

# **North Carolina National Wetland Conditional Assessment Site Descriptions, Rapid Assessment Results, and Method Evaluation**

**North Carolina Department of Environment and Natural Resources –  
Division of Water Quality**

**Virginia Baker, Rick Savage, James Graham, and Anthony Scarbraugh**



## **Presentation Topics**

1. National Wetland Conditional Assessment (NWCA)
2. NC Wetland Sites
3. Wetland Classification Results
  - a. Status and Trends results
  - b. NC Wetland Assessment Method (NCWAM)
4. Rapid Assessments
5. NCWAM and ORAM Rapid Assessment Results
  - a. Overall Results for NCWAM and ORAM
  - b. Overall Results for NCWAM and ORAM by wetland class
6. NC Evaluation of NWCA

# National Wetland Conditional Assessment

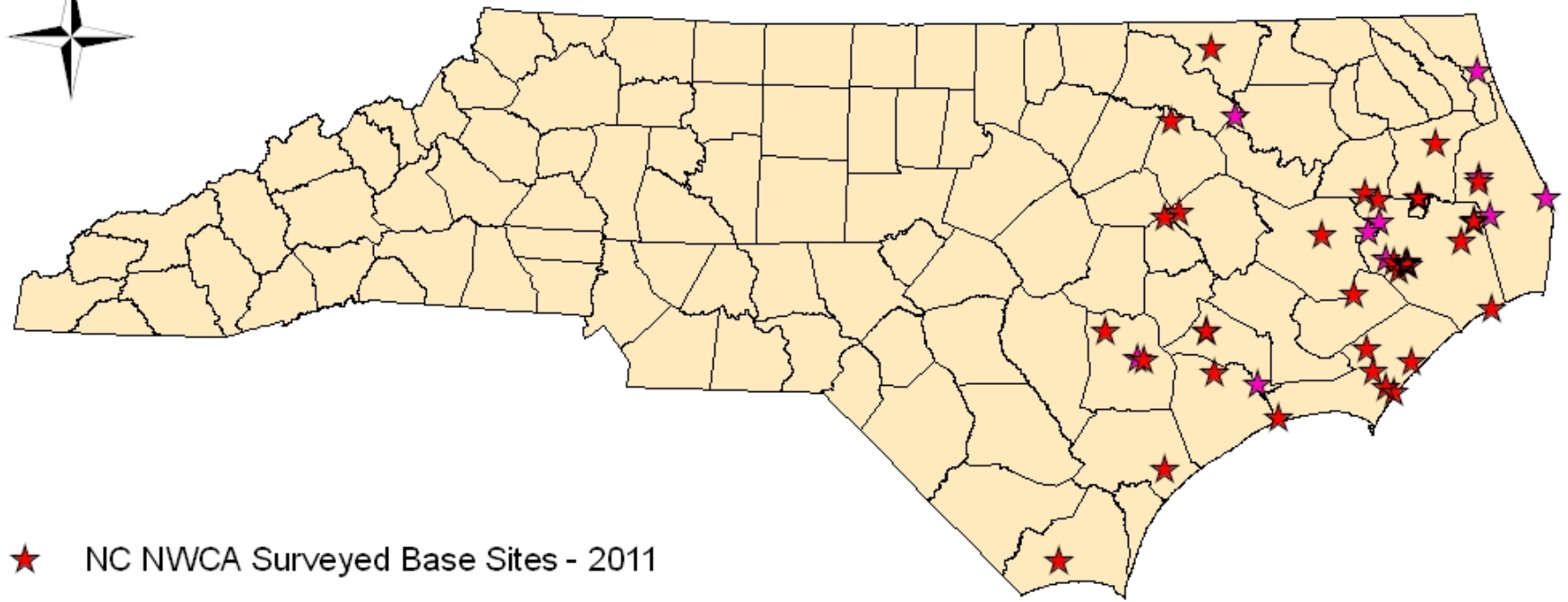
The NWCA was a collaborative effort between the EPA and state, tribal, and federal partners for the first every national wetland survey.

1000 sites surveyed nationwide.

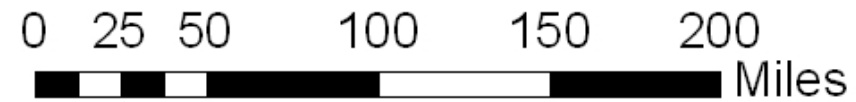
The NWCA method was used to gather ecological data on the vegetation, hydrology, water quality, soils, and condition of the surrounding buffer.

NC surveyed 47 sites in the coastal plain region.

