UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAY 23 2013

Chuck Wakild
Director
Division of Water Quality
North Carolina Department of Environment
and Natural Resources
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Dear Mr. Wakild:

The Environmental Protection Agency (EPA) has received the draft North Carolina Nutrient Criteria Development Plan (NCDP), dated April 15, 2013. The plan was released for a public comment period that runs from April 17 until May 24, 2013. This NCDP does not provide the information needed for mutual agreement with EPA on nutrient criteria development. The EPA requests North Carolina Division of Water Quality (NCDWQ) to redraft the NCDP to incorporate current guidance, previous EPA comments and the regulatory requirements for criteria development under 40 CFR 131 so that the process of working towards mutual agreement can begin.

In 1998, the EPA issued the *National Strategy for the Development of Regional Nutrient Criteria* and the *Water Quality and Standards Plan – Priorities for the Future*, which presented methods that would protect and restore water quality from nutrient over-enrichment. In November 2001, to further aid the states in managing nutrient enrichment, the EPA's Office of Science and Technology issued guidance which is referred as the, 'Grubbs Memo.' In this, states were requested to develop a nutrient criteria plan which would involve the outlining of a detailed strategy (including a schedule and specific milestones) that will result in the development of scientifically defensible numeric nutrient criteria. As outlined in previous letters to the State, this guidance has served as the impetus for the establishment of EPA-State mutually agreed plans. The EPA rescinded mutual agreement of North Carolina's Nutrient Criteria Implementation Plan (NCIP), dated October 25, 2005, for reasons outlined in a letter from the EPA to DWQ dated September 1, 2010 (copy enclosed). In that letter, the EPA provided recommendations for drafting a revised NCDP.

After the EPA rescinded mutual agreement, a task was added to the EPA/NCDWQ Section 106 workplan for the state to draft and submit to the EPA a revised NCDP. The state did not meet that commitment in Fiscal Year (FY)11 or FY12. The current draft NCDP is intended to fulfill the FY13 work plan to submit the new plan to the EPA by June 30, 2013.

The EPA's review of this most recent draft NCDP focused on the plan components as outlined on pages 5 through 12 of the document. Our conclusion is that the plan, as presented, does not

fulfill the expectations of EPA guidance or regulations for criteria development under 40 CFR 131. Most notably, the plan does not provide the detail necessary to understand the basis for the development of criteria as presented in Table 1 (page 5). These decisions must be clearly understood as they form the basis for the remainder of the plan. The state should provide the supporting documentation, including data, methods or analyses used to determine which criteria will be prioritized. For example in Table 1, information was not provided to support the following conclusions:

- The criteria for both reservoirs and estuaries are listed as "adequate" for assessment and "restoration" and therefore are not addressed further in the NCDP.
- "Ongoing efforts are in place through the current nutrient management strategies" to protect estuaries and "implementation of nutrient management strategies involves re-evaluation of whether the targets are achieving restoration and protection of the waters." Estuary criteria are not included in the plan based on that evaluation.
- Criteria to protect reservoirs in the Mountain and Upper Piedmont waterbodies " may not be adequately protected by current criteria." However, the NCDP does not address this.
- The reservoir section of Table 1 does not mention an analysis of the reservoirs outside the Mountain and Upper Piedmont.

It is vital to receive the supporting documents for these decisions, in part because these conclusions appear to be inconsistent with those provided in the 2005 NCIP where revisions of numeric nutrient criteria for lakes, reservoirs and estuaries was prioritized (see also the discussion on DWQ's NCIP, EPA Sept 2010 letter, pg. 3). These findings may also not be consistent with the current condition of the waters of the state as described in basin planning documents, the DWQ annual fish kill reports or the Section 303(d) list. Until the supporting documentation on these initial conclusions is received, EPA will not be able to move forward in the mutual agreement process.

The Clean Water Act (CWA) requires that the development of numeric nutrient criteria be based on sound science and EPA's expectations are that a state NCDP will consider all waterbodies of the state and include both causal and response variables. If the NCDP does not provide a sound scientific basis for the plan then it is unlikely to result in criteria that would meet the requirements for approval under Section 303(c) of the CWA or the implementing regulations under 40 CFR 131.

