North Carolina's Wetland Program Plan

Monitoring and Assessment

2013-2017

Submitted by:
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January 2013

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Funded by EPA Wetland Program Development Grant CD 95488411

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North Carolina Wetland Program Plan

January 28, 2013

INTRODUCTION

The North Carolina Division of Water Quality (NC DWQ), with assistance from an EPA Wetland Program Development (WPD) Grant, is developing North Carolina's Wetland Program Plan (WPP). The WPP will address North Carolina's wetland program development plans for the next five years and will incorporate all four Core Elements of EPA's Wetlands Program Framework (Monitoring and Assessment, Regulation, Voluntary Restoration and Protection, and Water Quality Standards for Wetlands) as well as address community outreach and education and sustainable financing options. Given the large number of agencies, organizations, and individuals that contribute to the understanding and protection of streams and wetlands in North Carolina, NC DWQ feels that it is important to obtain feedback from members of a stakeholder group in order to develop a comprehensive WPP. Members of the stakeholder group are still being identified at this time. Individuals will likely be selected from the following list of agencies and organizations, although additional interests may be identified as the selection process proceeds:

- US Army Corps of Engineers,
- US Fish and Wildlife Service,
- Albemarle-Pamlico National Estuary Program (APNEP),
- NC Department of Transportation,
- NC Ecosystem Enhancement Program (NC EEP),
- NC Division of Coastal Management,
- NC Natural Heritage Program,
- Local Government Leagues/Councils,
- Academic groups from North Carolina Universities,
- Professional organizations representing a cross section of the regulated community, and
- Various Environmental and/or Non-Profit Organizations

The stakeholder process for the development and refinement of all four Core Elements will begin in early 2013. Considering the amount of work that has already been done, NC DWQ has the necessary experience to lay the groundwork for the WPP by beginning with the Monitoring and Assessment Core Element. The Monitoring and Assessment component of the WPP will be shared with the stakeholder group in 2013 and appropriate adjustments will be made based on the feedback. All portions of the WPP will be considered part of a living document that will be reviewed and revised when appropriate and/or necessary.

GOALS

NC DWQ's mission is to protect and enhance North Carolina's surface water and groundwater resources for the citizens of North Carolina and future generations through water quality monitoring programs, efficient permitting, responsible management, fair and effective enforcement and excellence in public service. Many other federal, state, and local governments have similar missions, and along with private companies, organizations, and citizens are working to protect the waters of the state while encouraging responsible development practices.

The goals of the WPP are to evaluate existing resources, identify needs of North Carolina's wetland program participants (public, private, groups and individuals), and determine the future direction for development of wetland programs in North Carolina.

The objectives and activities identified will assess the extent and quality of the state's wetlands, encourage and improve the amount and quality of wetland restoration and protection, and support planning and regulatory programs. Future collaboration among the wetland program participants will expand available resources and improve program efficiency. Improved integration between individual programs will provide more comprehensive water quality protection through monitoring and assessment, regulation, restoration and protection, acquisition, mapping, planning, and education/outreach.

CORE ELEMENT 1: MONITORING AND ASSESSMENT

BACKGROUND

The wetlands monitoring program in NC has primarily been supported by EPA Wetland Program Development Grants (WPDG) since 2004, when the wetland monitoring program first began. The grant-supported wetlands monitoring projects have allowed NC DWQ to address specific wetland issues related to monitoring and assessment as North Carolina's wetland programs have evolved over time; however they have not necessarily been part of an overarching monitoring and assessment strategy. Each grant had specific wetland monitoring goals identified, focusing on a particular wetland type or wetlands within a specific watershed. The wetlands monitoring work in NC has monitored over 10 wetland types and collected extensive data including GIS/land use analysis, rapid assessments, water quality, soils, hydrology, and biological surveys of vegetation, amphibians, and macroinvertebrates.

The work that has already been done through WPDGs includes conducting research, implementing rules and policies, developing regulatory tools, and performing training; thus, establishing a sturdy foundation for the continued development and growth of a strong, sustainable wetland monitoring and assessment program. A consistent scientific methodology for monitoring wetlands in the southeastern United States has already been established based on this work.

