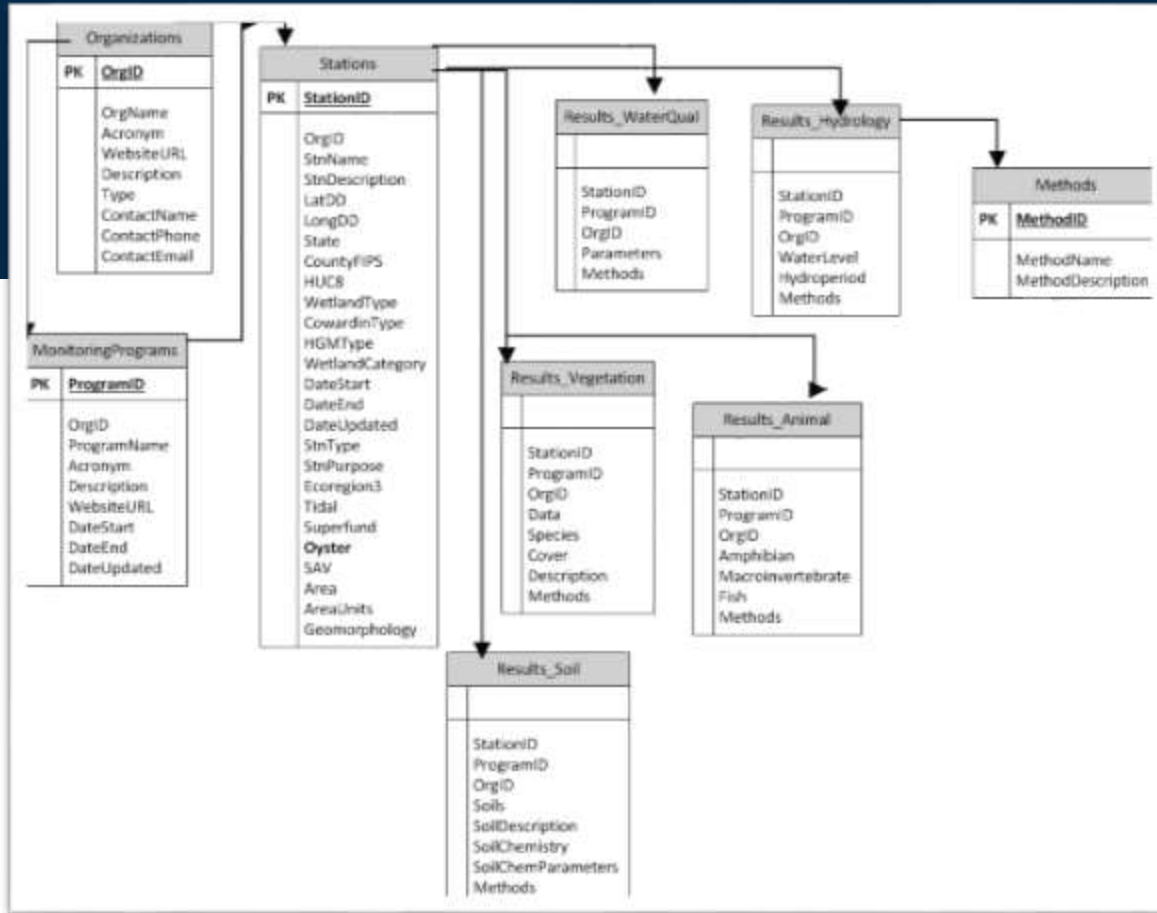


May 2016



May is American Wetlands Month!

- Started in 1991 (25 years ago)
- 2011 *National Wetlands Condition Assessment (NWCA)* released
- NOAA's "What's Wild in Our Wetlands"
- Society of Wetland Scientists
 - Wetland Treasures initiative
 - Wetland Ambassadors Program
- US Fish and Wildlife Service
 - Wetlands Mapper for hand held devices
 - National Wetlands Inventory, Version 2 dataset



USFWS: NWI, version 2: An example of SWI mapping shows a composite of all surface waters and wetlands. Wetland polygonal features were retained from the NWI dataset (dark green) and combined with orphaned wetland linear features that were buffered to narrow polygons (light green) and hydrology linear segment connectors also buffered and assigned ecological classification (blue).

Agenda

- Introductions
- National Monitoring Conference
- Review data submissions
 - Organizations and monitoring programs
 - Station information
 - Parameters
- Database development input
- In-person meeting: June 28-29
 - Logistics
 - Attendance
 - Agenda

National Monitoring Conference: Tampa, May 2-6, 2016



Regional Coastal Wetlands Monitoring Workgroup: Multi-state collaboration on data and assessment methodologies

Kim Matthews, Liz Sullivan • RTI International, Research Triangle Park, NC
 Kristine Cherry • Governors' South Atlantic Alliance, Charleston, SC



Workgroup members meeting in the South Carolina Division of Natural Resources facility in Charleston, SC.

