PUBLIC COMMENTS

The Division accepted public comments from December 4, 2012 through February 4, 2013. Comments were submitted by the following individuals and organizations:

Individuals:

1. 19 postcards
2. Tim Spruill, Hydrologist, USGS-Retired

Organizations:

1. Albemarle-Pamlico National Estuary Partnership
2. Cardno ENTRIX
3. Catawba Riverkeeper
4. City of Charlotte
5. City of Salisbury
6. Division of Marine Fisheries
7. Division of Soil and Water Conservation
8. Mecklenburg County
9. Neuse River Compliance Association
10. North Carolina American Water Works Association – Water Environment Association
11. North Carolina Farm Bureau Federation, Inc.
12. North Carolina League of Municipalities
13. North Carolina Water Quality Association
14. UNC Wilmington Center for Marine Sciences (2)
15. Waterkeepers Alliance/Waterkeepers Carolina

Dear Ms. Reid,

I understand the NC Environmental Management Commission (EMC) is developing a plan to control nutrient pollution in lakes, streams and estuaries. I am sending this postcard to request the EMC to create rules that greatly limit discharges of nutrients – especially nitrogen and phosphorus - in all NC waters. I take this position because of the biological decline of the Rocky River in Chatham County that has been caused in large part by excessive discharges of phosphorus and nitrogen from chicken processing plants. **As such, I strongly urge the EMC and the NC Division of Water Quality to do all it can to curb such discharges in the Rocky River and in all NC waters.**

Thank you for your consideration

Ms Reid, this is such an important issue. I hope that you can help.
Sincerely,
Clarke Atkeson
Jane Lewis Scales Distinguished Professor, NCSU College of Veterinary Medicine

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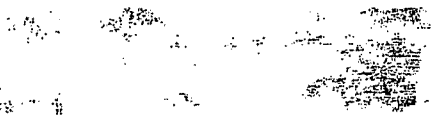

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Stacey Curtis
97 Woods Mill Bend Dr.
Siler City NC 27344

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DOUGLAS PIERSON
RESIDENT, CHATHAM COUNTY

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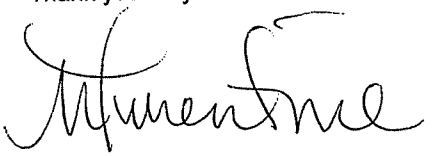

2012

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Martha H. Frost

16 December 2012

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Diana Hales
Chatham County

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Gloria Norwood

12-13-12

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Ted Shear
928 Ravenwood Dr
Raleigh

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Kathleen Sage

From: Tim Spruill [tbspru@gmail.com]
Sent: Friday, January 18, 2013 11:31 AM
To: Reid, Dianne
Cc: Wakild, Chuck; Brower, Connie; Crowell, Bill; Carpenter, Dean; erinr@ptrf.org; Larry Baldwin; smith@mspraleigh.com; joann_burkholder@ncsu.edu; Mike Piehler; hpaerl@email.unc.edu; Carlton Hershner
Subject:The North Carolina Nutrient Planning Process---Reasons to adopt Numeric Nutrient Standards

Hello Dianne,

I am submitting the following material to be considered as part of DWQ's efforts to establish standards for nutrients. This is an opportunity for the State of North Carolina to finally adopt reasonable and effective standards which protect its waters from biological overproduction due to excessive nutrient runoff. My overall suggestion for DWQ is to include a serious discussion of establishment of numeric chemical nutrient standards along with the response variable standards, such as chlorophyll a, in the planning process. Without chemical numeric standards for both phosphorus and nitrogen, effective prevention of over-fertilization of streams, lakes, reservoirs, and estuaries is very difficult and, ultimately, costly to the State and its numerous stakeholders.

Specific suggestions and recommendation are given below. If you should have any questions or need further information, please don't hesitate to call (919 518-5489) or email me (tbspru@gmailcom). I would be glad to provide any literature citations for material referred to here or to present information that needs further explanation. Thanks very much for the opportunity to attend the public meeting in Raleigh on December 4th last year and to offer input to North Carolina's nutrient planning process.

Sincerely,

Tim Spruill, Hydrologist, USGS-Retired
3818 Chestnut Ridge Church Road
Efland, NC 27243

Considerations, rationale and recommendations to include in the nutrient standards planning process

Background

The Clean Water Act (1972) was passed with the intention of making the waters of the United States fishable, swimmable, and drinkable by 1983 and that no discharges to waters of the United States occurred by 1985. This was to be done primarily through control of point source discharges through the NPDES Program. Water quality standards were to be established to trigger a management response to waters of the United States that did not meet their designated uses-when established standards were

exceeded, such waters were to be put on the 303d list and a TMDL (total maximum daily load) program established to remediate the particular stream until the standard was achieved. However, eventually it became obvious that reducing point sources alone were not going to attain use standards, particularly since non-point sources account for 50% or more of nutrient pollution in streams nationwide. By 1987, the Clean Water Act Amendments were passed and included section 319 which is focused on helping states control pollution from non-point sources.

A TMDL is eventually initiated when a stream is identified as not meeting the intended uses of the stream. It is identified primarily through water quality standards-when standards are not met, it is included in the 303d list submitted every 2 years to EPA for consideration for establishing a TMDL. Environmental variables, such as nitrogen or phosphorus, that can cause a problematic biological, physical, or chemical responses, and/or response variables, such as dissolved oxygen (the chemical response) or chlorophyll a (the biological response)) can, when assigned numeric limits, be used as standards to indicate when water quality is impaired or will become impaired for its intended uses. North Carolina only monitors response variables to over-fertilization with nutrients, chlorophyll a and dissolved oxygen. Use of response variables for protecting water quality is problematic since by the time algal blooms are occurring, creating high chlorophyll a concentrations (by the North Carolina definition, 40 µg/L or greater indicates impairment), only remedial action is possible. Unfortunately, once the disposal (discharge) and land use practices that caused the problem are in place, it is a difficult, time consuming, and expensive problem to remediate. Therefore, it is important to establish standards that are protective of water quality before a water body reaches impaired status. Currently, the chlorophyll a standard indicates when a stream, lake or reservoir does not meet its intended uses, so that, by definition, it is not protective. More importantly, without numeric chemical nutrient standards in place, streams and water bodies that do not exhibit a eutrophication response (see point 2 below) can transport large quantities of nutrients which fuel excessive algal growths in the summer and early fall months to downstream lakes, reservoirs, and estuaries.

Reasons why North Carolina (as well as other states) should establish numeric standards, along with suggestions for inclusion in the planning process, are presented below:

1. For North Carolina to make progress in protecting water quality from over-fertilization and resulting eutrophication, the State should seriously seek and consider new opinions, both inside and outside the state, from a variety of individuals and academic institutions who possess knowledge on establishment of water quality standards and criteria.

2. Not all streams and reservoirs respond biologically to over-fertilization with nutrients. Consequently, streams that are not detected using biological monitoring techniques (i.e., response variables such as chlorophyll a) can transport excessive amounts of nitrogen and phosphorus to downstream bodies of water, including estuaries and sounds, the ultimate receivers of all pollution in the basin draining to the ocean from each river basin. Uniform numeric chemical nutrient standards should be established to prevent this situation from occurring. Reasons why such streams and other water bodies do not respond biologically are due primarily to two features of some streams: a. flow may be too rapid and the

water has short residence times and/or it is too deep so that water column algal blooms are not likely or b. water is too sediment-laden and turbid which restricts light penetration and therefore limits phytoplankton or periphyton growth. In either case, with no overt biological indication of a problem, the result is excessive nutrient transport to downstream water bodies and, ultimately, estuaries, where water quality becomes degraded, particularly during summer to early fall. Over fertilization of quiescent water bodies can result in extreme algal growths and die-back, which then causes oxygen depletion (hypoxia) and fish kills, as well as the occurrence of harmful algae, protozoans, and bacteria. No remedial or preventative actions are implemented to control locally high loading in streams that do not exhibit biological effects because they are not easily detectable by visual methods. In addition, streams that do not locally exhibit eutrophication effects and are not identified as impaired, allow excessive discharges without a cost to the discharger(s), which is unfair to other dischargers who are in compliance and have expended time, effort, and funds to meet their responsibility.

Recommendation-Numeric chemical standards should be established for all streams to protect the ultimate receiver of all nutrient loading, the estuary:

1. to prevent catchments which do not locally exhibit effects of eutrophication from contributing excessive quantities of nutrients to the receiving estuary through uncontrolled point and nonpoint source discharges to the State's waters.

2. to prevent unfair (to those watersheds and stakeholders who are not discharging excessive amounts—i.e. the mass/unit area that is proportional to the relative amount from upstream areas of the watershed delivered to the receiving estuary) portion of the cost of preventing eutrophication to the State's waters.

3. The scientific basis for establishing reasonable, broadly applicable, numeric standards based on either loading rates (or yields) or on concentration of total nitrogen and total phosphorus to prevent or minimize eutrophication effects are and have been available for at least 30 years. Relationships between chlorophyll a concentrations and concentrations of dissolved phosphorus and nitrogen, while not precise, are positively correlated at lakes, estuaries and reservoirs worldwide where light is not a limiting factor this has been corroborated by many researchers since the 1970s. Based on a least squares regression derived from a collection of more than 200 lakes and quiescent bodies of water in Canada, the United States, and Europe (see Rast, Jones, and Lee, 1983, Jour. Water Poll. Control Admin., 55 (7), p. 992, fig. 1) a total P concentration of about 0.05 mg/L (or annual areal loading rate of 0.05 mg/m3) resulted in the occurrence of chlorophyll a concentrations ranging between about 2.5 to 40 µg/L (the 95%confidence interval (CI)) (North Carolina standard). The upper part of this 95% CI is 40 µg/L, meaning that there is a 5% or less chance that at the lake concentration of 0.05 µg/L of total P, chlorophyll a concentrations would exceed 40 µg/L. Based on this and several previous estimates of total P and N concentrations that are associated with eutrophication, a total P exceeding approximately 0.05-0.1 mg/L and total N exceeding approximately 0.35-1 mg/L can produce algal blooms and associated chlorophyll a values of greater than 40 µg/L under late summer conditions. Because P can be

abundant in estuarine systems, nitrogen can more often be the limiting factor for nuisance algal growths in marine environments. Therefore, environmental release of both nutrients should be controlled.

Recommendation: NCDENR DWQ should seriously consider information supportive of numeric nutrient standards and include opinions, evidence from published papers, and arguments by scientists supportive of this view in any discussions. As has been recommended in many studies on estuarine over-fertilization conducted in North Carolina and other areas of the U.S., reduction of both nitrogen and phosphorus are necessary to prevent eutrophication incidents in freshwater and estuaries. The most commonly reported critical concentrations, above which concentrations are associated with summertime algal blooms approximate between 0.05 and 0.1mg/L as an upper limit for total phosphorus and approximately 7- 10 times those concentrations (0.35-1 mg/L) for total nitrogen. These concentrations should be considered as part of the discussions for establishment of chemical nutrient standards in all lakes, reservoirs, estuaries and streams, at least in the Piedmont and Coastal Plain regions, with more restrictive standards for the Blue Ridge. The upper part of these ranges might be most appropriate for stream standards, with the lower part more suitable for quiescent water bodies.

4. If the nutrient or chlorophyll a standards are set to indicate degraded water quality, then unfortunately, the damage is already done by the time violations are detected, requiring expensive and time-consuming remediation procedures, including modeling and estimation of load contributions from all sources. All excessive nutrient discharges, land-use practices, and poor environmental practices that are responsible for the degraded water quality also will have become firmly established and will likely be politically difficult, expensive, and time consuming to change.

Recommendation- Enforceable nutrient and chlorophyll a standards should be set to levels that prevent degraded water quality and to implement preventative procedures and land-use practices before reaching degraded status. Unless a standard is enforceable by the State, there is little incentive from stakeholders to enact remedial procedures until the standard is reached, at which time it is too late for cost-effective remediation. At the very least, discussions should include viable ways that protective standards might be effectively implemented that could use techniques other than legal enforcement options.

5. While models may be appropriate for remediation at selected sites which have established TMDLs, numeric chemical standards based on available scientific knowledge provide general safeguards which help prevent water bodies from becoming impaired due to eutrophication. However waiting until more expensive techniques are necessary to remediate conditions (which may not always be economically possible) should be avoided. Waiting until water bodies need remediation is a poor way to manage in that it allows the resource to be damaged (impaired for its uses) and it requires large expenditures for cleanup.

Recommendation-By establishing and adopting numeric chemical standards that are preventative and broadly applied (broadly across regions such as the Inner and Outer Coastal Plain, Piedmont, and Blue Ridge) water quality can be protected against future increases in nutrient concentrations and loads by

collecting relatively straightforward monitoring data with existing monitoring programs in place. These preventative standards should be the critical “warning” link to initiating nutrient control practices in such watersheds before reaching concentration or load standards that indicate loss of use. Use of response variables alone, such as chlorophyll a, does not ensure that excessive loading and/or concentrations will be detected in all streams and water bodies because deficiencies indicated under point 2 above.

6. Although standards are often thought of in terms of concentration, it may be reasonable and effective, as well as consistent within the context of the TMDL program, to consider nutrient controls in terms of watershed loading by using annual yields (tons per square mile per year). Based on runoff coefficients for selected land uses estimated by previous researchers, 1 tpsm of total nitrogen and 0.1 tpsm total phosphorus would be reasonable annual average targets for yields to estuaries and lakes. These yields allow for some contamination by urban and agricultural practices, but would avoid extreme rates of nutrient loading (i.e., above 0.15 tpsm for total P and 1.4 tpsm for total N).

Recommendation- Include the possibility of using annual nutrient yields as a way to protect water quality of lakes and estuaries in future discussions. There is much good information on yields typical of various land uses that could be used to develop workable protective nutrient loading standards for streams draining into lakes, reservoirs, and estuaries.

Albemarle-Pamlico National Estuary Partnership
N.C. Department of Environment and Natural Resources

Pat McCrory, Governor John E. Skvarla, III, Secretary
Bill Crowell, Director

February 4, 2013

Ms. Dianne Reid
N.C. Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Ms. Reid,

Thank you for the opportunity to comment on the development of N.C. Division of Water Quality's (DWQ) Nutrient Criteria Implementation Plan. On behalf of the Albemarle-Pamlico National Estuary Partnership (APNEP), I offer comments regarding potential initiatives to support protective and scientifically defensible nutrient criteria for the Albemarle-Pamlico estuarine system, including its supporting waterways. More broadly, these projects are designed to support accountable management of this nationally significant resource, the second largest estuarine complex in the United States.

At this time neither the staff, policy board, or advisory committees of APNEP have taken a formal position on whether specific causal or response numeric nutrient criteria should be adopted for the waters of the Albemarle-Pamlico ecosystem. However, we note the potential for such criteria to better account for excess nutrient inputs into estuarine waters. Given that the State of North Carolina and the U.S. Environmental Protection Agency (EPA) have expressed intent to consider development of numeric nutrient criteria, APNEP is pleased to offer the support of its network of science and policy professionals to advise on this issue. Furthermore, while our funding levels preclude us from providing full support for the initiatives suggested below, we will consider providing some financial support in partnership with other mutually interested parties.

Examining methodologies for developing estuarine numeric nutrient criteria

Several methods of adopting numeric nutrient criteria (NNCs) for estuarine waters have been generally acceptable by the EPA nationwide. These include reference condition approaches, stressor-response relationships, and water quality simulation models.

Reference condition approaches require the study of unimpaired water bodies and using these parameters as a baseline by which criteria can be adopted in a broader class of waters. This approach was ultimately adopted in Florida for estuarine waters after years of criteria development.

Stressor-response relationship models consider the environmental endpoint the regulating agency wants to achieve, then informs criteria development by noting the empirical relationships between nutrient inputs and that endpoint. By way of example, unimpaired waters in the Albemarle-Pamlico estuary should be free from harmful algal blooms and support healthy populations of submerged aquatic vegetation. Thus, nutrient criteria would be developed after considering the

pathways by which nutrients impact these outcomes. Published literature and regression analyses regarding these relationships would be instructive in indicating endpoints.

Water quality simulation models are a third method by which NNCs can be developed. This approach simulates the relationships between physical, chemical, and biological processes to study water quality scenarios. Models that can potentially be used in NNC development include the Loading Simulation Program in C++ (LSPC); the Environmental Fluid Dynamics Code (EFDC); the Water Quality Analysis Simulation Program (WASP); and the SPAtially Referenced Regression On Watershed attributes model (SPARROW).

