



**Towards a National
Evaluation of Compensatory
Mitigation Sites
II. Results of Pilot Studies**

Pilot Studies



- Designed to test study design and evaluate mitigation projects in North Carolina and Ohio
- Both compared results to existing biological assessment data
- Both had readily available electronic data on mitigation sites in the state
- Illustrate modifications that can be made to study design based on local circumstances

Ohio Pilot Study

Great Lakes Basin Evaluation of Compensation Sites Report

January 24, 2012



Prepared for:
U.S. Environmental Protection Agency
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Ohio Pilot Study



- Limited to Lake Erie Watershed
- 60 wetland mitigation project points (Assessment Areas)
- ILF not used in State; study limited to MB and PRM projects
 - 30 AA points in 18 MB projects
 - 30 AA points in 30 randomly selected PRM projects
 - Target population defined as projects of at least 0.1 ha permitted/approved in 1995 or later

Ohio Pilot Study: Sample Methods



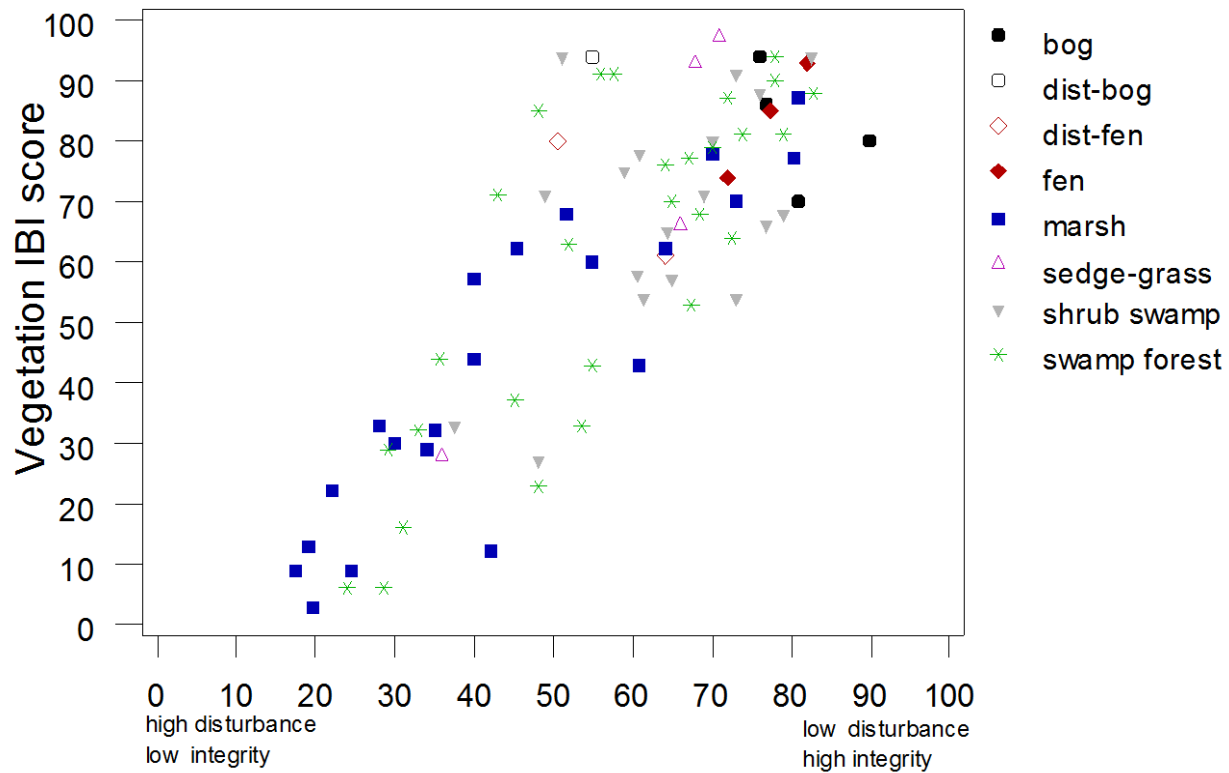
- **Methods based on National Wetland Condition Assessment (NWCA)**
- **Modification to Soils Protocol**
 - Sampled to 10-15 cm for chemical analysis
- **Success Criteria based Vegetation IBI scores**
 - Must meet criteria for “good” ecological condition

VIBI Parameters Measured Include...



