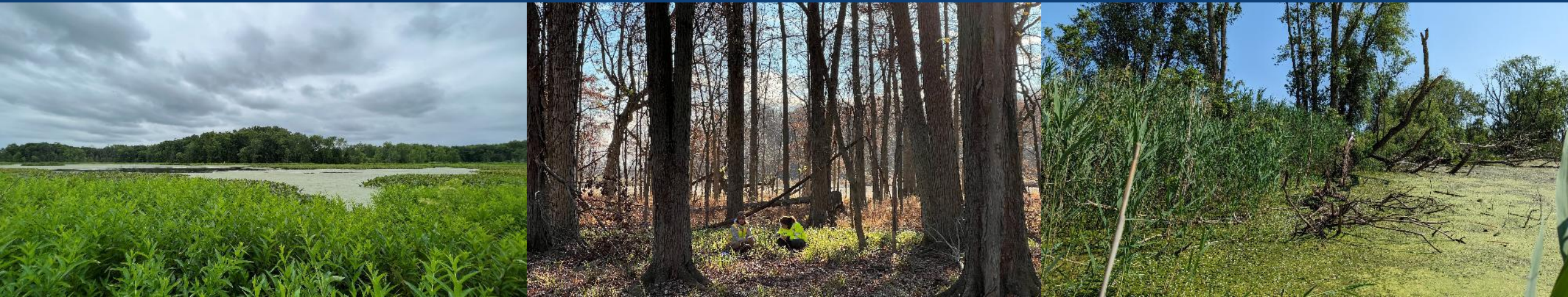


October 14, 2025

Evaluation of Alternate Wetland Assessment Methods

Jeff Boyles



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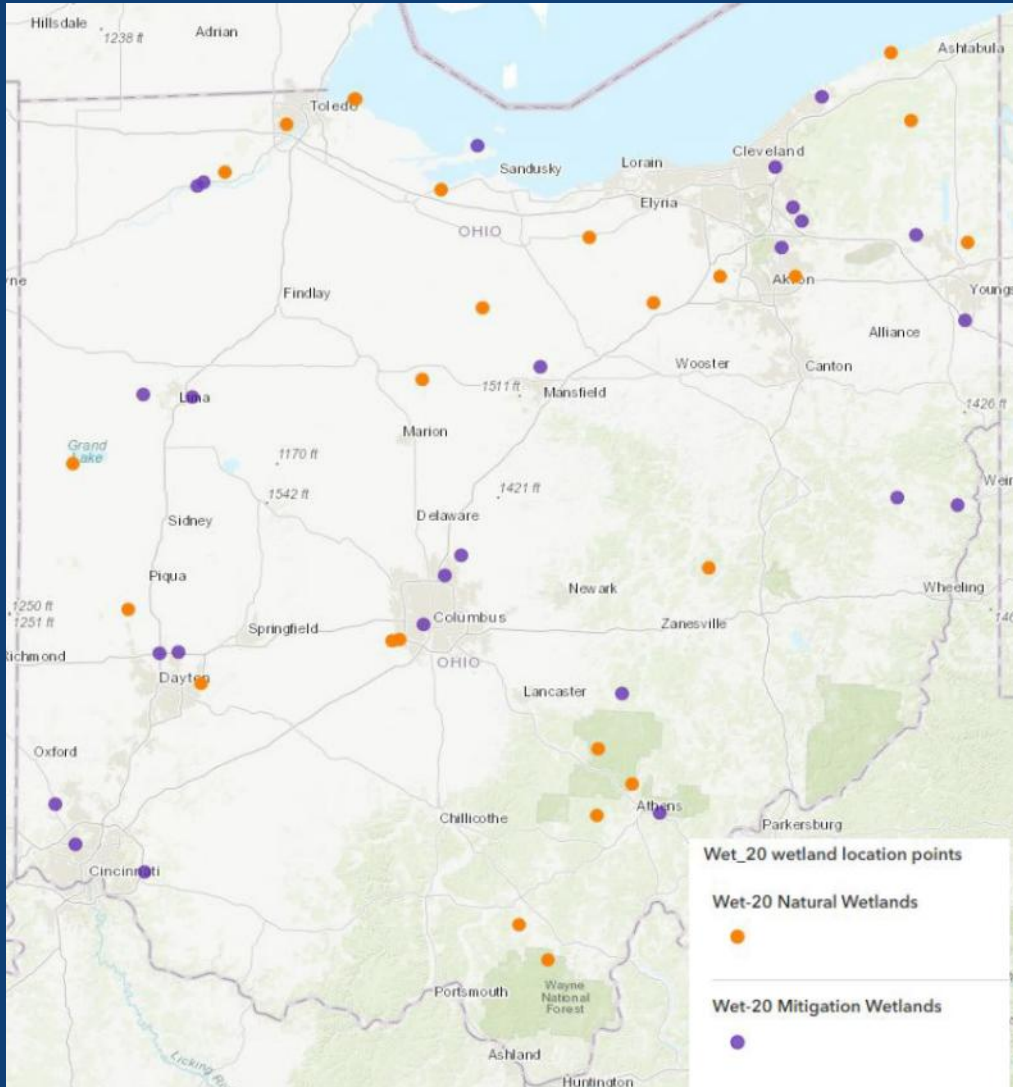
AGENDA