On May 14, 2013, the EPA senior management team met with you and your staff to discuss, among many items, North Carolina's NCDP. During those discussions, the possibility was raised of DWQ working collaboratively with the Albemarle-Pamlico National Estuary Partnership (APNEP) to address nutrient enrichment in the estuary. The EPA is supportive of such a partnership. This approach has resulted in successful development of numeric nutrient criteria in other estuaries, such as Tampa Bay, Florida. By letter dated February 4, 2013, the APNEP offered the support of its network of science and policy professionals to work with DWQ. The EPA encourages NC to pursue this possible collaboration and include such a proposal in the next iteration of the NCDP. As well, the EPA will evaluate in the coming months the resources we could provide for such a partnership.

The EPA looks forward to receiving a newly drafted plan with the appropriate scientific information to support its review. Until such time as DWQ submits a plan that meets the minimum conditions needed for mutual agreement, North Carolina is considered deficient for Task 3 of the Section 106 Workplan. North Carolina has experienced significant delays in the development of numeric nutrient criteria. The EPA would welcome the opportunity to work more closely with North Carolina to assist the State in its efforts to address this serious environmental concern.

Sincerely,

Joanne Benante

Joanne Benante, Chief
Water Quality Planning Branch

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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SEP 0 1 2010

Coleen H. Sullins
Director
Division of Water Quality
North Carolina Department of Environment
and Natural Resources
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Dear Ms. Sullins:

The Environmental Protection Agency (EPA) is in receipt of North Carolina Division of Water Quality's (DWQ's) November 5, 2009, letter requesting a revision to the timelines in the EPA-State mutually agreed upon Nutrient Criteria Implementation Plan (NCIP), dated October 25, 2005. Since receipt of that letter, DWQ also submitted to EPA, as part of the State's draft 2008 - 2010 triennial review, proposed revisions to the State's Water Quality Standards, including revisions to numeric nutrient criteria. At EPA's request, DWQ submitted supplemental information on the development of the proposed nutrient criteria on June 11, 2010. This letter is a response to the State's request for timeline extensions to the NCIP, as well as EPA's comments on the nutrient criteria portion of the State's triennial review. EPA has concerns regarding the State's proposed numeric nutrient criteria, as well as the State's request to revise the timelines of the NCIP. Those concerns, along with EPA's suggestions on how to proceed, are outlined in the comments enclosed with this letter.

While North Carolina has invested in alternative, non-water quality standards strategies and approaches for addressing nutrient over-enrichment, these efforts should be considered to be complimentary to the development of numeric nutrient criteria. Scientifically derived, numeric nutrient criteria will prevent nutrient pollution and create clear water quality goals for restoration. Based on a review of the proposed water quality standards, EPA does not find the new criteria to be supported by sufficient data or supporting documentation. Furthermore, EPA believes that the existing mutually agreed upon plan with North Carolina no longer accurately reflects the current approach in use by the State and, as such, can no longer be used to assess and track the State's progress in meeting specific milestones necessary for timely development of numeric nutrient criteria. Consequently, EPA does not concur with the request to revise the existing NCIP by changing the timelines only, based on the proposed nutrient criteria.

It is recommended that the State proceed with revision of the existing plan as soon as possible to both accurately reflect the State's current approach and outline a path forward that is consistent with EPA's guidance and direction with respect to numeric nutrient criteria development. EPA requests the State submit such revised plan to EPA

for reconsideration of mutual agreement. In addition, the State should be prepared to submit to EPA the full data set on which the proposed criteria were based, and the methods used and analyses conducted to support the scientific basis of the new proposed water quality standards (40 CFR 131.6).

For further discussion of these matters, I encourage your staff to contact the North Carolina Water Quality Standards Coordinator, Lisa Perras Gordon, at 404-562-9317, as well as the Region's Nutrient Criteria Coordinators, Ed Decker at 404-562-9383 and Lauren Petter at 404-562-9272. If you have any questions, please do not hesitate to contact me at 404-562-9125.

Sincerely,

Joanne Benante

Joanne Benante, Chief
Water Quality Planning Branch

Enclosures (2)

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

North Carolina Division of Water Quality (DWQ) sent a letter on November 5, 2009, requesting a revision to the timelines in the EPA-State mutually agreed upon Nutrient Criteria Implementation Plan (NCIP), dated October 25, 2005. The November 2009, letter conveys that the State continues to pursue revised chlorophyll a (Chl *a*) standards along with proposals for lower Chl *a* monitoring threshold values (not adopted as water quality standards) as its primary approach to refined nutrient control criteria. DWQ requested an extension of the timelines specified in the NCIP for approval of such criteria at the state level. After receipt of the letter, EPA requested the opportunity to review the draft numeric nutrient criteria prior to the State moving forward towards public notice and hearings. DWQ sent the draft criteria to EPA, via email, in January 2010, with a follow-up conference call also held in January 2010. At EPA's request, supplemental information on the criteria development was received from DWQ in June 2010.

