

Intensification of the National Wetland Condition Assessment (NWCA) in Ohio

Brian Gara

Ohio EPA

Wetland Ecology Group

May 3, 2012

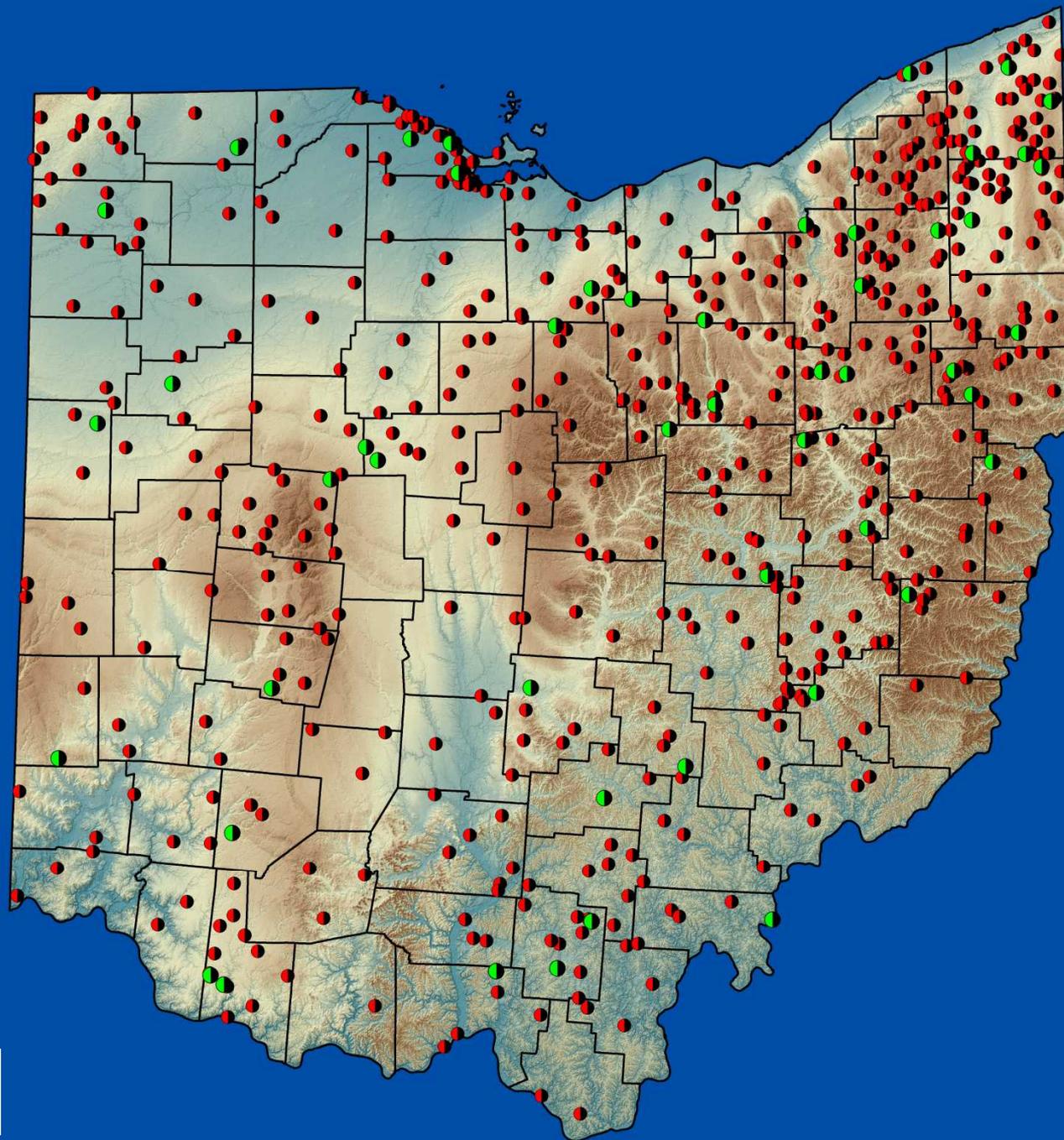


Overview

- NWCA consists of a total of ~1000 wetlands monitored nationwide – Ohio had 11 of these sites.
- The Ohio EPA Wetland Ecology Group (WEG) conducted the NWCA surveys for Ohio's random picks (11 sites + 2 revisits).
- The WEG received a US EPA Wetland Program Development grant to “intensify” the dataset to a total of 50 wetlands monitored across the state over a 3 year period (2011-2013). This intensification grant will allow us to prepare a scorecard of wetland condition for Ohio.
- Both the NWCA and Ohio EPA developed field assessment techniques will be used on each of the wetlands included in this study.