- Project Background
- Site Selection
- Methods
- Results
- Regulatory Implications



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Site Selection



- 50 Sites
 - Mitigation and Natural Wetlands
 - Categories 1-3
 - Vegetative Communities
 - HGM Classes
 - Eco Regions



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Site Selection

- Property Owner Permissions
- Last Minute Changes
- Access Issues

Methods

Field Assessment Protocol

- Uniform sampling method for all 50 sites
- Wetland boundary – level 2, then level 3
 - ORAM
 - OMWAM
 - VIBI plot setup
 - Modified FQAI
 - Rapid VIBIs
 - Traditional VIBI and VIBI-FQ



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Methods



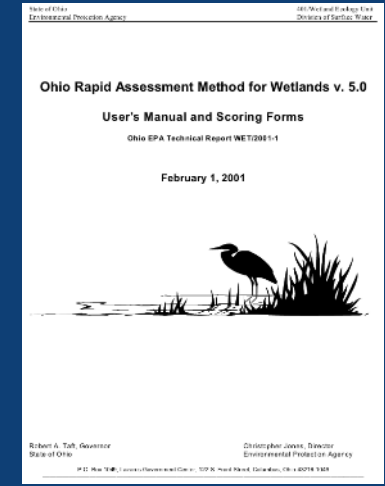
- Seven Assessments at Each Wetland
 - ORAM
 - OMWAM
 - VIBI
 - VIBI-FQ
 - Rapid VIBI
 - Rapid VIBI-FQ
 - FQAI



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Methods

- Ohio Rapid Assessment Method (ORAM)
 - Ohio's Method of Qualitatively Assessing Wetlands
 - Categories 1-3 (OAC 3745-1-54)
 - (ii) In assigning a wetland category, the director will consider the results of an appropriate wetland evaluation method acceptable to the director, including but not limited to the "Ohio Rapid Assessment Method (ORAM)" version 5.0, "Vegetation Index of Biotic Integrity for Wetlands (VIBI)" version 1.5, and "Amphibian Index of Biotic Integrity for Wetlands (AmphIBI)," and other information necessary in order to fully assess the wetland's functions and services.
 - (iii) In assessing any reestablished (restored), established (created), or rehabilitated (enhanced) wetland for any purpose, the director will consider the results of VIBI or other appropriate wetland evaluation method acceptable to the director. **ORAM is not an acceptable wetland evaluation method for reestablished (restored), established (created), or rehabilitated (enhanced) wetlands.**
 - Score 0-100 based on 6 Metrics
 - Wetland Area
 - Upland Buffers and Surrounding Land Use
 - Hydrology
 - Habitat Alteration and Development
 - Special Wetlands
 - Vegetation, Interspersion, Microtopography



Lowest ORAM Score: 17.5
Highest ORAM Score: 95



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Methods

- Ohio Mitigation Wetlands Assessment Method (OMWAM)
 - Developed by Hull & Associates, Inc. (now Verdantas) for ODOT
 - Designed to account for natural and mitigation wetlands
 - Categories 1-3
 - Score 12-52 based on 12 Metrics
 - Water Quality
 - Hydrology
 - Biodiversity
 - Societal
 - Site Potential, Landscape Potential, Value