Background

Monitoring the coastal wetlands of North Carolina, South Carolina, Georgia, and Florida is necessary to understand the current extent, condition, and function of these important natural resources and to begin to predict how these ecosystems will respond to changes in land use, climate, sea level, and water quality. Currently, there is no standardized or widely accepted monitoring program within these South Atlantic states. Instead, various federal, state, and local agencies, in addition to universities and nongovernmental organizations, are monitoring different aspects of coastal wetlands and their associated waters. However, there is little coordination among these agencies and organizations and there is limited sharing of data and information and leveraging of resources.

Purpose and Goals

The Governors' South Atlantic Alliance (GSAA) has established a workgroup to facilitate communication about coastal wetland science in the South Atlantic and to collaboratively develop and enhance complementary monitoring programs. The goals of this workgroup are:

1. to develop a catalog of available coastal wetlands monitoring data,
2. assess the comparability of state wetland monitoring efforts, and
3. evaluate existing state methodologies to improve the consistency of monitoring efforts across the South Atlantic region.

Methods – Formation of the Workgroup

Workgroup Membership – The responsibility of monitoring wetlands often falls to multiple state agencies; therefore, to be successful, the workgroup needs to be inclusive of all state agencies with an interest in coastal waters. To provide the expertise and experience to develop and conduct effective wetland monitoring programs, the workgroup also includes practitioners from federal agencies and universities.

Active Participation/Engagement Process – Members participate in monthly webinars and in-person meetings (twice a year) with remote participation possible for members who can not travel. Utilization of online goals and chat functions ensures equal participation among members.

Feedback Loop – Workgroup re-evaluates decisions made at previous meetings through distribution of meeting minutes and through presentations at the next monthly meeting.

Ownership of Process – Key decision points are discussed by workgroup members and determined by the majority of the members.

Geographic Extent and Scope

Geographic Scope:

- Located within North Carolina, South Carolina, Georgia, and Florida
- Located within watersheds designated by 6-digit hydrologic unit codes (HUCs) that drain to the Atlantic Ocean



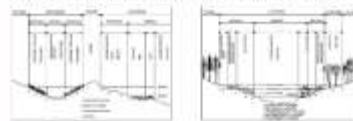
Definition of a wetland:

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have one or more of the following three attributes:

- at least periodically, the land supports predominantly hydrophytic;
- the substrate is predominantly undrained hydric soil; and
- the substrate is mineral and is saturated with water or covered by shallow water at some time during the growing season of each year.

The **upland limit of a wetland** is designated as (1) the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic or xerophytic cover; (2) the boundary between soil that is predominantly hydric and soil that is predominantly mesohydric; or (3) in the case of wetlands without vegetation in soil, the boundary between land that is flooded or saturated at some time during the growing season each year and land that is not.

The boundary between wetland and deepwater habitat in Marine and Estuarine Systems coincides with the elevation of the extreme low water at spring tide; permanently flooded areas are considered deepwater habitats in these Systems. The boundary between wetland and deepwater habitat in the Riverine and Lacustrine Systems lies at a depth of 2 m (6.6 feet) below low water; however, if emergents, shrubs, or trees grow beyond this depth at any time, their deepwater edge is the boundary.



Estuarine System

Lacustrine System

Comparability of State Monitoring Programs

We will evaluate monitoring methodologies for coastal wetlands across the South Atlantic region and identify gaps in current programs and make recommendations for potential program enhancements based on wetland type and program objectives. We will prepare a report that identifies priority data that should be collected to improve comparability of wetland results across the region. In addition to data collection methods, we will identify potential partnerships among state and federal programs, universities, and other organizations to leverage resources, outcomes, and outreach activities. The report will also discuss how these data can be used to communicate the condition and functions of coastal wetlands and their role in achieving Clean Water Act goals.



Coastal Wetlands Data Catalog

We are developing a catalog of stations and available monitoring data for coastal wetlands in the South Atlantic states. The design of the data catalog and user interface is being developed based on input from the Coastal Wetlands Monitoring Workgroup.

The Coastal Wetlands Data Catalog will be easy to access and query information. The data catalog is being created using Microsoft Access and will be available at the GSAA website (<http://southatlanticalliance.org>).

The Data Catalog provides a centralized location to access information about coastal wetland monitoring programs and station information including geographic location, wetland type, parameters monitored, and sampling methods used. If available, web links will be provided for the user to access the data and the monitoring program.



Components of the Coastal Wetlands Data Catalog

The user will be able to query on each component variable and find information based on location, watershed, wetland type, or monitoring parameter. The data catalog will increase collaboration and sharing of data and information to better assess the condition and function of coastal wetlands in the South Atlantic region of the United States.

More than just Coastal Wetlands

The workgroup decided that the Data Catalog can include more than just wetland data. It may contain stations for nearby surface water quality stations or upland terrestrial sites that may influence nearby wetlands. The database can also include oyster reefs, submerged aquatic vegetation, and impoundments.