NC DWQ's wetland monitoring and assessment protocols and data have many uses throughout the state and will continue to be integrated into other state programs through various partnerships, collaborations and sharing of data. The Wetland and Stormwater Branch and the Aquifer Protection Section of NC DWQ utilize the wetland monitoring protocols and data to assist with permitting decisions and mitigation guidelines associated with wetland impacts due to 401 Water Quality Certification approvals, stormwater, dewatering, and mining operations. Wetlands monitoring data will be included in the state's Integrated Reports and NC DWQ will seek ways to use the data to help determine, assess, and improve impaired waters of the state. NC EEP utilized monitoring data from the Fishing Creek and Lockwoods Folly watersheds while developing these watershed plans. Future plan developments can utilize similar monitoring data from other watersheds. Collaborations have begun with APNEP to provide data from existing wetland sites and to increase the number of long term monitoring sites in the APNEP area. This collaboration will improve the ability of both organizations to accomplish their program goals. The wetland monitoring macroinvertebrate and amphibian data have been provided to the DWQ Environmental Sciences Section/Biological Assessment Unit and to the NC Museum of Natural Sciences Amphibian Collection, respectively. These data sets are increasing their respective databases and increasing the scientists' knowledge of species ranges and requirements. This improved data set will improve the ability to determine wetland and water quality assessments based on these biological indices. These integration activities will build program capacity and improve ability for regulatory decision making and long term planning efforts across NC water quality programs.

The initial WPDG (CD 97426001) began North Carolina's monitoring initiative by focusing on headwater wetlands as well as defining, establishing, and implementing supplemental Unique Wetland water quality classifications. NC DWQ also worked with the state's in lieu fee program, NC Ecosystem Enhancement Program (NC EEP) (CD 96422105), to monitor Basin Wetlands, Riverine Swamp Forests, and Bottland Hardwood Forests on a watershed basis. Several sites from each of these two projects are incorporated into a suite of sites that are being monitored on a long term basis.

Two additional grants dealing with isolated wetlands (CD 95415809 and a Regional Environmental and Assessment Program Grant) resulted in the mapping, determination of frequency and acreage, and determination of hydrologic connectivity of isolated wetlands. The biocriteria and pollution absorption capacity of isolated wetlands were also characterized.

NC DWQ is currently involved in several projects that are aiming to evaluate, guide, and improve the quality of wetland mitigation in the state. One study looked at the spatial relationship between aquatic resource impacts and compensatory mitigation in North Carolina (CD 95415709). NC DWQ Environmental Senior Specialists are also being contracted by the Environmental Law Institute (ELI) as part of the WPDG, North Carolina Wetland Mitigation Evaluation Pilot Survey. NC DWQ is also working to develop a Coefficient of Conservatism for

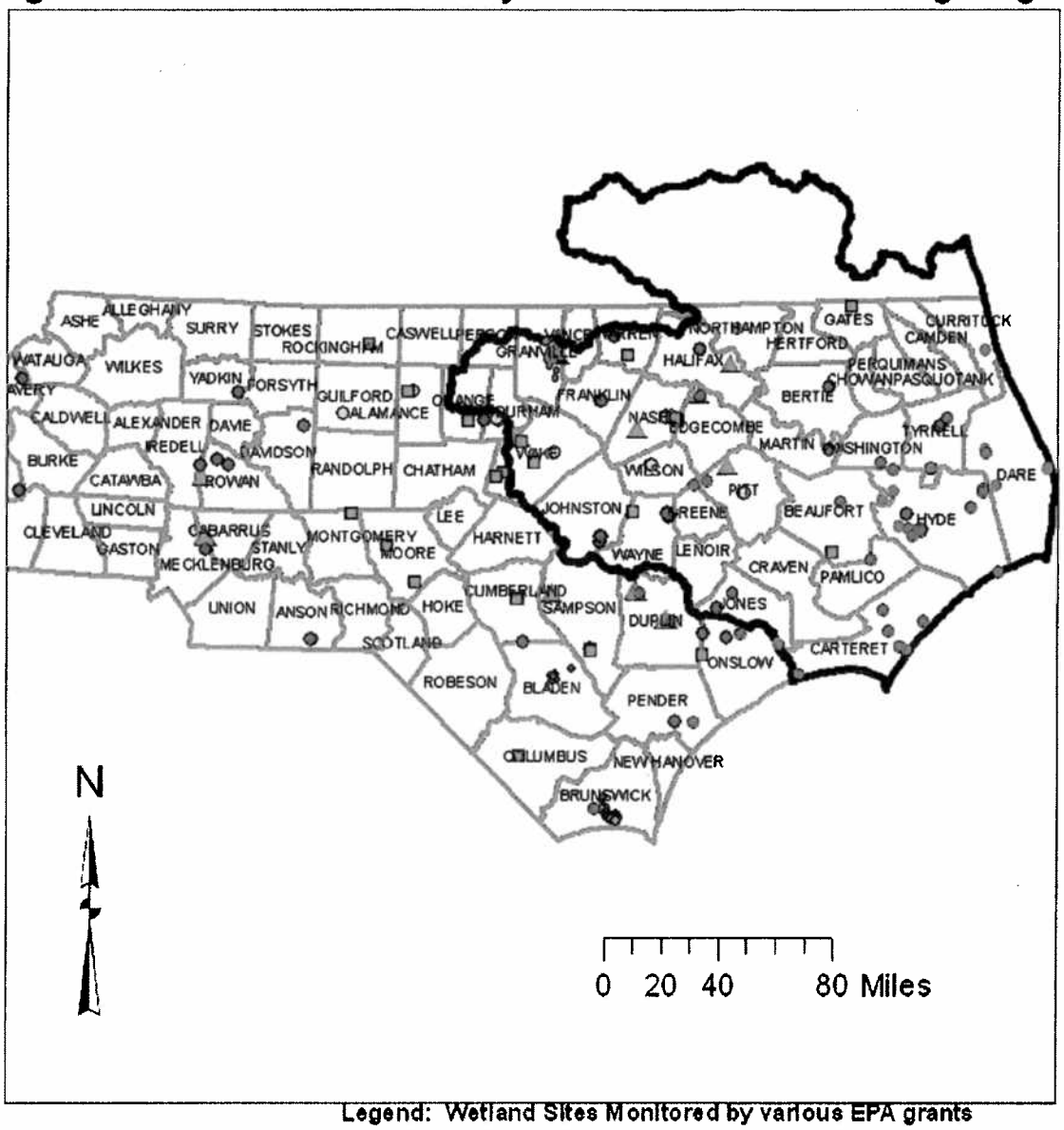
wetland plants utilizing a team of expert botanists from the Southeast (CD 95488411), and success criteria and restoration techniques are being evaluated in order to promote aquatic biota in NC mitigation wetlands (CD 00D01512).