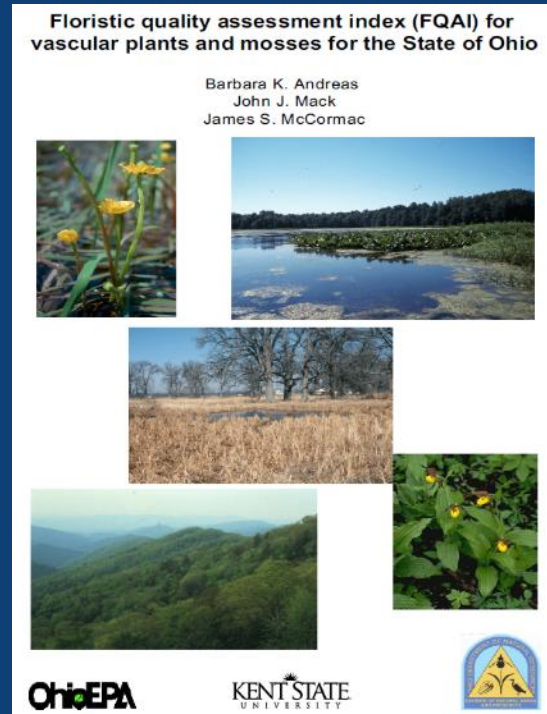
Wetland Score	Ohio Antidegradation Category
>32	3
23–32	2
<23	1



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Methods

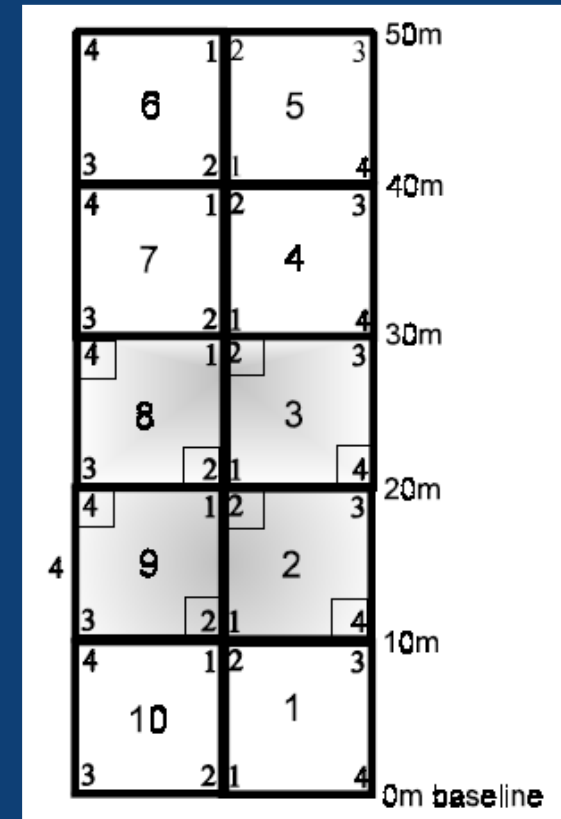
- Modified Floristic Quality Assessment Index (FQAI)
 - Sampling within a 5-meter radius circle
 - Typically set up FQAI plot within Module 7 of VIBI plot