# North Carolina NWCA Base and Over Sample Sites Surveyed in 2011



- ★ NC NWCA Surveyed Base Sites - 2011
- ★ NC NWCA Surveyed Over Sample Sites - 2011



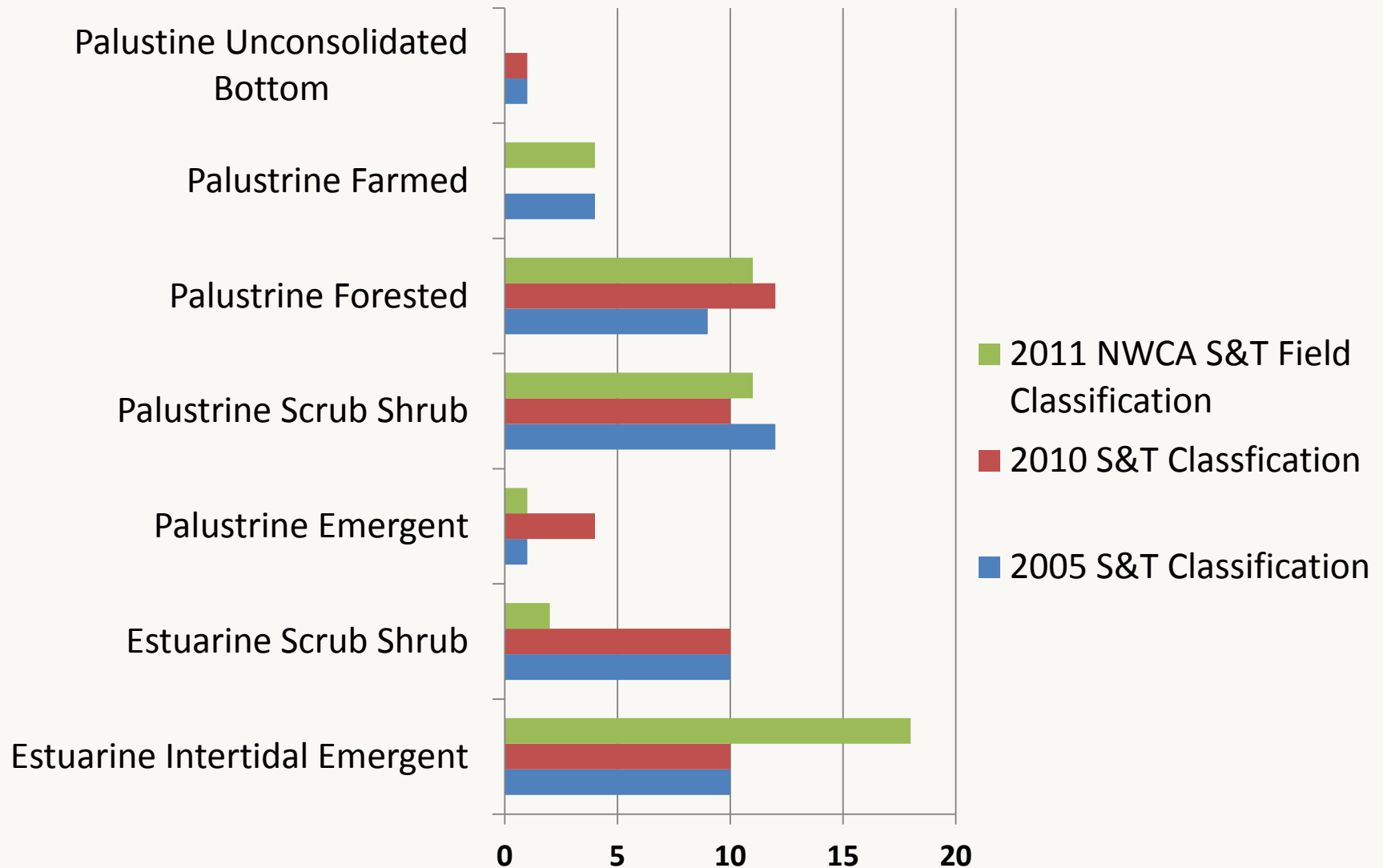
# North Carolina NWCA Crew



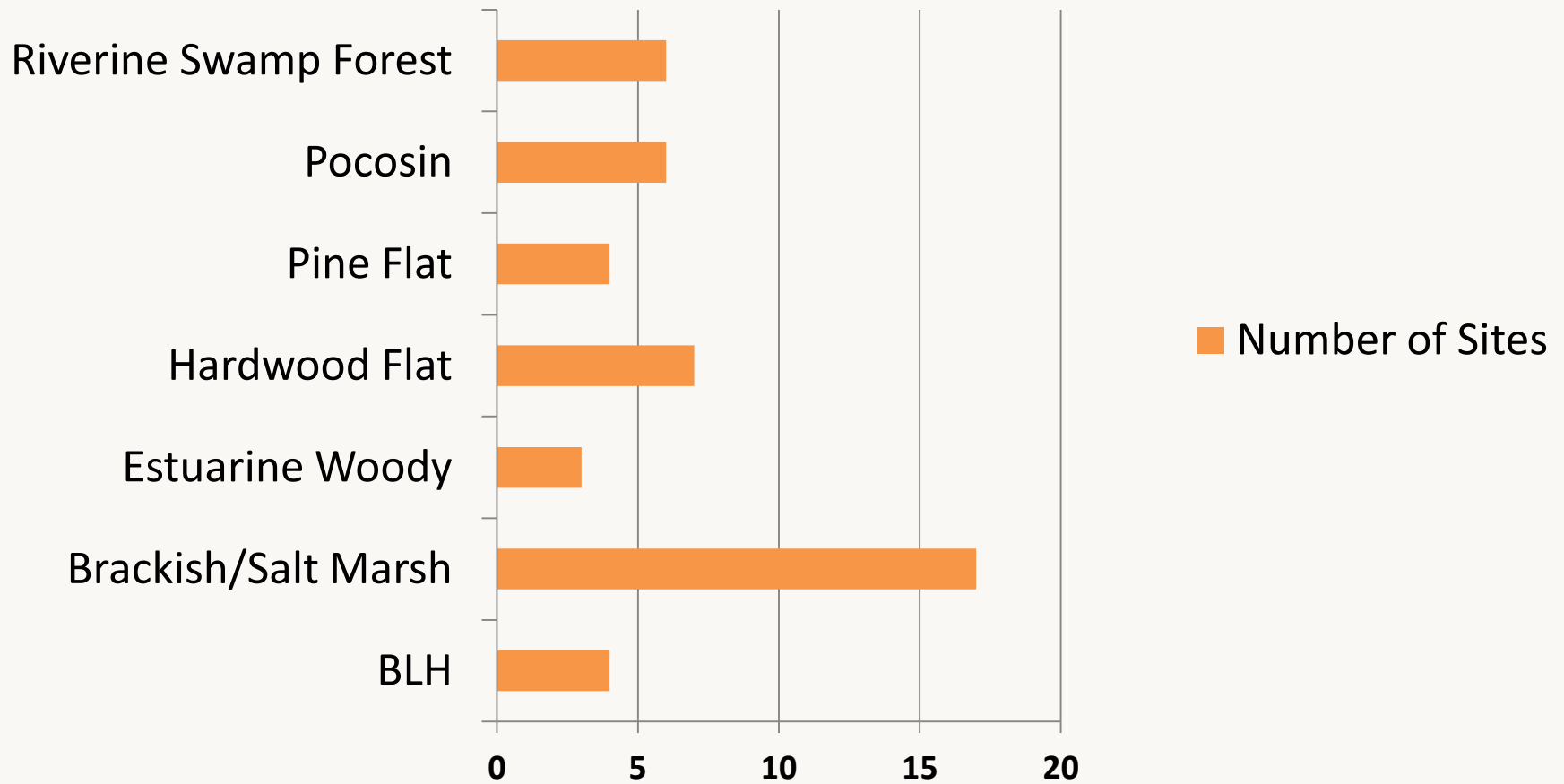
# Means of transport to sites



# Status and Trends Results for NC NWCA Sites



# NC Wetland Assessment Method Wetland Classification





# Status and Trends vs NCWAM Wetland Type Designation

<b>Status &amp; Trends NWCA - 2011</b>	<b>NCWAM Wetland Type</b>	<b>Number Sites</b>
E2EM - Estuarine Intertidal Emergent	Brackish/Salt Marsh	17
E2SS - Estuarine Scrub Shrub / Forest	Estuarine Woody	3
PEM - Palustrine Emergent	Pine Flat	1
PFO - Palustrine Forested	Bottomland Hardwood Forest	2
PFO - Palustrine Forested	Hardwood Flat	2
PFO - Palustrine Forested	Pine Flat	2
PFO - Palustrine Forested	Riverine Swamp Forest	5
PSS - Palustrine Scrub Shrub	Bottomland Hardwood Forest	2
PSS - Palustrine Scrub Shrub	Hardwood Flat	1
PSS - Palustrine Scrub Shrub	Pine Flat	1
PSS - Palustrine Scrub Shrub	Pocosin	6
PSS - Palustrine Scrub Shrub	Riverine Swamp Forest	1
Pf - Palustrine Farmed	Hardwood Flat	4

# Estuarine Intertidal Emergent – E2EM



Brackish / Salt Marsh

# Estuarine Scrub Shrub – E2SS



Estuarine Woody

# Palustrine Emergent - PEM



Pine Flat

# Palustrine Forested-PFO



Riverine Swamp Forest



Pine Flat



Hardwood Flat



Bottomland Hardwood Forest

# Palustrine Scrub Shrub - PSS



Pocosin

# Palustrine Farmed



Hardwood Flat

# Rapid Assessment Methods

## USA RAM – USA Rapid Assessment Method

- Developed as a part of the NWCA
- Performed at the beginning of survey day
- Currently being analyzed and evaluated by EPA

## NC Wetland Assessment Method

- Developed for use in NC on 16 defined types of wetlands
- Functional Assessment of Hydrology, Water Quality and Habitat
- Categorical results of High, Medium, and Low