North Carolina participated in the EPA's National Wetland Condition Assessment (NWCA) wetland survey in 2011 and is working collaboratively with South Carolina, Georgia, and Alabama on the Southeast Wetlands Monitoring Intensification grant (CD 95449910) in order to apply a regional emphasis to wetlands monitoring and draw conclusions about wetland condition on a regional level. Information gained from these collaborations will be shared amongst the EPA's Region 4 states through NC's instrumentation of the Southeast Wetlands Workgroup. Figure 1 shows the wetland sites that have been monitored as part of NC DWQ's Wetlands Monitoring Program's various wetland projects, as of December 2012.

NC DWQ is finalizing a Wetland Mitigation Guidance document (CD 95450010) and previously developed guidelines for stream and wetland restoration in response to violations of the Clean Water Act (CD 95415509). Training on this latter set of guidelines, as well as the North Carolina Wetland Assessment Method (NC WAM) (CD 95450109), which is a rapid wetland functional assessment tool, was provided to public employees throughout the state.

In the past few years, the NC wetlands monitoring program has begun to have an influence on multiple state regulatory programs. For example, the methodology for monitoring wetlands has been used in the 401 Water Quality Certification process where monitoring the impact to the affected wetland was needed on a long term basis. The Aquifer Protection regulatory program has also used the wetland monitoring methodology to develop monitoring requirements for wetlands adjacent to large wastewater land application systems. The need of other regulatory programs to have accurate wetland monitoring and assessment data available for regulatory decision making underscores the fact that a comprehensive wetlands monitoring and assessment strategy needs to be finalized, publicized, and utilized in order to help everyone better understand and protect the wetlands of North Carolina.

Figure 1: Wetlands Monitored by the NC Wetland Monitoring Program



Legend: Wetland Sites Monitored by various EPA grants

- brunswick_hydro_IW
- bladen_hydro_IW
- NWCA_BaseSites_Sampled-2011
- NWCA_OversampleSites_Surveyed2011
- Site_Locations_HeadwaterWetlands_Grant1
- New Headwater_Boundary
- Eli_Mitigation_Sites_AApoints_8-31-12
- GranvilleBoundryPoly
- Intensification_Grant_SWMG_JG

THE PLAN

The implementation plan for the wetlands monitoring and assessment program in NC will improve the integration of wetlands monitoring into other existing NC monitoring programs (i.e. Ambient Monitoring Program for streams, lakes, and rivers and the Biological Assessment Program) and the resultant 303(d) and 305(b) Integrated Report. Integration of the various aquatic monitoring programs entails building partnerships to share data and experience that will further common goals such as restoring and protecting wetlands and improving stream conditions in order to improve the overall water quality of the state. NC DWQ hopes to utilize the data to further support the regulatory programs (i.e. 401 Water Quality Certification, Isolated Wetlands, Stormwater, NPDES, Non-discharge Wastewater, etc.) and for future projects like determining success criteria for wetland mitigation projects and developing monitoring protocols for wetlands adjacent to mining operations or wastewater disposal facilities.

