



MONITORING CHANGES AT A SEDGE MEADOW SITE



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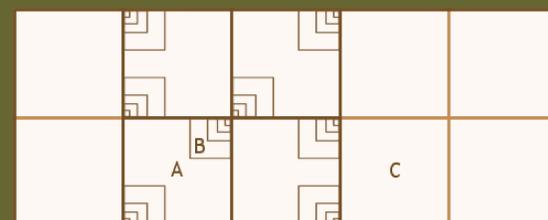
WHAT IS NIRMI?

The Northwest Indiana Restoration Monitoring Inventory (NIRMI) provides citizen, non-profit and government (local, state, federal) stakeholders with the in-depth and comprehensive data needed to track success in ecological restoration. This project uses nationally accepted, standardized ecological field methodology to monitor restoration trajectories and allows restorationists the ability to predict, plan, conduct, maintain and study successful restorations along Lake Michigan's south shore.

HOW IT WORKS

The main focus of NIRMI is the collection of data on vascular plant species, macrofungi, and soils. Within a plot (typically 50m x 20m in size, or 0.1 ha), we record species presence and relative abundance throughout the growing season and over many years. A plot is subdivided into ten, 10m x 10m modules, four of which are intensively surveyed for vascular plants and macrofungi at five spatial scales (from 0.01 m² to 100 m²). Soil samples are collected from the center of these four intensive modules. The cover of each plant taxon recorded within the plot is estimated and used to determine relative species abundance. These data then provide statistics for predictive variables (e.g. species diversity, floristic quality, community composition). Repeated surveys at the same plots over the long-term (decades) project a trajectory for a given restoration.

EXAMPLE PLOT LAYOUT



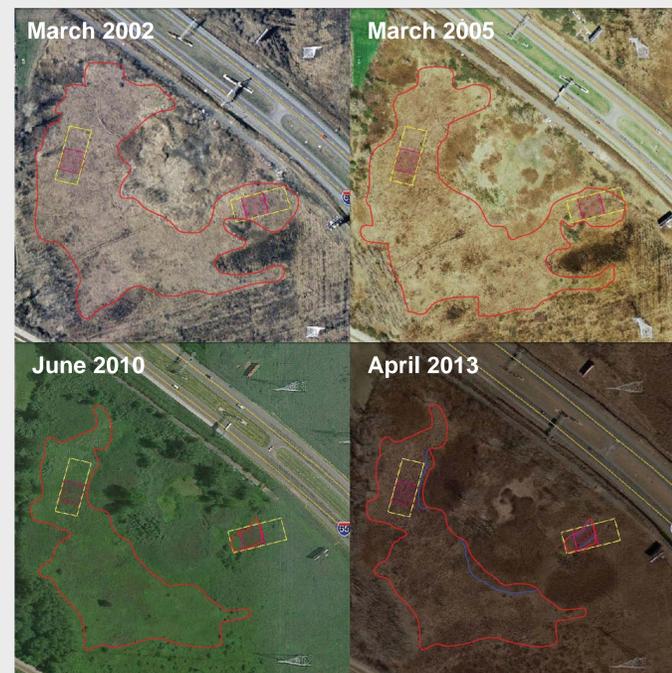
- A. Intensively sampled module
- B. Nested sub-quadrats of smaller scale
- C. Residual module

Site Description

Owned and managed by Save the Dunes, Fesko is located in the city of Gary in Lake County, Indiana. The approximately 25 acre preserve contains sections of remnant sedge meadow, a very rare and important habitat in northwest Indiana. The site contains many high quality plant species, but is under threat from large stands of encroaching *Phragmites australis* (common reed) and a few other invasive wetland plants.

NIRMI has three permanent 0.1 ha, standard 20m x 50m plots located in open sedge meadow areas surrounded by walls of *Phragmites* (Figure 1). This study focuses on Plots 1 and 3 which are most in danger of being engulfed by the *Phragmites* stands. Plot 1 is located in a small high quality area on the eastern edge of the site and is under severe threat of encroachment. Plot 3 is located in the northwestern portion of the site on slightly higher ground than the other two plots. It has large stands of *Phragmites* to its north, west, and east with part of the plot's east edge starting to be dominated by *Phragmites*.

Figure 1: Historical aerial images of site with NIRMI plots outlined in yellow. Red outline indicates approximate boundary of quality sedge meadow habitat as it changed over time.



Management & Survey Summary

Minimal management activities have taken place in the sedge meadow areas of Fesko. We originally set up and surveyed the plots in June 2011. Second surveys were done in late August 2011. In July 2013 Plots 1 and 3 were re-surveyed in hopes of documenting threats to the vegetation in these areas. No management activities had occurred at Fesko during the period of 2011 to 2013. All surveys were done using the standard NIRMI protocol where all plant species in the four intensive modules were recorded at varying spatial scales and estimates of percent cover of each species in a single module were made. Surveys of the remaining six non-intensive, residual modules were completed as well.