Examples of coastal wetland types: freshwater wetland (top left), oyster reef bed (top right), estuarine marsh (bottom left), and planted marsh (bottom right).

Workgroup Members

North Carolina	Affiliation
Lynell Kennedy & Kristin Harrop	NC Dept. of Environmental Quality (DEQ) Division of Water Resources
Marcos Andrus-Sayin	East Carolina University
Arlene Burwell	North Carolina State University
Dean Carpenter	Alabama-Piedmont National Estuary Partnership
Franklin Pickett	NC National Estuarine Research Reserve (NERR)
Gregory Miller	NC DEQ Division of Coastal Management
Christine Pickett	The Nature Conservancy
Carl Richardson	Duke University
Georgia	Affiliation
Ian Mackinnon & Dennis Ouellet	GA Department of Natural Resources
Morry Altier & Jessica O'Connell	University of Georgia
E.J. Jackson	Georgia Southern University
Monie Rankin	US Fish and Wildlife Service
Doug Sampson	Sea Grant National Estuarine Research Reserve
Katy Smith	University of Georgia
Florida	Affiliation
Mark Brian	University of Florida
J. Cole	Bethune-Cookman University
Wendy Die	Florida Telemonitoring Network (FTN)
Luca Gasparicchi	The Nature Conservancy
Courtney Hatfield	University of North Florida
Paul Haydt & Chuck Jansky	St. Johns River Water Management District
Ryan Mayer & Kari Robinson	Florida Sea and Wildlife Research Institute
Gally Reiss	University of Florida
South Carolina	Affiliation
David Graves & Rusty Stevens	SC Dept. of Health & Environmental Control
Tim Morris	University of South Carolina
Denise Sanger	SC Department of Natural Resources
Richard Vico	Coastal Carolina University
EPA	Affiliation
Florida Ours	EPA Region 4
Jane Nestorovic	EPA ORD Gulf Stream
Rita Kalla	EPA Region 4

Contact Us

Do you participate in or know of a monitoring program in North Carolina, South Carolina, Georgia, or Florida that could be included in this data catalog?

If you do or if you want to find out more about this project, please contact us:

Kim Matthews
 kmatthews@rti.org
 919-316-3386

Kristine Cherry
 Kristine.cherry@gsaalliance.org
 843-953-0740

Acknowledgments

This project is funded by EPA Region 4 Wetland Program Development Grant to the Governors' South Atlantic Alliance through the South Carolina Department of Health and Environmental Control.

Organizations (n=11)

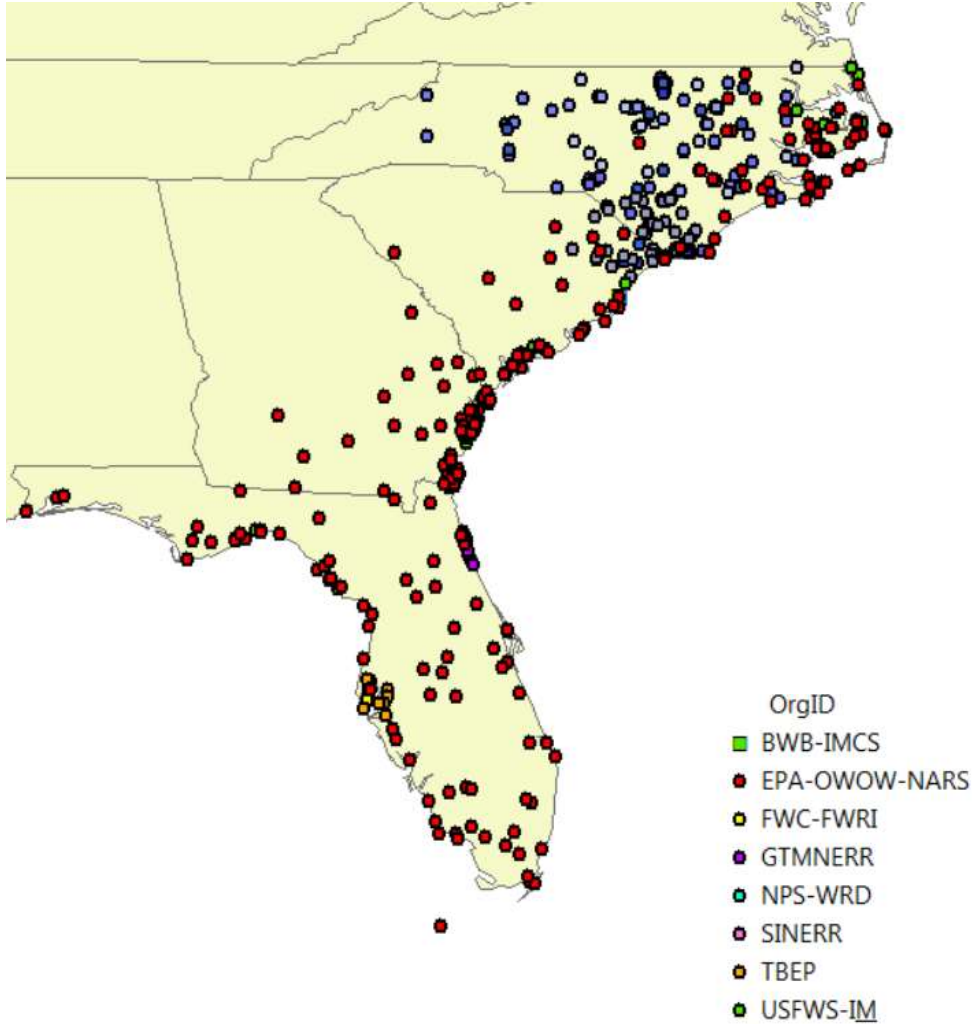
OrgID	Name	State
Federal Government		
EPA-OWOW-NARS	Environmental Protection Agency - Office of Wetlands, Oceans, and Watersheds - National Aquatic Resource Surveys	DC
USFWS-I&M	U.S. Fish and Wildlife Service, Southeast Region Inventory and Monitoring	SC
NPS-WRD	National Park Service Water Resources Division	
GTMNERR	Guana Tolomato Matanzas National Estuarine Research Reserve	FL
SINERR	Sapelo Island National Estuarine Research Reserve	GA
State/Local Government		
TBEP	Tampa Bay Estuary Program	FL
FWC-FWRI	Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute	FL
NCDEQ-DWR	North Carolina Department of Environmental Quality, Division of Water Resources	NC
SCDHEC	South Carolina Department of Health and Environmental Control	SC
Research/University		
BWB-IMCS	Belle W. Baruch Institute for Marine and Coastal Sciences	SC
GCE-LTER	Georgia Coastal Ecosystems Long Term Ecological Research	GA