OBJECTIVES

OBJECTIVE 1: Refine and publish the NC DWQ wetland monitoring and assessment strategy, keeping it consistent with *Elements of a State Water Monitoring and Assessment Program for Wetlands* (EPA, 2003 & 2006).

Elements of a State Water Monitoring and Assessment Program for Wetlands (EPA, 2003 & 2006) specifies that States should implement a wetland component into their overall surface water monitoring strategy by 2014. Refinement of NC DWQ's draft wetland monitoring and assessment strategy will provide a comprehensive strategy that will build upon the foundation that has been developed over the last decade through the various EPA Wetland Program Development Grant projects. NC DWQ's draft wetland monitoring and assessment strategy already identifies objectives of the monitoring and assessment program, types of monitoring, site selection processes, field methodology, and core indicators of wetland function and condition. It also identifies other programs that can use the monitoring and assessment data and how these programs can use the collected data to support their programs and to assist with basinwide planning. Along with the specifications already laid out in NC DWQ's draft monitoring and assessment strategy document, the following activities are proposed as part of the WPP over the next five years:

<u>ACTION 1</u>: Define Wetland Monitoring Objectives and Strategies

Program Capacity Development: An increase in public input and awareness concerning the state's wetland monitoring initiatives will improve public support and participation. Establishing overarching and focused baseline data will provide scientific support for future policy decisions.

ACTIVITIES:

a) Establish a stakeholder group to provide input into the Monitoring and Assessment strategy and determine shared activities and goals [2013]

b) Finalize and publish North Carolina's Wetland Monitoring and Assessment Strategy [2013]

c) Use the developed monitoring protocols to assess technology and development issues that arise

Short Term [2013-2014]

i. Obtain baseline data for wetlands that may be impacted by hydraulic fracturing for shale gas extraction

ii. Assess the effects of mine dewatering/groundwater lowering and the impacts of associated discharges into wetlands

Long Term [2015-2017]

iii. Monitor and assess the impacts to wetlands by other various technology or development issues that arise (e.g. offshore drilling, coastal road and bridge construction, etc.)

ACTION 2: Develop and refine the monitoring design

Program Capacity Development: Obtaining additional professional input and publication of stardardized wetland monitoring protocols will provide a consistent data format that will allow for the compilation of wetland data into a primary dataset. This dataset can then be analyzed by multiple groups, agencies, etc. for various purposes.

ACTIVITIES:

a) Formalize wetlands monitoring methods into statewide guidance (utilize stakeholder group) [2013-2014]

b) Continue to use a consistent scientific methodology for monitoring wetlands, incorporating NWCA methods

Short Term [2013-2014]

i. Publicize the current wetland monitoring methodology being utilized by NC DWQ's wetland monitoring program on the NC DWQ website

Long Term [2013-2017]

ii. As necessary, update the wetland methodology and publicize any necessary changes

iii. Utilize the current wetland monitoring methodology on current and future monitoring projects

ACTION 3: Identify additional core indicators to represent wetland condition or a suite of functions

Program Capacity Development: Continued work on improving assessment methods is important in obtaining the most reliable data. Validation of these methods and training users on the methodology will ensure the reliability of the methods and the data obtained.

ACTIVITIES:

a) Development of Rapid Assessment Methods

Short Term

i. Provide training on NC Wetland Assessment Method (NC WAM) [2013]

ii. Validation of NC WAM in conjunction with other monitoring projects

- Validate NC WAM for Headwater Wetlands [2013]
- Validate NC WAM for Basin Wetlands [2013]
- Validate NC WAM for Riverine Swamp Forests and Bottomland Hardwood Forests [2014]

iii. Complete development of NC Stream Assessment Method (NC SAM) [2013]

iv. Provide training for NC SAM [2013-2014]

v. Validate NC SAM level 2 forms with level 3 field data[2013-2014]

Long Term

vi. Continue validating NC WAM on other wetland types as projects and sufficient data warrant [2015-2017]

vii. Continue validating NC SAM based on geographic location and stream size [2015-2017]

OBJECTIVE 2: Implement a sustainable wetlands monitoring program consistent with the wetlands monitoring and assessment strategy and effectively communicate monitoring activities and results with interested stakeholders.