Results

Re-surveys of Fesko Plots 1 and 3 in 2013 showed increase in *Phragmites* presence and decreased cover of quality herbaceous plant species as compared to 2011 (Figure 2). Comparison of data collected in 2011 to those collected in 2013 showed slight decreases in average C-value (Coefficient of Conservatism) and FQI (Floristic Quality Index) for both plots (Figure 3).

Figure 2: Changes in *Phragmites* presence and abundance from 2011-2013
 a. Visual changes in Plot 3 from 2011 (left) to 2013 (right).



b. *Phragmites* presence at nested spatial scales between 2011 and 2013.

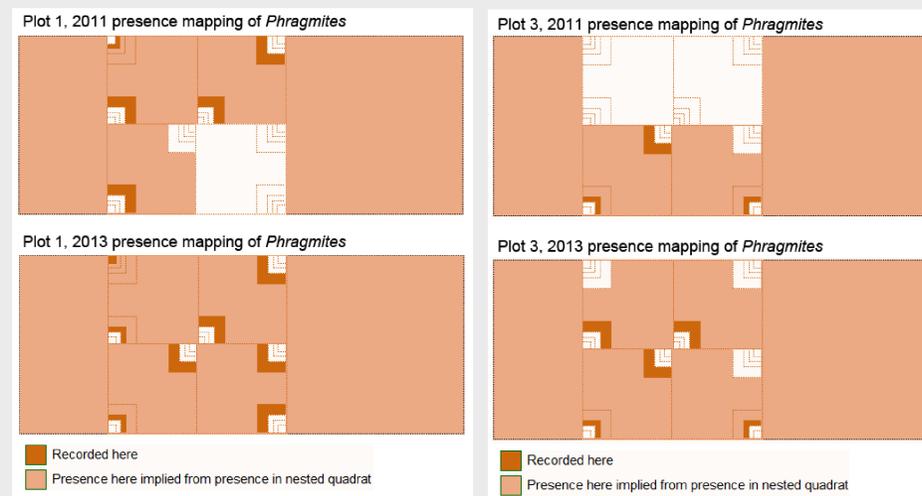


Figure 3: Sample Metrics for vegetation changes from 2011 to 2013

Plot 1 - 2011 metrics		Plot 1 - 2013 metrics	
Species count	68	66	Species count
Average C-value	4.687	4.446	Average C-value
FQI (Floristic Quality Index)	38.361	35.846	FQI (Floristic Quality Index)

Plot 3 - 2011 metrics		Plot 3 - 2013 metrics	
Species count	51	45	Species count
Average C-value	4.18	4.045	Average C-value
FQI (Floristic Quality Index)	29.557	26.835	FQI (Floristic Quality Index)

Discussion

Two years after our initial survey of Fesko in 2011 we have observed visual and quantitative changes to Plots 1 and 3. Figure 2 shows the changes in *Phragmites* presence between our two visits. Maps of each plot in Figure 2b indicate encroachment of *Phragmites* into new modules and at finer spatial scales in 2013. This progress of encroachment is ubiquitous at Fesko as shown by historical aerial imagery in Figure 1.

While species richness (number of species) decreased in each plot from 2011 to 2013, it is not likely significant due to inherent variability in sampling. The decreases in calculated average C-value and FQI may be more representative of a true decrease in vegetative quality. Monitoring these plots in future years may refine data and show statistical trends.

All of these data support the necessity for both continued monitoring and increased management in order to maintain floristic quality and overall habitat value.

Summary

Fesko has experienced obvious declines in environmental quality within a two year period. This is the latest stage of an on-going trend (over a decade) of habitat dereliction. With appropriate management activity degraded areas can be restored to a higher quality. At a minimum, to maintain the current sedge meadow boundaries invasive control measures should be implemented as soon as possible.

We believe Fesko should be a priority site for management due to the scarcity of the sedge meadow plant community in the southern Lake Michigan rim region.

Acknowledgments

Special thanks to NIRMI Director Dr. Peter Avis, Procedural Manager & Botanist Gayle Tonkovich, Data Manager & Mycologist Wyatt Gaswick, and NWI Cluster GLISTEN Coordinator Dr. Erin Argyilan.

We are especially grateful for the generosity of the Flora Richardson Foundation in providing funds to support our work with NIRMI this summer. Since 2010 NIRMI has been supported by grants from ArcelorMittal, the Gaylord & Dorothy Donnelley Foundation, the Indiana Lake Michigan Coastal Program, Indiana University, and the Lilly Foundation.

