Water Quality Monitoring: Opportunities for Interdisciplinary Education and Research

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Things you'll hear today

- Fostering interdisciplinary opportunities
- Interdisciplinary interaction
- Ecological Systems Laboratory
- JI Case Wetland
- Challenges of interdisciplinary water quality monitoring

Fostering Interdisciplinary Opportunities

- Rose-Hulman Institute of Technology
  - Undergraduate engineering, science, and mathematics
  - Approximately 1,800 students
- Need for interdisciplinary opportunities
  - Undergraduates
  - Stovepipe curriculum
  - Limited research
  - Focus on teaching

Interdisciplinary Interaction

Civil Engineering

Biology

Chemistry

Interdisciplinary Interaction

Faculty

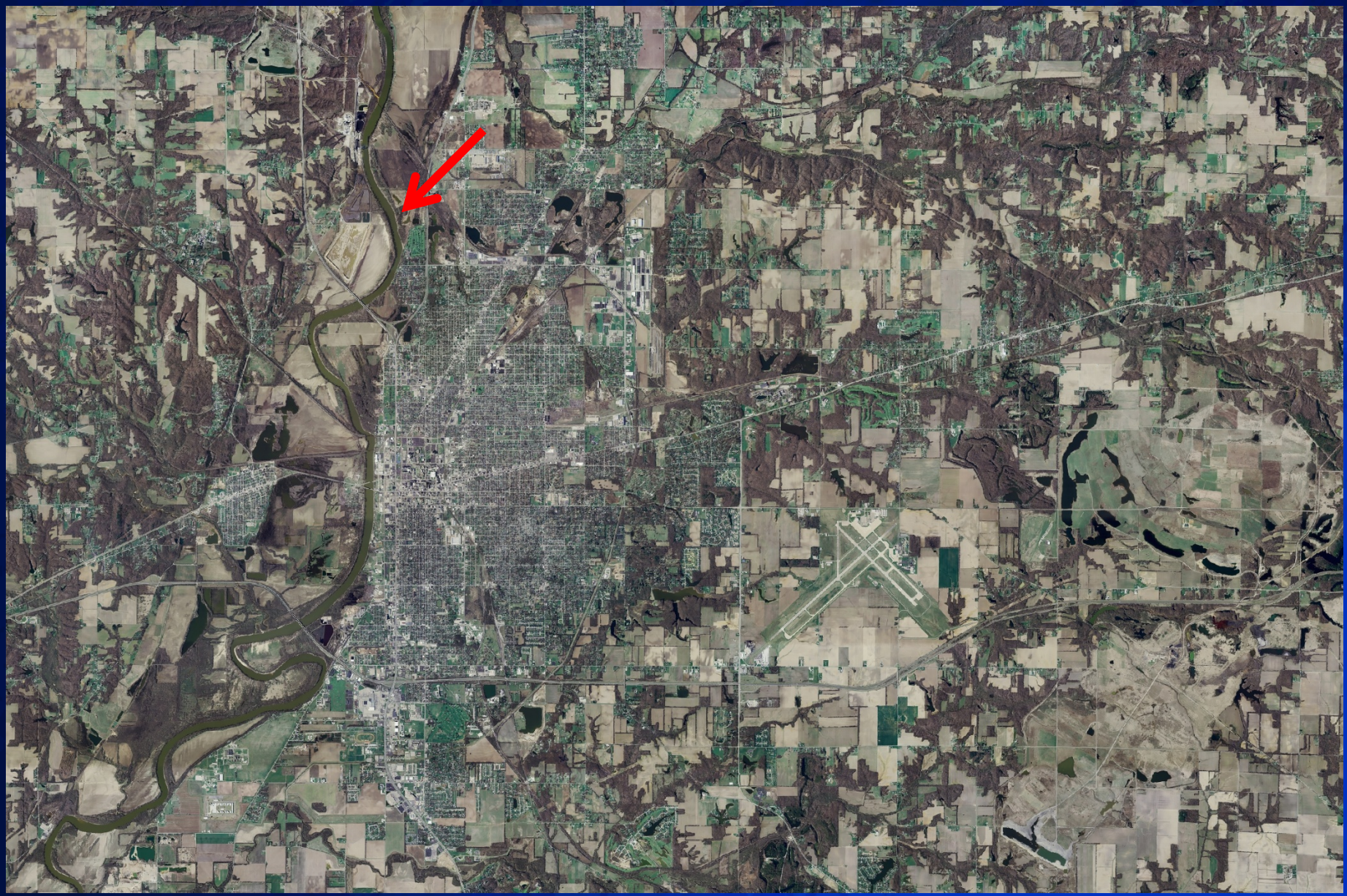
Students

Monitoring groups

K-12

Water Quality Monitoring
Ecological Systems Laboratory