NC DWQ is already implementing several projects as part of the monitoring and assessment program. Quality Assurance Project Plans (QAPPs) have been developed for all projects that are actively collecting data and will be developed for all proposed projects as well. Evaluation of collected data and dissemination of results will allow for detection of changes over time and ultimately lead to better wetland management decisions. The biannual state CWA 303(d)/305(b) Integrated Water Quality Report will be a major vehicle for dissemination of wetland condition, monitoring activities and results.

ACTION 1: Ensure the scientific validity of monitoring and laboratory activities

Program Capacity Development: Assessment of current monitoring techniques and development of new, appropriate techniques will provide the most accurate, up to date information on the condition of the waters of the state.

ACTIVITIES:

a) Develop QAPPs for all appropriate projects [all years]

b) Develop and validate assessment tools to assist with the monitoring of wetland sites and wetland mitigation sites

Short Term [2013-2014]

i. Evaluate existing tools and provide needs assessment and validation plan (dependent on staff and resources)

ii. Develop and validate Coefficient of Conservatism

Long Term [2015-2017]

iii. Develop assessment tools based on the needs assessment and validation plan

ACTION 2: Monitor Wetland Resources as specified in NC DWQ's monitoring and assessment strategy

Program Capacity Development: Following a monitoring schedule and establishing and maintaining statewide and regional wetland monitoring networks will provide project focus and trackability, and improve data consistency.

ACTIVITIES:

a) Establish a monitoring schedule for the types of wetland monitoring [2013]

i. Ambient Monitoring Data (rotating basin approach)

ii. Basinwide/watershed data (need based, targeted monitoring)

iii. Random Monitoring data (~2 year intensive sampling)

iv. NWCA Survey Schedule

b) Establish the list of sites for North Carolina's Wetland Monitoring Reference Network [2013]

c) Provide leadership for the establishment of a regional wetland monitoring network in the Southeast

Short Term [2013-2014]

i. Determine the participants and level of responsibility to the group

ii. Establish the guidelines for locations and types of wetlands to be monitored

iii. Establish protocols for monitoring and data management

Long Term [2015-2017]

iv. Determine the sites to be monitored as part of the Southeast Regional Wetland Monitoring Reference Network

v. Coordinate data collection and reporting

d) Assist the EPA with the development of a national wetland reference network [yearly]

e) Collect wetland monitoring data based on the established schedule [yearly]

ACTION 3: Establish Reference Condition

Program Capacity Development: Defining wetland reference conditions will provide realistic, attainable guidelines for wetland preservation, enhancement and restoration.

ACTIVITIES:

a) Utilize data from North Carolina, the Southeast region, and NWCA monitoring reference networks to define reference condition [2013-2015]
b) Utilize collected wetland data to develop typical profiles for North Carolina wetland types and establish reference wetland parameters [2013-2015]
c) Develop metrics, based on the monitoring data, that can be utilized to support regulatory programs (e.g. IBI's) [2013-2015]

ACTION 4: Track monitoring data in an Electronic Monitoring Data Management System

Program Capacity Development: The establishment and maintenance of one primary, publicly accessible, electronic wetland monitoring database will improve the consistency and accessibility of the wetland data and improve an agency's ability to access and analyze that data. These improvements should improve public awareness, interest, and involvement in the protection and enhancement of the waters of the state.

ACTIVITIES:

a) Evaluate, determine, and develop a means of sharing wetland monitoring data electronically [2013-2015]
b) Begin population of the wetland monitoring electronic data set, and evaluate for any necessary changes [2015-2017]
c) Report on wetland monitoring activities and results in the State's Integrated Water Quality report [2014 and 2016]
d) Continue to identify sites that can be repeatedly sampled as part of the State, Regional, and National monitoring networks [yearly]

ACTION 5: Analyze monitoring data to evaluate wetlands extent and condition/function or to inform decision-making

Program Capacity Development: Data analysis to establish baseline conditions will be followed by subsequent analyses in order to show trends in wetland condition. These analyses and trend determinations can be used to help determine the condition of the waters of the state and be incorporated into DWQ and Integrated Water Quality Reports.