Organizations – Number of Stations

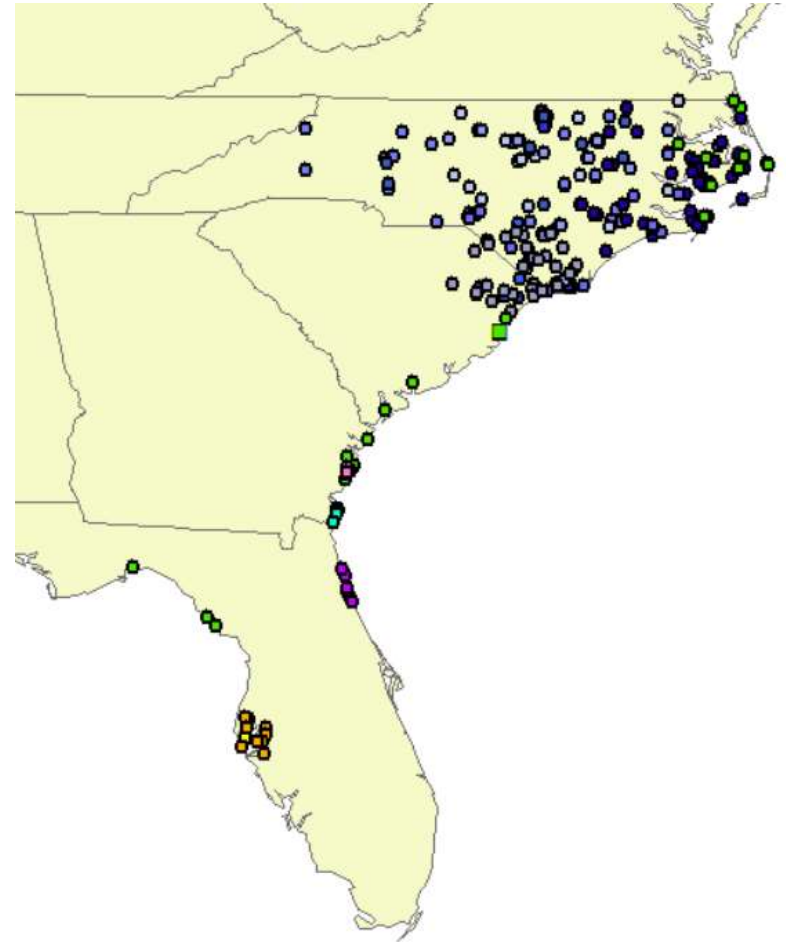
OrgID	Name	#
Federal Government		
EPA-OWOW-NARS	Environmental Protection Agency - Office of Wetlands, Oceans, and Watersheds - National Aquatic Resource Surveys	236
USFWS-I&M	U.S. Fish and Wildlife Service, Southeast Region Inventory and Monitoring	20
NPS-WRD	National Park Service Water Resources Division	TBD
GTMNERR	Guana Tolomato Matanzas National Estuarine Research Reserve	6
SINERR	Sapelo Island National Estuarine Research Reserve	9
State/Local Government		
TBEP	Tampa Bay Estuary Program	9
FWC-FWRI	Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute	6
NCDEQ-DWR	North Carolina Department of Environmental Quality, Division of Water Resources	247
SCDHEC	South Carolina Department of Health and Environmental Control	TBD
Research/University		
BWB-IMCS	Belle W. Baruch Institute for Marine and Coastal Sciences	10
GCE-LTER	Georgia Coastal Ecosystems Long Term Ecological Research	24