## Ohio Rapid Assessment Method

- Conditional Assessment
- Numerical results of 0-100 (0-90 for NC)



# USARAM

1. Buffer Perimeter
2. Buffer Width
3. Stressors in the Buffer
4. Topographic Complexity
5. Patch Mosaic Complexity
6. Vertical Complexity
7. Plant Community Complexity
8. Water Quality Stressors
9. Alterations to the Hydroperiod
10. Stressors to the Substrate
11. Invasive Plants
12. Vegetation Stressors

# NCWAM

## 1. Hydrology

- Surface storage and retention
- Subsurface storage and retention

## 2. Water Quality

- Particulate change
- Soluble change
- Pathogen change
- Physical change
- Pollution change

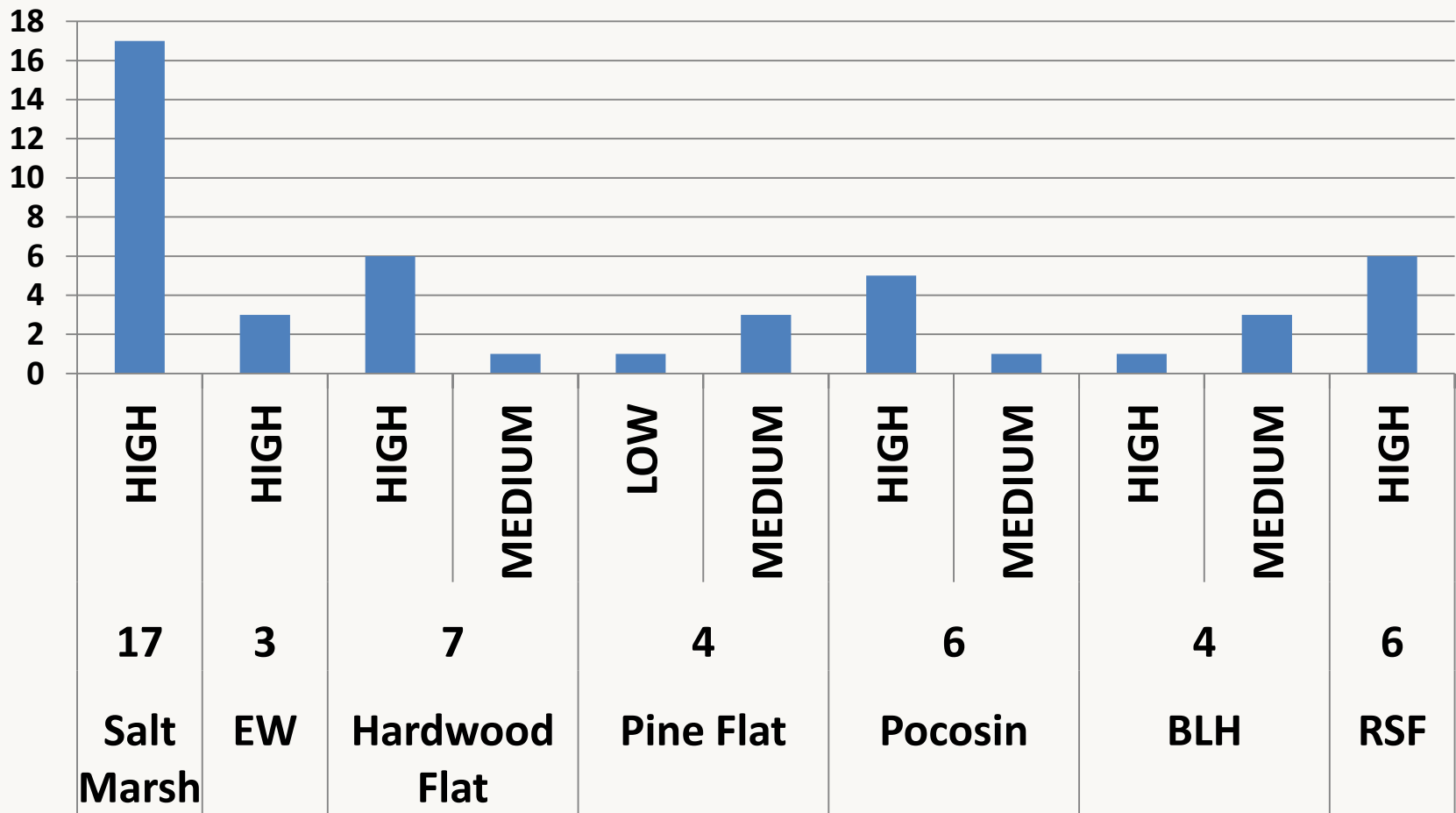
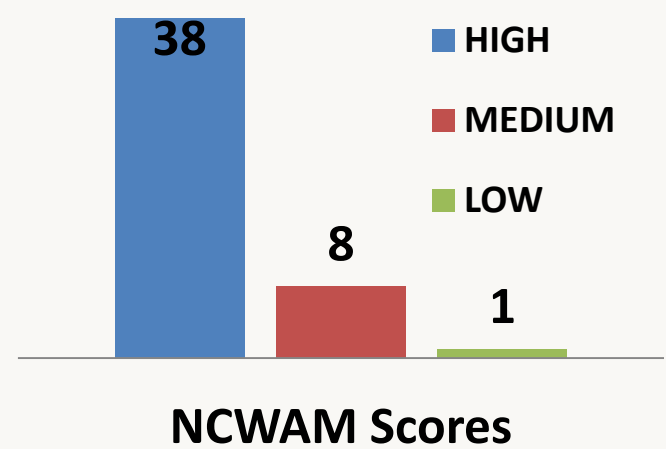
## 3. Habitat