We suggest that a dedicated independent contractor manage the development and consideration of numeric nutrient criteria approaches specifically related to North Carolina's estuarine waters. To develop protective criteria for these estuarine waters, each of the above approaches should be considered in kind. If sufficient data exists, an ideal scenario might entail developing numeric criteria using each methodology, then comparing the results and adopting criteria accordingly. Such work might be undertaken in concert with the APNEP Science and Technical Advisory Committee, with ample opportunity for scientific input from state and federal agency representatives and researchers in relevant fields. APNEP would be pleased to administer the contract, or otherwise provide support should it be administered elsewhere. We note that a knowledgeable contractor developed Florida's estuarine criteria recommendations, which were ultimately supported by the State of Florida, the water management districts, and the EPA.

Developing a reliable long-term source of estuarine water quality information

Despite the size and national significance of the Albemarle-Pamlico estuary, monitoring efforts for these waters are lacking by almost any measure. For the location of North Carolina's ambient monitoring stations, please visit: http://portal.ncdenr.org/web/wq/ess/eco/ams. North Carolina's ambient monitoring system has poor coverage in the Albemarle-Pamlico estuary, with no stations in Bogue, Back, Core, Croatan, Roanoke, or Currituck Sounds. Some ambient stations are found in the river mouths of the Neuse and Pamlico Rivers, but otherwise no ambient monitoring data exists for the vast expanse of Pamlico Sound. Albemarle Sound currently has the best monitoring coverage, with ambient stations at most river mouths and through the center of the sound. North Carolina currently has 323 ambient monitoring stations in place on inland waters, and we acknowledge the importance of uninterrupted data sets for North Carolina's waters. **However, we request that the DWQ and the EPA partner with APNEP to consider options through which consistent and statistically rigorous water quality information might be obtained for North Carolina's major sounds.**

In addition to the nutrient criteria development process, such monitoring is necessary to determine the efficacy of management actions taken to improve estuarine water quality by APNEP, the Division of Water Quality, the Division of Coastal Management, and others. Ambient monitoring should at minimum include both causal and response variables related to nutrient pollution, including total phosphorus, total nitrogen, algae, chlorophyll a, dissolved oxygen, and total organic carbon. This information may also provide the basis for future placed-based (as opposed to use-based) criteria for North Carolina's major sounds, which vary in a number of ecologically important ways.

Albemarle-Pamlico National Estuary Partnership
N.C. Department of Environment and Natural Resources

Pat McCrory, Governor John E. Skvarla, III, Secretary
Bill Crowell, Director

In 2013, APNEP will begin working with its partners to draft an integrated monitoring framework for the Albemarle-Pamlico region, including its estuarine waters. The primary objective of this effort is to develop a strategy to ensure monitoring information collected by citizens, businesses, and management agencies supports a statistically rigorous assessment of the Albemarle-Pamlico ecosystem in addition to satisfying regulatory requirements. Benefits of this approach include identifying monitoring efficiencies among agencies and developing environmental indicators that provide objective feedback on the state of the environment. Support and consultation with the DWQ during this process will be appreciated, and its results promise to inform potential nutrient policy adjustments.

Determining the current status of nutrient loading in North Carolina's estuaries

For the purposes of nutrient criteria development and until an integrated estuarine monitoring network can be established, an intensive data collection effort is necessary to reliably characterize the condition of the sounds' water quality. **APNEP recommends that an interim monitoring effort throughout North Carolina's major sounds begin as soon as practicable.** Sites selected for this effort may ultimately be good candidates for ambient monitoring stations and can expand the temporal and spatial record of water quality information upon which management decisions are made. While we are cognizant of the shifting baselines problem, such information may also provide insights regarding the development of a reference condition approach to criteria development.

Support for the development of cost-benefit analyses regarding nutrient impacts on North Carolina's estuaries.
Potential regulations related to the development of numeric nutrient criteria will be subject to the development of a fiscal note describing the costs and benefits of such an action. To the extent possible, a fiscal analysis should attempt to quantify the economic benefits arising from such regulation. To that end, **APNEP requests support for an examination of the ecosystem services provided by North Carolina's sounds and associated habitats, and the extent to which these services might be reduced by excessive nutrient inputs**. An example of this type of work is the valuation of ecosystem services provided by Florida's Indian River Lagoon, estimated at $3.7 billion in 2007. This information can be paired with straightforward compliance cost estimates to provide a thorough understanding of the positive and negative economic implications of potential nutrient regulations as they pertain to North Carolina's estuarine waters.

In closing, thank you for your consideration of these recommendations as they pertain to North Carolina's Nutrient Criteria Implementation Plan. We look forward to a productive working relationship with the Division of Water Quality and other stakeholders in this process.

Sincerely,

Bill Crowell

Bill Crowell
Director
Albemarle-Pamlico National Estuary Partnership

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone/Fax: 919-707-8632 | www. apnep.org

From: Doug Durbin [doug.durbin@cardno.com]
Sent: Monday, February 04, 2013 2:55 PM
To: Reid, Dianne
Cc: Kenneth Reckhow; Alix Matos
Subject: Comment on Numeric Nutrient Criteria Development Plan

Dear Ms. Reid,

As an Environmental and Natural Resource Management Consulting Firm, Cardno ENTRIX is very interested in the Numeric Nutrient Criteria (NNC) development process being undertaken by the State of North Carolina through your division. We have been closely involved in the parallel process going on in Florida and other parts of the US, so we are aware of the complexity and controversy that can arise.

At this point in the process, as you are developing an updated plan for NNC establishment, we offer just one suggestion. We see great value in the State convening a small technical advisory group to offer insight and alternatives to DWQ while the approved plan is actually being implemented. Outlining the conceptual structure and purpose of such an advisory group within the plan itself would help to codify the group's role (and limitations of that role). We recommend using an advisory panel *during* the process, rather than a "peer review" committee, which is usually limited to an after-the-fact interpretation of the process and outcomes, and where we frequently see peer reviewers' recommendations downplayed or ignored because the process is too far along to implement substantial adjustments, even if they are warranted.

An advisory panel offering comment during the establishment process has the ability to provide ideas, direction, and possibly even information, which DWQ could elect to use to improve its process and outcome. As long as DWQ's plan stipulates the limitations of the responsibilities and expectations of the panel, there should not be concern over the panel delaying the process or distracting the Division from its mission.

The advisory group should be restricted to individuals with demonstrated relevant technical expertise. In the plan, DWQ could specify, or simply suggest, which stakeholder groups would be able to nominate a representative. We suggest that the advisory group be limited to 12 or fewer individuals, representing a balanced combination of local governments, water/power utilities, industry/mining, agriculture/silviculture, and environmental interests. The group could operate on a fixed meeting schedule (e.g., bi-monthly) or on an as-needed basis.

Feel free to contact us if you have questions regarding this recommendation. We look forward to interacting with you through the NNC development process for North Carolina.

Thank you.

Douglas J. Durbin, Ph.D.
SOUTHEAST BUSINESS UNIT MANAGER / SENIOR PRINCIPAL, VICE PRESIDENT
CARDNO ENTRIX

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February 4, 2013

Dianne Reid, Environmental Program Supervisor
Classifications and Standards Unit Program, DWQ Planning Section
North Carolina Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, North Carolina 27699-1617
Dianne.Reid@NCDENR.gov
(919) 807-6427

Re: North Carolina Nutrient Criteria Development Plan

Dear Ms. Reid:

We are submitting comments regarding the North Carolina Nutrient Criteria Development Plan ("NCDP") after having attended the December 12, 2012, public meeting in Huntersville. As acknowledged by the North Carolina Department of Environment and Natural Resources ("DENR"), the United States Environmental Protection Agency ("EPA") has consistently urged states – including North Carolina – to begin developing numeric criteria for causal variables (i.e., nitrogen and phosphorous) in addition to response variables (i.e., chlorophyll-a, clarity and dissolved oxygen). We agree that nitrogen and phosphorous are far better metrics for nutrient-related water quality problems, and here we present our comments on how DENR should begin to account for these nutrients in its waterways as it develops the plan to submit this summer to the Environmental Management Commission ("EMC") and eventually the EPA before commencing the process of establishing standards.

Nutrients are particularly problematic non-point-source pollutants. While the Clean Water Act ("CWA") had a tremendous impact in addressing point-source pollution, non-point-source pollution in the form of nutrient overloading has become much, much worse. The exact problems vary geographically within states, but nutrient overloading is by no means a problem relegated to the coastal region. The comments here reflect our concerns especially as they relate to the Catawba River basin, which begins in the mountains and then is predominantly Piedmont in character.

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1. **Nitrogen and phosphorus need to be considered and in their entireties**

Many elements – especially N and P – transport primarily in the particulate phase (Mayer et al., 1998; Meybeck, 1982; Seitzinger et al., 2005). This transport occurs on the surface of sediment particles (either in direct sorption or in the coating of organic matter surrounding sediment particles), which in some testing is filtered out to leave only the dissolved phase. However, post-deposition, the N and P can release and become bioavailable once again. Without considering the total N and P, there will likely still be eutrophication problems even when testing of only the dissolved phase revealed relatively little N and P in transport. Additionally, this is yet another reason to monitor these, as the causal variables, rather than simply the response variables, especially in the rivers and streams that deliver N and P to the lakes, where they tend to create problems.

2. **Agriculture and dry litter spreading must be considered**

In Eastern North Carolina, swine concentrated animal feeding operations ("CAFOs") and their waste ponds have long plagued waterways, especially during heavy rain events. However, in North Carolina, poultry CAFOs have exploded onto the scene thanks to a legislative provision that does not subject them to public record like other CAFOs. Using aerial imagery, we have identified approximately 600 poultry houses in the North Carolina portion of the Catawba River basin alone, and updated imagery is likely to reveal more houses. Today, the common method for disposing of dry poultry litter is to apply it to the surface of a field through simple spreading. We have conducted flyovers to observe dry poultry litter storage and often observe it being stored uncovered outside, where it may remain uncovered for up to 15 days before being in violation. Regional offices of DENR have only one person dedicated to inspecting the hundreds of houses in their basin (this is the case as I understand it in Mooresville), and those people have responsibilities in other areas, too. There is a gross lack of resources to inspect and monitor every poultry CAFO. However, the primary concern with the impact of these on the environment is with regard to nutrient overloading, so targeted monitoring around (upstream and downstream of) areas densely populated with poultry CAFOs would target a likely key source. Otherwise, problematic sources – most notably over-application relative to the appropriate agronomic rate or application when rain is imminent – are likely to go unattributed to those responsible. Many of these poultry houses exist in sub-basins draining to Lake Hickory, Lake Rhodhiss and the South Fork River, all of which have had nutrient issues.

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3. Sludge spreading must be considered

When wastewater is treated, the residuals are dewatered, and the result is a sludge, which many utilities have spread on fields in the state. Farmers benefit by receiving a free, potent source of nutrients, but sludge application is poorly monitored. The field application of sludge has many of the same issues (i.e., over-application and application when rain is imminent) as dry poultry litter spreading. Again, DENR lacks the resources to have someone monitoring and inspecting sludge spreading with any regularity. The impacts of N and P in applied sludge must be better understood relative to the surrounding waterways and overall environment. With such waterway monitoring for impacts upstream and downstream of sludge spreading sites, more appropriate agronomic rates and N and P limits can be established.

4. Fertilizer education

One of the biggest but least potent sources of N and P is landscape fertilization by residents and businesses. The CWA addressed point source pollution very well, but problems with non-point source pollution were poorly addressed and have grown in recent years. Fertilizer blackouts, like those in Florida, could be one part of the solution. However, given the large number of individual properties, enforcement is again likely to be an issue, so new regulations combined with education programs are the best solution. We hope that this area in particular can be better addressed before algal blooms like those seen in Florida and even coastal North Carolina become problems.

We appreciate the opportunity to comment so early in the process of even developing the plan. Please contact us if you have any questions, and we look forward to seeing the final Nutrient Criteria Development Plan.

Sincerely,
S. Samuel Perkins
Director of Technical Programs

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February 4, 2013

Ms. Dianne Reid, Classifications & Standards Unit Supervisor
Division of Water Quality
NC Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

Subject: Comments from City of Charlotte
Nutrient Criteria Development Plan (NCDP)

Dear Ms. Reid:

The City of Charlotte appreciates the opportunity to provide comments to the Division of Water Quality (DWQ) regarding the Nutrient Criteria Development Plan (NCDP). We offer the comments below for your consideration.

A public comment period is needed on the DRAFT Nutrient Criteria Development Plan before it is approved by EMC.

While we appreciate the opportunity to provide comments at this point in time, it is somewhat difficult to offer meaningful suggestions with the wide range of possibilities available for developing nutrient criteria. Allowing a public comment period on the DRAFT NCDP will allow the affected stakeholder to provide more structured and beneficial comments. As it stands a very short window of opportunity exists to provide comments when the DRAFT NCDP is made available to the Environmental Management Commission members. Additional time and a formal announcement of a comment period on the DRAFT NCDP will result in a better plan benefitting North Carolina Division of Water Quality, the Environmental Protection Agency and the affected stakeholders.

Nutrient Criteria at the river basin level should only be developed as a screening tool , while site-specific criteria should be developed and measured at the water body level BEFORE listing a water body as impaired.

There are many parameters that affect how Nitrogen and Phosphorus are processed in a water body. Both of these nutrients are typically required for a healthy ecosystem and as such they are not pollutants. As acknowledged by DWQ in their presentations at the public meetings, variables such as flow, tides, temperature, turbidity, canopy, and substrate all have an influence at the water body level. This list is not comprehensive and we ask that the influence of site-specific characteristics be quantified and taken into consideration before listing a water body as impaired. In an effort to focus limited resources river basin screening tools could be developed to narrow the list of water bodies than need further, site-specific investigation. The water bodies requiring further investigation could be further prioritized based on the screening tools but listing the water body as impaired should be based on site-specific criteria. Understanding these site-specific characteristics will also help identify measures to improve the conditions if a water body is found to be impaired.

Designated uses may need to be prioritized with regards to nutrient criteria.

Designated uses can sometimes be in conflict with regards to nutrients where higher nutrients may increase the biomass and sustain a healthy ecosystem (aquatic life usage) while at the same time the conditions may not be appealing for primary recreational usage (swimming). In these instances the designated uses will have to be prioritized.

Ms. Dianne Reid
NCDENR - Division of Water Quality
February 4, 2013

Understand the background noise or variability of each parameter at the water body scale before classifying a water body as impaired.

Because Nitrogen and Phosphorus are essential at some level to a healthy aquatic ecosystem, at appropriate levels they are not pollutants. Furthermore, these nutrients likely exist in varying concentrations in a healthy ecosystem. This variability should be accounted for and explicitly addressed before considering a water body as impaired. Quantifying the variability can help define the amount of investigation needed for a "pollutant" or a water body. When there is a larger degree of variability, there is often more uncertainty in our understanding of what is healthy. The uncertainty should be accounted for by increasing the amount of supplemental data required to fully assess the designated uses of a water body before listing it as impaired.

A multivariable approach is best, use a matrix.

In developing nutrient criteria with so many factors influencing whether the nutrients are considered a pollutant or part of a healthy ecosystem, a matrix of variables should be used to keep track of appropriate causal and response variables. Not only does a matrix provide the benefit of organizing multivariable data, but it can then also be used to assess the water body condition to determine if the designated uses are impaired. The matrix approach will help lend credibility to an impaired listing and can be used to defend a listing. In addition, the matrix approach easily incorporates the variability of each causal and response variable and can be used to scientifically and statistically determine the extent of impairment.

Do not use only numeric criteria; include a narrative assessment of water body health including algal or aquatic species as indicator of impairment or lack thereof.

When verifying the condition of a water body, algal samples and other aquatic species should be used to support the findings from numeric criteria. Some species prefer high nitrogen while others prefer high phosphorus. Algal and other aquatic samples should be used to help make the connection between parameters analyzed for water quality and the aquatic health of the water body. These samples should not be used as a basis for impairment but rather to support the conclusions developed from other criteria.

Should you have any questions or need additional information, please contact me at 704-336-2167 or Kyle Hall at 704-336-4110.

Sincerely,

Daryl Hammock, PE
Water Quality and Environmental Permitting Manager

Kyle Hall, Storm Water Services
Jennifer Frost, Storm Water Services

City of Salisbury
North Carolina

February 1, 2013

Via U.S. Mail to:
North Carolina Division of Water Quality
Attn: Dianne Reid
1650 Mail Service Center
Raleigh, NC 27699-1650

Via email to: Dianne.Reid@ncdenr.gov

Subject: Public Input: North Carolina Nutrient Criteria Development Plan

Dear Division of Water Quality:

The North Carolina Division of Water Quality (DWQ) is expected to submit a revised Nutrient Criteria Development Plan (NCDP) to the Environmental Management Commission (EMC) and U.S. Environmental Protection Agency (USEPA) in 2013. As a stakeholder in water quality protection, the City of Salisbury (Salisbury) appreciates the opportunity to provide recommendations at this early stage of the NCDP schedule.