- Presence/absence
- % cover herb and shrub stratum
- Stem density and basal area shrub and tree stratum (shrub and forest only)
- Standing biomass (emergent only)
- FQAI and other metrics

Ohio Vegetation IBI



Landscape Development Index (LDI)



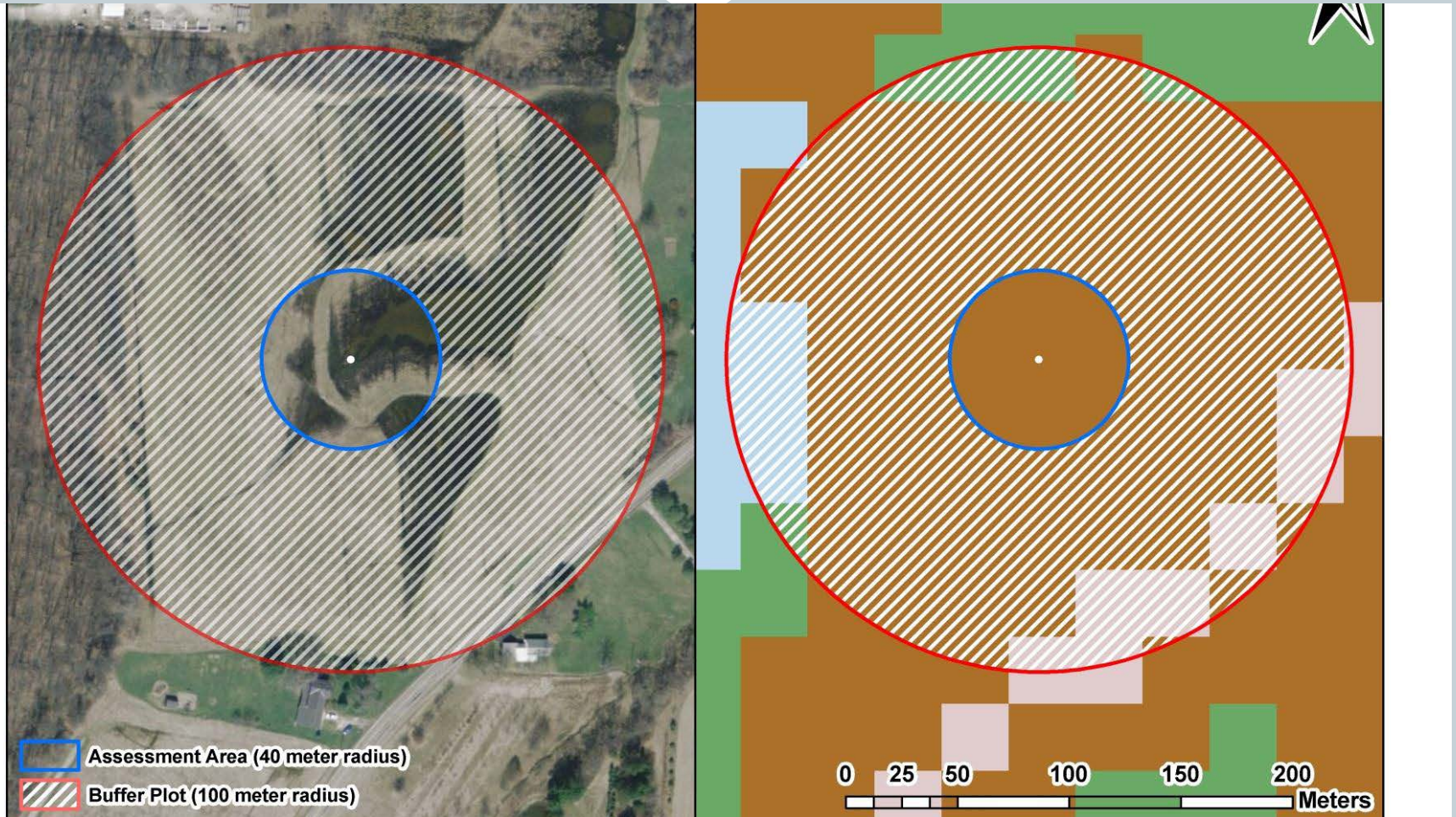
- Remote assessment of surrounding land-use
- Each land use assigned coefficient based on human activity
- A weighted average of land use intensity