- Physical structure
- Vegetation composition
- Landscape patch structure
- Uniqueness

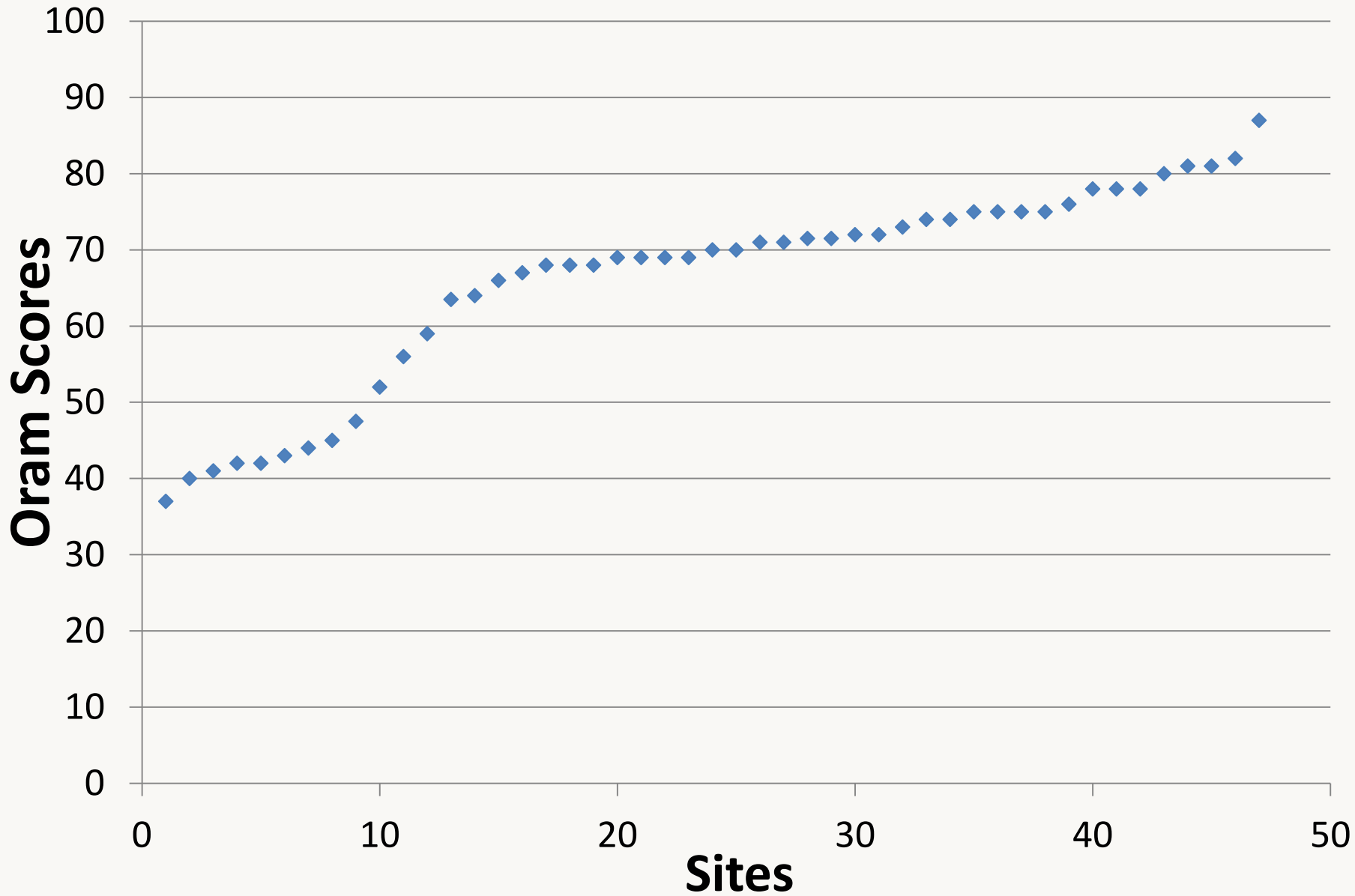
# ORAM

1. Wetland area
2. Upland buffers and surrounding land use
3. Hydrology
4. Habitat alteration and development
6. Plant communities, interspersions, microtopography