NWCA Wetland Sample Sites

- Updated National Wetland Inventory (NWI) layer (226,228 wetland polygons) for Ohio used to pick the NWCA and intensification sample.
- A Generalized Random Tessellation Stratified (GRTS) survey design was used to select 50 base and 550 oversample sites.
- Breakdown of sample based on wetland type is as follows:
 - PEM (emergent) – 107
 - Pf (farmed) – 113
 - PFO (forested) – 138
 - PSS (scrub-shrub) – 119
 - PUBPAB (ponds) – 123



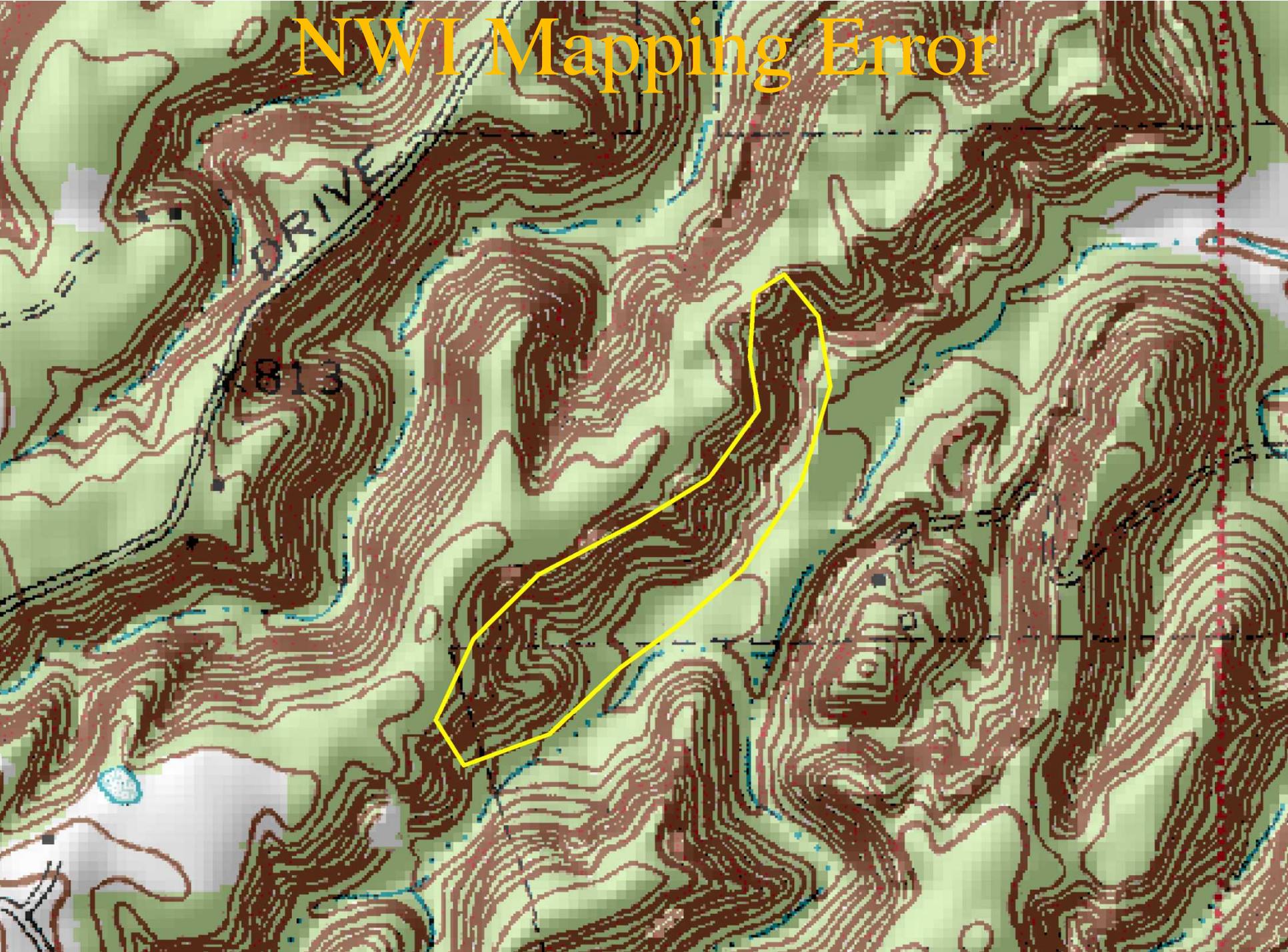
Updated NWCA Sample Points

- Base
- Oversample

Non-target Wetland Type



NWI Mapping Error



Wetland Conversion



Landowner Resistance

“Hey you Wetland Ecologists, get off my yard!!!”