Distribution of Stations

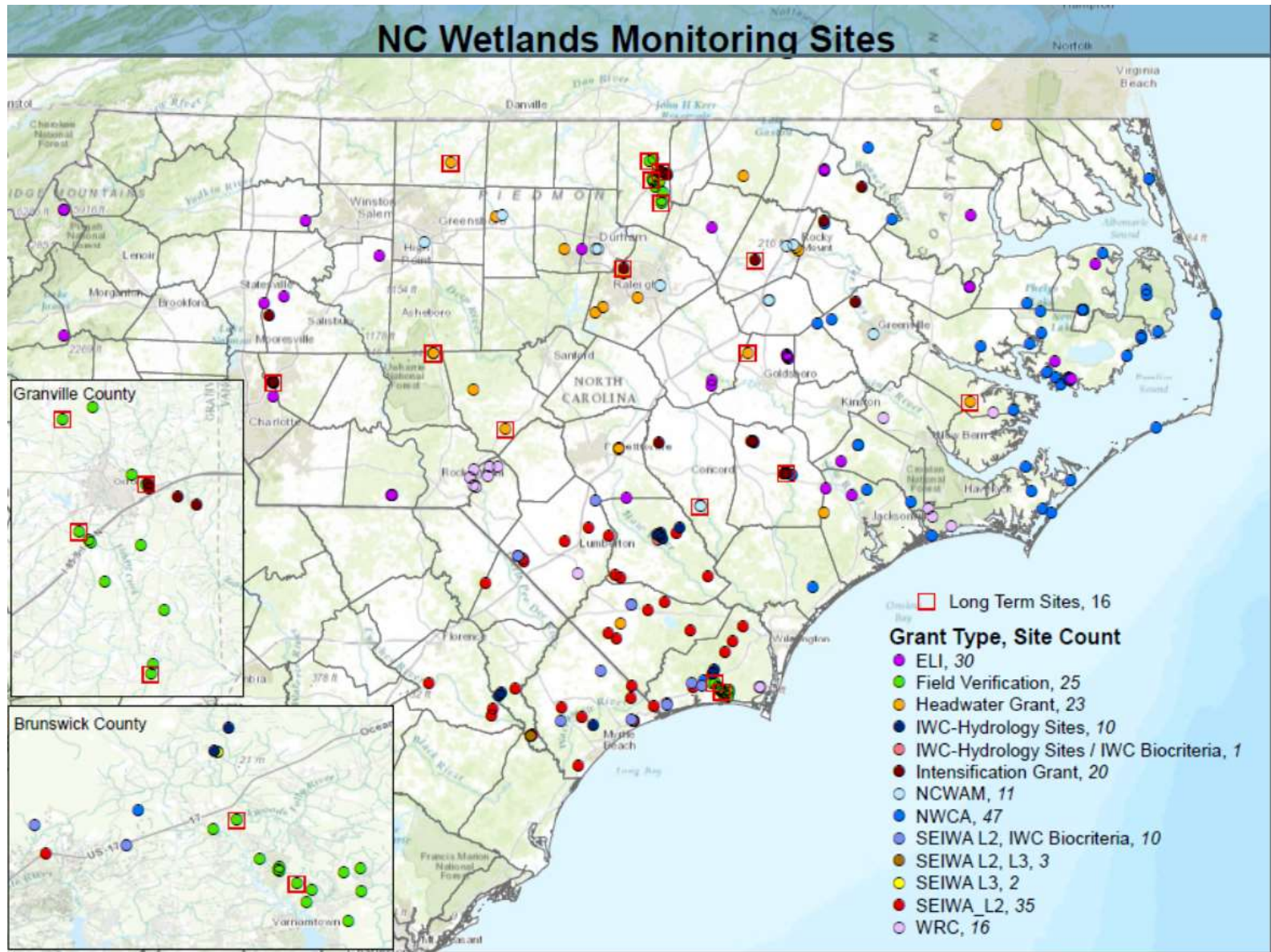
With EPA NWCA (2011)



Without EPA NWCA (2011)