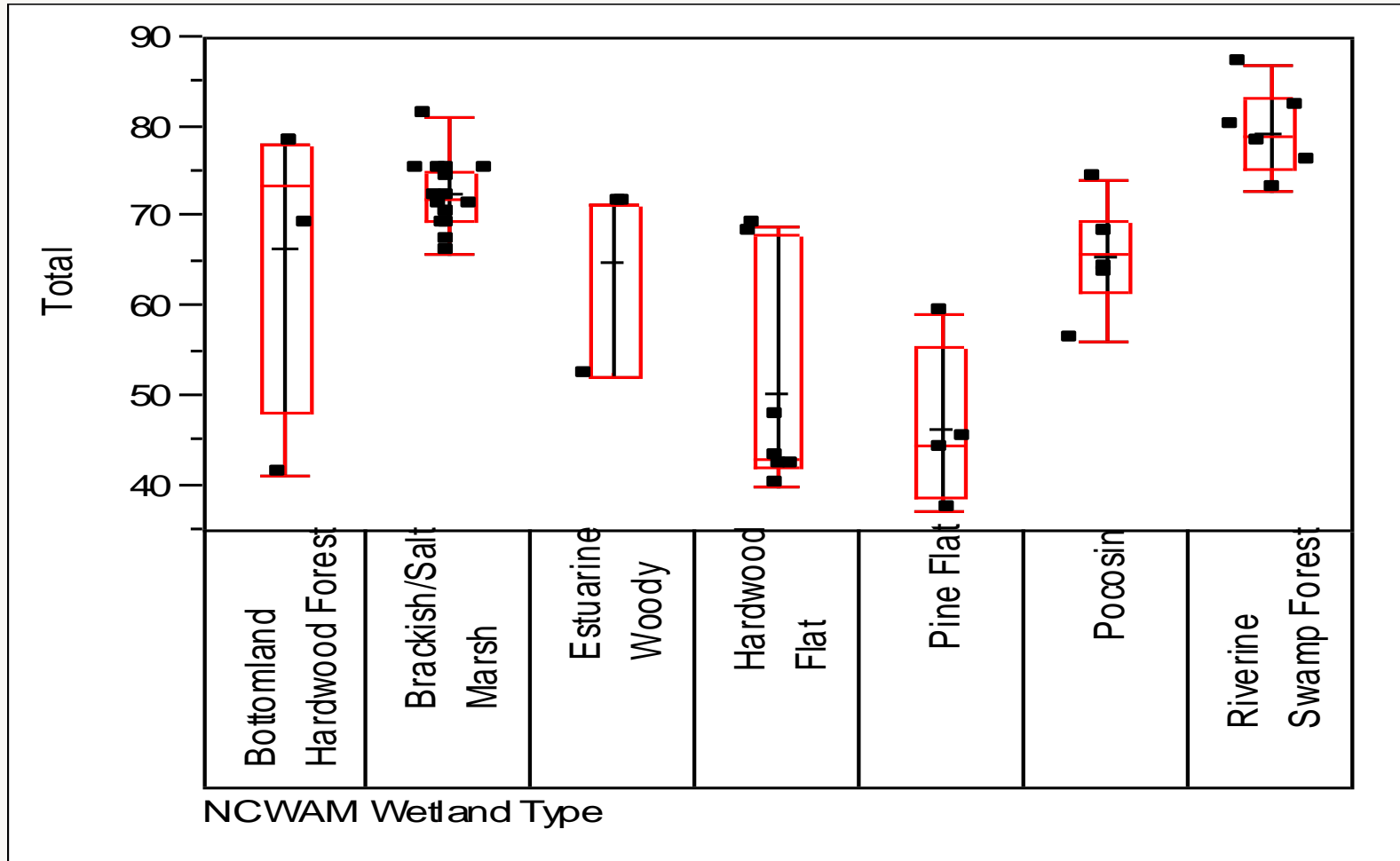
# NCWAM Results