ACTIVITIES:

a) Draft an initial reporting format for showing baseline wetland condition and showing trends in wetland ambient conditions [2013-2014]
b) Use the various types of monitoring data (ambient, basinwide, random, and NWCA) and the data from the monitoring networks to establish baseline wetland conditions [2014]

c) Use the various types of monitoring data (ambient, basinwide, random, and NWCA) and the data from the monitoring networks to show trends in the ambient conditions of wetlands [2014 forward]
d) Track the quantity and quality of wetlands statewide (based on monitoring data) and assign wetlands to a categorical scale such as "good", "fair", or "poor" to indicate their condition [2014 and 2016]
e) Identify changes in wetlands in order to establish a relationship between changing wetland condition and stream condition (e.g. due to human impact, climate change, etc.) [2014 forward]
f) Document the condition of wetlands that have been restored [2015 forward]
g) Report wetland impacts and compensatory mitigation as part of the quarterly reports for NC Division of Water Quality's strategic plan [yearly]
h) Report biannually in the state 303(d)/305(b) Integrated Water Quality Report [yearly]

OBJECTIVE 3: Incorporate wetlands monitoring data into Agency planning, actions, procedures and regulatory programs.

Integration of the wetlands monitoring program with existing monitoring initiatives and other regulatory programs will strengthen partnerships in order to share data and experience that will further common goals such as restoring and protecting wetlands and improving stream condition. Implementation of an effective and consistent wetlands monitoring program and working with other regulatory and resource agencies will result in better management decisions, overall improvements in water quality and reduced impairments.

ACTION 1: Incorporation of monitoring and assessment data into other programs and planning units

Program Capacity Development: The incorporation of the wealth of wetland monitoring data into the functions and documentation of other state programs will greatly improve the protection and enhancement of wetlands and additional waters of the state.

ACTIVITIES:

a) Integrate wetland monitoring into other existing North Carolina monitoring programs

Short Term

i. Initiate discussions with other North Carolina monitoring programs (e.g. Ambient Monitoring Program for streams, lakes, and rivers; Biological Assessment Program, Albemarle-Pamlico National Estuary Program (APNEP), etc.) [2013]
ii. Begin integrating wetlands monitoring data into other monitoring program reports (303(d)/305(b) Integrated Report, APNEP, etc.)[2014]

Long Term [2015-2017]

iii. Continue reporting wetlands monitoring data in monitoring program reports (303(d)/305(b) Integrated Report)

iv. Formally integrate wetlands monitoring data into other long term agency plans (106 workplan and NC DWQ Surface Water Monitoring Strategy)
v. Add additional APNEP sites to the state's wetland monitoring reference network

b) Incorporation of wetland monitoring and assessment data into Basinwide Plans and TMDL development

Short Term [2013-2014]

i. Collaborate with NC DWQ Planning Section to evaluate opportunities for incorporation of wetland monitoring and assessment data into Basinwide Plans and TMDL development

Long Term [2015-2017]

ii. Integrate wetland protection and restoration into Basinwide Plans and TMDL development

ACTION 2: Evaluate the environmental consequences of an action or group of actions; modify programs as needed based on monitoring and assessment data

Program Capacity Development: Improvement on the collection and storage of the scientific wetland data will aid in the assessessment, understanding, and improvement of statewide guidance documents, policies, and regulations.

ACTIVITIES:

a) Report to the EPA through grant reports (CD 95488411) on the permitted impacts and required compensatory mitigation prior to and following various 401 programmatic changes [2014-2015]
b) Use the monitoring protocols and data to support regulatory programs (e.g. 401 Water Quality Certifications, Isolated Wetlands, Stormwater, NPDES, Non-discharge Wastewater, etc.) [yearly]

ACTION 3: Improve the site-specific management of wetland resources

Program Capacity Development: The monitoring data will assist in improving the guidelines, guidance documents, and assessment of wetland enhancement and restoration projects.

ACTIVITIES:

a) Use the monitoring data to establish guidelines for wetland mitigation project success [2015 forward]
b) Utilize the monitoring data to document the condition of restored wetlands and the resulting improvements to water quality and/or impaired streams [2015-2017]

ACTION 4: Develop geographically-defined wetland protection, restoration, and management plans

Program Capacity Development: Improve the state's water quality by improving the location and success of mitigation projects through advancements in assessment tools, focused mitigation projects in areas with impaired waters, and improved mapping tools.

ACTIVITIES:

a) Guide stream and wetland mitigation planning with the particular goal of improving impaired streams (can identify wetland restoration sites that can improve water quality) [2015-2017]
b) Evaluate tools to monitor and assess the success of stream and wetland mitigation sites (e.g. mitigation project construction protocols, Coefficient of Conservatism scores, IBI's, wetland profiles of biological communities, rapid assessments, etc.) [2014-2017]
c) Develop mapping tools to help prioritize monitoring and management areas [2014-2017]

OBJECTIVE 4: Identify sustainable financing for long term wetlands monitoring activities.