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Methods

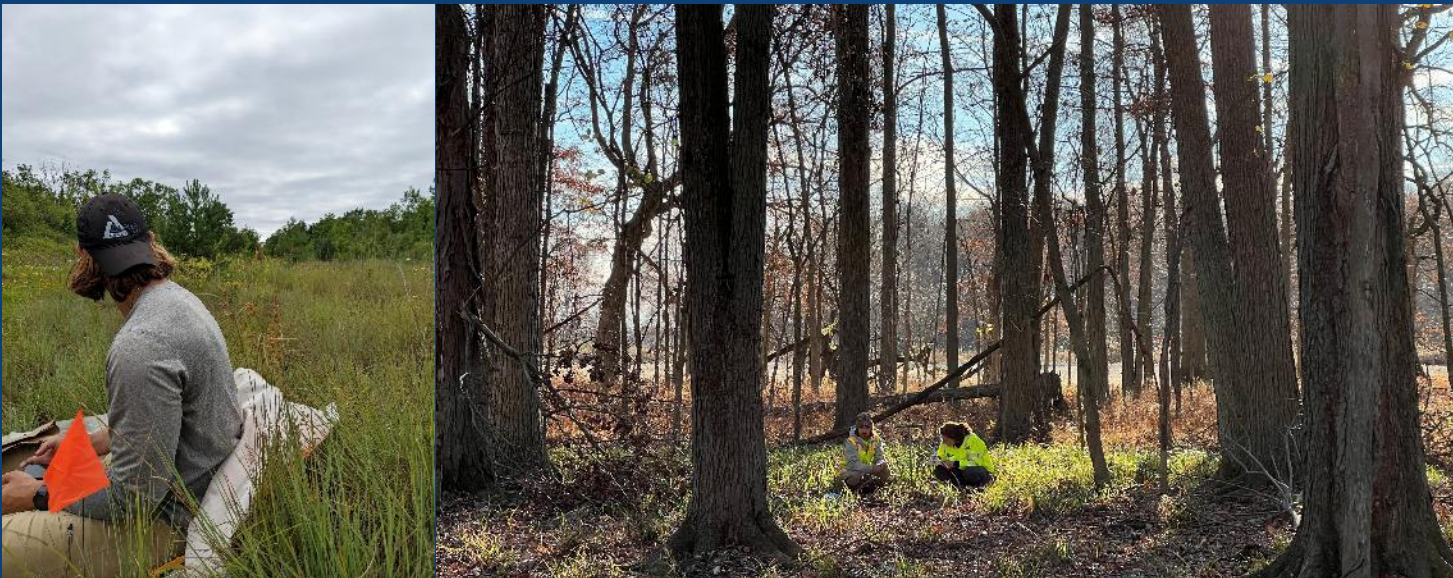
- Vegetative Index of Biotic Integrity (VIBI)
 - Representative plot location
 - 20m x 50m plot. 10 modules
 - Intensive sampling within four modules and nested corners
 - Biomass collection or woody survey
- VIBI-Floristic Quality (FQ)
 - Calculated based on diversity and dominance of vegetation as they relate to CofC values



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Methods

- Rapid VIBI
- Rapid VIBI-FQ
 - Time-based “meander” survey within the VIBI plot
 - No intensive sampling or vegetation collection



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Methods

- Coordination of Fieldwork
 - Typically, 2-4 personnel per site
 - Each field team assessed a variety of sites
 - Develop the most efficient workflow through a defined field assessment protocol & reduce subjectivity
 - First site performed with B&N, MAD, and Ohio EPA
- Issues during Fieldwork
 - Weather, unwadeable wetlands, dense vegetation, modified VIBI plots
 - Completed 34 sites in 2022
 - Completed remaining 16 sites in 2023