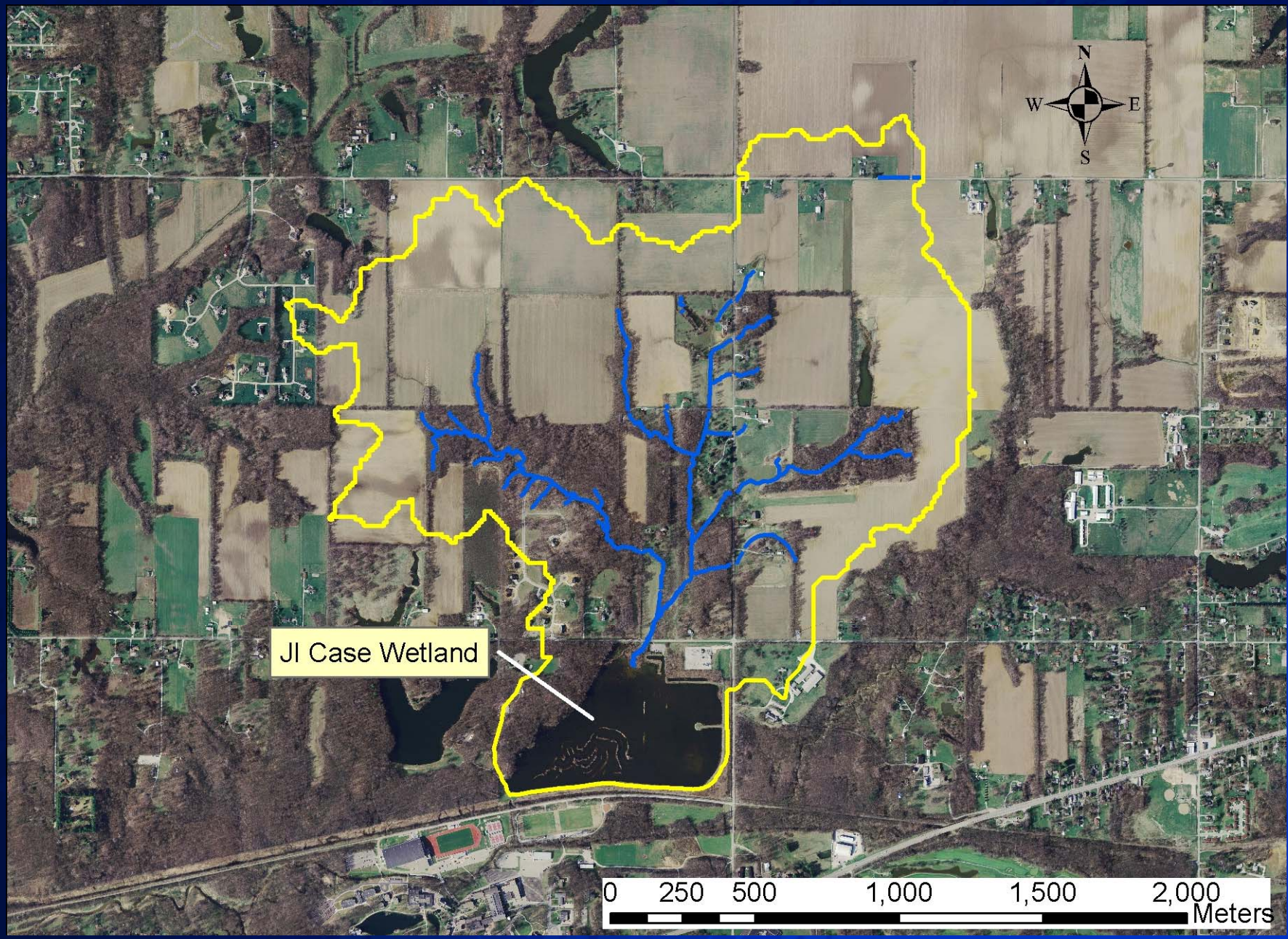
JI Case Wetland / Wabash River

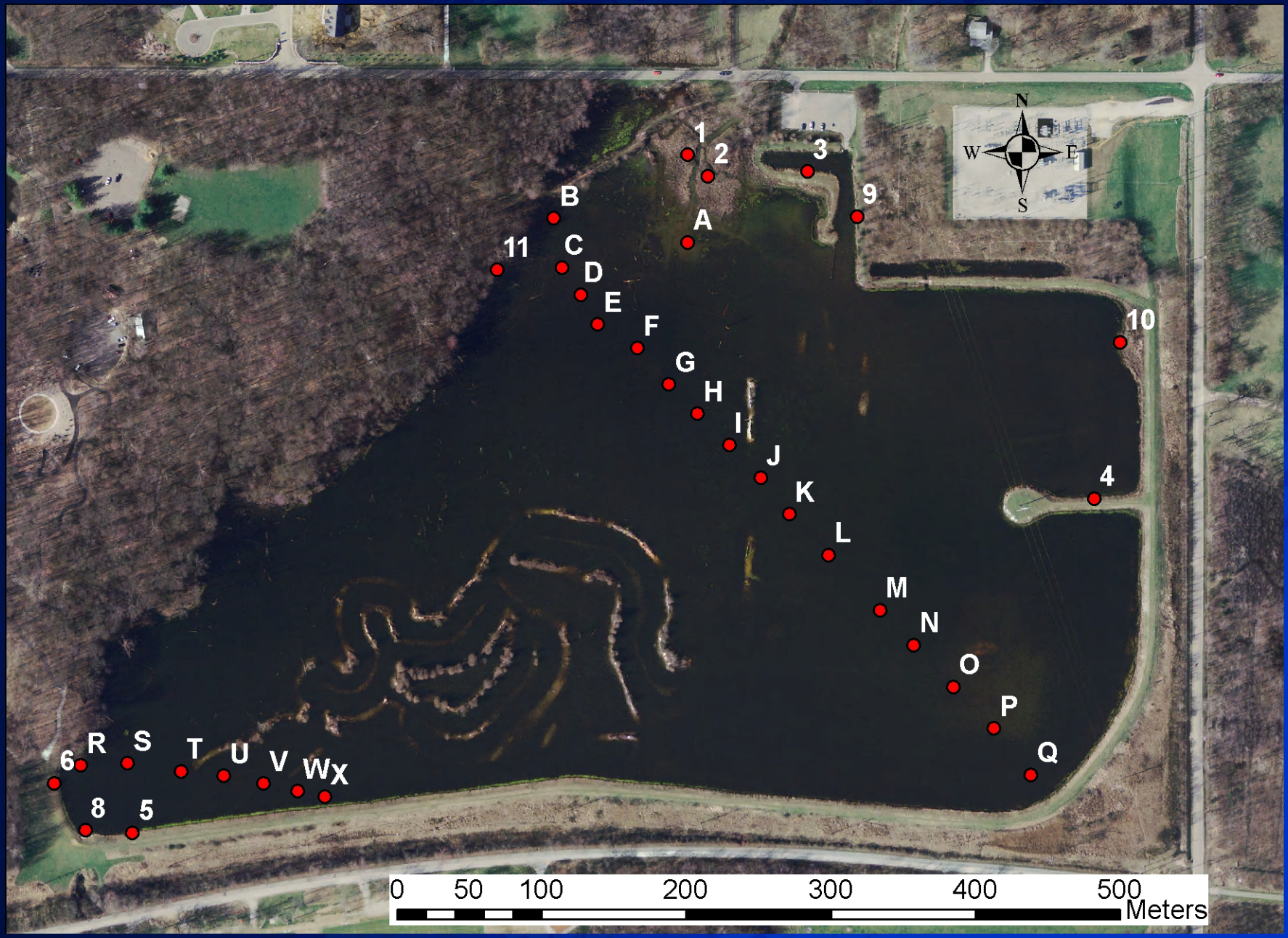


Lost Creek South Fork

J.I. Case Wetland

- Constructed in 1984
- Managed by Vigo County Department of Parks and Recreation
- 54-acre impoundment, 800 acre watershed (50 % agricultural land use, remaining mostly forested and some open water)
- Average depth of 3 feet, maximum depth 12 feet
- 8050 m of streams and ditches