As a member of NCWQA, we fully support their recommendations made separately. In addition, we also recommend the inclusion of the following in the NCDP:

> Where impairment occurs in *impounded* stream segments rather than throughout a basin, *in-lake* protection and remediation methods will be evaluated as alternatives to basin-wide methods for addressing impairment.
>
> When impairment occurs in an impoundment or in a portion of an impoundment, operation and management of the impoundment must be considered in the development of methods for water quality protection and enhancement. These methods can include, for example, headwater elevation management, impoundment retention time management, water release scheduling, aeration/oxygenation, dredging, sediment capping, and other methods.

Thank you for your consideration of this most important request.

Sincerely,

Jim Behmer, P.E.
Utilities Director

217 S. Main Street *P.O. Box 479* *Salisbury, N.C. 28145* *Phone: (704) 638-5270* *Fax: (704) 638-5232*

North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries

Pat McCrory
Governor

Dr. Louis B. Daniel III
Director

John E. Skvarla, III
Secretary

February 1, 2013

To: Dianne Reid, DWQ

From: Anne Deaton, DMF

Subject: DWQ Nutrient Criteria Development Plan

On December 17, 2012, I attended the public meeting regarding DWQ's plans to update the Nutrient Criteria Development Plan (NCDP) and DMF supports this effort. The increasing algal blooms on the Cape Fear River and the spatially and temporally significant fish kills on the lower Neuse River in 2012 are visible indicators that, while progress has been made in controlling nutrient concentrations in surface waters, more work is needed. Appropriate monitoring to determine site-specific measures for the control of nutrients at levels that do not cause biological degradation is critical for protecting and enhancing North Carolina's waters and aquatic resources.

The NC Coastal Habitat Protection Plan (Deaton et al. 2010) demonstrates the strong link between water quality and the health of our coastal habitats and fish populations. Eutrophication and sedimentation in the Neuse River has resulted in die-off of subtidal oysters (DMF, unpub. data, 2012) and contributed to large menhaden kills. In the Cape Fear River, increasing blue-green algal blooms degrade water quality in areas utilized by the Atlantic and shortnose sturgeon (federally endangered), river herring(currently being considered for listing), and depleted stocks of striped bass. In Bogue Sound, waters classified as ORW, seagrass is showing signs of stress and declining density. Filamentous blue-green algae has been observed covering areas of seagrass in the sound, indicating that nutrient concentrations are high. Seagrass, or submerged aquatic vegetation (SAV), requires relatively high amounts of light penetration/water clarity to survive; 15-25% of surface light compared to 1% for phytoplankton. Research conducted in the Chesapeake Bay found that total suspended solids less than 15 mg/l and chlorophyll *a* less than 15 ug/l are needed to maintain adequate water clarity for submerged aquatic vegetation.

Due to the detrimental effect of eutrophication on coastal habitat and fish, DMF recommends that a focus of the plan include:

- The Cape Fear River. This coastal river basin, despite high flow rates and direct connection to the ocean, is showing signs of eutrophication, which could negatively impact several federally listed and depleted anadromous fish species. Monitoring of cause and response variables in targeted areas is needed to determine source and effect of nutrient loading and effective control strategies. Nutrient management strategies should consider point and nonpoint pollutant sources from all land uses, as well as hydromodifications that could be contributing to nutrient response variables.
- The estuarine rivers, creeks and sounds where SAV is or has historically occurred. Bogue Sound, in particular, is in need of more intense monitoring and assessment. Because of the sensitivity of SAV to nutrient and sediment concentrations, this critically important fish habitat should be protected. Existing research indicates that current nutrient and sediment criteria are insufficient to maintain adequate water quality for this habitat.
- The lower Neuse River. Although nutrient management strategies are already in place, more monitoring and action may be needed.

Thank you for the opportunity to comment.

Deaton, A.S., W.S. Chappell, K. Hart, J. O'Neal, B. Boutin. 2010. North Carolina Coastal Habitat Protection Plan. North Carolina Department of Environment and Natural Resources. Division of Marine Fisheries, NC. 639 pp.

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Steve Troxler
Commissioner

North Carolina Department of Agriculture
and Consumer Services
Division of Soil and Water Conservation

Patricia K. Harris
Director

February 4, 2013

Ms. Dianne Reid, Classifications & Standards Unit Supervisor
Division of Water Quality
NC Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

Dear Ms. Reid,

The North Carolina Department of Agriculture and Consumer Services, Division of Soil and Water Conservation appreciate the opportunity to provide input at this early stage into the Division of Water Quality's revisions to the state's Nutrient Criteria Development Plan (NCDP). The department and division are engaged in the state's activities regarding nutrient criteria development and implementation. Staff have participated in the stakeholder group discussing the once proposed chlorophyll-a threshold rules and attended the Nutrient Forum. In addition, our agency serves a critical role in the implementation of the agriculture rules in existing nutrient management strategies. Our comments at this time focus on the process regarding the nutrient criteria that will be developed, however, more meaningful comments could be provided with sufficient time to review the draft plan.

Schedule and proposed timeline

The following schedule and proposed timeline shared at the December 2012 meeting, while covering a period of four years, has a short amount of time available for the development and approval of the plan. Public participation appears throughout the schedule, but it is missing in an important part of the schedule. There is no public participation built in between steps 5, 6, 7 – the development of the plan, Water Quality Committee (WQC) approval and Environmental Management Commission (EMC) approval. The schedule should be readjusted to allow for a period of public review and comment after the draft plan is developed and before it is presented for approval to the WQC and EMC. We recommend that this public review period last for minimum of 30 days in order to obtain high quality comments from affected stakeholders. The division understands that this will impact the rest of the schedule, but it will bring concerns and suggestions to light earlier in the process and hopefully speed approval of the plan.

The division strongly recommends that instead of listing public participation in the schedule throughout the schedule, that a standing stakeholder group be established to evaluate NC's NCDP. There is precedence for DWQ to use this type of group process. Examples include the Technical Advisory Committees established to guide the modeling and development of nutrient management strategies in the Jordan, Falls and High Rock Lake Watersheds. It is even more important for this type of group to be formed for the development of the state's nutrient criteria, as it has the potential to impact all waters. This new advisory group should be created at this

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Raleigh, NC 27604

step in the schedule, as a new step 5 in the proposed schedule, prior to the development of the NCDP. This group should stay in place through the adoption of nutrient criteria. The department and division respectfully request a seat on this new stakeholder committee.

Criteria development

The division would also like to take the opportunity to begin the comment process on the actual nutrient criteria that will ultimately be developed and adopted. North Carolina has focused on the use of chlorophyll-a as an indicator of nutrient enrichment, and current water quality standards and nutrient sensitive waters strategies reflect this use. The division encourages the continued use of chlorophyll-a as a response variable where appropriate and applicable. The chlorophyll-a criterion in standards should only be adjusted when science justifies new number(s), and when it is cost effective and achievable to implement.

Should the state need to pursue a new approach to nutrient standards that includes response variables (nitrogen and phosphorus), we strongly recommend that causal variables (biological parameters) be tied to water quality assessment. This matrix type of approach in determining nutrient impairments was highlighted during the Nutrient Forum, and has been found to be effective in other states. In addition, due to the diversity in North Carolina streams, rivers, and lakes, we support the development of more site specific standards that will actually determine whether a water body is meeting its intended uses.

Thank you for your consideration of these comments. If you have questions or would like to discuss them further, please contact Julie Henshaw, NPS Programs Section Chief. She can be reached at 919-715-9630 or julie.henshaw@ncagr.gov.

Sincerely,

Patricia K. Harris

Patricia K. Harris, Director
Division of Soil and Water Conservation
NC Department of Agriculture and Consumer Services

Cc: Dr. Richard Reich
Julie Henshaw

Charlotte-Mecklenburg STORM WATER Services

700 North Tryon Street
Charlotte, NC 28202
Fax: 704.336.4391

January 31, 2013

Ms. Diane Reid, Classifications & Standards Unit Supervisor
Division of Water Quality
NC Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

Re. Comments on the Nutrient Criteria Development Plan

Dear Ms. Reid:

Representatives from the Mecklenburg County Water Quality Program attended the December 12, 2012 public input meeting in Huntersville, NC regarding the upcoming nutrient criteria development process. From this meeting and the schedule published on NC DENR's website, it appears that there will be no comment period on the Nutrient Criteria Development Plan (NCDP) prior to its presentation to the Environmental Management Commission (EMC). Mecklenburg County would greatly appreciate the opportunity to review and comment on the Draft NCDP prior to its presentation to the EMC.

If you have any questions regarding this comment please contact David Kroening at 704-336-5448 (David.Kroening@MecklenburgCountyNC.gov).

Sincerely,

David Kroening
Project Manager

Received 2/1/13
DM

Neuse River Compliance Association®
P.O. Box 1410
Clayton, N.C. 27528 - 1410

January 31, 2013

Mrs. Dianne Reid, Classification & Standards Unit Supervisor
Division of Water Quality, NCDENR
1617 Mail Service Center
Raleigh, N.C. 27699 - 1617

Dear Ms. Reid:

On behalf of the Neuse River Compliance Association ("NRCA"), we respectfully submit the attached comments on the Nutrient Criteria Development Plan (NCDP).

The NRCA members are comprised of local governments and other major owners of wastewater treatment facilities (see attached member list) in the Neuse River Basin. Our members have continued to improve water quality in the Neuse River and its estuary by reducing their nitrogen discharge as a group well over 70% since 1995.

In 1998, the Neuse River was declared nutrient sensitive waters and the Neuse Management Strategy was adopted with an overall goal of a 30% reduction in total nitrogen loading to the Neuse Estuary. Despite huge nitrogen reductions by point sources (wastewater treatment facilities) since the implementation of the Neuse Management Strategy, research by the Division of Water Quality and the University of North Carolina's Marine Science Institute indicates little or no net gain of nutrient loading reduction to the Neuse Estuary. Research also indicates the Trent River located in New Bern has insignificant point source contribution yet the nutrient load from that sub-basin delivers a substantial amount of nitrogen load to the estuary that can only be contributed to non-point sources. These results illustrate that "all players" must be included and held accountable in order for any nutrient plan to be successful.

Thank you for the opportunity to submit our comments. If you require any additional information please let us know.

Sincerely,

Daniel F. McLawhorn, Chairman

Enclosure
cc: LNBA/NRCA Board

NRCA's Recommendations for Revisions to the Nutrient Criteria Development Plan

- "Adaptive management" strategies are necessary in designing nutrient management programs that achieve nutrient reductions. Ten years of implementing the Neuse Management Strategy illustrated the need to allow point and non-point source trading to meet nutrient management goals. As discussed at the May, 2012 N.C. Forum on Nutrient Over-Enrichment there are many mechanisms that can be implemented at a very low cost as opposed to major improvements at wastewater treatment facilities (that are the most expensive in cost per pound of nitrogen removed). Many utilities would invest in other best management practices if allowed nutrient credit for those investments and greater nutrient reductions would be achieved at a lower cost.

- "Avoid a one-size-fits-all approach"- North Carolina has a variety of eco-regions that differ in their capacity to attenuate nutrient load. What may work in the upper Piedmont will not provide the same level of absorption or assimilation in a water body in another region of the state. The nutrient plan must be flexible to account for these varied ecosystems.

- "Support continued research"- the current research on the health and improvement of the estuary is not being financially supported by the Division. Programs that once were supported by the Division (ModMon & FerryMon) no longer receive state funding. The future of these programs is unsure. The strategy selected by the Division must provide for and support monitoring to verify the criteria are succeeding in the goal of reducing nutrients in the effected water bodies.

- "TMDL water bodies"- the NRCA endorses the Division's position that any revisions to the nutrient criteria will not impact water bodies that have implemented a TMDL. The Neuse Management Strategy has been in place for 10 years and any revisions should be implemented through the TMDL process.

- "Cost-benefit analysis"- the NRCA supports the inclusion of a cost benefit analysis in selecting the appropriate levels in the nutrient criteria. The members of the NRCA have invested over $300 million in facility improvements to reduce nitrogen delivered to the Neuse Estuary. As significant as these reductions have been no "net gain" has been realized in nitrogen load reductions delivered to the Neuse estuary. Extrapolation of these results indicates that benefits will be greater if greater focus is placed on non-point source reductions.

- "Strategy sustainability"- the plan selected by DWQ must be sustainable in terms of overall impact to the environment. Nutrient reductions at wastewater treatment facilities are not only capital intensive but have a significant impact on greenhouse emissions (energy demands), increased biosolids productions, and additional chemical costs. Non-point source reduction practices can be accomplished with less environmental cost as noted in the Nutrient Forum.

- The NRCA supports comments submitted by the N.C. League of Municipalities and by the N.C. Water Quality Association.

- The NRCA has concerns that the Division will not allow ample time to review the final plan based on the proposed schedule (less than 2 weeks) that has been publicized for final plan review.

Neuse River Compliance Association Membership

Town of Apex
Town of Benson
Town of Cary
Town of Clayton
Contentnea MSD
Town of Farmville
Dupont-Kinston
City of Goldsboro
City of Havelock
Johnston County
Town of Kenly
Town of LaGrange
City of New Bern
Progress Energy - Carolinas
City of Raleigh
City of Wilson
City of Kinston
Aqua, North Carolina
South Granville Water and Sewer Authority
Marine Corp Air Station - Cherry Point
Carolina Water Service, Utilities, Inc.

NC AWWA-WEA
www.ncsafewater.org
Dedicated to Safe Water

February 1, 2013

Ms. Dianne Reid, Classifications & Standards Unit Supervisor
Division of Water Quality
NC Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

Re: NC AWWA-WEA Comments on North Carolina's Nutrient Criteria Development Plan

Dear Ms. Reid:

Attached, please find the North Carolina Section American Water Works and Water Environment Association's (NC AWWA-WEA) comments on North Carolina's Nutrient Criteria Development Plan, which have been prepared by the Regulatory Affairs Committee.

NC AWWA-WEA is appreciative on NC DENR DWQ's commitment to a proactive, open, science-based process for refining nutrient management policies and nutrient criteria. NC AWWA-WEA has enormous expertise and experience through its 3,400 members and we look forward to the opportunity to serve as a collaborative and constructive partner by providing further technical information to NC DWQ as defensible, protective standards are developed to protect public health and the environment.

Thank you for your consideration of our comments, which are attached. If you would like any follow-up communication on these important issues, please feel free to contact me at 336-747-7312, email: ronh@cityofws.org, or Lindsay Roberts, Executive Director, NCAWWA-WEA at 919-784-9030 x 210, email: lroberts@ncsafewater.org.

Sincerely,

Ron Hargrove
Chair, Regulatory Affairs Committee

cc: Board of Trustees
Lindsay Roberts

NORTH CAROLINA
AMERICAN WATER WORKS ASSOCIATION – WATER ENVIRONMENT ASSOCIATION

FEBRUARY 4, 2013

COMMENTS ON NORTH CAROLINA'S NUTRIENT CRITERIA DEVELOPMENT PLAN

Background

The North Carolina Division of Water Quality (DWQ) is expected to submit a revised Nutrient Criteria Development Plan (NCDP) to the Environmental Management Commission (EMC) and U.S. Environmental Protection Agency (USEPA) in 2013. As a major stakeholder in water quality protection, the North Carolina American Water Works Association-Water Environment Association (NC AWWA-WEA) appreciates DWQ's commitment to an open, science-based process for refining the NCDP and related policies.

The NC AWWA-WEA is a volunteer association dedicated to providing water and wastewater education, training, and service in an effort to protect public health and the environment. We have over 3,000 members in North Carolina representing municipal and private utilities, consulting engineering firms, government agencies, companies who provide equipment and supplies to the industry, and representatives of academia who teach and conduct research in water and wastewater-related areas. Our organization is unique as it is able to look at water quality issues from a broad perspective, realizing that water and wastewater issues go beyond the end of the pipe.

On January 12, 2010, in response to comments on the proposed nutrient Threshold Rule approach, the Environmental Management Commission (EMC) directed the DWQ to perform the following actions:

- Review alternatives to the threshold rules and indicators/criteria for determining eutrophication.
- Develop a clearer statement of the underlying science.
- Provide more detailed review of costs and cost savings.
- Consider basin thresholds on something other than chlorophyll-a.
- Consider other indicators of trending or change.
- Increase education on nutrient over enrichment.

The NCDP is the plan being developed to encompass these actions.

In consideration of the mission of the NC AWWA-WEA and the goals presented by the EMC, the purpose of this document is to provide NC AWWA-WEA's comments on the current draft NCDP being developed by the DWQ based on the plan framework that was presented in public presentations in December 2012. These comments seek to retain the strengths of North Carolina's existing approaches while making additional progress in key areas.