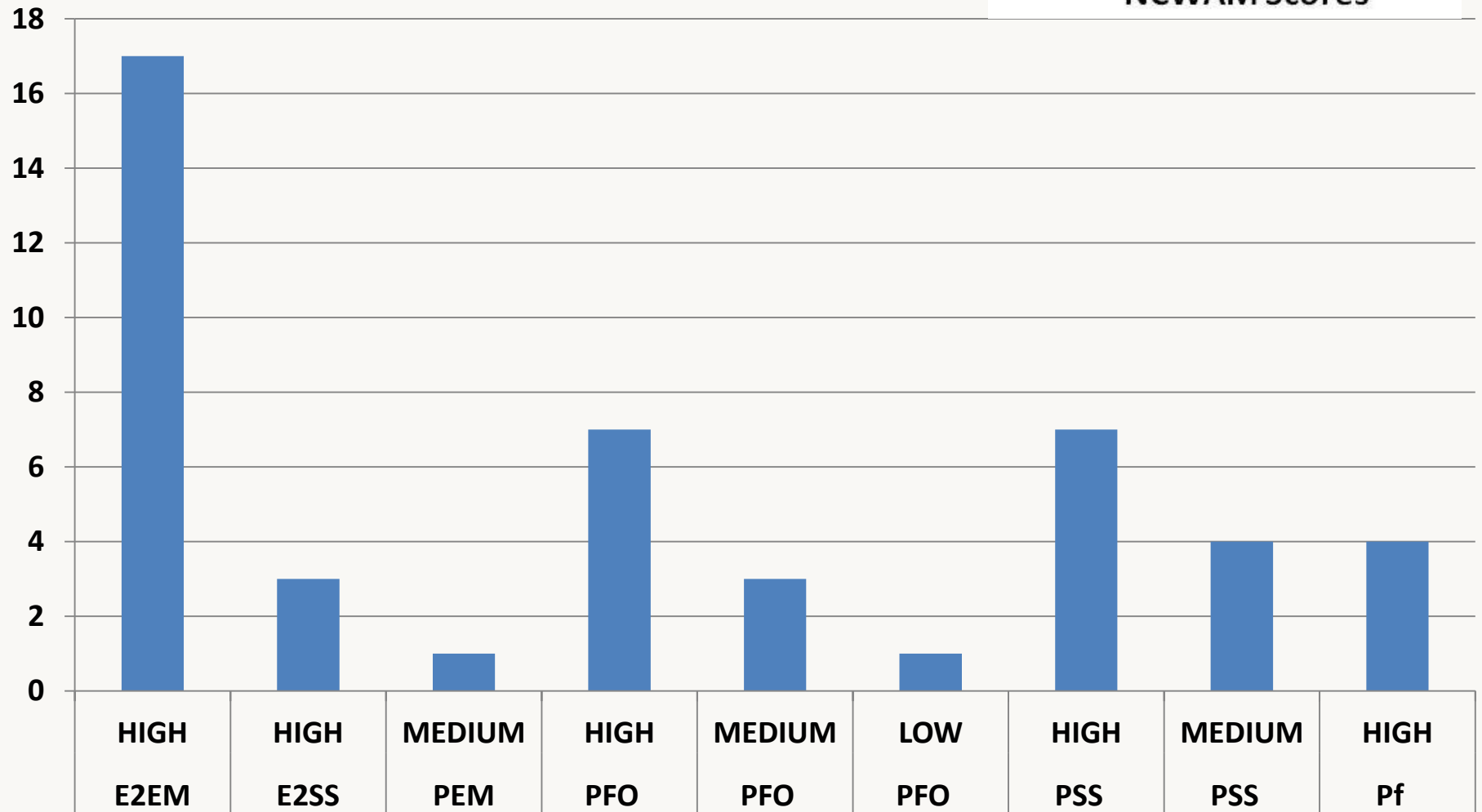
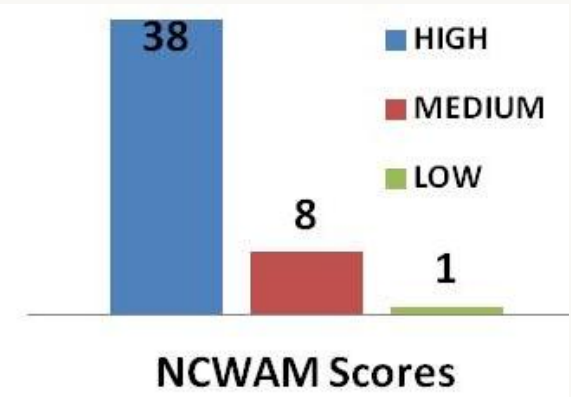
# ORAM Scores