NWCA Wetland Assessments

- Soils
 - Dig 4 soil pits (~60cm deep)
 - Collect bulk density, soil enzyme, and soil chemistry samples from single “representative” pit
- Vegetation
 - Five 10M x 10M plots evaluated for numerous types of vegetation data (presence, cover, bryophyte/lichen, woody debris, etc.)
- Algae
 - Samples of water and substrate collected for algal taxonomic and toxin work
 - Water samples filtered for algal chlorophyll samples
- Hydrology
 - Water samples collected for chemical analysis
 - Basic hydrologic field data collected at time of site visit
- Buffer
 - Twelve 10M x 10M buffer plots located along N/S and E/W axes examined for large number of parameters, including invasive species presence, human disturbances, and cover of natural vegetation.
- USA-RAM
 - A preliminary 11 metric “rapid” approach was tested for each wetland. Data on various habitat features and stressors collected for the assessment area.

NWCA Intensification Wetland Assessments

- Soils
 - Dig 1 soil pit (~60cm deep)
 - Collect bulk density, soil enzyme, and soil chemistry samples from single “representative” pit
- Vegetation
 - Five 10M x 10M plots evaluated for numerous types of vegetation data (presence, cover, bryophyte/lichen, woody debris, etc.)
- ~~Algae~~
 - ~~Samples of water and substrate collected for algal taxonomic and toxin work~~
 - ~~Water samples filtered for algal chlorophyll samples~~
- Hydrology
 - Water samples collected for chemical analysis (to be conducted by Ohio EPA Lab)
 - Basic hydrologic field data collected at time of site visit
- Buffer
 - Twelve 10M x 10M buffer plots located along N/S and E/W axes examined for large number of parameters, including invasive species presence, human disturbances, and cover of natural vegetation.
- USA-RAM
 - A preliminary 11 metric “rapid” approach was tested for each wetland. Data on various habitat features and stressors collected for the assessment area.

Ohio Wetland Assessment Techniques

- Ohio Rapid Assessment Method for Wetlands (ORAM), version 5.0.
 - Field procedure taking approximately 1 hour to conduct
 - Several metrics evaluated, examining various aspects of wetland's ecological condition (e.g., buffer integrity, surrounding land use intensity, plant community quality, hydrology/substrate/habitat “intactness”)
 - Results in a score from 0 to 100 which allows Ohio EPA 401 permit reviewers to place the wetland in its appropriate antidegradation category.
- Vegetation Index of Biotic Integrity (VIBI).
 - Detailed analysis of wetland plant community
 - 10 metrics derived from plant presence and cover class data collected from a 20M x 50M plot. Different suite of metrics are calculated for each wetland plant community type (emergent, forested, scrub-shrub)
 - Can take several hours to conduct, depending on diversity of plant community.
 - Protocols modified slightly to allow vegetation data collected using standard NWCA methodology to also calculate a VIBI score

“Simplified” VIBI or “VIBI-Floristic Quality”

- Focuses exclusively on site diversity and dominance as they relate to FQAI species sensitivity concept (only two metrics are calculated!).
- Resultant “Simplified” VIBI or “VIBI-FQ” score correlates closely with traditional VIBI and ORAM calculations.
- Easier to conduct, calculate and interpret than the traditional VIBI, with very little (if any) loss of information.
- Unlike the traditional VIBI, the “VIBI-FQ” does not require classification of the habitat, and therefore numeric differences accurately differentiate habitats based on deviation from true “reference” condition (apples to apples comparison).
- Is a viable ecological assessment technique in any area of the United States that has a comprehensive FQAI document for the region’s flora (i.e., not just Ohio).

Assessment of Wetland Bryophyte Community



Tree Moss
(Climacium americanum)