Network of NC Monitoring Stations



Monitoring Programs – Federal Government

OrgID	Name	Program	ProgramID
Federal Government			
EPA-OWOW-NARS	Environmental Protection Agency - Office of Wetlands, Oceans, and Watersheds - National Aquatic Resource Surveys	National Wetland Condition Assessment	NWCA
USFWS-I&M	U.S. Fish and Wildlife Service, Southeast Region Inventory and Monitoring	Coastal Wetland Elevation Monitoring	CWEM
NPS-WRD	National Park Service Water Resources Division	TBD	TBD
GTMNERR	Guana Tolomato Matanzas National Estuarine Research Reserve	Guana Tolomato Matanzas National Estuarine Research Reserve System-Wide Monitoring Program	GTMNERR-SWMP
SINERR	Sapelo Island National Estuarine Research Reserve	System Wide Monitoring Program (Sapelo Island NERR)	SINERR-SWMP

Additional Federal Organizations and/or Monitoring Programs:

- NC NEERS (Brandon Puckett)
- NOAA Center for Coastal Fisheries and Habitat Research (Carolyn Currin)
- DOD – Camp Lejeune (DCERP/RTI)
- North Inlet-Winyah Bay NERR
- EPA Region 4 or ORD (Peter Kalla and Janet Nestlerode)
- National Park Service – Southeast Coast Network
- National Estuary Partnerships

Monitoring Programs – State/Local Government

State/Local Government			
OrgID	Org Name		ProgramID
TBEP	Tampa Bay Estuary Program	Tampa Bay Critical Coastal Habitat Assessment	CCHA
FWC-FWRI	Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute	Coastal Habitat Integrated Mapping and Monitoring Program	CHIMMP
NCDEQ-DWR	North Carolina Department of Environmental Quality, Division of Water Resources	Southeast Wetland Monitoring and Assessment Intensification Grant (NC)	INTENS
		National Wetland Condition Assessment, North Carolina	NWCA-NC
		Southeast Isolated Wetlands Assessment	SEIWA
SCDHEC	South Carolina Department of Health and Environmental Control	Southeast Wetlands Assessment	SEWA
		Southeast Isolated Wetlands Assessment	SEIWA

Additional State/Local Government Organizations and/or Monitoring Programs:

- NCDEQ- DWR – additional monitoring program (Kristie Gianopulos/RTI); NCDPCM
- SC DNR (Denise Sanger); SC DEHC – other programs?
- GA CRD and UGA MAREX (Jan MacKinnon); GA DNR Beach Monitoring Program ; GA EPD (Bradley Smith)
- FL DEP; St. John's River Water Management District; other districts
- Others?

Monitoring Programs – Research/Universities

Research/University			
BWB-IMCS	Belle W. Baruch Institute for Marine and Coastal Sciences (University of South Carolina)	National Science Foundation Long Term Research in Environmental Biology at North Inlet SC	NSF-LTREB
GCE-LTER	Georgia Coastal Ecosystems Long Term Ecological Research	GCE LTER Continuous Salinity, Temperature and Water Level Monitoring	GCE-LTER-STWL
		GCE LTER Climate Monitoring	GCE-LTER-CLIM
		GCE LTER Water Quality Monitoring	GCE-LTER-WQM

Additional Research/Universities:

- NC: Duke University (Curt Richardson), NCSU (Mike Burchall), ECU (Marcelo Ardon-Sayao), UNC-IMS (Mike Piehler), UNC-Wilmington (?)
- SC: Coastal Carolina University; USC (Dan Tufford);
- GA:
- FL: Volusia County (J. Cho); Marine Discovery Center
- The Nature Conservancy
- Carolina Vegetation Survey
- Volunteer monitoring/citizen scientists

- National Wetland Condition Assessment
 - EPA owner = Parameters/data from standard methods
 - State owner = Supplemental information

OrgID ProgramID	Parameters
EPA-OWOW-NARS NWCA	Water quality (chlorophyll, nitrate+nitrite, ammonium, total nitrogen, total phosphorus, pH, conductivity); Soils (chemistry, bulk density, soil enzymes, and stable isotopes); Hydrology (description); Vegetation (Species composition and abundance, native/alien species, vegetation structure); algae (species and toxin); Rapid Assessment Method (USA RAM)
NCDEQ-DWR NWCA-NC	Amphibians (visual and auditory); Macroinvertebrates (sweep net and funnel traps); Land Development Index; Rapid Assessment Methods (NC WAM, ORAM); Water Quality (TSS, fecal coliform, nutrients, metals, carbon); Hydrology (surface water monitoring wells)

Parameters

Parameter Name

adjacent surface water DO
Air Temperature
algae (species and toxin)
Ammonium
Barometric Pressure
Benthic Macroinvertebrates (Abundance)
Canopy cover
canopy height
dissolved oxygen
faunal species
feldspar horizons
Fish/Nekton (Abundance)
Hydrology (description)
interstitial salinity
marsh elevation (cm; Cahoon&al 2002)
marsh elevation (cm; Cahoon&al 2002)
Nitrate
Nitrite
Orthophosphate
PCQ sampling
pH
plant height
porewater Cl- (g/L; voulimetric titration)
porewater Fe (uM; Gibbs 1979)
porewater NH4&PO4 (uM; Strickland & Parsons 1972)
porewater salinity
Porewater Salinity (Sipper Tubes)
porewater sulfide (uM; Cline 1969)
porewater temperature