Comments on NCDP

Specific comments on the NCDP include the following:

1. *Schedule/timing of the effort.* Based on the timelines shared at the December meetings, it appears that the actual NCDP will only be available for public review for a minimal time – no more than 10-14 days – prior to a planned March vote on the NCDP by the N.C. Environmental Management Commission (EMC) Water Quality Committee. NC AWWA-WEA members do not believe this abbreviated schedule will provide adequate time for review of the draft plan, impacting their ability to respond with meaningful comments for EMC commissioners. While recognizing the U.S. Environmental Protection Agency's (EPA) desire to have an approved NCDP by June, the NC AWWA-WEA requests that DWQ and the EMC postpone consideration of the NCDP until the May/July pair of EMC meetings. Such a delay would allow a more reasonable amount of time for a full public review of the proposal. A one-month delay on submitting the plan to EPA is a reasonable accommodation to allow a complete public process and is in accordance with EPA's desire to have a partnership between the state and stakeholders on this issue.

2. *Goals for solutions to nutrient impairment:*

a) Base implementation on site-specific data and analysis – DWQ should include in the NCDP further research to inform a scientifically-defensible categorization of the state's waters, with nutrient criteria tailored to the specific characteristics of each category. Also due to the extreme variability in the effects of nutrient inputs on any given water body, any nutrient criteria should include a verification component that confirms the impairment state of the specific waters. The NCDP should focus on response criteria over numeric nutrient criteria.

b) Demonstrate use impairment – use "use assessment methodology," when describing how to make impairment designations for instances of nutrient criteria exceedances; require further study and confirmation of actual impacts to designated uses *before* declaring a water body as impaired for nutrients. Once nutrient criteria have been exceeded, but before an impairment determination is made, the DWQ should conduct thorough site-specific analysis into whether a water body's designated uses are impaired as well. Such an analysis would likely include measurements of the water body's biological characteristics to verify whether the nutrient inputs are actually harming the aquatic life of the particular water body.

c) Assign responsibility proportionate to the source of impairment - Upon detection and validation of a water body's trend toward impairment, the members suggest that DWQ consider non-regulatory approaches to work with proven nutrient contributors to that water body and the public. Communication of the trend with contributors and the public may assume a primary tactic in this approach. The communications should contain solid evidence of a trend toward degradation, accompanied by suggested control strategies and information on the consequences of violating a water quality standard.

d) Include measures to equitably hold accountable all contributors to the impairment - The principle of flexibility is a central tenet to effective nutrient management in the state's waters. Without flexibility to tailor management solutions to the specific needs of various water bodies, significant public and private resources may be spent in an inadequate pursuit of improving water quality. Likewise, without the flexibility to conduct further studies on whether a water body meets its designated uses upon detection of elevated nutrient levels, impairment determinations would not accurately reflect conditions in the water body.

e) Cost-benefit analysis should overlay all nutrient management strategy decisions - One basic tenet of these management strategies should hold that the cost of implementing a particular nutrient control must be in proportion to the expected reduction in nutrient loads to the water body. Implementation strategies should also explore innovations such as nutrient trading to stimulate effective reductions of nutrient loads at the most reasonable cost. Other opportunities could include the development of a nutrient credit system that would reward nutrient contributing entities for reducing nutrient discharges to a greater extent than required.

f) Nutrient Sensitive Waters (NSW) classification needs to be revised – NSW classification could very well be a method of proactively addressing increasing eutrophication in water bodies. The NCDWQ website defines the Nutrient Sensitive Waters (NSW) classification as:

Supplemental classification intended for waters needing additional nutrient management due to being subjected to excessive growth of microscopic or macroscopic vegetation.

Proactively using this definition of NSW would seem to accomplish what the NCDP is trying to achieve. However in its current state, the NSW classification only impacts NPDES discharges. Specifically, GS 143-215.1 (c1)-(c6) currently prescribes automatic 5.5 mg/l and 2 mg/l limits for TN and TP, respectively, for any waters designated as NSW by the EMC. The NSW classification would need to be improved to include an entire toolbox of methods that could be used to administer an appropriate nutrient management plan based on identification of significant sources of nutrients and the cause and effect impacts to a waterbody.

g) Refine the use of the word "criteria" as it can sometimes be problematic - Many equate criteria to a standard. Clarification is needed to present criteria as an "Action Level" or target level that when exceeded over some frequency and duration requires additional actions. Actions are then put in place such as elevation of monitoring activity and/or land use evaluations to further refine the issue and causative factors that are the contributors of N&P to allow site specific plans to be formulated.

h) Development of a separate category for flowing waters is not needed – Control of nutrient impairment should be focused on non-flowing waters and therefore be the focus of the NCDP. Development of flowing water biological indicators such as periphyton would impact the schedule as the usefulness of this biological parameter for controlling nutrient impairment is not proven. NC has never utilized periphyton as a biological indicator and has few resources and expertise for the efforts needed to develop such a criteria. Very few states have utilized this biological parameter so its usefulness is very questionable. As nutrient issues are presented in non-flowing waters, control strategies, and protection measures can be extended as far upstream in flowing waters as necessary to mitigate any responding condition.

i) Public education is important to promote basin-wide nutrient control understanding, development, and implementation of control approaches – Public education and involvement is a key to success in implementing nutrient management programs. In this, point source controls should not be imposed in the absence of a basinwide planning methodology that addresses all major sources. Basin planning efforts should evaluate the cumulative impact of sources such as treatment plants, cropland, animal operations, stormwater, forests, septic tanks (groundwater sources of nutrients) and atmospheric deposition. It is important to keep the public informed as the NCDP considers the long-term impacts of sources that discharge directly to surface water and those that load nutrients to groundwater that subsequently enter surface waters.

j) Utilize statistically significant sampling methods and analysis prior to designating a water body as impaired – Non-flowing waters are impacted by detention time, seasonal changes in water density (stratification), stormwater flows, and water body use. A sufficient number of samples must be performed that address each of the natural impacts to a water body to provide a statistically significant conclusion that a water body is suffering from degradation due to nutrient loading or that the water body is impaired. The NCDP should develop guidelines and procedures to develop statistically significant sampling protocols.

NC DENR DWQ's hosting of the May 2012 NC Forum on Nutrient Over-enrichment demonstrated a commitment to a proactive, open, science-based process for refining nutrient management policies and nutrient criteria. NC AWWA-WEA greatly appreciates this commitment and we encourage DWQ to continue to provide opportunities for both public participation and technical input. The NC AWWA-WEA through its 3,000 volunteer members from across the state offers a wealth of expertise and experience and welcomes the opportunity to participate with DWQ in this effort. We would like to serve as a collaborative and constructive partner with DWQ in developing defensible, protective standards in the effort to protect public health and the environment.

Thank you for your consideration of these comments. If you would like to arrange any follow-up communications on these important issues, please contact Ron Hargrove, Regulatory Affairs Committee Chair, NCAWWA-WEA at (336) 747-7312 or ronh@cityofws.org.

NORTH CAROLINA
FARM BUREAU FEDERATION, INC.

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February 4, 2013

Ms. Dianne Reid
Environmental Program Supervisor
Classifications & Standards Unit Programs
NC Division of Water Quality
N.C. Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601

Via email to: Dianne.Reid@ncdenr.gov

Dear Ms. Reid:

The North Carolina Farm Bureau Federation (NCFB) is NC's largest general farm organization, representing the interests of farm and rural people in our state. This letter is to comment on the North Carolina Nutrient Criteria Development Plan, as presented at public meetings in December of 2012.

The NCFB was an active participant in the stakeholder group that reviewed the previously proposed chlorophyll a threshold rule, a concept that was to address some of the nutrient criteria issues. The NCFB attended the Nutrient Forum and continues to be very engaged on the nutrient criteria issue. We appreciate the opportunity to provide comments on the State's further efforts in the area of nutrient criteria development.

We understand that DWQ is currently seeking comments on the Development Plan, which is essentially the process by which the State will proceed to develop nutrient criteria, or to amend its existing criteria. We understand that DWQ is not seeking comments on the criteria themselves at this time. Therefore, we will address our comments to process and project issues.

Stakeholder Group Should Be Convened and Stay In Place

We urge that this process not be rushed. It is important that a stakeholder group be convened immediately and that it stays in place to advise DWQ as the process moves forward over the next few years. In the slides shown at the presentation there are several stages where "Public Participation" is listed as a step. It is important that DWQ also be advised by stakeholders throughout this entire process, not just after certain steps are completed. DWQ must take steps to get adequate input as the process proceeds, without rushing to meet deadlines set by others that may not be in NC's best interest.

The stakeholder process will insure that input is received before key steps are taken. A stakeholder group will allow DWQ to identify possible problems and respond to potential criticisms before proceeding forward with proposals. The group will be able to advise DWQ as to the adequacy of its approach and provide valuable suggestions while the process moves forward.

Don't Reinvent the Wheel

We question whether the case has been made that our State needs to adopt an extensive new set of nutrient criteria. North Carolina has an excellent record of addressing nutrient issues through nutrient strategy development and, in many cases, subsequent rule adoption. The NC Nutrient Criteria Development Plan should not be designed to "reinvent the wheel." The Plan should foremost address and stress the first goal stated on the Criteria Development Plan website, "The plan will: [h]ighlight and enhance North Carolina's current approaches to nutrient management."

There is much to "highlight" in North Carolina's current approach. In fact, far more than highlighting should be done. DWQ should extensively describe our current approach and its implementation in order that its usefulness and success can be recognized by EPA and others. Further, an extensive review of the current approach is needed if DWQ intends to attempt to justify efforts to "enhance" the State's current approaches.

However, the word "enhance" is vague and it is difficult to comment on this. If there are "enhancements" needed -- and we will need to be convinced that they are -- these must undergo stakeholder review and significant public comment before DWQ proposes changes to the criteria that will affect the many rules and programs already in place. North Carolina's state and local governments, farmers and other citizens have invested a tremendous amount of time, energy and money in the existing programs and in implementation of regulations. The criteria should not be "enhanced" without an extensive review of the economic impact of such changes on farmers and other North Carolinians.

North Carolina's Waters Are Highly Variable and This Must Be Considered

The website says the plan will "[p]rovide for exploration of site-specific and waterbody type-specific approaches." We feel this concept is very important, particularly the site-specific approach. North Carolina has tremendous physiographic differences from the mountains to the coast. We are very concerned that there will be an effort to force North Carolina to adopt numeric nutrient standards. Any "one size fits all" set of State numeric nitrogen and phosphorous standards will not work. We feel that even regional numeric standards by physiographic region will cause lots of problems. This will be particularly true if there are no response variables considered along with any N and P "numbers."

If, after extensive input, changes to our existing nutrient criteria are found to be necessary, nutrient criteria should address specific problems using a site-specific and meaningful response variable or set of variables for an individual waterbody. If a broader approach is necessary, any proposed waterbody-type approach must have meaningful response variables that are adjusted, first, to NC's various physiographic regions and then refined to smaller scales. The finer scales should lead as far as possible to the small watershed scale, or even to the reach level.

This will be important because there is tremendous variability within waterbody types. Nutrients in slow-moving "blackwater" streams will not have the same effect as in fast-running trout streams. The same is true in Carolina bay-type lakes versus piedmont or mountain lakes. Problems caused by nutrients, where they occur, will vary across the state. The headwaters of a waterbody are not the same as the lower reaches of a stream or the same as at the dam of a lake. Therefore, if new criteria are needed, a site-specific approach is most desirable and any needed "exploration" should lean towards site-specific approaches.

Many Built-In Protection and Prevention Mechanisms Already Exist

The website states that the plan will "[p]rovide for exploration of built-in protection and prevention." Before "exploring" such, the State should consider the many mechanisms already in place. North Carolina already has nutrient strategies for a large part of the State, nutrient regulations for much of the State, and also has the nutrient sensitive waters classification capability when waters are determined to be nutrient sensitive.

While not necessarily adopted for nutrient management, NC's water supply watershed regulations, state and federal stormwater regulations, sedimentation and erosion control regulations, and many similar requirements are in place. They provide built-in protection and prevention. A newer non-regulatory program is the Community Conservation Assistance Program to assist with non-agriculture best management practice implementation. It also funds practices for protection and prevention.

Providing these built-in protections and prevention specific to agriculture are: nutrient reduction mandates, federal conservation compliance mandates, State and federal cost-share and agricultural best management implementation programs, wildlife habitat programs, forestry management and harvest BMP programs, animal waste and mortality management regulations, and other regulations and programs. These all contribute to water quality improvement, including reducing nutrient contributions to waters, even if nutrient delivery reduction is not the primary purpose of all of the programs or regulations.

Do not adopt new criteria or regulations until all mechanisms currently in place -- regulatory and voluntary – have been extensively examined for their capability to reduce runoff and manage nutrient delivery. Do not pursue a set of criteria that will lead to another layer of regulation without a thorough evaluation of the many existing mechanisms' ability to provide built-in protection and prevention.

If Needed, Response Criteria Should Be Considered and Chlorophyll a Should Be Included

The website states that the plan will "[i]nclude review of a variety of possible criteria including response variables like benthic macroinvertebrates, periphyton, continuous dissolved oxygen, total organic carbon, algal densities and causal variables like nitrogen and phosphorus." We are very concerned about the possibility of numeric nutrient standards being proposed as part of this process. As stated above, statewide numeric nutrient standards, or even standards adopted by physiographic region, will be problematic due to the State's physiography and the variability of waterbody types and within waterbody types.

Also, is this list of response variables all inclusive? We feel there are probably others that should be discussed, and stakeholder involvement would help identify those. Why is chlorophyll a not listed here? There is a listing of "algal densities." Algal densities and chlorophyll a are not the same, and we are concerned that chlorophyll a is not listed. Is this an indication that DWQ is not going to consider its existing response variable along with others? We hope that is not the case.

Involve Stakeholders throughout the Process

Finally, the website says the plan will "[i]nvolve all stakeholders." As we stated above, a stakeholder group is needed to advise DWQ on the development plan and on the nutrient criteria themselves. This group should be kept fully informed during each step in the process in order to provide input as each stage of the criteria development proceeds. NCFB requests to be part of that stakeholder group.

Thank you for the opportunity to comment on the North Carolina Nutrient Criteria Development Plan. If you have questions, please do not hesitate to contact me.

Sincerely,

Anne Coan

Anne Coan
Director of Environmental Affairs

NC LEAGUE OF MUNICIPALITIES

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January 15, 2013

Ms. Dianne Reid, Classifications & Standards Unit Supervisor
Division of Water Quality
NC Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

Dear Ms. Reid,

The NC League of Municipalities is a membership organization of over 550 municipalities and affiliate organizations. The League members have identified nutrient management as their top regulatory concern, recommending the following goal: "Support solutions addressing nutrient impairment in waters that are based on site-specific data and analysis, demonstrate use impairment, assign responsibility proportionate to the source of impairment, and include measures to equitably hold accountable all contributors to the impairment."

League members have prioritized this issue because municipalities assume a primary responsibility for implementing the requirements of the federal Clean Water Act (CWA). This responsibility comes because many municipalities hold wastewater and/or MS4 stormwater permits, which allow them to discharge into various waters of the state. When one of those water bodies exceeds the numerical criteria measuring the effects of nutrients on those waters and is determined to be impaired, the CWA requires clean-up plans. In those instances, permitted dischargers to impaired waters, like municipalities, receive new permit limits and program directives as they become subject to nutrient management strategies. Due to the increased obligations they must assume in implementing strategies, municipal permit-holders have a great interest in all aspects of nutrient management, starting with the development of nutrient criteria.

The League's member cities, towns, and affiliates therefore appreciate the opportunity to provide advance input on the state's revisions to its Nutrient Criteria Development Plan (NCDP). Given the large public and private resources needed to address nutrient impairment in water bodies, the League strongly supports the N.C. Division of Water Quality (DWQ) as it leads a robust, open process for all stages of nutrient management. In particular, League members appreciate the outreach effort by DWQ to inform the public of the purpose of the NCDP through the series of public meetings held in December.

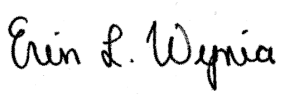
However, League members have concerns regarding the timing of this effort. Based on the timelines shared at the December meetings, it appears that the actual NCDP will only be available for public review for a minimal time – no more than 10-14 days – prior to a planned March vote on the NCDP by the N.C. Environmental Management Commission (EMC) Water Quality Committee. League members do

not believe this abbreviated schedule will provide adequate time for review of the draft plan, impacting their ability to respond with meaningful comments for EMC commissioners. While recognizing the U.S. Environmental Protection Agency's (EPA) desire to have an approved NCDP by June, the League all the same requests that DWQ and the EMC postpone consideration of the NCDP until the May/July pair of EMC meetings. Such a delay would allow a more reasonable amount of time for a full public review of the proposal. A one-month delay on submitting the plan to EPA is a reasonable accommodation to allow a complete public process and is in accordance with EPA's desire to have a partnership between the state and stakeholders on this issue.