Results



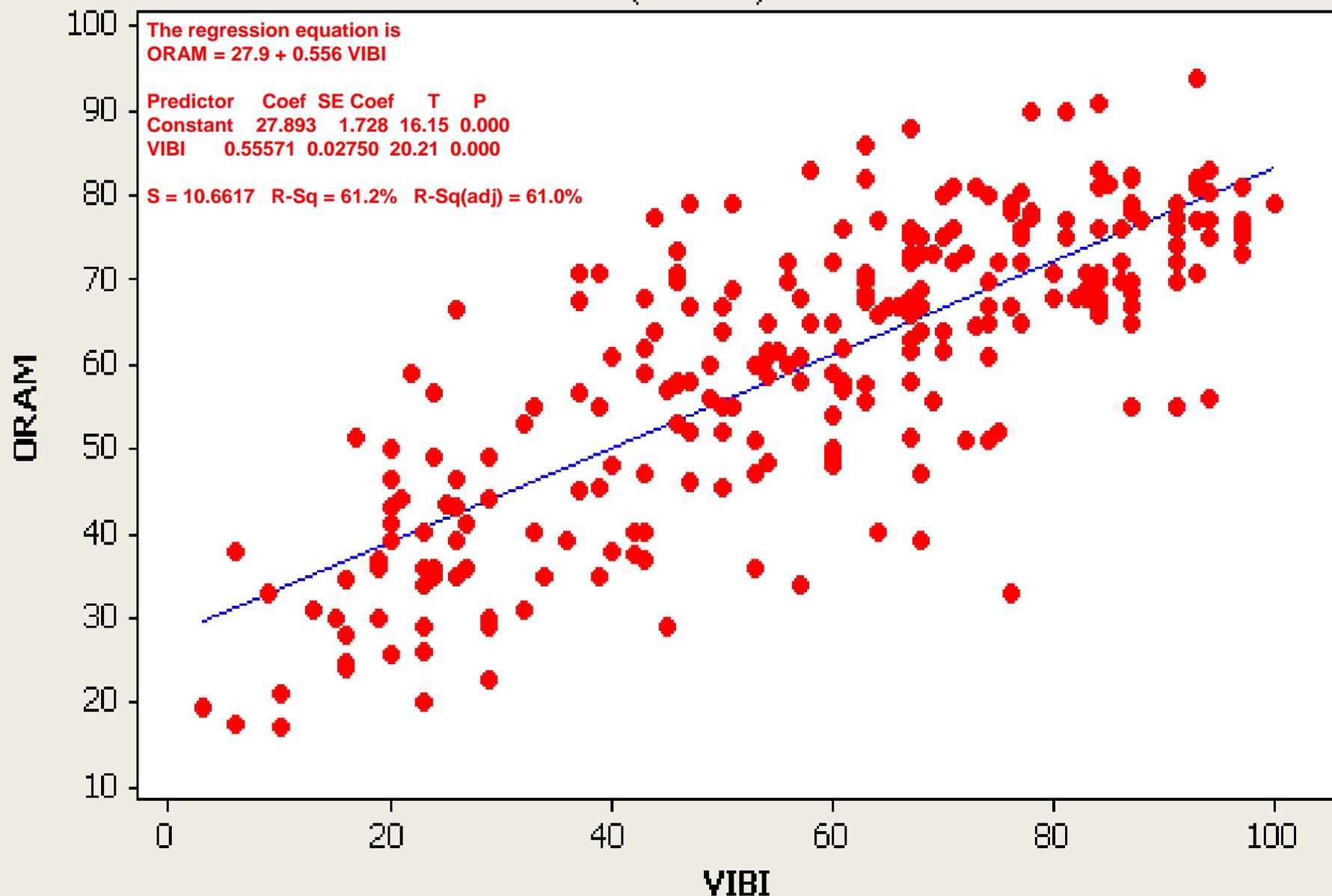






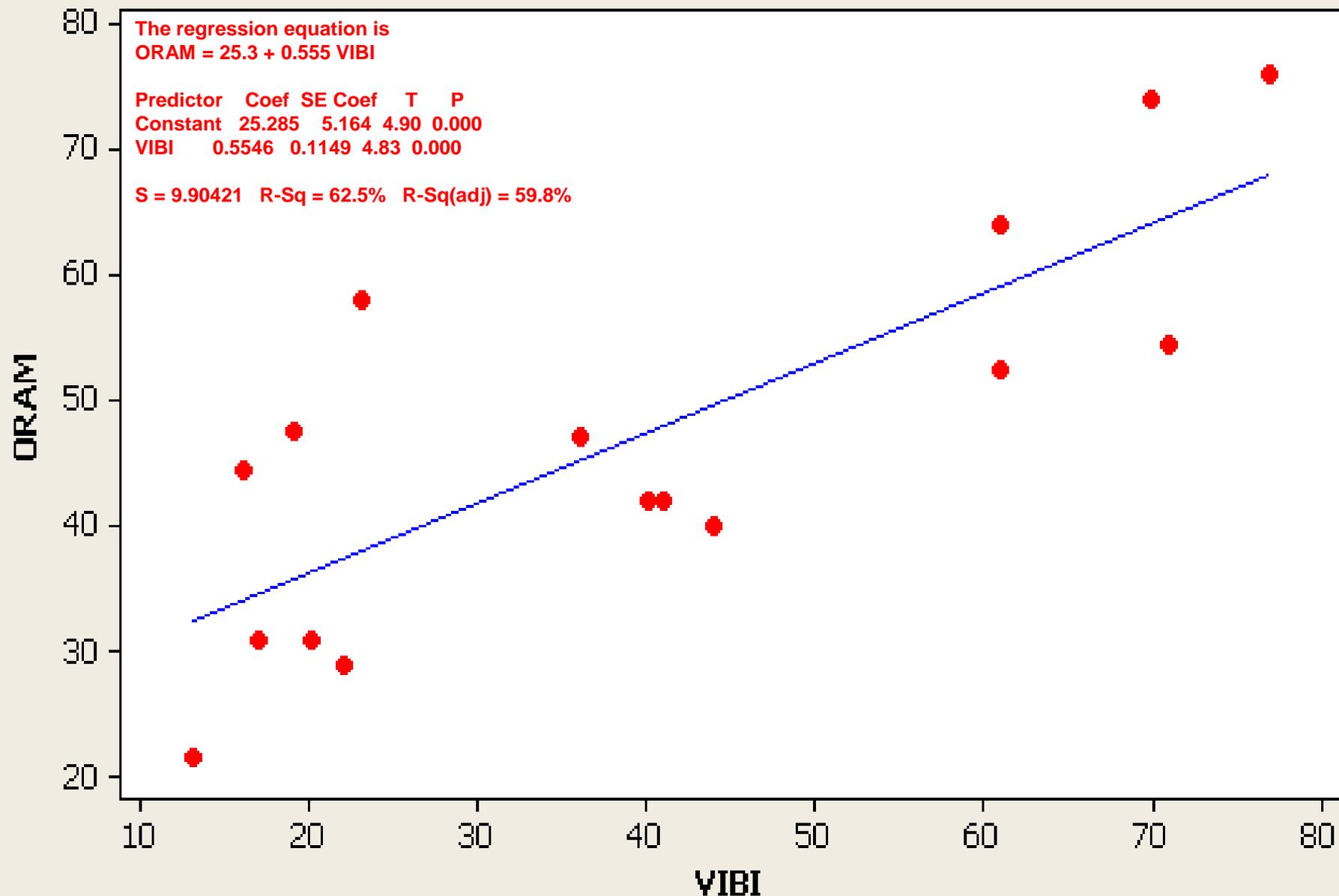
Scatterplot of ORAM vs VIBI: Natural Wetlands Monitored (1999-2010)