$$LDI_{total} = \sum \% Lu_i * LDI_i$$

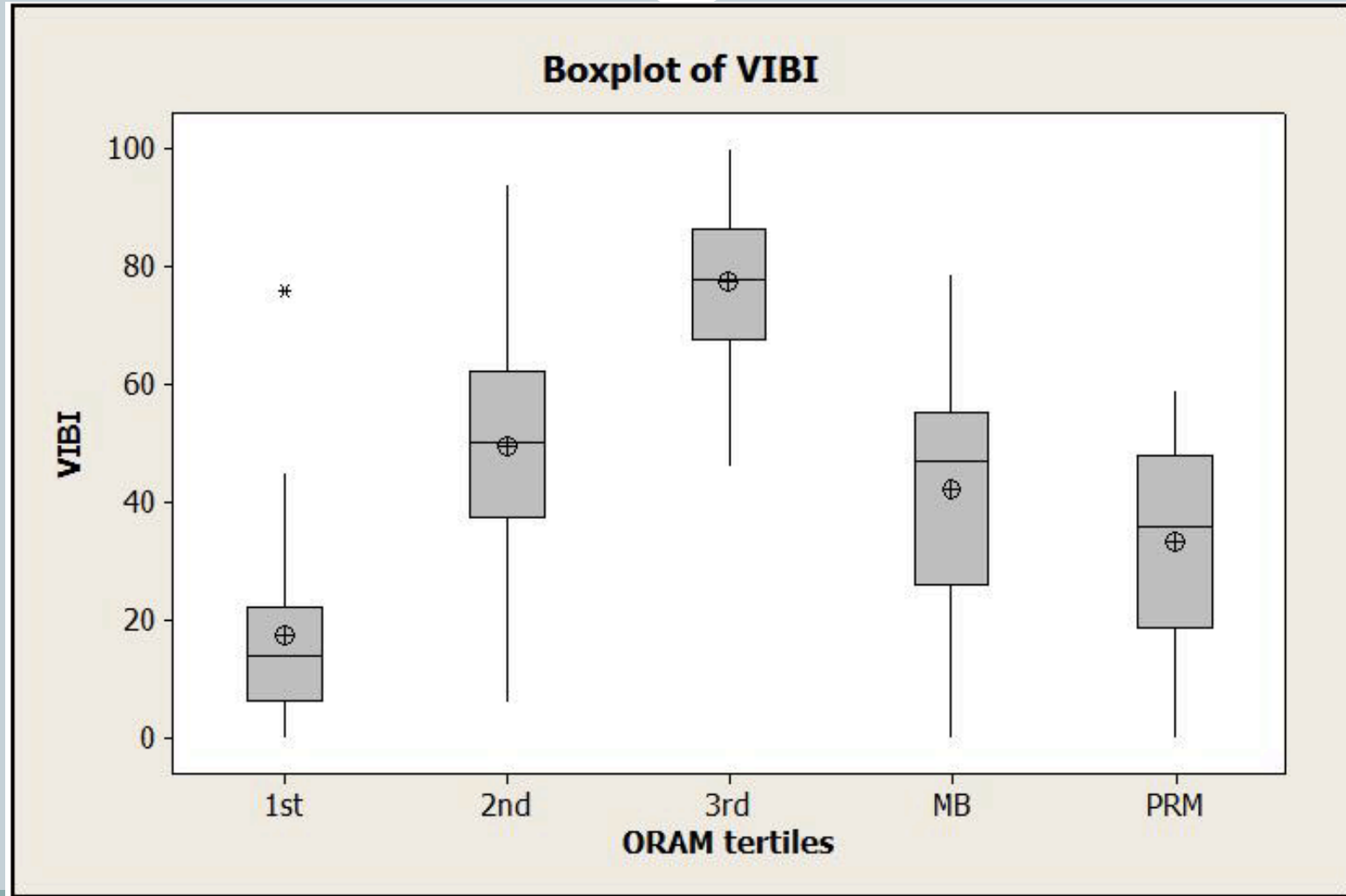
Ohio Land Cover Distinctions	LDI coefficient
Forest and open water	0.00
Pasture	1.08
Crop	3.25
Urban/Recreational Open Space	3.57
Residential	4.04
Commercial/Industrial/Transportation	4.65