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Site Examples



• Symmes Creek Oxbow, Gallia County



Big Bailey Swamp, Athens County

Site Examples



Site Examples



• Cedar Point NWR, Lucas County



Cedar Point NWR, Lucas County

Site Examples



Muck Farm – ODNR, Henry County



Sears Woods State Nature Preserve, Crawford County

Site Examples



- Landfill Reclamation Site, Perry County

Mud Brook Mitigation Site, Summit County

Site Examples



Wills Creek AMD, Muskingum County

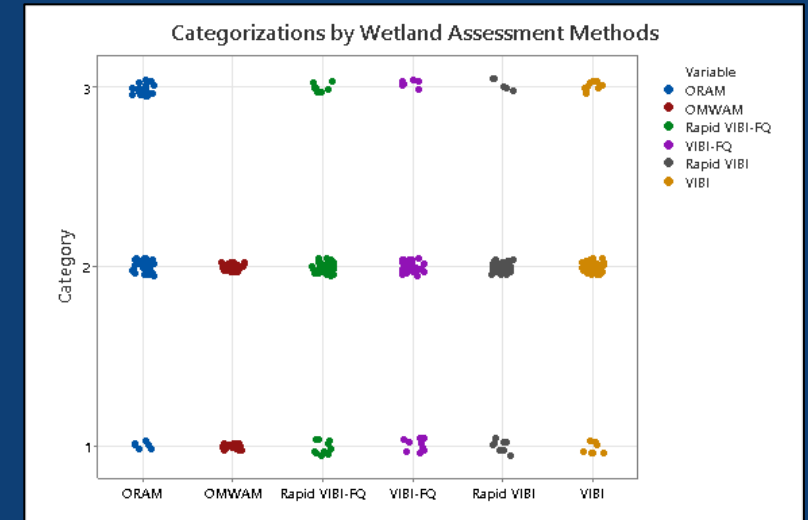
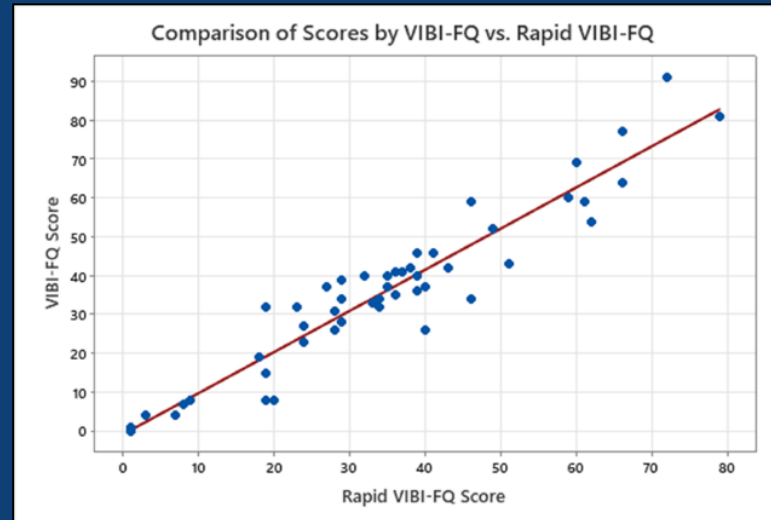
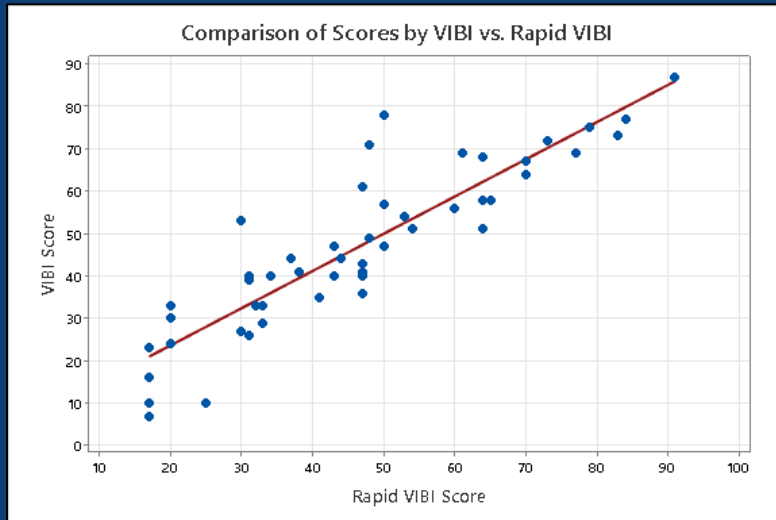


Green Heron Metropark, Butler County

Results

VIBI vs. Rapid VIBI & VIBI-FQ vs. Rapid VIBI-FQ

Assessment	Finding
Regression Models	Significant correlations in scores
Wilcoxon Signed Rank Test	Significant correlations in categorizations