# ORAM Scores by NCWAM Wetland Type

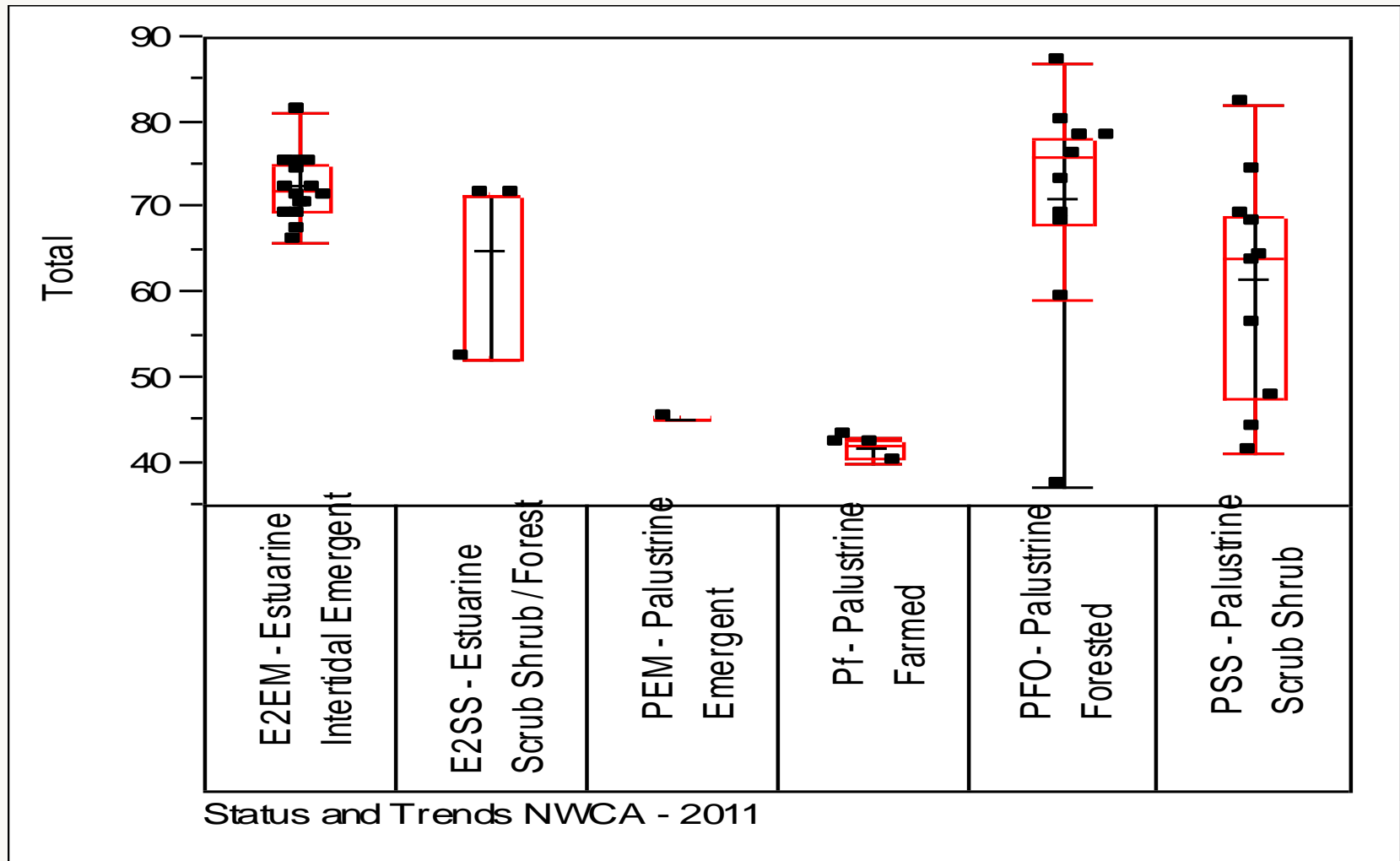


# Status and Trends NWCA – 2011 vs NCWAM Scores



# ORAM Scores by Status and Trends

## NWCA – 2011 Wetland Type





# NC Team Evaluation of NWCA-Veg Team

1. Difficulty in measuring veg in wetland systems with dense undergrowth
2. Difficulty in measuring vines, arboreal lichens, and moss
3. Some trouble initially identifying algal mats
4. Add metric for standing dead woody shrubs and trees <5cm
5. Redundancy in USARAM, add Flags.

# NC Team Evaluation of NWCA – AB Team

1. GPS was found to be the most effective in locating buffer plots.
2. Define veg structure more accurately in buffer plots with metric for woody vine coverage.
3. Plastic plunger in muck and peat soils was problematic in extracting soil samples for soil enzymes and isotopes.
4. In high water table wetlands use of an auger to reach 125cm should be considered.
5. On Hydrology form-water sources-estuary add sub-category for influence of winds.

# NC Team Evaluation of NWCA

1. Use of a fifth team member on more difficult sites.
2. Some wetlands were marginal due to only 1 of 3 (vegetation, soils, hydrology) wetland criteria required rather than ACOE definition.
3. Results may be skewed due to the number of public verse private lands evaluated.
4. **OVERALL** NC Team thought the NWCA was extremely well planned, written, and executed by the EPA and supporting states, tribes, and GLEC.

# Thank you EPA

## Questions?

North Carolina DENR

Division of Water Quality

Virginia Baker [virginia.baker@ncdenr.gov](mailto:virginia.baker@ncdenr.gov)

Rick Savage [rick.savage@ncdenr.gov](mailto:rick.savage@ncdenr.gov)

James Graham [james.graham@ncdenr.gov](mailto:james.graham@ncdenr.gov)

Anthony Scarbraugh [anthony.scarbraugh@ncdenr.gov](mailto:anthony.scarbraugh@ncdenr.gov)