Parameter Name

Precipitation
productivity (gdw/m2/y; Morris & Haskin 1990)
Relative Humidity
salinity
soil composition
soil pH
Soils (chemistry, bulk density, soil enzymes, and stable isotopes)
species cover
Specific conductance
specific conductivity
Surface elevation (RSET)
temperature
Total PAR
tree height
Turbidity
USA Rapid Assessment Method
Vegetation % cover
Vegetation (Carolina Vegetation Survey)
Vegetation (Species composition and abundance, native/alien species, vegetation structure)
vegetation cover
Vertical Accretion (Marker Horizon)
Water quality (chlorophyll, nitrate+nitrite, ammonium, total nitrogen, total phosphorus, pH, conductivity)
Water Temperature
Wind Direction
Wind Speed

Parameters - categories

Atmospheric Conditions	Soils and Elevation	Porewater	Physical/ Chemical Water Properties	Hydrology	Biology	Rapid Assessment Methods
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Atmospheric Conditions
Relative Humidity
Air Temperature
Barometric Pressure
Wind Direction
Wind Speed
Precipitation
Total PAR

Soils and Elevation
soil composition
soil pH
Soils (chemistry, bulk density, soil enzymes, and stable isotopes)
Surface elevation (RSET)
marsh elevation (cm; Cahoon&al 2002)
feldspar horizons
Vertical Accretion (Marker Horizon)

Porewater
interstitial salinity
porewater Cl- (g/L; volumetric titration)
porewater Fe (uM; Gibbs 1979)
porewater NH4&PO4 (uM; Strickland & Parsons 1972)
porewater salinity
Porewater Salinity (Sipper Tubes)
porewater sulfide (uM; Cline 1969)
porewater temperature

Parameters - categories

Atmospheric Conditions	Soils and Elevation	Porewater	Physical/ Chemical Water Properties	Hydrology	Biology	Rapid Assessment Methods
-------------------------------	----------------------------	------------------	--	------------------	----------------	---------------------------------

Physical/Chemical Water Properties
Water Temperature
temperature
pH
dissolved oxygen
adjacent surface water DO
salinity
Specific conductance
Turbidity
Chlorophyll-a
Nutrients (Ammonium, nitrate, nitrite, orthophosphate)
Metals
Carbon
Silicate

Hydrology
Hydrology (description)
Water level/elevation
Indicators

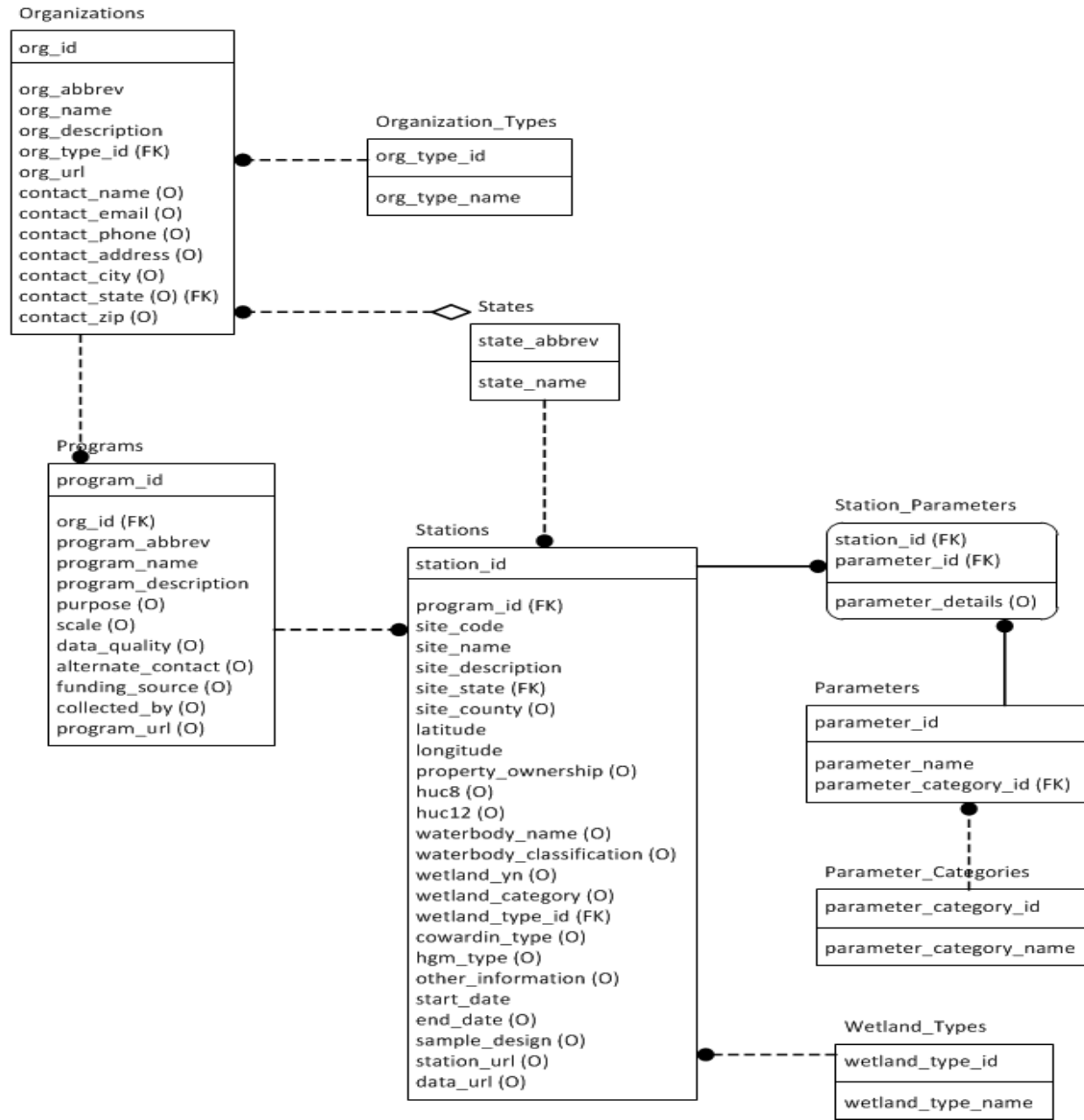
Rapid Assessment Methods
USA RAM
ORAM
NCWAM
LDI