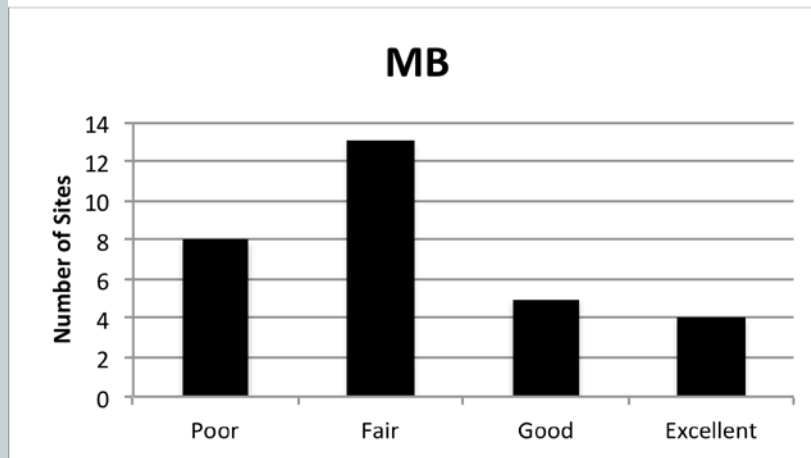
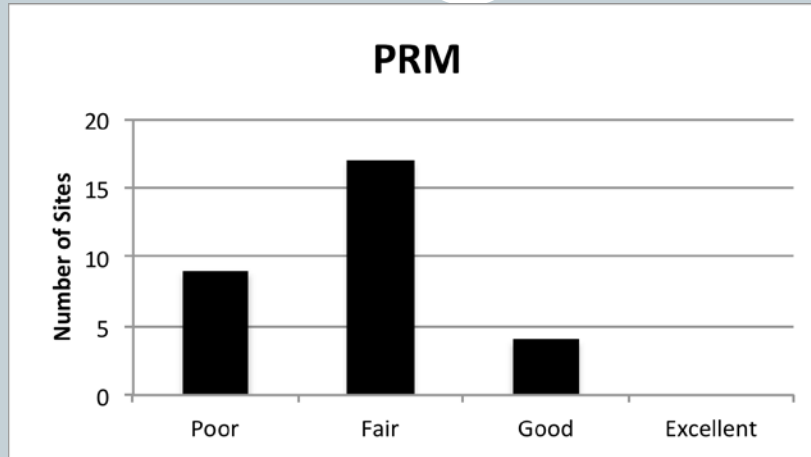
Standard Assessment Area and Buffer Plot for Ohio Sample Sites



Results: VIBI Scores for natural, MB and PRM sites



Results: VIBI Score Distributions for PRM vs MB Projects



Field Evaluation of Restored Wetlands in North Carolina Using Floristic Indices, Rapid Assessments, and Environmental Parameters

North Carolina Pilot Study

FINAL REPORT

Submitted to:

Environmental Law Institute

Submitted by:

NCSU Biological and Agricultural Engineering Department



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North Carolina Pilot Study



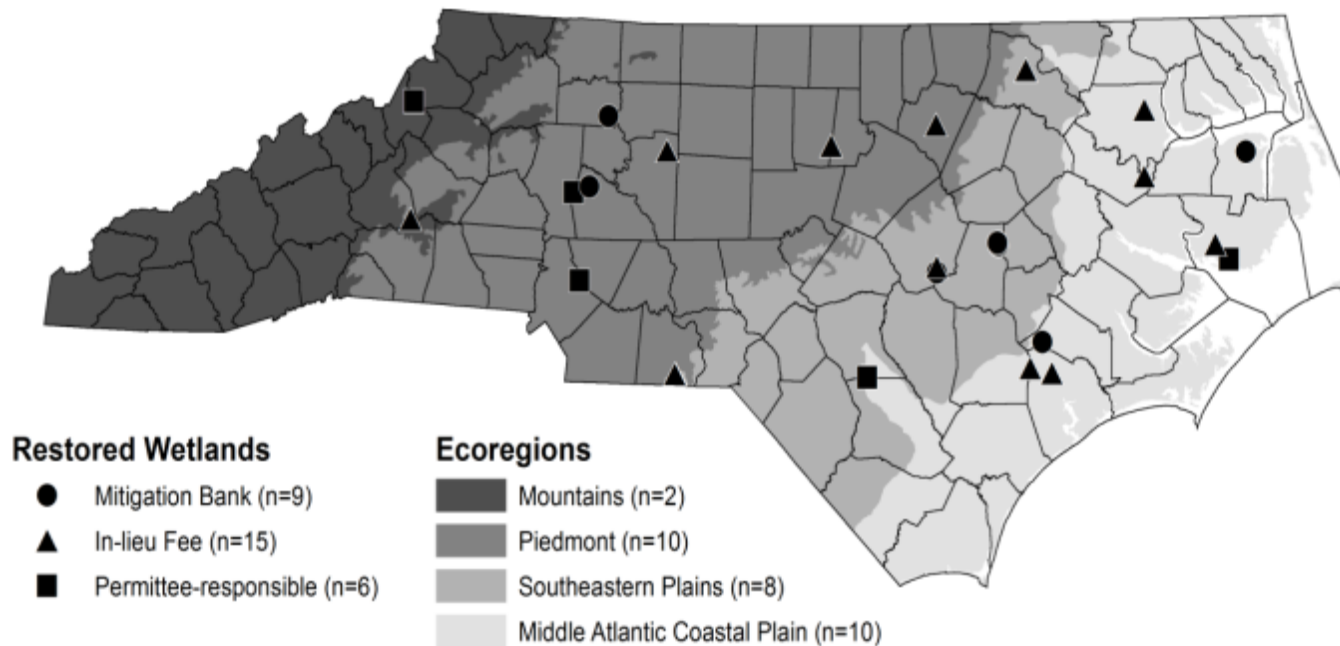
- 30 mitigated wetlands across NC
- Included 16 ILF, 8 MB, and 6 PRM sites
- Land use settings:
 - 27 sites in rural watersheds
 - 2 adjacent to parking lots
 - 1 in residential neighborhood
 - Target population defined as projects of at least 0.1 ha permitted between 2002-2006