(N=261)

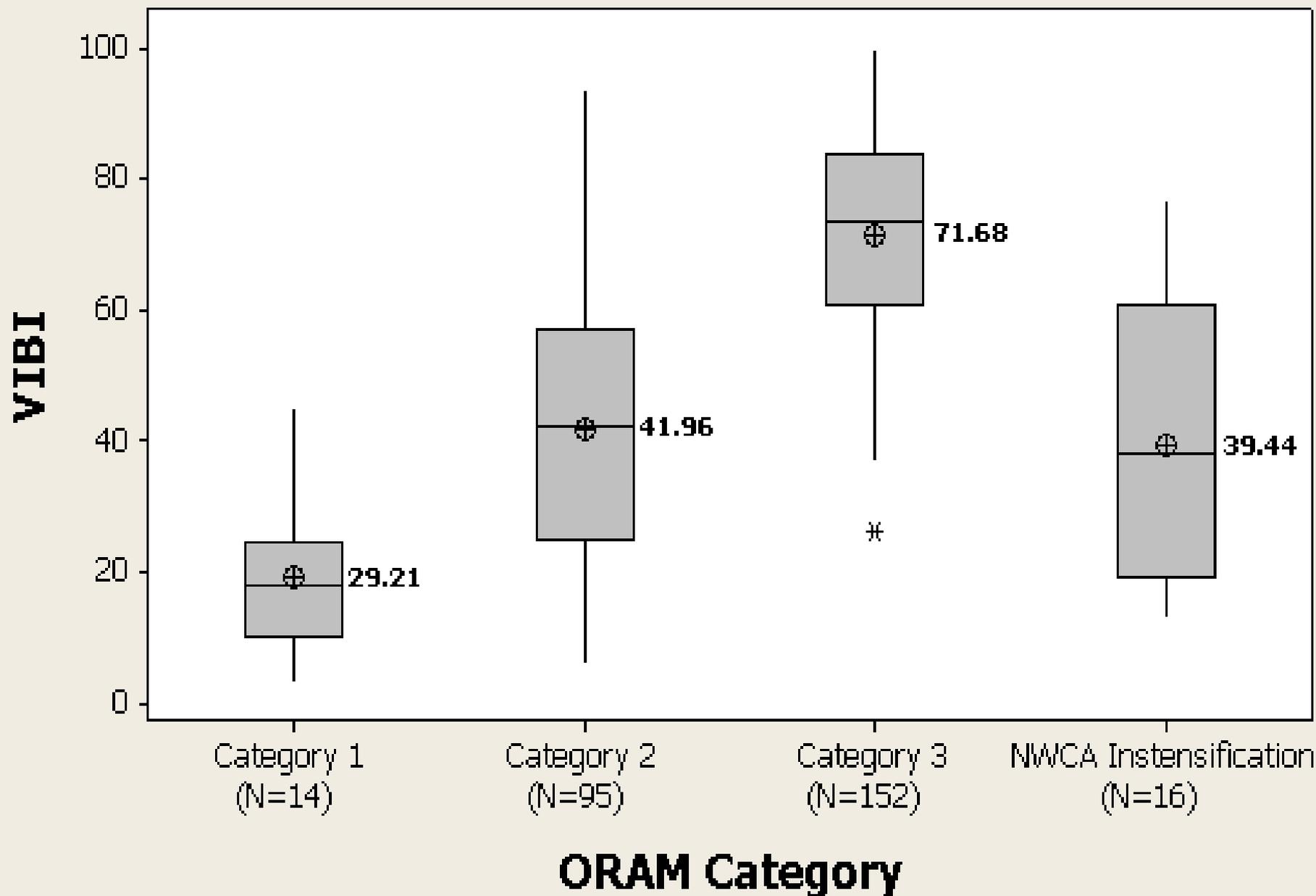


Scatterplot of ORAM vs VIBI: NWCA Intensification (2011)

(N=16 [11 NWCA sites + 2 revisits + 3 intensification sites])