N
W
E
S
JI Case Wetland
0
250
500
1,000
1,500
2,000
Meters


1
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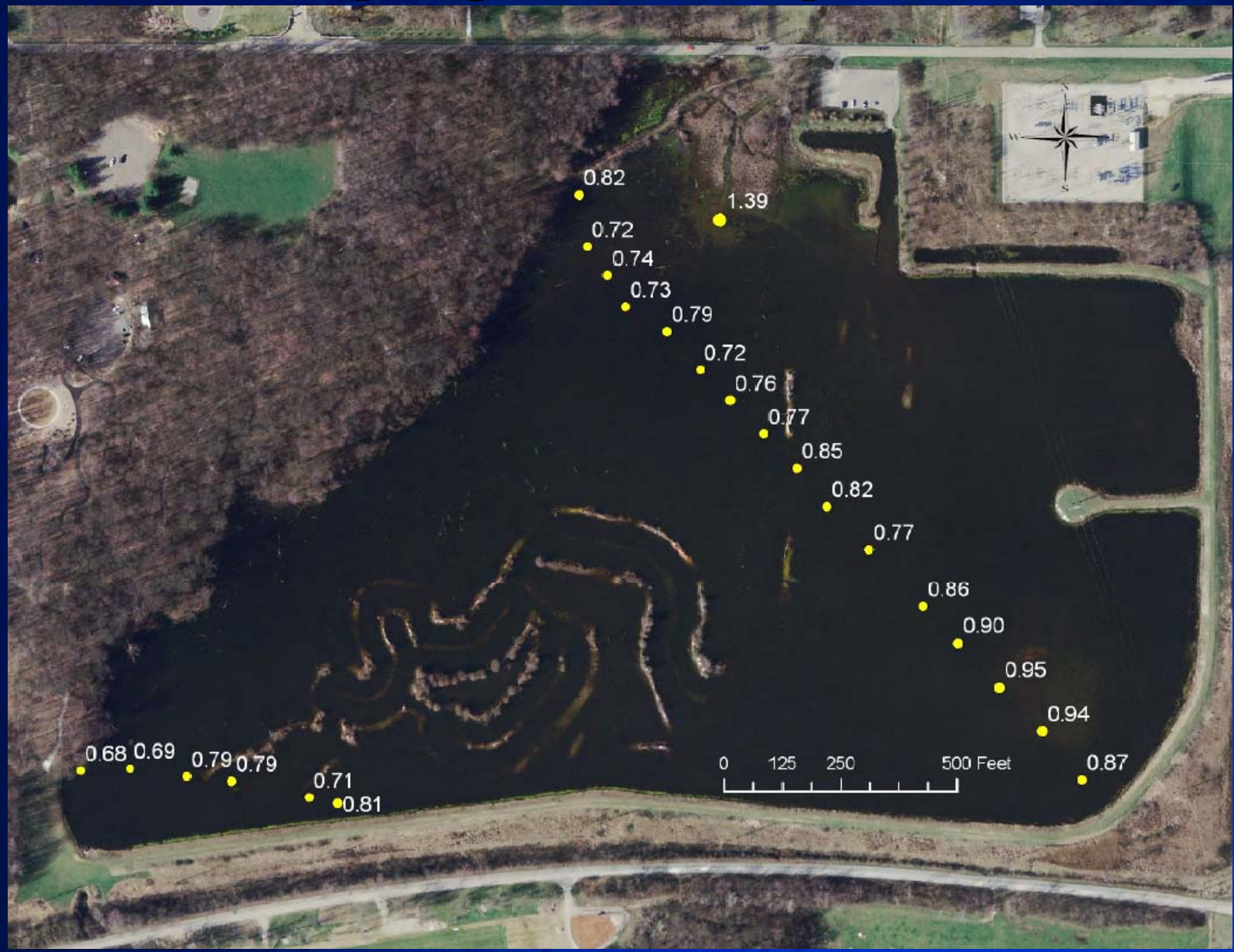
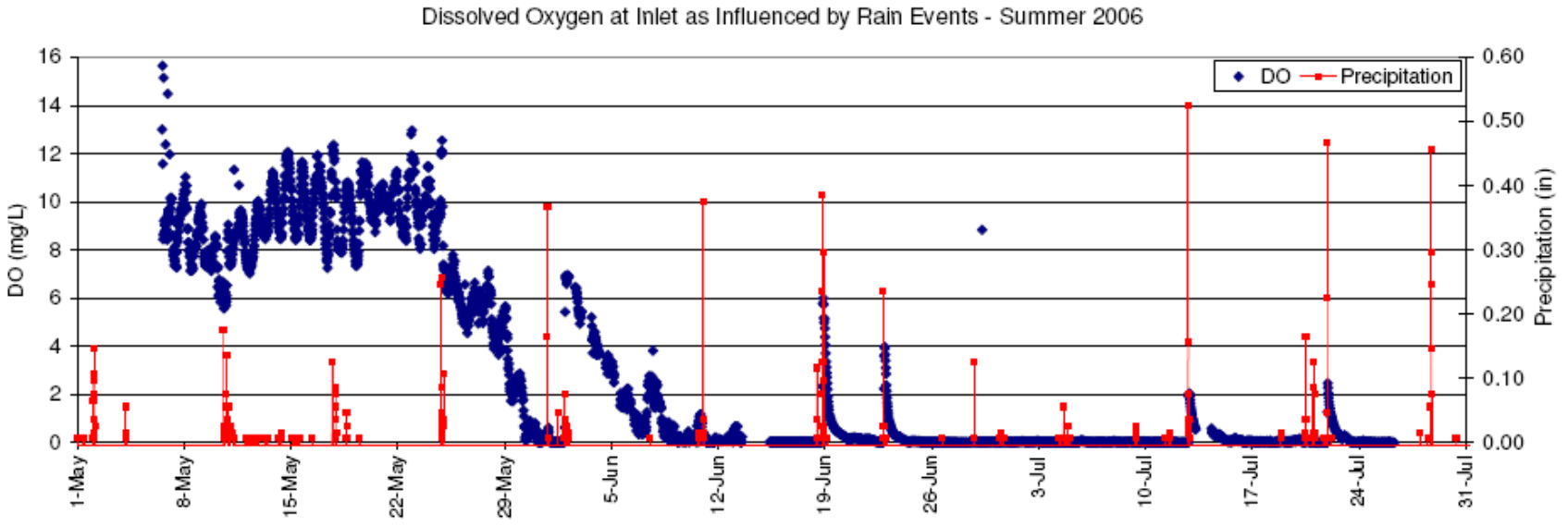
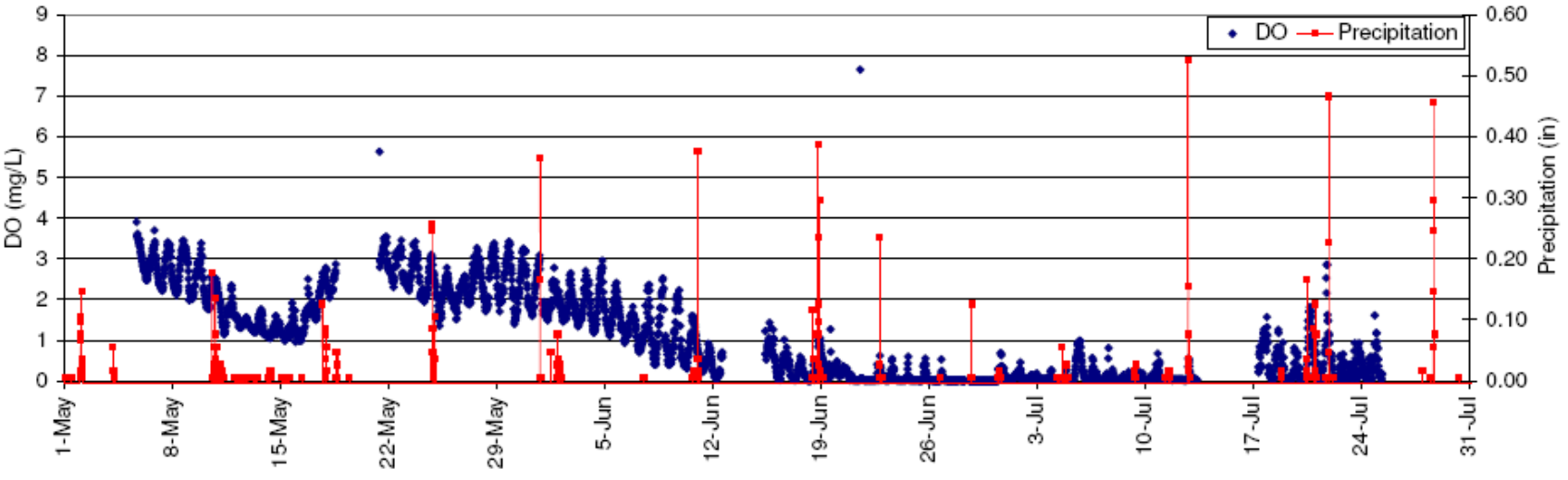
50
100
200
300
400
500
Meters