North Carolina Pilot Study: Sample Methods

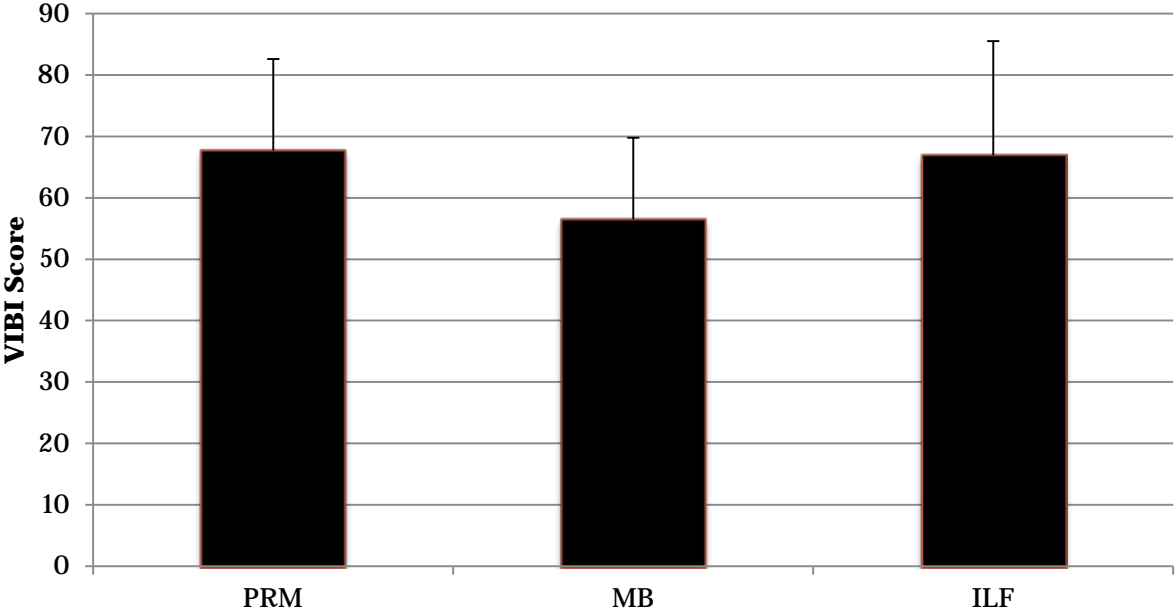


- **Methods based on National Wetland Condition Assessment (NWCA)**
- **Also modified the soil protocol**
- **Success Criteria based on Modified Ohio VIBI scores (Tiered Aquatic Life Uses)**
 - **VIBI Scores**
 - ✦ 0 – 29: Low Quality Wetland Habitat
 - ✦ 30 - 59: Restorable Quality Wetland Habitat
 - ✦ 60 - 75: Wetland Habitat
 - ✦ 76 – 100: Superior Quality Wetland Habitat
- **Used opportunity to test assessment methods**