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Results

ORAM Natural vs Mitigation

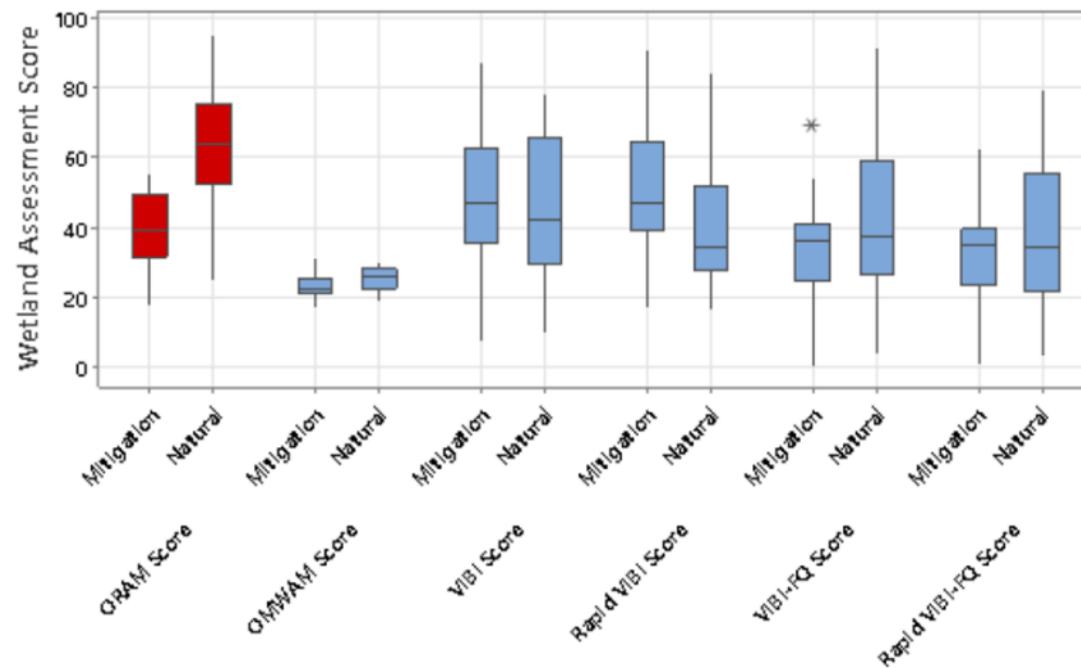
Assessment

ANOVA Test

Findings

Mitigation wetlands score approx. 10 points lower in ORAM than natural wetlands

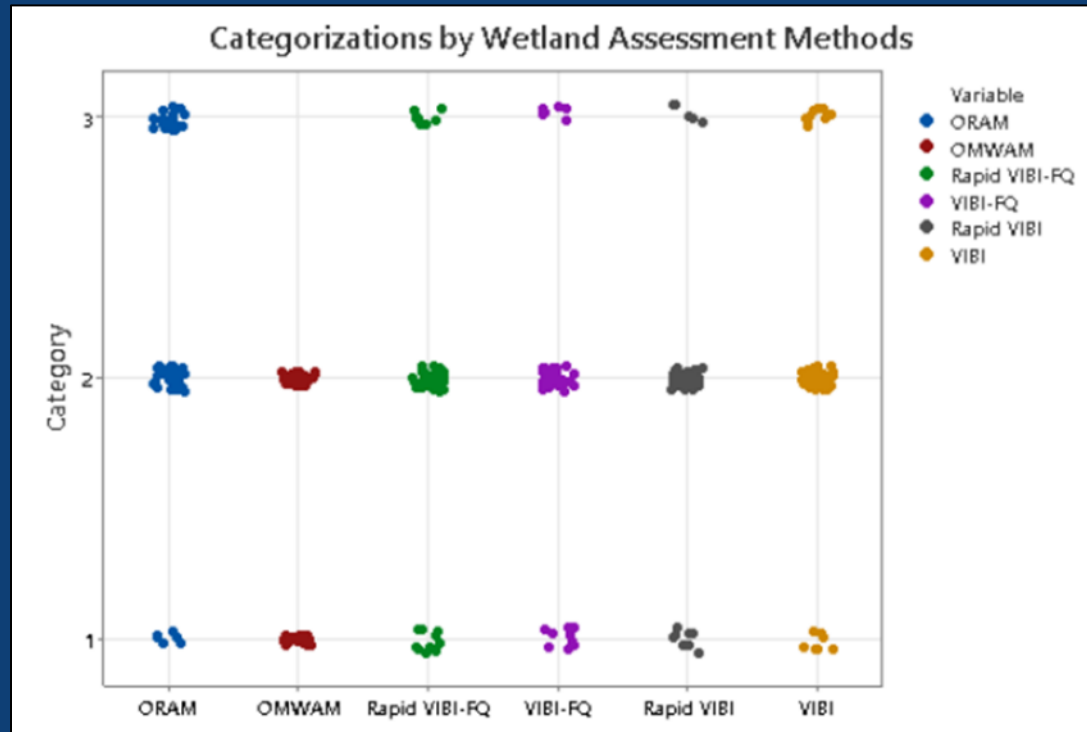
Scores by Wetland Assessment Methods: Natural vs. Mitigation Wetlands