To date, wetlands monitoring in NC has been accomplished primarily through competitive EPA WPDGs. To effectively report on wetland condition and improve water quality, we cannot continue to rely solely on the funding sources of the past. Obtaining stable and renewable funding sources is critical to ensure that the wetlands monitoring groundwork developed over the past decade can be sustained for full integration into state and federal water quality programs.

ACTION 1: Investigate alternative funding sources for NC's wetland monitoring program

Program Capacity Development: All facets of the state's wetland monitoring program will be enhanced by securing long term and/or recurring funding sources.

ACTIVITIES:

a) Work with wetlands program plan stakeholder group to determine funding opportunities [2013-2014]
b) Evaluate opportunities for obtaining federal 106 funding to support wetland monitoring staff positions and activities [present-2014]
c) Research methods utilized in other states to fund wetland monitoring activities and evaluate applicability in NC [2014-2015]
d) Investigate feasibility of developing and/or revising fee based programs to fund wetlands monitoring initiatives [2015-2016]
e) Continue to request state appropriated funding to support wetland monitoring staff positions and activities [yearly]

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Appendix A

Summary of Activities by Year

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Year 1 [2013]:

1:1a. Establish a stakeholder group to provide input into the Monitoring and Assessment strategy and determine shared activities and goals

1:1b. Finalize and publish North Carolina's Wetland Monitoring and Assessment Strategy

1:3a.i. Provide training on NC Wetland Assessment Method (NC WAM)

1:3a.ii. Validation of NC WAM in conjunction with other monitoring projects

- Validate NC WAM for Headwater Wetlands
- Validate NC WAM for Basin Wetlands

1:3.a.iii.Complete development of NC Stream Assessment Method (NC SAM)

2:2a. Establish a monitoring schedule for the types of wetland monitoring

i. Ambient Monitoring Data (rotating basin approach)

ii. Basinwide/watershed data (need based, targeted monitoring)

iii. Random Monitoring data (~2 year intensive sampling)

iv. NWCA Survey Schedule (5 year schedule dependent on EPA)

2:2b. Establish the list of sites for North Carolina's Wetland Monitoring Reference Network

3:1a.i. Initiate discussions with other North Carolina monitoring programs (e.g. Ambient Monitoring Program for streams, lakes, and rivers; Biological Assessment Program, Albemarle-Pamlico National Estuary Program (APNEP), etc.)

Year 1-2 [2013-2014]:

1:1c.i. Obtain baseline data for wetlands that will be impacted by hydraulic fracturing for shale gas extraction

1:1c.ii. Assess the effects of mine dewatering/groundwater lowering and the impacts of associated discharges into wetlands

1:2.a. Formalize wetlands monitoring methods into statewide guidance (utilize stakeholder group)

1:2b.i. Publicize the current wetland monitoring methodology being utilized by NC DWQ's wetland monitoring program on the NC DWQ website

1:3a.ii. Validation of NC WAM in conjunction with other monitoring projects

- Validate NC WAM for Riverine Swamp Forests and Bottomland Hardwood Forests

1:3a.iv.Provide training for NC SAM

1:3a.v. Validate NC SAM level 2 forms with level 3 field data

2:1b.i. Evaluate existing tools and provide needs assessment and validation plan (dependent on staff and resources)

2:1b.ii. Develop and validate Coefficient of Conservatism

2:2c Provide leadership for the establishment of a regional wetland monitoring network in the Southeast

i. Determine the participants and level of responsibility to the group

ii. Establish the guidelines for locations and types of wetlands to be monitored

iii. Establish protocols for monitoring and data management

2:3a. Utilize data from North Carolina, the Southeast region, and NWCA monitoring reference networks to define reference condition [2013-2015]

2:3b Utilize collected wetland data to develop typical profiles for North Carolina wetland types and establish reference wetland parameters [2013-2015]

2:3c. Develop metrics, based on the monitoring data, that can be utilized to support regulatory programs (e.g. IBI's) [2013-2015]

2:4a. Evaluate, determine, and develop a means of sharing wetland monitoring data electronically [2013-2015]

2:5a Draft an initial reporting format for showing baseline wetland condition and showing trends in wetland ambient conditions

2:5b. Use the various types of monitoring data (ambient, basinwide, random, and NWCA) and the data from the monitoring networks to establish baseline wetland conditions [2014]