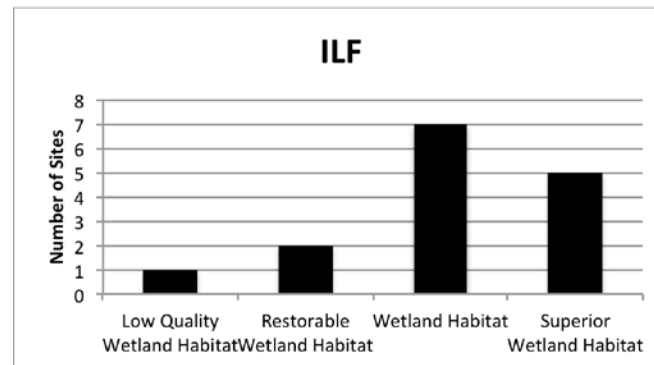
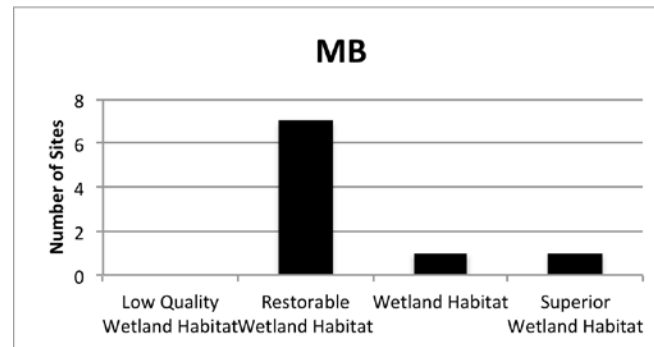
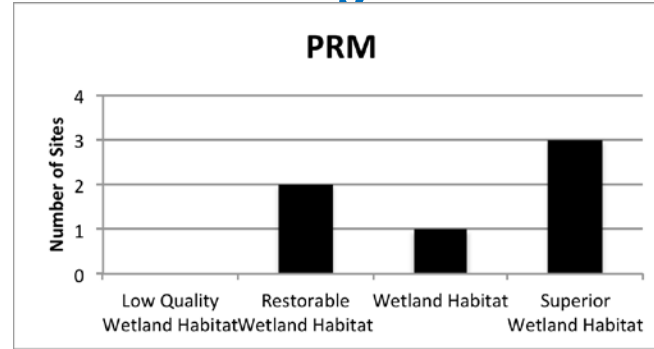
North Carolina Sampled Wetlands by Ecoregion



VIBI Scores for North Carolina Wetlands



VIBI Score Distributions for NC Mitigation Projects



Lessons Learned in Pilot Studies



- The method's flexibility allows it to be adapted to a range of local conditions and mitigation programs.
- In NC and OH, changes made to the proposed methodology included:
 - Smaller target population led to smaller than recommended sample size (30 vs. 50 sites)
 - Simplification of soil protocol
 - Multiple point in single MB, better represents larger sites
- Benchmarking against existing ambient monitoring data is essential to evaluate performance

Opportunities to Improve Future Studies



- The NWCA data can provide a consistent ‘universal’ data set for evaluating mitigation performance nationwide
 - Includes data from USA-RAM and the VIBI
- Archive the data in a nationally-consistent framework / database
- Invest in creation of state/regional/tribal databases of compensatory mitigation projects
- Adaptive management: use data to develop better performance standards and monitoring protocols

Recommendations for Mitigation Performance Assessment



- Develop a targeted set of questions to focus the assessment of your particular program
- Select sites based on design best suited to answer those questions
- Access NWCA sampling protocols and data
- Map the mitigation sites, banks, and in-lieu fee programs
- Conduct the assessment

Fennessy Recommendations

Cause of Failure	Recommendation	Selected Measures
Studies of performance often limited in scope, making comparisons difficult (through time and across regions)	States need consistent methods to evaluate mitigation projects and program performance.	<ul style="list-style-type: none">• Adopt standard methodology as proposed• Benchmark with NWCA and/or statewide data
Many states have incomplete or inaccessible project records that prevents ability to track and assess	Electronic databases of compensatory mitigation projects are needed	<ul style="list-style-type: none">• Funding needed to gather and organize current and historic data on compensatory mitigation and improving the our ability to track these data into the future• Use database to initiate studies of compensatory mitigation using the study design
Consistent performance standards lacking, prevents adaptive management and project improvement	Use the data collected to develop better performance standards and monitoring protocols	<ul style="list-style-type: none">• Pilot studies can show relationship between performance standards and project success• Standards must be ecologically relevant, use existing biological assessment methods (VIBI)



Thank You!

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