The League members offer the enclosed thoughts and principles for DWQ to incorporate into the updated NCDP. Many of the League member cities and towns have already accumulated a substantial amount of experience in addressing nutrient impairment, through compliance with the nutrient rules for Jordan Lake, Falls Lake, Randleman Lake, Goose Creek, Neuse River, and the Tar-Pamlico River. The thoughts offered below are directly informed by their experience. In addition, many of the points are drawn from the presentations given at the N.C. Forum on Nutrient Over-Enrichment earlier this year. Aside from comments on nutrient criteria, a discussion of other aspects of nutrient management such as impairment decisions or implementation measures is offered to inform the development of criteria. Many of these over-arching principles apply to both criteria development and other aspects of nutrient control regulation.

Again, thank you for the opportunity to provide advance input at this stage of nutrient criteria development. The League anticipates providing further comments once a draft NCDP becomes available, and looks forward to working with DWQ staff and EMC members in the coming months to create an NCDP tailored to North Carolina's specific water quality needs.

Respectfully submitted,



Erin L. Wynia
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1. ***Blend causal and response variables.*** Most importantly, League members firmly support an approach to nutrient criteria standards that blends both causal variables (e.g., nitrogen and phosphorus) and response variables (e.g., biological measures). Numerous presenters at the N.C. Forum on Nutrient Over-Enrichment reported that measuring only nitrogen and phosphorus levels in waters provides a poor mechanism to evaluate impairment, given the insufficient scientific links between nutrient levels in waters and evidence of impairment. Particularly in flowing waters such as rivers and streams, inputs such as temperature, light, flow, and the physical structure of the streams may contribute to impairment as much as nitrogen and phosphorus inputs.

   The League therefore recommends that DWQ investigate methods for using response variables to confirm that a water body's biology – and by extension, its designated uses – are impacted by any elevated nutrient levels. EPA has approved this general approach in other states, such as Florida, Maine, and Ohio. The approaches from all three of these states were examined in-depth at the nutrient forum, giving DWQ a good starting point when developing North Carolina's approach. The League supports an approach to writing nutrient criteria standards that tightly ties causal measures to (1) response variables and (2) impacts on a water body's designated uses.

   →***Looking beyond standard-setting:*** The League suggests that the state's "use assessment methodology," when describing how to make impairment designations for instances of nutrient criteria exceedances, require further study and confirmation of actual impacts to designated uses *before* declaring a water body as impaired for nutrients. In the case of nutrient impairments, the dedication of resources to address the impairment is simply too great not to take additional measures to confirm the impairment.

2. ***Avoid a one-size-fits-all approach***. Equally important as measuring the appropriate parameters is accounting for different characteristics between water bodies across the state. North Carolina is a large state with a significant amount of diversity in its ecological systems. In addition to the three dominant geographical regions in the state, North Carolina enjoys a host of ecoregions and water body types. The nutrient forum demonstrated that lakes, streams, and estuaries all have different capacities for nutrient absorption. In addition, these various water body types are subject to different nutrient inputs, not all of which are attributable to regulated discharges. Given this wide range of water body characteristics, the League recommends that DWQ include in the NCDP further research to inform a scientifically-defensible categorization of the state's waters, with nutrient criteria tailored to the specific characteristics of each category.

→***Looking beyond standard-setting:*** In tandem with considering the broader range of water body characteristics for criteria development, the League recommends a similar reconsideration of the designated uses of each water body type. Under the CWA, designated uses are evaluated along with criteria, or standards, when determining the impairment status of a water body. Ecological and recreational designated uses may differ between water body classifications, and they can often be in conflict. The League recommends that DWQ design an NCDP project to support a reconsideration of designated uses, including the possibility that for some water systems, competing uses may need to be prioritized to achieve an optimal water quality result.

3. ***Perform site-specific analyses***. Due to the extreme variability in the effects of nutrient inputs on any given water body, any nutrient criteria should include a verification component that confirms the impairment state of the specific waters. For example, some water systems naturally contain elevated levels of nutrients when compared to other waters that do not absorb nutrients at the same rate. Elements of the NCDP should account for this natural variability in nutrient levels by exploring the appropriate steps to take to confirm actual impairment of specific waters. Importantly, EPA also encourages tailoring criteria to specific localized conditions (Grubbs memo, 2001, pg. 2).

   The League also anticipates the NCDP will set out a schedule to prioritize activities that will ultimately lead to development of nutrient criteria. Admittedly, site-specific analysis activities such as monitoring – while necessary with such an unwieldy water quality issue as nutrient impairment – are labor- and resource-intensive. In light of these constraints, when examining ways to efficiently integrate site-specific analysis into the state's nutrient criteria, DWQ could benefit from prioritizing ecological systems for this more in-depth analysis.

   →***Looking beyond standard-setting:*** The League recommends that DWQ extend this principle of site-specific analysis beyond criteria development to making impairment determinations. Once nutrient criteria have been exceeded, but before an impairment determination is made, the League expects DWQ to conduct thorough site-specific analysis into whether a water body's designated uses are impaired as well. Such an analysis would likely include measurements of the water body's biological characteristics to verify whether the nutrient inputs are actually harming the aquatic life of the particular water body.

4. ***Integrate flexibility into criteria***. As explained above, with respect to the wide variability of the effects of nutrient inputs on the health of different waters, the League supports a flexible approach to criteria development. The nutrient forum prompted several possibilities:

a. Develop a range in values for both causal and response variables, indicating where specific water body types should fall within those ranges;
b. Set criteria for each classification of waters, possibly using different methods to set this criteria depending on the pertinent characteristics of that water body type;
c. Follow Maine's example, setting criteria based on both causal and response variables but including an option in the criteria for site-specific nutrient values.

→***Looking beyond standard-setting:*** The principle of flexibility is a central tenet to effective nutrient management in the state's waters. Without flexibility to tailor management solutions to the specific needs of various water bodies, significant public and private resources may be spent in an inadequate pursuit of improving water quality. Likewise, without the flexibility to conduct further studies on whether a water body meets its designated uses upon detection of elevated nutrient levels, impairment determinations would not accurately reflect conditions in the water body. The League therefore encourages a basic principle of flexibility throughout the nutrient regulatory process.

5. ***Incorporate cost-benefit analysis***. The League recommends that the NCDP include projects aimed at setting the appropriate *levels* of any selected nutrient criteria, including incorporating a cost-benefit analysis into any decision-making. A cost-benefit analysis would also form a solid basis for NCDP projects that might examine different water body classification categories, especially when needing to weigh competing designated uses of various water bodies. The League would note that already, a cost-benefit analysis is required of all regulations such as new surface water standards/criteria and water body classifications under the N.C. Administrative Procedures Act, through the fiscal note requirement.

→***Looking beyond standard-setting:*** While the NCDP primarily addresses water body standards and classifications, the impacts of these regulations are mostly felt from implementation plans that result from exceedances of those standards and classifications. Therefore, in this area, League members firmly believe cost-benefit analysis should overlay all nutrient management strategy decisions. One basic tenet of these management strategies should hold that the cost of implementing a particular nutrient control must be in proportion to the expected reduction in nutrient loads to the water body. Implementation strategies should also explore innovations such as nutrient trading to stimulate effective reductions of nutrient loads at the most reasonable cost.

6. ***Conduct further research***. To make the final nutrient criteria as scientifically sound as possible, the League recommends several NCDP research projects:

a. First, building off research presented at the nutrient forum, the NCDP should include a project to examine the effect of legacy groundwater contributions to a water body's nutrient load.

b. The plan should also include projects to examine the appropriate variable (or nitrogen-to-phosphorus ratio) to measure for each water body type. For example, the nutrient forum presented research showing that in lakes, phosphorus controls algal *quantity* while nitrogen controls the *quality/type* of algae. North Carolina's projects should examine these effects more closely when deciding the appropriate parameter to use in the eventual regulatory scheme.

c. The plan would also benefit from identification of water body types needing further monitoring to support valid criteria, especially in light of the already-identified deficiency in data for streams and other flowing waters.

d. Finally, the plan should include research projects to examine the effects of inorganic and organic nitrogen on various water body types. Such projects would influence any final numeric criteria set for causal parameters such as nitrogen.

However, the League also recognizes that while DWQ undertakes the necessary research to fill data gaps in the current plan, the NCDP must demonstrate a commitment to further nutrient controls *now*. Current activities to control nutrient impairments of lakes and estuaries – an area DWQ has determined is sufficiently addressed through its long-standing chlorophyll-*a* approach – will no doubt continue throughout the time needed to complete NCDP research projects. The NCDP can identify such planned activities to show the state's continued commitment to addressing nutrient impairment.

→ ***Looking beyond standard-setting:*** The nutrient forum demonstrated the scientific uncertainty that still exists when designing effective nutrient management strategies. And closer to home, N.C. researchers continue to investigate the effectiveness of various strategies, particularly non-point source controls such as urban stormwater management techniques. Whether in the NCDP or beyond, the League recommends that DWQ devise research projects to measure the effectiveness of a wide variety of non-point source control techniques, tailoring the projects to each of the different water body types in the state. The non-point sources to consider should include, at a minimum, urban stormwater, crop and animal agriculture, septic, groundwater, and atmospheric contributors. This research would ideally result in management strategies that more effectively target nutrient inputs.

7. ***Examine alternatives to the threshold "protection" approach.*** As with the threshold rules proposal advanced by DWQ in 2010, League members continue to strenuously object to any regulatory approach which imposes permit limits and other nutrient control strategies upon the occurrence of exceedances of a numerical value that is *not* the water quality standard. The threshold approach and any other similar approaches remain flawed because they do not adequately reflect *trends* in water bodies. The League therefore recommends that the NCDP contain projects to explore methods that would accurately determine a particular water body was headed toward impairment.

   → ***Looking beyond standard-setting:*** Upon detection and validation of a water body's trend toward impairment, the League suggests that DWQ consider non-regulatory approaches to work with proven nutrient contributors to that water body and the public. Communication of the trend with contributors and the public may assume a primary tactic in this approach. The communications should contain solid evidence of a trend toward degradation, accompanied by suggested control strategies and information on the consequences of violating a water quality standard.

January 29, 2013

By First Class and Electronic Mail

Ms. Dianne Reid, Classifications & Standards Unit Supervisor
Division of Water Quality
NC Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

RE: **Recommendations for Revision of North Carolina's Nutrient Criteria Development Plan**

Dear Dianne:

I am writing on behalf of the North Carolina Water Quality Association (NCWQA) to convey the attached recommendations for revising North Carolina's Nutrient Criteria Development Plan.

We appreciate the Department's thoughtful consideration of these comments, and look forward to working with the Department to update and enhance the state's nutrient control programs. If you have any questions or would like to discuss these issues, please feel free to contact me at 704-336-4460 or JJarrell@ci.charlotte.nc.us.

Sincerely,

Jacqueline A. Jarrell, P.E.
Chair, NCWQA Nutrient Committee

Attachment

C: NCWQA Board
Mr. Clifton Bell

NORTH CAROLINA WATER QUALITY ASSOCIATION

JANUARY 29, 2013

RECOMMENDATIONS FOR REVISION OF NORTH CAROLINA'S NUTRIENT CRITERIA DEVELOPMENT PAN

Background

The North Carolina Division of Water Quality (DWQ) is updating its Nutrient Criteria Development Plan (NCDP) for submittal later this year to the Environmental Management Commission (EMC) and U.S. Environmental Protection Agency (USEPA). As a major stakeholder in water quality protection, the North Carolina Water Quality Association (NCWQA) appreciates DWQ's commitment to an open, science-based process for refining DWQ's NCDP and related policies. This document provides NCWQA's recommendations for revising the NCDP in 2013. Our recommendations seek to retain the strengths of North Carolina's existing approaches while refining the NCDP to take advantage of recent significant technical and regulatory developments relating to nutrient control.

In a previous communication (Attachment 1), we outlined the NCWQA's six priorities for DWQ's development of nutrient policies. Our priorities seek to ensure that DWQ's nutrient management strategy is science-based, flexible, proactive, equitable, cost-effective, and sustainable. The North Carolina Forum on Nutrient Enrichment conducted in May 2012 was an excellent educational event that reinforced and expanded on the importance of each of these priorities. Our specific recommendations follow.

NCWQA's Recommendations for NCDP Revision

1. *The NCDP should build upon the foundation of North Carolina's existing successful programs*. North Carolina has long been a national leader in the use of response criteria (chlorophyll-*a*), nutrient trading, and developing basin-specific nutrient reduction strategies. The state has a variety of regulations and programs for addressing nutrients, including the Nutrient Sensitive Waters classification and standards (15A NCAC 02B .0223), basin planning program, water quality criteria, NPDES permitting program, and nutrient-based agricultural cost-share programs. In fact, North Carolina can point to existing programs for all eight of EPA's recommended elements for a state nutrient management framework (USEPA, 2011). Although there are opportunities to enhance these elements, NCWQA

recommends that the NCDP emphasize the effective leveraging, coordination, and refinement of existing programs, and adopt major new elements only as necessary to address any major regulatory gaps.

2. *Refinements to the NCDP should retain North Carolina's focus on response criteria over numeric nutrient criteria*. One the major challenges that states have faced in deriving numeric nutrient criteria (NNC) is that nutrient concentrations are very poor predictors of use attainment in many hydrologic settings. The lack of simple dose-response relationships is caused by many water body-specific factors (e.g., hydraulic residence time, light availability, top-down controls) that affect how water bodies respond to nutrient loading (USEPA Science Advisory Board, 2010). The scientific weakness of independently-applicable NNC is one of primary conflicts underlying criteria adoption in Florida (Durbin, 2012). USEPA's listed reasons for advocating NNC (Gilinksy, 2012) appear to be rooted in ease of promoting nutrient reductions rather than defensible linkages to use attainment. However, it should be noted that USEPA's own "flagship" nutrient strategy for the Chesapeake Bay did not use NNC, but instead relied on models to translate between nutrient loading and key response criteria (Batiuk, 2012).

   DWQ has aggressively pushed back against a knee-jerk reliance on nitrogen and phosphorous numeric criteria. Prior DWQ Director Coleen Sullins was frequently quoted as saying that "the right tool is not always a number." We could not agree more.

   North Carolina has effectively identified nutrient impairments through the use of response criteria (chlorophyll-*a*, dissolved oxygen), which can be more defensibly linked to designated uses and which inherently incorporate water-body-specific characteristics. Similarly, other states have made progress in developing criteria that emphasize the biological response of water bodies over nutrient concentrations, even if nutrient concentrations are also considered. Examples provided at the North Carolina Nutrient Forum include:

   - Ohio's proposed trophic index criterion, which includes both nutrient concentrations and biological response variables (Miltner, 2012).
   - Maine's DEP use of biological information in assessment and to identify waters where a site-specific nutrient criterion would be appropriate (Danielson, 2012).
   - Florida's DEP's proposed use of biological information to verify nutrient impairments in streams (FDEP, 2012).

   North Carolina's existing NCDP (DWQ, 2005) cites the intention to rely on "regionally specific nutrient response criteria" such as chlorophyll-*a* and phytoplankton measures. NCWQA believes the NCDP should retain this focus and reliance on response criteria instead of NNC. NCWQA also encourages DWQ to explore approaches for incorporating biological information into assessments to address and correct false positive findings of impairment. Information presented at the Nutrient Forum and communications with USEPA Region IV hold promise that USEPA will be open to scientifically-grounded alternatives to

independently-applicable NNC. This is the right approach for North Carolina so we urge DWQ to continue pressing EPA to accommodate this approach.

3. *An option for site-specific criteria development must be provided*. Closely related to the recommendation above, we urge DWQ to include a provision for adopting water body-specific nutrient criteria. The importance of site-specific criteria is rooted in the wide variability in how water bodies respond to nutrient loadings. The opportunity to establish site-specific criteria will be useful for (1) addressing site-specific variability in the relation between response variables and higher-level biological responses; (2) adjusting criteria for water bodies that have historically exceeded default criteria while still meeting designated uses; (3) recognizing that some water bodies will exceed default criteria due to natural causes such as low hydraulic flushing; and (4) providing additional, scientifically-based, protection for selected outstanding resource waters. DWQ has acknowledged the almost stream-by-stream variability in nutrient issues. Give the expense and regulatory implications of nutrient control requirements we believe an option for site-specific criteria development is essential.

4. *Any new response criteria should have a demonstrated cause and effect relationship with designated use attainment*. The existing NCDP indicates that North Carolina will explore the utility of alternative response criteria such periphyton measures in streams. NCWQA supports the investigation of alternative response variables, but with the strong encouragement that such variables only be adopted as criteria if they can be defensibly linked to impacts on aquatic life, recreation, drinking water, or other designated uses. Such linkages should go beyond mere statistical correlations to include mechanistic, cause-and-effect relations which are demonstrated by scientific investigation. This is not to advocate that all scientific uncertainty in criteria-use linkages can or must be eliminated.

