.S. Army Corps of Engineers – Engineer Research and Development Center
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 - North Atlantic Division
 - Buffalo District
 - St Louis District
- Shed Aquarium, Chicago, IL
- University of Wyoming
- Utah State University
- Mississippi State University
- **University of Illinois – Urbana-Champaign****



Questions?

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