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Results

OMWAM vs. Other WAMs



Assessment

Wilcoxon Signed Rank Tests

Findings

OMWAM yielded significantly different categorizations from all other assessment methods



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Results

OMWAM & HGM Classes

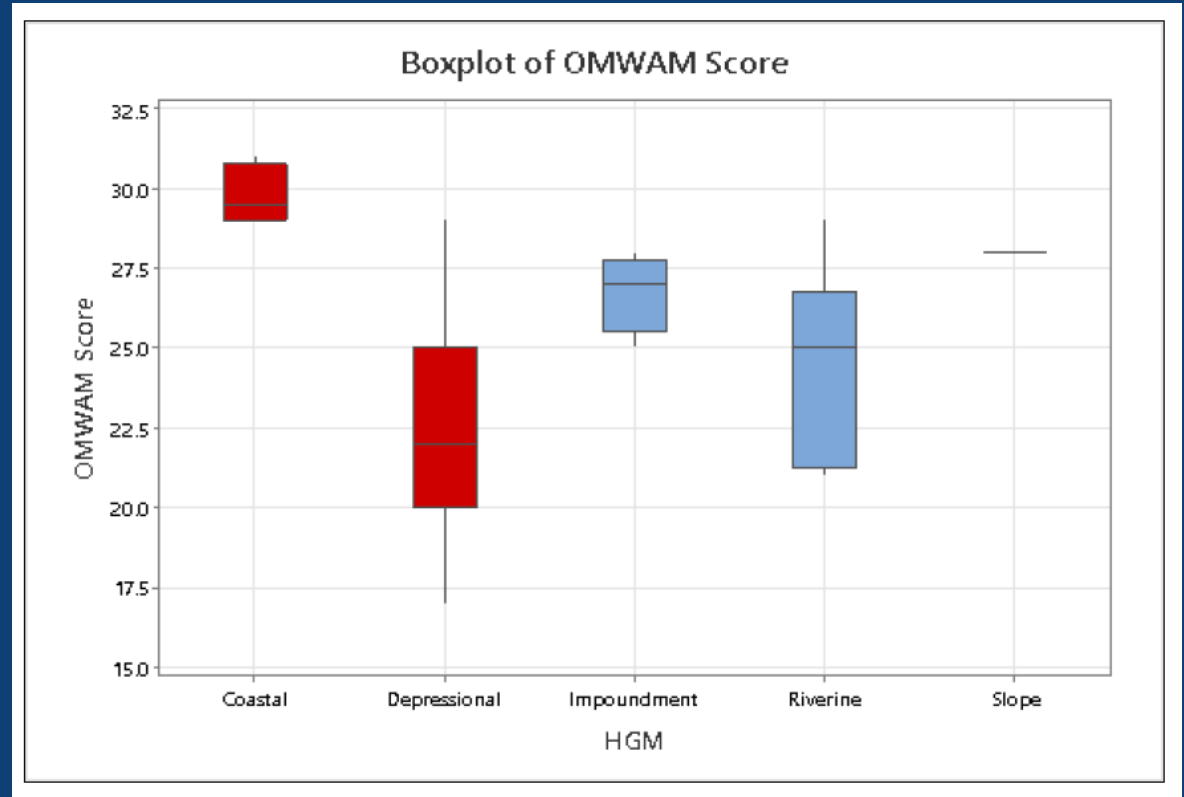
Assessment

ANOVA Test

Findings

Depressional wetlands scored 2.89 points lower than OMWAM mean scores

Coastal wetlands scored 3.33 points higher than mean scores



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Results

VIBI/VIBI-FQ vs. Modified FQAI

Assessment

Regression Models

Findings

Correlation between scores determined by VIBI-FQ and Modified FQAI (by the associated equations)