2:5c. Use the various types of monitoring data (ambient, basinwide, random, and NWCA) and the data from the monitoring networks to show trends in the ambient conditions of wetlands [2014 forward]

2:5e. Identify changes in wetlands in order to establish a relationship between changing wetland condition and stream condition (e.g. due to human impact, climate change, etc.) [2014 forward]

3:1a.ii. Begin integrating wetlands monitoring data into other monitoring program reports (303(d)/305(b) Integrated Report, APNEP, etc.)[2014]

3:1b.i. Collaborate with NC DWQ Planning Section to evaluate opportunities for incorporation of wetland monitoring and assessment data into Basinwide Plans and TMDL development

4:1a. Work with wetlands program plan stakeholder group to determine funding opportunities

4:1b. Evaluate opportunities for obtaining federal 106 funding to support wetland monitoring staff positions and activities

Year 3-5 [2015-2017]:

1:1c.iii. Monitor and assess the impacts to wetlands by other various technology or development issues that arise (e.g. offshore drilling, coastal road and bridge construction, etc.)

1:2b.ii. As necessary, update the wetland methodology and publicize any necessary changes

1:2b.iii. Utilize the current wetland monitoring methodology on current and future monitoring projects

1:3a.vi. Continue validating NC WAM on other wetland types as projects and sufficient data warrant

1:3a.vii.Continue validating NC SAM based on geographic location and stream size

2:1b.iii. Develop assessment tools based on the needs assessment and validation plan

2:2c Provide leadership for the establishment of a regional wetland monitoring network in the Southeast

iv. Determine the sites to be monitored as part of the Southeast Regional Wetland Monitoring Reference Network

v. Coordinate data collection and reporting

2:4b. Begin population of the wetland monitoring electronic data set, and evaluate for any necessary changes

2:4c. Report on wetland monitoring activities and results in the State's Integrated Water Quality report [2014 and 2016]

2:5d. Track the quantity and quality of wetlands statewide (based on monitoring data) and assign wetlands to a categorical scale such as "good", "fair", or "poor" to indicate their condition [2014 and 2016]

2:5f. Document the condition of wetlands that have been restored [2015 forward]

3:1a.iii. Continue reporting wetlands monitoring data in monitoring program reports (303(d)/305(b) Integrated Report)

3:1a.iv. Formally integrate wetlands monitoring data into other long term agency plans (106 workplan and NC DWQ Surface Water Monitoring Strategy)

3:1a.v. Add additional APNEP sites to the state's wetland monitoring reference network

3:1b.ii. Integrate wetland protection and restoration into Basinwide Plans and TMDL development

3:2a. Report to the EPA through grant reports (CD 95488411) on the permitted impacts and required compensatory mitigation prior to and following various 401 programmatic changes [2014-2015]

3:3a. Use the monitoring data to establish guidelines for wetland mitigation project success [2015 forward]

3:3b. Utilize the monitoring data to document the condition of restored wetlands and the resulting improvements to water quality and/or impaired streams

3:4a. Guide stream and wetland mitigation planning with the particular goal of improving impaired streams (can identify wetland restoration sites that can improve water quality)

3:4b. Evaluate tools to monitor and assess the success of stream and wetland mitigation sites (e.g. mitigation project construction protocols, Coefficient of Conservatism scores, IBI's, wetland profiles of biological communities, rapid assessments, etc.) [2014-2017]

3:4c Develop mapping tools to help prioritize monitoring and management areas [2014-2017]

4:1c. Research methods utilized in other states to fund wetland monitoring activities and evaluate applicability in NC [2014-2015]

4:1d. Investigate feasibility of developing and/or revising fee based programs to fund wetlands monitoring initiatives [2015-2016]

Yearly:

2:2d. Assist the EPA with the development of a national wetland reference network

2:2e. Collect wetland monitoring data based on the established schedule

2:4d. Continue to identify sites that can be repeatedly sampled as part of the State, Regional, and National monitoring networks

2:5g. Report wetland impacts and compensatory mitigation as part of the quarterly reports for NC Division of Water Quality's strategic plan

2:5h. Report biannually in the state 303(d)/305(b) Integrated Water Quality Report

3:2b. Use the monitoring protocols and data to support regulatory programs (e.g. 401 Water Quality Certifications, Isolated Wetlands, Stormwater, NPDES, Non-discharge Wastewater, etc.)

4:1e. Continue to request state appropriated funding to support wetland monitoring staff positions and activities