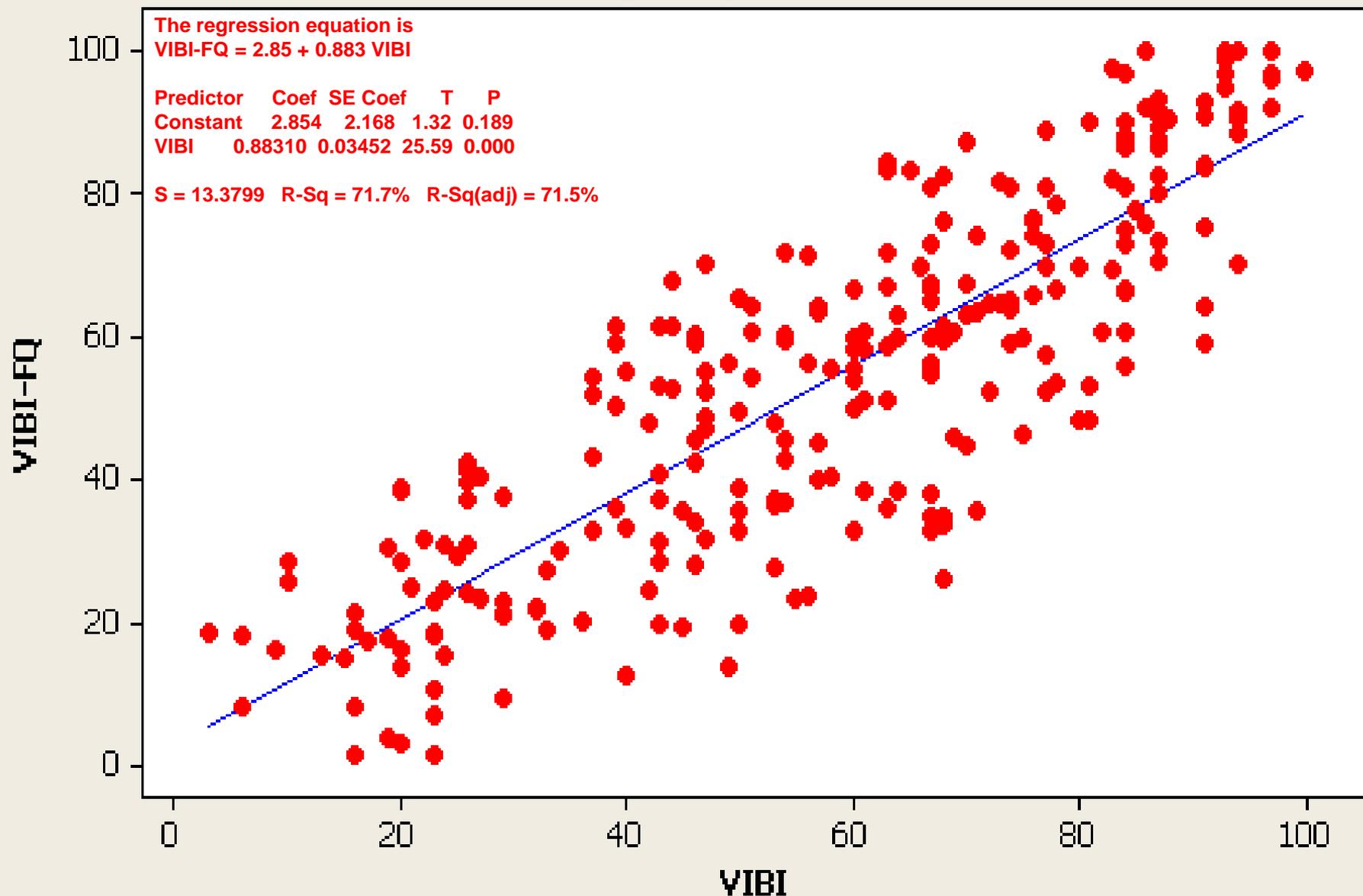


Boxplot of VIBI vs. ORAM Category



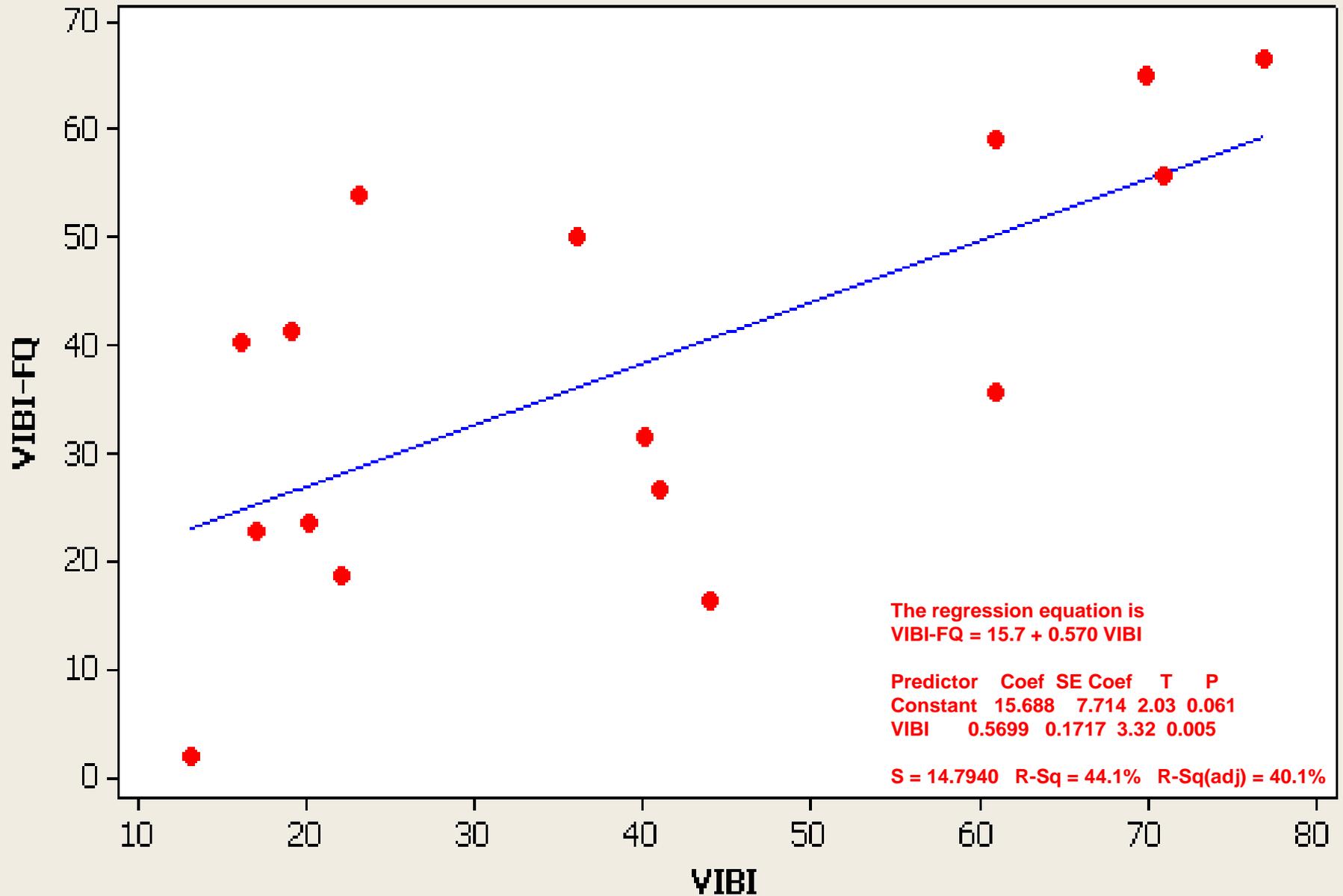
Scatterplot of VIBI-FQ vs VIBI: Natural Wetlands Monitored (1999-2010)

(N=261)