Total N (mg/L as N) June 29, 2006

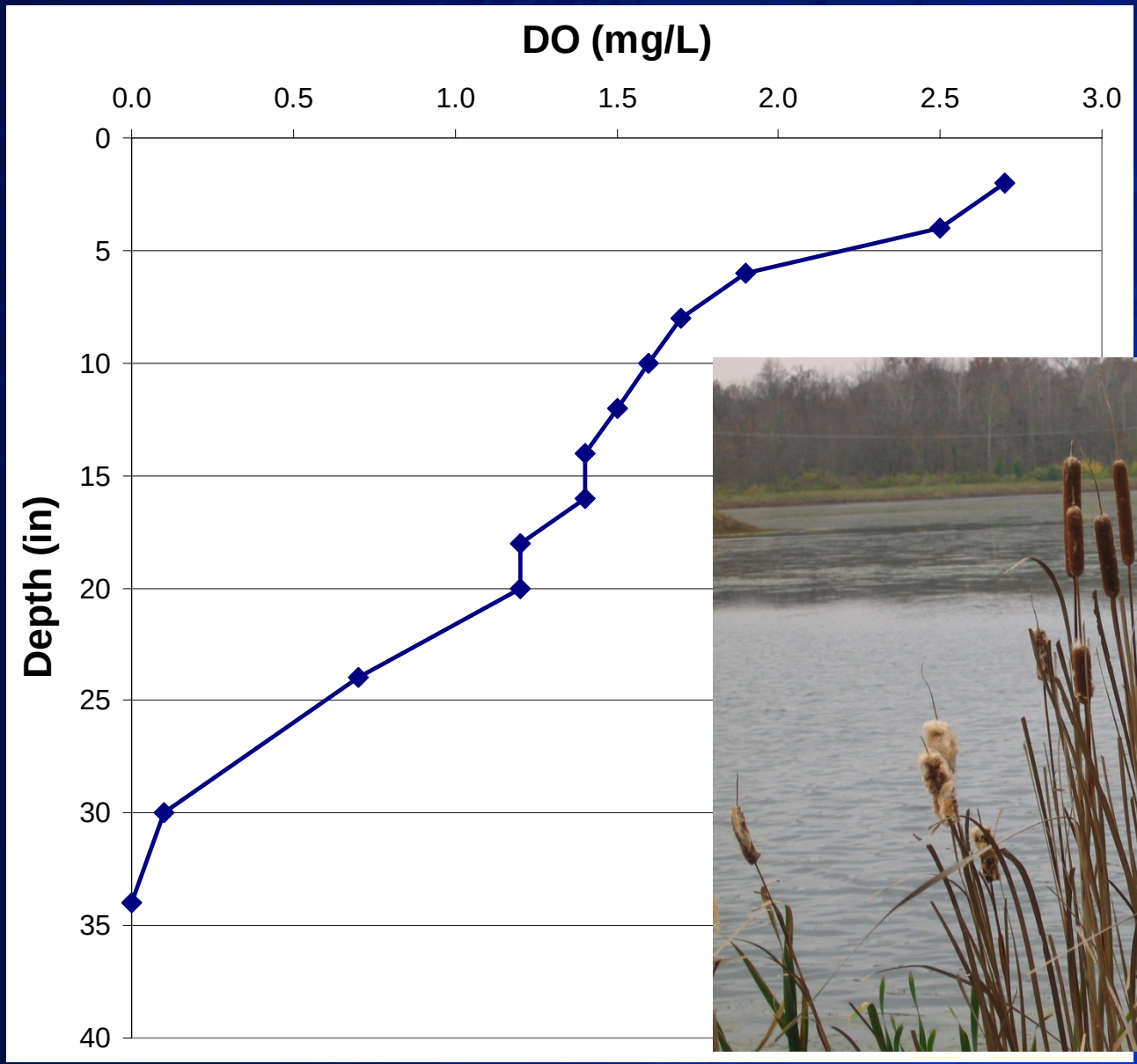


Water Quality

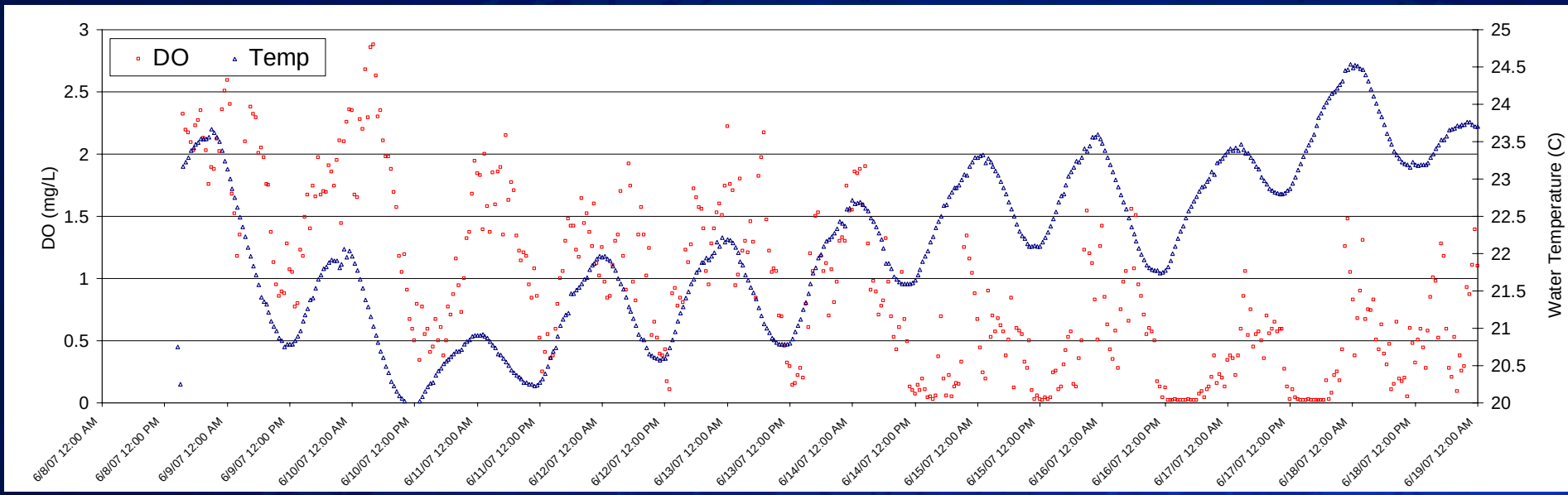




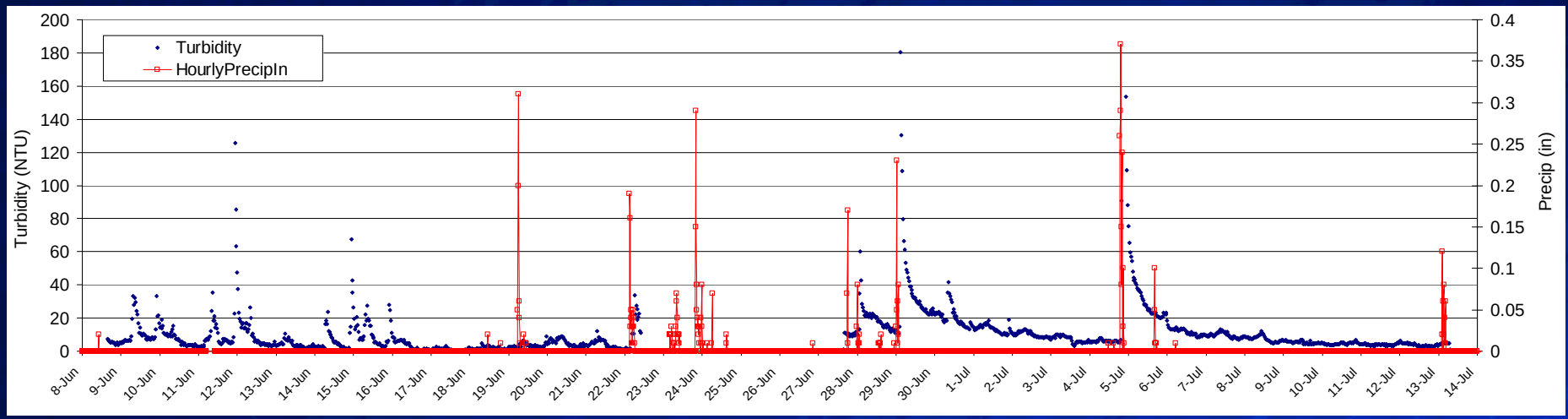
Water Quality



Diurnal DO Fluctuations

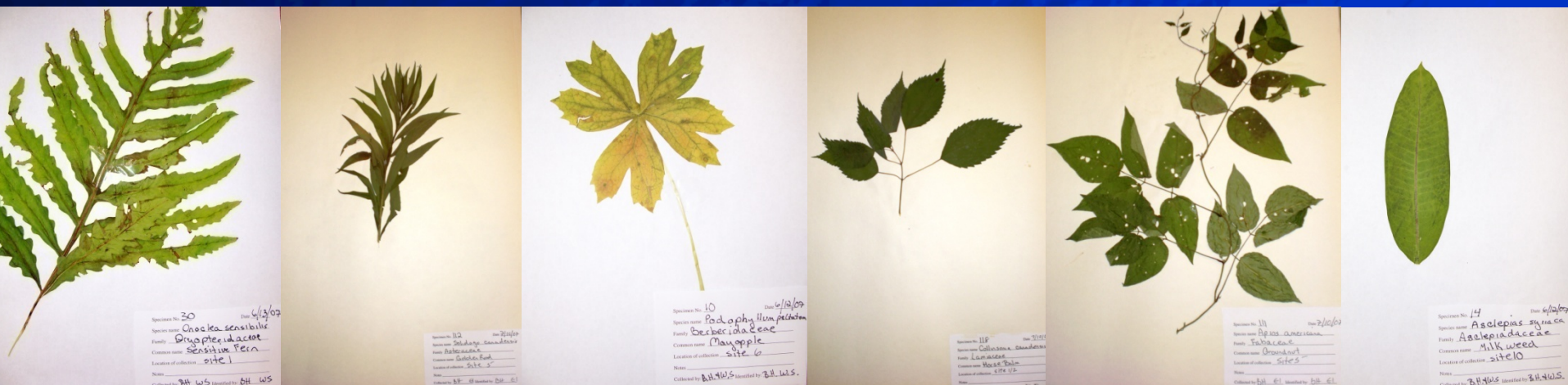


Turbidity Spikes / Storm Events



Vegetation Surveys

- 1 m x 1 m area sampled at each trap location
- Plants identified by species and the wetland indicator status
  - occurs in wetlands at a high frequency
  - occurs mostly in wetlands
  - occurs equally in both wetlands and non-wetlands
  - occurs mostly in non-wetlands
  - usually does not occur in wetlands



Amphibian Counts

Bacterial Analysis

Water Sample

Culture Dependent	Culture Independent
Plate Samples on Culture Medium	DNA Extraction and Molecular Techniques
Colony Forming Units	Genetic Sequences
LOAD	IDENTITY

Challenges

- Recruiting students
  - All female across the three disciplines
- Defining the problem
  - Identifying the things we want to measure and look at
- Too much data
  - Analysis and interpretation
- Too little time
  - Summer effort only
  - Integrating K-12 and citizen groups
- Sustaining the effort (funding)

Thank you !!