   For example, North Carolina's existing NCDP indicates that the state will explore various algal measures in streams such as periphytic chlorophyll-*a*, percent coverage, and diatom indices of biotic integrity (IBI). Diatom IBIs are an example of an indicator that may or may not have direct meaning for designated use attainment. In contrast, high accumulations of nuisance or toxic algal taxa may directly impact high trophic levels or other uses. NCWQA looks forward to working with DWQ to evaluate the utility of alternative response criteria.

5. *North Carolina should consider refinement of designated uses in concert with criteria development*. In order to achieve the most defensible links between criteria and designated uses, it may be necessary to refine designated use categories. This could take the form of a tiered aquatic life use (TALU) framework that acknowledges variation in the biological potential of different water bodies. Several states (e.g., MN, ME, NJ) have developed TALUs which provide higher levels of protection for higher quality or value streams. Similarly, USEPA led the Chesapeake Bay states in a process to refine the designated uses of Bay waters into ecologically-based categories (migratory & spawning waters, shallow water, open water, deep water, etc.). We encourage DWQ to consider and implement similar TALU

and spatial concepts to further tailor use designations in conjunction with criteria development.

6. *Criteria frequency and averaging periods should accommodate environmental variability*. Although much of the focus often falls on criteria magnitude, criteria frequency and duration (averaging period) must also be carefully considered. The response of may water bodies to nutrient loading can vary a great deal based upon hydrologic, seasonal, and inter-annual variability. Criteria frequency and averaging periods should be set to avoid assessment being largely influenced by uncontrollable short-term peaks or unusual hydrologic years. For example, Florida DEP's proposed nutrient criteria for lakes and streams are expressed as an annual geometric mean not to be exceeded more than once in a three-year assessment period (FDEP, 2012). This approach de-emphasizes outliers and unusual loading events (e.g., hurricanes) and emphasizes the long-term status of the water body. NCWQA encourages DWQ to consider similar approaches for North Carolina.

7. *Proactive/preventative strategies should retain flexible implementation mechanisms and not default to limit-of-technology treatment requirements*. As written, the existing NCDP indicates that the state would retain equitable, basin-specific approaches for preventing further degradation of nutrient enriched water bodes. For example, it states that the DWQ would "develop and implement a comprehensive, *site-specific* [emphasis added] strategy for all nutrient enriched waters" that would "address both point and nonpoint sources". NCWQA recommends that the revised NCDP retain and reemphasize the need for basin specific planning approaches and non-regulatory agreements among dischargers over stringent, one-size-fits-all treatment requirements for regulated sources.

   The NCDP's concepts on protecting nutrient enriched waters led to the proposed "chlorophyll-*a* threshold rules" to which NCWQA objected in 2011. NCWQA's objections were not rooted in opposition to proactive measures or the use of scientifically-defensible response thresholds to diagnose potential nutrient enrichment. Rather, NCWQA opposed the automatic triggering of highly-stringent and non-cost-effective point source controls without consideration of equity, need, and basin-specific characteristics for situations where impairment was not occurring but a threshold below the impairment level was being exceeded. This approach appeared to depart both from DWQ's successful basin-specific planning approaches and the original intent of the NCDP.

   As discussed during the Nutrient Forum, limit-of-technology nutrient removal is often not necessary and comes with significant countervailing environmental impacts, undermining it as a sustainable approach to reduce nutrients on a basin scale (Bell, 2012). Attaining the most stringent treatment tiers requires significant construction, energy, chemicals, greenhouse gas emissions, and waste materials generation to remove a relatively small amount of the remaining nutrients (Falk and others, 2011). Especially in nonpoint-source dominated basins, these costs will often outweigh the potential to affect algal responses, and more moderate treatment requirements will be more appropriate. For this reason, NCWQA recommends that any default technology-based requirements for point sources be

set at moderate treatment levels, and that more stringent treatment levels only be imposed if the need and cost-effectiveness can be demonstrated on a basin-specific level to specifically prevent impairment. The NCWQA would be glad to work with DWQ to define moderate treatment levels and could provide supplement technical and cost information to support such a definitional effort.

Furthermore, point source controls should not be imposed in the absence of a basinwide planning methodology that addresses all major sources. Basin planning efforts should evaluate the cumulative impact of sources such as treatment plants, cropland, animal operations, and atmospheric deposition. It is important to consider the long-term impacts of sources that discharge directly to surface water and those that load nutrients to groundwater which subsequently enter surface waters.

8. *Proactive/preventative strategies should include the confirmation of increasing trends in response variables*. The diagnosis of nutrient enrichment—and the need for preventative management—should be based not only on the magnitude of response variables, but also on trends. For example, if a water body historically exceeded chlorophyll-*a* thresholds but showed no signs of degradation, it may not require as aggressive management as a water body with increasing trends. The planning response should include an investigation of why response variables are changing (nutrient loads, streamflow/climatic trends, natural cycles) before jumping to the imposition of aggressive nutrient control requirements.

9. *Implementation approaches should include nutrient trading and offsets*. North Carolina has been a national leader in nutrient trading, which has been shown to facilitate implementation and lower overall costs (Houtven and others, 2012). As North Carolina revises the NCDP, DWQ must retain and expand options for nutrient trading and offsets. Given the high costs of nutrient controls, it is important that localities receive credit for all effective nutrient reduction practices that can be documented. Septic system hook-ups are an example of an effective nutrient reduction practice for which North Carolina currently lacks a clear mechanism for crediting, although other states (e.g., VA, MD) in the mid-Atlantic region do provide credits for this practice. It is recommended that the NCDP identify the need for a statewide review of nutrient reduction practices and how they can be credited so that we provide incentives (rather than disincentives) for ongoing cost-effective nutrient reductions.

10. *Implementation mechanisms should include cost-benefit analyses*. As discussed at the Nutrient Forum, nutrient controls practices vary over several orders of magnitude regarding the cost-per-pound of nutrients removed. Similarly, nutrient reduction practices vary a great deal regarding ancillary benefits (stream protection, wildlife habitat, flooding reduction, aesthetics) and detriments (energy use, waste production, greenhouse gas emissions, etc.). In order to achieve the greatest environmental benefit with limited resources, holistic cost-benefit analyses should be a mandatory element of basin-specific implementation mechanisms.

11. *The NCDP should include a realistic, staged schedule that makes near-term progress while providing sufficient time for needed research and cost-effective long-term implementation*. The NCDP will include a revised schedule and milestones. Some of the NCDP elements (e.g., the exploration of alternative response variables) will require significant time for both scientific research and translating the results of that research into effective policies/regulations. Underestimation of the time required to identify and adopt scientifically-defensible criteria has been a major reason for the need to repeatedly revise states' NCDPs. The NCDP should provide short- and moderate-term milestones that emphasize leveraging/refinement of the State's existing programs, and longer-term milestones for elements requiring scientific research.

12. *The public review period for the NCDP should allow time for meaningful input and revision*. We urge the Department to provide a public review period of at least 30 days on the proposed revisions to the NCDP. Moreover, DWQ should provide adequate time for it to review and incorporate those comments, as warranted, before taking the final revision to the NCDP to the EMC. This will help ensure that the public review is meaningful and could increase stakeholder buy-in to the NCDP.

The Department's May 2012 Nutrient Forum demonstrated a commitment to an open, science-based process for refining nutrient policies. NCWQA greatly appreciates this approach, and encourages DWQ to continue to provide opportunities for both public participation and technical input. The NCWQA membership is largely composed of water quality professionals, and the organization has a great depth of expertise in water quality science, engineering, and policy. Our members have been leaders in a number of the Basin programs across the State. We would like to serve as constructive partner with DWQ in developing defensible, protective standards. As such, NCWQA would welcome the opportunity to both participate in public forums and serve as a technical resource to DWQ on NCDP-related issues.

Thank you for considering these comments.

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ATTACHMENT 1

NORTH CAROLINA WATER QUALITY ASSOCIATION

SEPTEMBER 16, 2011

PRIORITIES FOR NUTRIENT MANAGEMENT STRATEGIES

Background

North Carolina has various existing laws, regulations and policies to address nutrient loadings to surface waters. Like other states, North Carolina also faces the challenge of EPA expectations for numeric nutrient criteria (NNC), and is pursuing a nutrient criteria implementation plan. In recent years, DWQ drafted "chlorophyll-a threshold rules" that would have mandated specific, stringent management measures for water bodies deemed to be nutrient enriched. DWQ is currently exploring alternatives to the threshold rules, and is planning a scientific forum on the topic in early 2012.

As a major stakeholder in the protection of state waters, the North Carolina Water Quality Association (NCWQA) is committed to a constructive partnership with DWQ and other stakeholders on nutrient management issues. Our goal is to identify viable nutrient management strategies, either by leveraging existing approaches or enhancing/augmenting these approaches, as necessary. As a first step, the NCWQA has developed a list of priorities for nutrient management strategies. It is hoped that this list will be a useful tool for communication with DWQ, and also for future evaluation of the potential alternatives.

Priority #1—Science-Based

Nutrient management strategies should be based on an understanding of the relationship between nutrient loadings, water body responses, and designated use attainment. In practice, this means that policies should: (1) use meaningful response variables that are effective indicators of designated use attainment; (2) allow the use of quantitative, predictive tools for linking nutrient management actions with water quality responses; and (3) allow the flexibility to easily adopt site-specific alternative criteria for local waterways. Lacking such elements, there can be no assurance that the correct nutrient is being controlled, or that appropriate and cost-effective controls are established.

Priority #2—Flexible Rather Than One-Size-Fits-All

Nutrient load sources and reduction opportunities vary greatly between watersheds. Nutrient-related policies should allow the flexibility to tailor management approaches to specific basins, while achieving the total load reduction goal(s) that will result in attainment of the designated use. This will allow targeting of the most effective (and cost-effective) control measures.

Flexibility is also required to allow trading and offsets between source sectors, which has been shown to greatly reduce overall implementation costs and to accelerate loading reductions. Flexibility in implementation schedules is also needed.

Priority #3—Preventative Rather That Just Reactive

The NCWQA recognizes the importance of preventing nutrient impairments, rather than merely reacting to impairments after they occur. NCWQA expects this priority to be a topic of major discussion as existing approaches and potential alternatives are considered.

Priority #4—Address All Major Sources

Consideration of all major nutrient sources is a matter of fundamental equity. However, beyond equity, it is also necessary to ensure that the desired water quality benefits are actually realized. Past experience has shown that focusing on easily-regulated sources, to the exclusion of other sources, has resulting in major public expenditures without any commensurate water quality benefits. Any policy evaluation should include the consideration of amendments to State law to effectively and appropriately include all major sources. New control requirements should not be imposed on regulated sources disproportionately to other major sources.

Priority #5—Cost-Effective and Attainable

Nutrient-related approaches should be cost-effective. This will ensure that limited public and private resources are used in the most beneficial manner. For example, for the point source sector, the cost-per-pound reduced increases drastically as treatment plants are pushed ever closer to the limit of nutrient control technologies. Similarly, nonpoint source BMPs can vary in cost-effectiveness over orders or magnitude. Nutrient management approaches should have realistic goals and compliance schedules that consider socioeconomic impacts and competing priorities for limited public and private resources.

Priority #6 – Sustainable

Nutrient removal at most POTWs is extremely energy-intensive, can require significant amounts of chemicals, increase biosolids, and increase greenhouse gas emissions, among other negative environmental impacts. Conversely, nonpoint source nutrient reduction practices typically can provide ancillary environmental benefits such as the provision of wildlife habitat, flood hazard reduction, carbon sequestration, riparian zone protection, and public health protection. North Carolina's nutrient management strategies must consider the overall environmental impact of the approaches that will be employed.

Memo to: NC Division of Water Quality, in particular Nora Deamer, Kathy Stecker, Cam McNutt, Carrie Ruhlman
From: Dr. Michael A. Mallin, Research Professor, UNC Wilmington Center for Marine Sciences
Date: November 28, 2012
Subject: NC DWQ / Coalition sampling methods issue

The NC Division of Water Quality recently asked for public comment regarding use assessment methodology and field sampling methods. This memo addresses in particular inadequacy of the current methods(s) for collecting chlorophyll *a* samples.

Historically, the Cape Fear River and estuary historically hosted few algal blooms due to two factors 1) the estuary has a relatively fast flushing time of approximately seven days (Ensign et al. 2004), and 2) Piedmont-derived turbidity (Mallin et al. 1999; Dubbs and Whalen 2008) and organic color from Coastal Plain tributaries (Mallin et al. 2004) combine to rapidly attenuate surface irradiance (light) in the water column. However, in recent years (2009-2012), this river has been host to annual, unprecedented cyanobacterial blooms consisting primarily, but not exclusively, of *Microcystis aeruginosa*, at one point impacting 75 miles of the river. These are surface blooms (see photograph below), thus they overcome the problem of available water column light. This species has long been known as a toxin-producing organism (Burkholder 2002). The blooms have occurred in the summer months; sometimes in early fall as well, and have centered in the reach of the river from just above Lock and Dam #1 downstream to the Black River (NCDWQ 2011). In 2011 additional cyanobacterial blooms (including *Microcystis*) occurred in the Northeast Cape Fear River, leading to strong hypoxia with dissolved oxygen levels falling to 0.7 mg/L (Stephanie Petter Garrett, NCDWQ, personal communication, July and August 2011). These blooms represent a serious emerging threat to the river both in terms of ecosystem health and human health.

The lower Cape Fear River and estuary are currently on the North Carolina 303(d) list for impaired water due to low dissolved oxygen, or hypoxia (NCDWQ 2005). One cause of hypoxia in the Cape Fear system is algal blooms. Long-term chlorophyll *a* and BOD data collected by

researchers from the University of North Carolina Wilmington (UNCW) have demonstrated that at Station NC11, just downstream of Lock and Dam #1, chlorophyll *a* and BOD are strongly correlated, r = 0.53, p = 0.0001 (Mallin et al. 2006). Such lowered DO can stress resident and migratory fish and even pose a migratory barrier. In 2012 my laboratory conducted chlorophyll and BOD sampling in bloom conditions and found that these is a strong statistical relationship between the two parameters (Fig. 1); i.e. algal blooms drive BOD in this oxygen stressed river. Whereas in the case of an isolated bloom such a BOD source may not be important, when such blooms extend for several river miles (as they frequently do) they can become a significant source of labile BOD. The relationship between these surface cyanobacterial blooms and BOD has not yet been addressed in models used to produce a needed TMDL in this river. Especially since these blooms occur in summer, when DO is already stressed, such an oversight must be corrected.

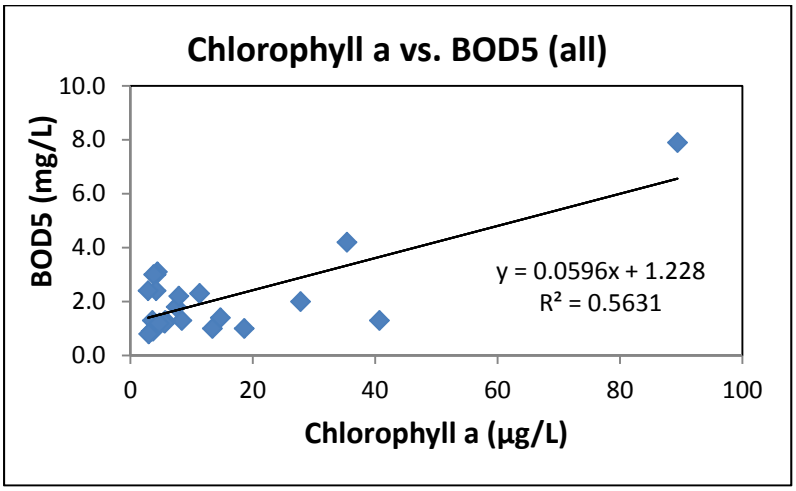

Figure 1. BOD as a function of chlorophyll *a* in July, 2012, Cape Fear River below Lock and Dam #1.

Regarding human and fish health, at least some of the blooms in the main stem of the Cape Fear have produced toxins. The North Carolina Division of Public Health had a 2009 bloom sample from Lock and Dam #1 tested and it came out positive for 73 ppb (µg/L) of microcystin (Dr. Mina Shehee, NC Division of Public Health, memo September 25, 2011), resulting in an advisory to keep children and dogs from swimming in the waters. For comparison, the World Health Organization has a guideline of < 1.0 µg/L of microcystin-LR for drinking water. Additionally, a UNCW Marine Science student directed by chemist Dr. Jeff Wright isolated two hepatotoxins, microcystin LR and microcystin RR, from Cape Fear *Microcystis aeruginosa* blooms in 2009 (Isaacs 2011).