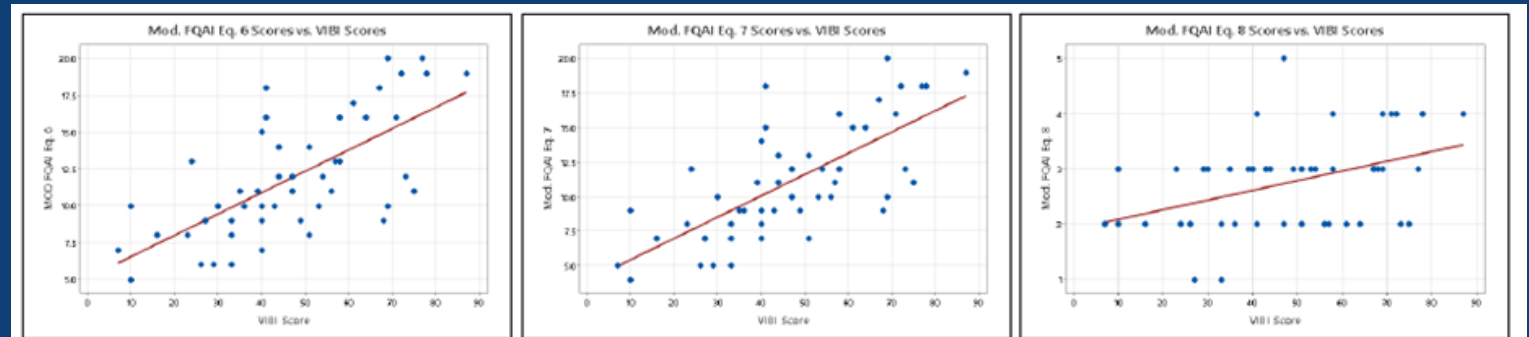


Figure 13: Scatterplots Comparing Mod FQAI Eq. 6, 7, & 8 vs. VIBI Scores

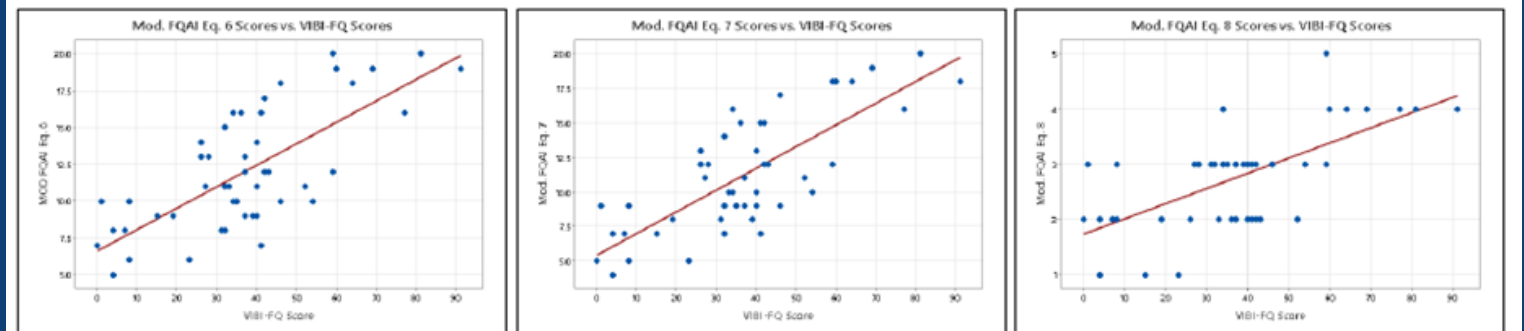


Figure 14: Scatterplots Comparing Mod FQAI Eq. 6, 7, and 8 vs. VIBI-FQ Scores



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Results

Significant Difference

ORAM Natural vs Mitigation: Scores

OMWAM vs. all other WAMS : Categorizations

Significant Correlation

VIBI vs. Rapid VIBI: Scores & Categorizations

VIBI-FQ vs. Rapid VIBI-FQ: Scores & Categorizations

VIBI/VIBI-FQ vs. Modified Equations: Scores



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Regulatory Implications

- OAC 3745-1-54(B)(2)(a)(ii)
- Evaluate Alternative Assessments for Mitigation Sites
- Recommendations
 - Further refinement
 - OMWAM, Rapid VIBI
 - FQAI – positive correlation, but...
 - Rapid VIBI-FQ for mitigation sites



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Ohio EPA



Joni Lung



Jeff Boyles



Matt Lamoreaux



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Burgess & Niple



Emily Dingman



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Crystal Scales, WPIT



Seth Swearingen



Matthew Kestner, PG



Nakayla Krahm

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Jenny Adkins, PWS



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Cody Wright



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QUESTIONS?



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THANK YOU!



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