Biology
plant height
Canopy cover
canopy height
tree height
Vegetation % cover
Vegetation (Carolina Vegetation Survey)
Vegetation (Species composition and abundance, native/alien species, vegetation structure)
vegetation cover
species cover
USA Rapid Assessment Method
PCQ sampling (point centered quarter)
productivity (gdw/m ² /y; Morris & Haskin 1990)
algae (species and toxin)
Benthic Macroinvertebrates (Abundance)
Fish/Nekton (Abundance)
faunal species

Parameters - categories

Atmospheric Conditions	Soils and Elevation	Porewater	Physical/ Chemical Water Properties	Hydrology	Biology	Rapid Assessment Methods
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Database Development



Database Development – Search Parameters

Organization

Fields	Searchable
Organization Name:	Yes
Organization Acronym:	No
Brief Description of Organization	No
Type of Organization (<i>govt, education, non-profit, other</i>):	Yes
Organization Web Page (URL):	No
Contact Names:	No
Email:	No
Phone:	No
Mailing Address:	No
City/Municipality:	No
State:	No
Zip Code:	no

Monitoring Program

Fields	Searchable
Program Name:	Yes
Acronym:	No
Brief Program Description:	No
Purpose:	No
Scale of Program (regional, state, or local):	Yes
Quality of Data	No
Contact Information :	NO
Funding Source:	NO
Data Collected By:	NO
Program Web Page (URL):	No

Database Development – Search Parameters

Field	Searchable
SiteCode	No
SiteName	No
Description	No
State	Yes
County	Yes
Latitude(DD)	No
Longitude(DD)	No
Property Ownership	no
HUC8	Yes
HUC12	Yes
Waterbody Name	Yes
Waterbody Classification	no
Is It a Wetland?	yes
Wetland Category	No
Wetland Type	No
Cowardin Type	no
HGM Type	no
Other Information	no
DateStart	no)
DateEnd	No
SampleDesign	no
Parameters	Yes*

*Parameters – Only search on parameter category

Next Steps

- May
 - Contact additional organizations and monitoring programs
 - Format data submissions for database
- Late May – Early June
 - Develop database
- June 16: Webinar
 - Present database to workgroup
- June 16-June 28: Workgroup members test database and prepare comments
- June 28-29 (in person meeting)
 - Review comments on database and determine modifications
 - Examine different monitoring programs and methods

June Meeting

Purpose:

- Provide comments on the “Beta” version of the database
- Review of state wetland monitoring efforts
- Identify potential collaborations
- Identify data gaps or missing monitoring efforts

Logistics:

- Dates: June 28-29 (T-W)
- Location: Guana Tolomato Matanzas National Estuarine Research Reserve near St. Augustine, FL
- Lodging: Double Tree by Hilton, St. Augustine, FL (8.18 mi from GTM)



June Meeting - Agenda

Day 1

- Review operation of database
- Provide comments on database
- Review and prioritize modifications to database
- Assessment of data compiled in database

Day 2

- Morning – tour at GTM
- Exploration of monitoring methods and procedures
- Use of wetland monitoring data to meet program goals
- Case study examples
- Other topics of interest?

Contact Information

Kim Matthews

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- kmatthews@rti.org

Kristine Cherry for travel support information:

- 843-953-0740
- Kristine.Cherry@GSAAlliance.org