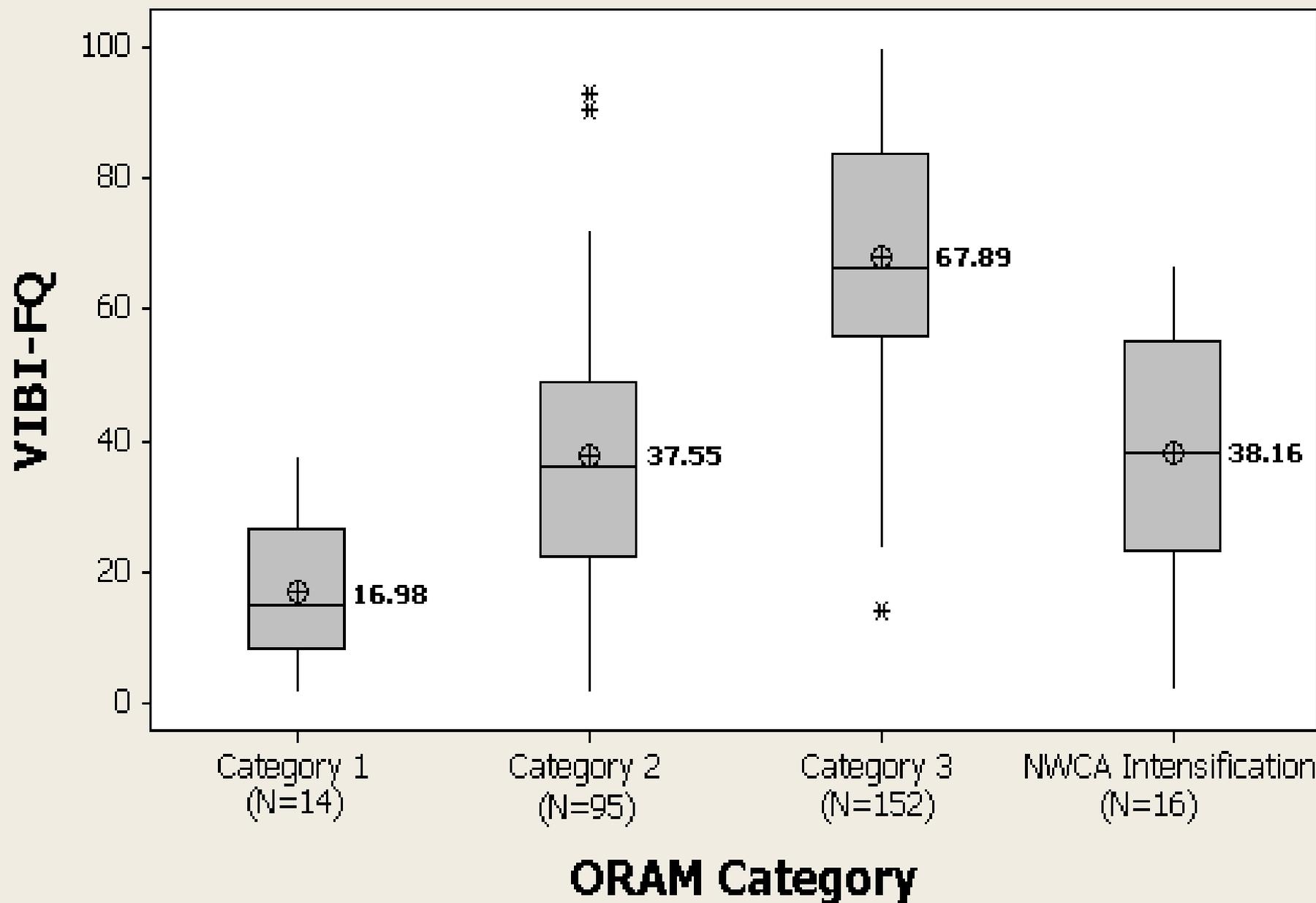


Scatterplot of VIBI-FQ vs VIBI: NWCA Intensification (2011)

(N=16)



Boxplot of VIBI-FQ vs. ORAM Category



Preliminary Bryophyte Sampling Results

Site	ORAM Score	VIBI Score	VIBI-FQ Score	Number of Moss Species	Moss FQAI
NWCA-OH-3003	42	40	31.7	5	5.367
NWCA-OH-3022	52.5	61	35.7	7	6.803
NWCA-OH-3019	64	61	59.3	22	16.056

Lessons Learned



- 1) 4 soil pits is overkill.
- 2) Should have experienced Phycologist collecting algae data.
- 3) Field recon is imperative for a efficient sampling day!
- 4) Minimize paperwork as much as possible!
- 5) Future NWCA projects should include at least two funded “dummy” site visits, which would can be conducted prior to the actual field sampling window.

Next Steps...

- 1) Determine property ownership and request site access for remaining 36 sites.
- 2) Perform field recon to verify site meets criteria for inclusion in NWCA, determine if modified AA set-up will be necessary, and evaluate site sampling logistics.
- 3) Conduct field assessments (18 sites each in 2012 and 2013).
- 4) Compare results of Ohio methodology with NWCA and USA-RAM metrics.
- 5) Generate a “scorecard” of Ohio wetland condition.

Thank You!