Despite the outbreak of these unprecedented blooms, current sampling methods do not reflect the magnitude of the problem. Based on the 2008 NPDES Discharge Monitoring Coalition Program Field Monitoring Guidance, Version 1.0, sampling for chlorophyll *a* is either to be done by grabs 15 cm below surface, or integrated sampling from 2X Secchi depth to the surface. However, the *Microcystis* blooms are massed at the surface. Sampling performed by my laboratory in summer

20102 demonstrates that surface sampling must be performed in order to properly quantify these blooms (Fig. 2).

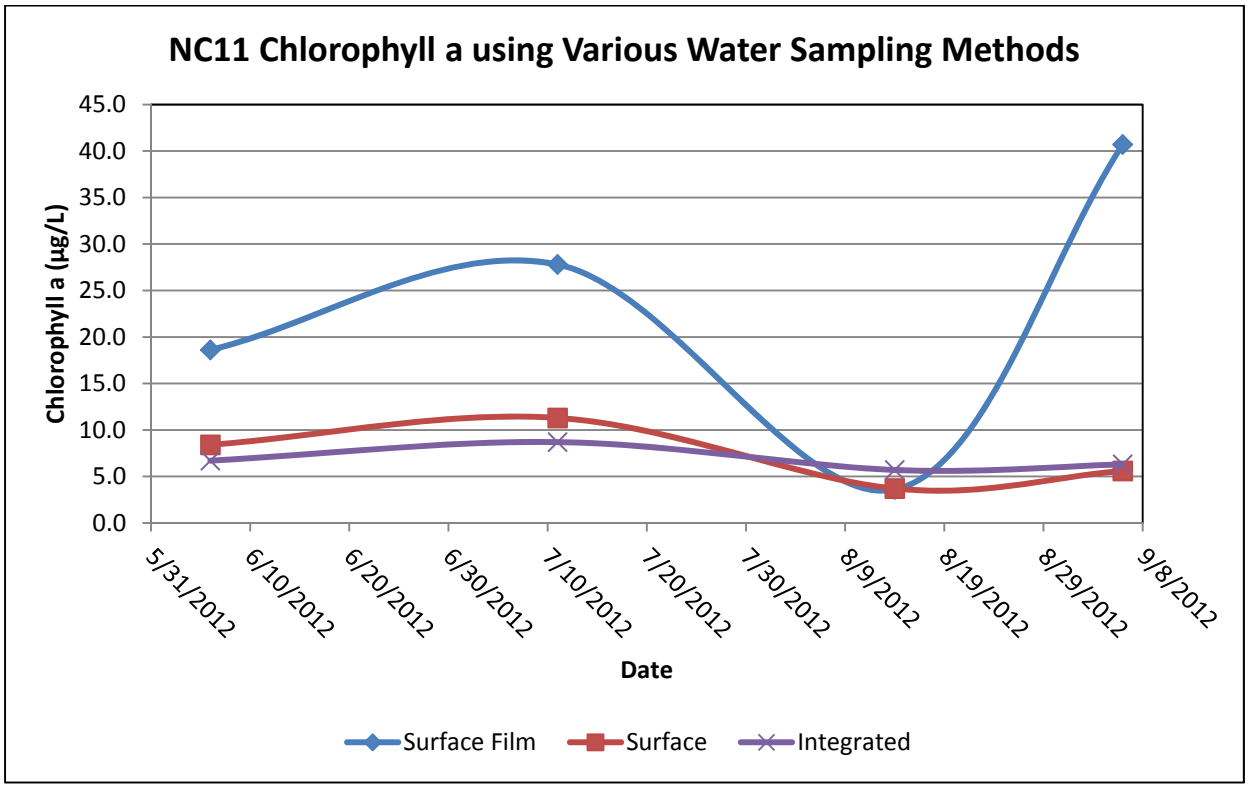

Figure 2. Illustration of summer 2012 sampling in the Cape Fear River below Lock and Dam #1, demonstrating that subsurface grab samples (shown in red, 15 cm below surface) and integrated sampling (shown in purple) both greatly underestimate *Microcystis* bloom biomass compared with surface film sampling (shown in blue).

Based on the cyanobacterial bloom formation frequency, extensive areal coverage, toxicity, and impacts to dissolved oxygen, I strongly urge the Division of Water Quality to modify assessment field methods to properly quantify *Microcystis* bloom samples by adding surface film sampling as a standard means to assess chlorophyll *a* biomass when such blooms are visible.

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From: Cahoon, Larry [cahoon@uncw.edu]
Sent: Monday, December 17, 2012 4:08 PM
To: Stecker, Kathy; Mcnutt, Cam; Deamer, Nora
Cc: Ruhlman, Carrie
Subject: RE: Ambient monitoring comments regarding chlorophyll a

Hello, I'd like to support and amplify the remarks my colleague, Dr. Mike Mallin, made to you a few weeks ago regarding field sampling for chlorophyll. I think it's important to reinforce the limited ability of suspended phytoplankton biomass, measured as chlorophyll a, to reflect nutrient fluxes in most aquatic ecosystems. As you are no doubt well aware, most freshwater systems exhibit very large growths of various aquatic macrophytes as well as periphyton and benthic microalgae. I note that in my experience many surface waters exhibit substantially greater plant biomass in these forms than in phytoplankton form. The diversity of these plants makes sampling repeatable, quantitative sampling and measurement in comparable units extremely difficult. I would be curious if the Division has been able to identify standard methods adequate for the purpose. Dr. Mallin noted the difficulties of sampling floating algal scums adequately. The photograph below illustrates a mixed Lemna/Azolla bloom on the surface of Rockfish Creek in Duplin County. This stream clearly has a nutrient loading issue, but would exhibit chlorophyll a values by standard methods well below the 40 ug/L threshold. I look forward to seeing more inclusive standards adopted.

Lawrence B. Cahoon, Professor
Biology and Marine Biology
University of N C Wilmington
910-962-3706

February 4, 2013

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Re: North Carolina's Nutrient Criteria Development Plan

Dear Environmental Management Commissioners and Division of Water Quality Staff:

Thank you for the opportunity to comment on the North Carolina Division of Water Quality ("NCDWQ") plan to develop a modified Nutrient Criteria Development Plan. These comments are submitted by WATERKEEPER® ALLIANCE ("WKA") and WATERKEEPERS® CAROLINA ("WKC"), an umbrella group that represents all ten Waterkeeper programs in North Carolina, including the Cape Fear RIVERKEEPER®, Catawba RIVERKEEPER®, French Broad RIVERKEEPER®, Haw RIVERKEEPER®, Pamlico-Tar RIVERKEEPER®, Upper & Lower Neuse RIVERKEEPERS®, Waccamaw RIVERKEEPER®, Watauga RIVERKEEPER®, White Oak New RIVERKEEPER®, and Yadkin RIVERKEEPER®. Our organizations collectively represent thousands of North Carolinians who drink, fish, swim, paddle, and earn a living on our state's rivers, lakes, reservoirs, and estuaries and whose use of these waters have been adversely impacted by nutrient pollution that has long been inadequately addressed by our water quality standards.

As an initial matter, it important to note that the public has not been provided with a copy of the Nutrient Criteria Development Plan ("NCDP") that the NCDWQ intends to submit to the Water Quality Committee on March 13, 2013, the Environmental Management Commission ("EMC") on May 9, 2013 and the EPA for final approval on June 30, 2013. Despite the fact that the public has not seen the NCDP, the NCDWQ has requested

public input on it by February 4, 2013 and does not intend to provide the plan for public review and comment once it becomes public. It is unreasonable to expect the public to provide thorough comments on a plan that it has not reviewed and for the NCDWQ to submit the plan for approval by the EMC prior to disclosing it to the public. The failure to provide an opportunity for meaningful public input on the NCDP is especially egregious considering the widespread and significant public health and environmental impacts from nutrient pollution in North Carolina, as well as the fact that the state has had a plan in place to develop nutrient water quality criteria for more than eight years but has failed to implement it. The State conducted the Nutrient Forum to inform the development of this plan in May of 2012. There was ample time to incorporate the results of this Forum into the NCDP and provide the public with an opportunity to review and comment on it prior to submission to the EMC. We request that the public be provided with the opportunity to review and provide comment on the NCDP prior to submission to the EMC.

I. North Carolina has Unreasonably Delayed Development of Numeric Nutrient Criteria for the Past Eight Years

EPA's push for states to develop numeric nutrient criteria began in 1998, when EPA issued its *National Strategy for the Development of Regional Nutrient Criteria* and the *Water Quality and Standards Plan – Priorities for the Future.* Both of these documents outlined the approach and strategies that would be used by EPA in assisting states in adopting nutrient criteria as part of their water quality standards.[1] "EPA published technical guidance for developing criteria for lakes and reservoirs in May 2000, rivers and streams in June 2000, and estuaries and coastal waters in October 2001. EPA also published recommended nutrient criteria for most streams and lakes in 2001."[2]

Further recommendations for states to create nutrient criteria came in 2001 when the EPA issued guidance that specifically requested states to submit nutrient criteria plans adequate to protect beneficial uses, which would be mutually approved by the state and the EPA.[3] The EPA stated that it intended to promulgate nutrient criteria, "relying substantially on EPA's section 304(a) water quality criteria, by the end of 2004, where States and authorized tribes have not substantially completed their adoption of such criteria according to the plan completed by the end of 2001, if the Administrator

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[1] National Strategy for the Development of Regional Nutrient Criteria (U.S. EPA June 1998); Water Quality Criteria and Standards Plan – *Priorities for the Future* (U.S. EPA June 1998).

[2] B. Grumbles, Assistant Administrator, Memo to States re: Nutrient Pollution and Numeric Water Quality Standards, (U.S. EPA May 25, 2007).

[3] Development and Adoption of Nutrient Criteria into Water Quality Standards (Geoffrey Grubbs, Director of Office of Science and Technology, U.S. EPA November 14, 2001).

determines that such new or revised standards are necessary to meet the requirements of the Clean Water Act."[4] In 2007, the EPA stated that: "[i]n a time of scarce resources and competing priorities, we cannot afford delayed or ineffective responses to this major source of environmental degradation. As any environmental professional understands, we can't effectively manage what we can't measure. Numeric environmental baselines help us to measure success, gauge effectiveness, and evaluate alternative approaches."[5]

In developing its original state Nutrient Criteria Implementation Plan (NCIP) in 2004, North Carolina chose to use only a single response-only variable, cholorophyll *a,* which was already currently being used in state water quality standards, despite the recommended parameters from EPA.[6] EPA Region 4 has expressed reservations about the use of a single response-only variable, "which by definition would not be preventive and would only be in effect for those waters of the state which are monitored."[7] However, in the NCIP, NCDWQ suggested that it would be undergoing a substantial modification of the chlorophyll *a* standard, so that it would be regionally-specific, and thus more protective of the state's waters.[8] Specifically, the NCIP divided waters into two groups: flowing waters and non-flowing waters.[9] In regards to the non-flowing waters, NCDWQ stated:

> NCDWQ envisions adopting region-specific, quantitative chlorophyll a criteria. NCDWQ believes that this action will require significant modifications to the current chlorophyll a criteria language. The State intends to conduct a complete scientific evaluation and review in order to determine the most effective methodology available with which to implement a revised chlorophyll a water quality standard for the control of nutrients. Anticipated outcomes of this review may lead to the incorporation of seasonal growing averages, instantaneous maximums, and frequency and distribution response criteria incorporated into the new, revised chlorophyll a standard. As previously discussed, regionally-specific

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[4] G. Grubbs, Memo to States re: Development and Adoption of Nutrient Criteria into Water Quality Standards, (U.S. EPA November 14, 2001).
[5] B. Grumbles, Assistant Administrator, Memo to States re: Nutrient Pollution and Numeric Water Quality Standards, (U.S. EPA May 25, 2007).
[6] North Carolina Nutrient Criteria Implementation Plan p.1 (NC DWQ June 1, 2004). http://portal.ncdenr.org/c/document_library/get_file?folderId=521753&name=DLFE-13928.pdf
[7] The Environmental Protection Agency (EPA) Comments on North Carolina's Proposed Water Quality Standards Revisions for Nutrients and Request for Timeline Extension on the Nutrient Criteria Implementation Plan p.2 (U.S. EPA September 1, 2010).
[8] Id.
[9] Id.

> chlorophyll a criteria will be developed for the mountains, piedmont, sandhills, coastal plains, and estuary regions of North Carolina.[10]

For flowing waters, which include rivers and streams, NCDWQ acknowledged that "chlorophyll a may not be the best estimate of nutrient enrichment in flowing waters," and instead recommended a "periphyton measurement" as the "primary nutrient parameter for flowing waters."[11]

Since the submission of the original NCIP on June 1, 2004, North Carolina has not met its obligations under the agreement and has requested timeline extensions twice, first in October 2005, and again in November, 2009. Additionally, NCDWQ submitted draft revisions to its state water quality standards in January of 2010 as part of its triennial review, and it is evident in the draft revisions that at that point in time, the state had still not made adequate progress toward reaching the goals for non-flowing waters that it had laid out in the NCIP. In comments responding to NCDWQ's submission of these draft revisions, EPA points out that the chlorophyll a standards are mostly unchanged from the values in place before the NCIP, and that no supporting data to justify such values has been provided. Additionally, EPA states:

> Based on the state's history and experience with nutrient controls and numeric chl a criteria, the State's prior reliance on a single response-only parameter as well as the significant activities and references to revisions outlined in the NCIP, EPA had anticipated that the State would propose region-specific criteria, all of which would include a significant lowering of the magnitude of Chl a from current criteria. A significant downward revision of the existing Chl a criteria magnitude values would result in concentrations more in-line with other states in the southeast and address the continued eutrophication described by the State in the NCIP.[12]

When questioned about this approach, NCDWQ stated to EPA in a January 2010 call that the "previously adopted magnitude values for Chl a have now been found to be sufficient, and that only minor changes, as noted, would be needed."[13] EPA considered

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[10] Id. at 3.
[11] North Carolina Nutrient Criteria Implementation Plan p.7 (NC DWQ June 1, 2004). http://portal.ncdenr.org/c/document_library/get_file?folderId=521753&name=DLFE-13928.pdf
[12] The Environmental Protection Agency (EPA) Comments on North Carolina's Proposed Water Quality Standards Revisions for Nutrients and Request for Timeline Extension on the Nutrient Criteria Implementation Plan p.4 (U.S. EPA September 1, 2010).
[13] Id. at 4

this to be a change from the NCIP, and did not see adequate data to support the state's change in direction.[14]

In regards to the status of reaching the goals stated in the NCIP for flowing waters, during the same call, NCDWQ communicated to EPA that "financial constraints had prevented the State from doing adequate research to develop the periphyton criteria."[15] According to EPA, prior to this January 2010 communication, "EPA had not been advised that the State had determined that it could not proceed with the proposed plan to develop periphyton criteria or appropriately refine Chl a criteria and that the State's approach for flowing waters had changed from the mutually agreed upon original and revised NCIP."[16]

II. North Carolina has Failed to meet its Legal Obligations to Protect its Waters and, as a result, Nutrient Impairment has Grown Worse in the State

The objective of the Clean Water ("CWA") is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). Under Section 303(c) of the CWA, the state is responsible for establishing water quality standards that designate uses for its waters and "water quality criteria" for those uses that must "protect the public health or welfare, enhance the quality of water" and serve the purpose of the Clean Water Act. 33 U.S.C. §1313(c)(2)(A).[17] These water quality standards "define the water quality goals of a water body . . . by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses." 40 C.F.R. § 131.2. Water quality criteria are required to "protect the designated use" and be "based on sound scientific rationale." 40 C.F.R. § 131.11(a)(1). These criteria "serve as the regulatory basis for the establishment of water-quality-based treatment controls and strategies." 40 C.F.R. § 131.2. For example regulators use them to calculate permit limits for particular sources, 40 C.F.R. § 122.44(d)(1)(i), and to develop regulations to reduce loadings to impaired waters. 33 U.S.C. § 1313(d).

If a state water quality standard is not consistent with the requirements of the CWA, or if the Administrator "determines that a revised or new standard is necessary" to meet the requirements of the CWA, the Administrator must "promptly prepare and publish proposed regulations setting forth a revised or new" standard. 33 U.S.C. § 1313(c)(4). Unless the state has adopted a revised or new standard that has been approved by the

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[14] Id.
[15] Id.
[16] Id.
[17] Water quality standards must "be established taking into consideration [the waters'] use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration [the waters'] use and value for navigation." *Id.*

EPA, the Administrator must adopt the revised or new standard within 90 days after publication. Id.

Further, NCDENR and the EMC have a duty "to design water quality standards that are adequate to protect human health, to prevent injury to plant and animal life, to prevent damage to public and private property, to insure the continued enjoyment of the natural attractions of the State, to encourage the expansion of employment opportunities, to provide a permanent foundation for healthy industrial development and to secure for the people of North Carolina, now and in the future, the beneficial uses of these great natural resources." N.C.G.S. §§ 143-211(c); 143-214.1. Under N.C.G.S. § 143B-282(a)(2)(b) and 143-214.1, the EMC has a duty to adopt rules for both classifications of water and standards for their protection consistent with the policy articulated in N.C.G.S. § 143-211(c).

After eight years of planning, assessment and scientific evaluation, North Carolina still has not developed numeric criteria adequate to protect the designated uses of the state's waters. In fact, North Carolina is still relying on the chlorophyll-a criterion it developed in the 1970s, which it acknowledged in 2009 was inadequate as evidenced by the continued eutrophication of the state's waters. Despite the state's unreasonable delay in reaching the goals stated in its NCIP, EPA has continued to give North Carolina more time to come up with adequate numeric nutrient criteria, justified by adequate data. After the exchanges in 2010, the state was given until June of 2013 to come up with a plan for the development of numeric nutrient criteria.

According to the U.S. Environmental Protection Agency, nutrient pollution adversely affects human health, fisheries and recreational water use:

> Nitrogen and phosphorus are the primary causes of cultural eutrophication. The most recognizable manifestations of this cultural eutrophication are algal blooms that occur during the summer. Chronic symptoms of over-enrichment include low dissolved oxygen, fish kills, murky water, and depletion of desirable flora and fauna. In addition, the increase in algae and turbidity increases the need to chlorinate water for drinking purposes. This, in turn, leads to higher levels of disinfection by-products that have been shown to increase the risk of cancer. Excessive amounts of nutrients can also stimulate the activity of microbes, such as *Pfisteria*, which may be harmful to human health."[18]

[18] G. Grubbs, Memo to States re: Development and Adoption of Nutrient Criteria into Water Quality Standards, (U.S. EPA November 14, 2001).

> High nitrogen and phosphorus loadings, or nutrient pollution, result in harmful algal blooms, reduced spawning grounds and nursery habitats, fish kills, oxygen-starved hypoxic or "dead" zones, and public health concerns related to impaired drinking water sources and increased exposure to toxic microbes such as cyanobacteria. Nutrient problems can exhibit themselves locally or much further downstream leading to degraded estuaries, lakes and reservoirs, and to hypoxic zones where fish and aquatic life can no longer survive.[19]

Nutrient pollution is a serious and widespread problem in North Carolina. The problem is underreported due to the lack of adequate water quality standards for nutrients, limited monitoring and assessment, and inadequate assessment methodologies. With only about 32% of its rivers and 57% of its lakes and reservoirs assessed, the 2010 North Carolina 303(d) List of Impaired Waters identifies 72 waterbody segments that are failing to meet the chlorophyll-a criteria and 50 waterbody segments that are failing to meet the dissolved oxygen criteria.[20] In addition, the State is in the process of developing or gathering information for nutrient related TMDLs in the Middle Cape Fear and High Rock Lake.[21] North Carolina has prioritized watersheds encompassing 36 percent of the state's land area for nutrient reduction as shown below:[22]

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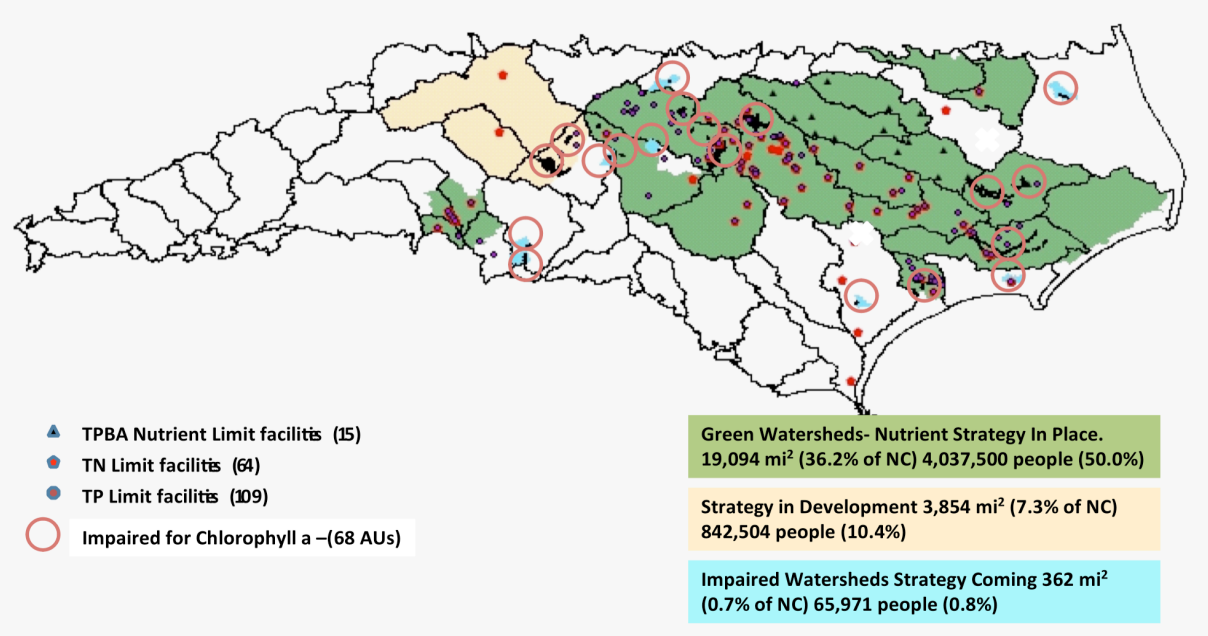
[19] B. Grumbles, Assistant Administrator, Memo to States re: Nutrient Pollution and Numeric Water Quality Standards, (U.S. EPA May 25, 2007).
[20] 2012 North Carolina 303(d) LIst - Category 5 http://portal.ncdenr.org/c/document_library/get_file?uuid=9d45b3b4-d066-4619-82e6-ea8ea0e01930&groupId=38364
[21] http://portal.ncdenr.org/web/wq/ps/mtu/specialstudies
[22] Briefing Package - NC Nutrient Activities (NCDENR April, 24, 2012)



The State has had to develop nutrient related TMDLs or loading reduction plans for Roberson Creek, Catawba Creek, Crowders Creek, Lake Wylie, McApline Creek, Little Sugar Creek, Irwin Creek, Neuse River Estuary, Roanoke River, Tar River, and Jordan Lake.[23] Nutrient strategies had to be implemented in Choan, New River, Randle Reservoir, Deep River, Abbotts Creek, and Twelve Mile Creek watersheds.[24] Additionally, there are four major watersheds that are impaired by nutrient pollution for which large-scale, long-term watershed restoration projects associated with TMDLs have had to be undertaken, including the Jordan Watershed, the Falls Watershed, the Tar-Pamlico Basin, and the Neuse River Basin.[25]

The nutrient reduction strategy for the Neuse River Basin has been in place since 1997, and the TMDL has been in place since 1999 yet the NCDENR reported in 2009 that:

> The majority of the freshwater stream miles in the Neuse River basin are impaired due to impaired biological integrity (BI), low dissolved oxygen levels and elevated turbidity (Figure ii). The majority of the fresh and saltwater acres are impaired as a result of elevated chlorophyll a and high pH (due to elevated nutrients), turbidity and bacteria (fecal coliform and

[23] http://portal.ncdenr.org/web/wq/ps/mtu/tmdl/tmdls
[24] Briefing Package - NC Nutrient Activities (NCDENR April, 24, 2012)
[25] http://portal.ncdenr.org/web/wq/ns

> enterococci) levels (Figure iii).[26] . . . Excessive nutrient loading is ultimately the primary stressor in the Neuse River basin resulting in the chlorophyll a impairment of Falls Lake and the Neuse River Estuary . . .

Similarly, according to the NCDWQ, "[i]n the mid-1980's, the Pamlico River estuary saw an increase in problems that pointed to excessive levels of nutrients in the water - harmful algal blooms, low oxygen levels, increased numbers of fish kills, and other symptoms of stress and disease in the aquatic biota."[27] In 1989, the EMC designated the basin as "Nutrient Sensitive Waters" and approved a nutrient strategy to reduce nutrient loads. The 1994 Tar-Pamlico Basinwide Water Quality Plan was submitted to EPA as a TMDL that called for a 30% nitrogen loading reduction and for maintaining phosphorus loads at 1991 levels.[28] In 2010, NCDWQ reported that the 2010 water quality assessment of the Pamlico River Estuary indicates ~28,923 acres of the Pamlico River Estuary remain impaired, the nitrogen loading goal has not been met, there has been an increase in phosphorus loading, and that "[t]his estuary impairment essentially represents the same area of impairment that is described in the 1994 Basinwide Plan and is covered by the estuarine response modeling and TMDL strategies described in the 1994 Basin Plan."[29]

For many years, EPA and numerous organizations have advocated that North Carolina adopt numeric nitrogen and phosphorus standards. North Carolina is the only state in the southeast that refuses to move toward adoption of numeric criteria. Instead, North Carolina continues to rely on a statewide chlorophyll-a criterion. The EPA has stated that, while this criterion was progressive when it was adopted in the 1970s, it is in need of revision and is now weaker than the standards in most other states.[30] In requesting an extension of the deadlines for development of nutrient criteria from EPA in 2009, NCDWQ acknowledged that its chlorophyll-a criterion needed to be revised and that "additional proactive nutrient control measures are warranted based on the latest

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[26] 2009 Neuse River Basinwide Water Quality Plan, http://portal.ncdenr.org/c/document_library/get_file?uuid=a8681cfe-0b28-4322-939e-2ae200a7d6fd&groupId=38364

[27] Tar Pamlico Nutrient Strategy, http://portal.ncdenr.org/web/wq/ps/nps/tarpamlico

[28] Id.

[29] 2010 Tar-Pamlico Basinwide Water Quality Plan, http://portal.ncdenr.org/c/document_library/get_file?uuid=fac63441-e4c6-479f-98df-17e3bdbb17f0&groupId=38364

[30] Joanne Benante, EPA Region 4 Chief Water Quality Planning Branch, Letter to DWQ, (U.S. EPA September 1, 2010).

advances in the science of nutrient management and the continued eutrophication of waters."[31]

Since 2001, EPA has recommended that the state adopt nutrient criteria which is fundamentally different than the approach taken by North Carolina:

> EPA's recommended parameters for nutrient assessment are total phosphorus, total nitrogen, chlorophyll-*a*, and some measure of water clarity (e.g., Secchi depth or photometer for lakes and reservoirs and turbidity for rivers and streams). Nitrogen and phosphorus are the main causal agents of enrichment, while the two response variables, chlorophyll-*a* and water clarity, are early indicators of system over-enrichment for most waters. EPA believes that nutrient criteria, to be effective, should address causal and response variables in a manner that results in quantifiable measures. States and authorized tribes have the flexibility to address nutrients using parameters other than those EPA recommends, if shown to be appropriate and protective of designated uses." [32]

In 2007, the EPA reaffirmed that "[t]o be effective, nutrient criteria should address causal (both nitrogen and phosphorus) and response (chlorophyll-a and transparency) variables for all waters that contribute nutrient loadings to our waterways."[33] And in 2011, the EPA continued to emphasize the necessity for developing numeric nutrient criteria stating that "[i]It has long been EPA's position that numeric nutrient criteria targeted at different categories of water bodies and informed by scientific understanding of the relationship between nutrient loadings and water quality impairment *are ultimately necessary for effective state programs*."[34] The EPA further noted that:

> Over the last 50 years, as you know, the amount of nitrogen and phosphorus pollution entering our waters has escalated dramatically. The degradation of drinking and environmental water quality associated with excess levels of nitrogen and phosphorus in our nation's water has been

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[31] Joanne Benante, EPA Region 4 Chief Water Quality Planning Branch, Letter to DWQ, (U.S. EPA September 1, 2010).
[32] G. Grubbs, Memo to States re: Development and Adoption of Nutrient Criteria into Water Quality Standards, (U.S. EPA November 14, 2001).
[33] B. Grumbles, Assistant Administrator, Memo to States re: Nutrient Pollution and Numeric Water Quality Standards, (U.S. EPA May 25, 2007).
[34] Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions, at 2-3 (emphasis added) (U.S. EPA March 16, 2011). http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/upload/memo_nitrogen_framework.pdf

> studied and documented extensively, including in a recent joint report by a Task Group of senior state and EPA water quality and drinking water officials and managers. As the Task Group report outlines, with U.S. population growth, nitrogen and phosphorus pollution from urban stormwater runoff, municipal wastewater discharges, air deposition, and agricultural livestock activities and row crop runoff is expected to grow as well. Nitrogen and phosphorus pollution has the potential to become one of the costliest and the most challenging environmental problems we face.[35]

North Carolina's waters are also experiencing increased nutrient pollution and associated degradation of drinking water, fisheries and recreational resources. The problem has been exacerbated by North Carolina's undue delay in adopting and enforcing appropriate nutrient criteria necessary to protect designated uses for the state's waterbodies. The EMC has a duty to adopt nutrient criteria that are protective of designated uses for its surface waters pursuant to Section 303(c) of the CWA. 33 U.S.C. §1313(c)(2)(A) and 40 C.F.R. § 131.2. It further has a duty to base the nutrient criteria on sound scientific rationale." 40 C.F.R. § 131.11(a)(1). Because NCDWQ has been evaluating its criteria for eight years and it is not disputed by EPA or NCDWQ that the existing criteria is inadequate to protect the designated uses of North Carolina's waters, if the EMC does not propose a reasonable plan designed to quickly establish appropriate numeric criteria based on sound science, the EPA also has a duty to step in and promulgate nutrient criteria for North Carolina to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a); 33 U.S.C. § 1313(c)(4).

The only evidence of NCDWQ's intentions for the upcoming NCDP is contained in a powerpoint presentation provided to the public in December of 2012. The powerpoint presentation does not provide any details regarding the substance of the NCDP. It does provide a rough outline of the development process and estimates it may take about four years before the EMC adopts any changes to the existing, inadequate criterion. At the public meeting held on December 4, 2012, however, the NCDWQ staff acknowledged that it could take much longer. This is unreasonable given the time that has elapsed and the state of the scientific knowledge on these issues in North Carolina and across the country. No justification for such a lengthy additional delay before adoption of any additional criteria is provided.

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[35] Id.

Without access to a draft of the NCDP, it is impossible to comment on the substance of it. However, the NCDP should include specific actions and deadlines that prioritize promulgation of criteria in impacted waters where adequate scientific justification for criteria exists. This information is readily available in North Carolina's Coastal Plain and in many other areas of the state.[36] Numeric criteria should address causal (both nitrogen and phosphorus) and response variables for all waters that contribute nutrient loadings to our waterways, targeted at different categories of water bodies and informed by scientific understanding of the relationship between nutrient loadings and water quality impairment. Where scientific information is lacking, the plan should set forth specific plans for collecting information necessary for criteria development. The work plan and schedule should contain interim milestones, including but not limited to data collection, data analysis, criteria proposal, and criteria adoption consistent with the Clean Water Act on a phased schedule.

WATERKEEPER® ALLIANCE and WATERKEEPERS® CAROLINA appreciate the opportunity to comment on the NCDP. We look forward to further participating in the process when a draft of the actual NCDP is provided for public review and input. Please feel free to contact Kelly Hunter Foster at kfoster@waterkeeper.org or Erin Riggs at erinr@waterkeeperscarolina.org if you have any questions.

Sincerely,

Kelly Hunter Foster
Senior Attorney
Waterkeeper Alliance

Erin Riggs
Associate Executive Director
Waterkeepers Carolina

[36] See e.g., November 28, 2012 Memo on Proposed Assessment Methodologies to NCDWQ from Dr. Michael A. Mallin; Experiments in the coastal ocean (Paerl et al. 1990) and tidal creeks (Mallin et al. 2004) show that as little as 50 μg-N/L (0.050 mg-N/L) can stimulate significantly greater phytoplankton production (relative to a control); In blackwater streams and rivers generally 200-500 μg-N/L (0.20-0.50 mg-N/L) is needed for significant stimulation of phytoplankton (Mallin et al. 2004); Selection of water quality variables for nutrient criteria using structural equation modeling, M. Kennery and K. Reckhow (2007) http://eco.confex.com/eco/2007/techprogram/P6805.HTM; Reckhow, K.H., G.B. Arhonditsis, M.A. Kenney, L. Hauser, J. Tribo, C. Wu, L.J. Steinberg, C. A. Stow, S. J. McBride. (2005) A Predictive Approach to Nutrient Criteria. Environmental Science and Technology. 39(9): 2913-2919;
U.S. EPA Ecoregion Recommended Nutrient Criteria,
http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/ecoregions/index.cfm