DWQ has proposed a multi-faceted approach for control of nutrients which includes development of numeric nutrient criteria as well as supplemental non-water quality standards approaches such as threshold levels. EPA briefly reviewed the alternative approaches including the threshold levels found in *15A NCAC 02B .0611 - .0613* and forwarded email comments to DWQ in March 2010 (Lisa Gordon to Jeff Manning). EPA supports and encourages activities under other programs to control and manage nutrients and acknowledges North Carolina's unique approach to nutrient control. EPA Region 4 has often cited North Carolina as an innovative leader in management of nutrients in programs both inside and outside of water quality standards with innovative efforts that go back more than two decades, including the use of the Nutrient Sensitive Water designation. Such types of innovative approaches were highlighted and encouraged by EPA at a recent State/EPA Nutrient Innovation Task Group meeting. The Region would like to encourage the State to compile data, reports and studies which quantify and demonstrate the effectiveness, enforceability, protectiveness and measurable results of such efforts to address nutrient issues so that they may be reviewed and potentially utilized at both the regional and national level.

For purposes of the Clean Water Act (CWA), however, EPA's primary focus and goal with respect to the NCIP has been the development of numeric nutrient criteria. EPA's support for the use of non-CWA alternative approaches has always been, and continues to be, *as a supplement to* the development of scientifically defensible numeric criteria. The alternative approaches were initially proposed by the State as a means to potentially support the State's desire to proceed with nutrient standards that included a single response-only variable, and not to adopt water quality criteria for nitrogen or phosphorus. It is EPA's understanding that the State is not intending for these alternative approaches, including the thresholds, to be adopted as water quality standards. As such, these alternative approaches would not be submitted to EPA for review under Section 303(c), and would not be applicable or required for any CWA purposes. Specifically, the

threshold levels would not be used proactively for the development of permit limits under Section 402 of the CWA to prevent over-enrichment, nor would they be used directly for assessment of waters under Section 303(d) of the CWA.

In 1998, EPA issued the *National Strategy for the Development of Regional Nutrient Criteria* and the *Water Quality and Standards Plan – Priorities for the Future* which set out the premise that improved water quality standards were critically needed for nutrient control. In November 2001, EPA's Office of Science and Technology issued guidance (known as the "Grubbs Memo") to states to request that each state develop a nutrient criteria plan to outline a specific strategy, milestones and schedule to develop nutrient criteria. States were also directed to take downstream effects into account as criteria were developed. That guidance was the impetus for the development of EPA-State mutually approved plans to develop numeric criteria. Activities nationally and experience here in the Region have reinforced for EPA the vital importance of the development of scientifically defensible, numeric nutrient water quality criteria, including reports indicating that nutrient impairment is on the rise and likely to get significantly worse. In fact, the EPA Office of Inspector General (OIG) has recently been critical of EPA for the slow progress of nutrient criteria development as well as for the lack of accountability by states in meeting the goals and milestones of the nutrient criteria development plans. (*"EPA Needs to Accelerate Adoption of Numeric Nutrient Water Quality Standards", Report No. 09-P-0223*, August 26, 2009).

Therefore, EPA's comments below focus on the State's status of development of numeric nutrient criteria under the NCIP and the State's existing water quality standards rulemaking process and not the non-water quality standards alternatives.

The NCIP

The 1998 Nutrient Strategy and the Grubbs Memo in 2001 articulated EPA's position on the importance of criteria development as well as the flexibility afforded to the states. In these documents, EPA strongly recommends four parameters for criteria development: two causal - total phosphorus and total nitrogen; and two response - Chl *a* and clarity.

During development of the NCIP, North Carolina stated that it decided not to pursue criteria development for three out of four of the recommended parameters. EPA Region 4 had – and continues to have - reservations regarding the adequacy 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. North Carolina asked for the opportunity to demonstrate that the development of a new, single response-only variable approach, in conjunction with the State's other innovative programs, would be protective of State waters. The primary focus of the State's NCIP, therefore, was on the development of new response-only water quality criteria. EPA agreed to allow North Carolina the flexibility to demonstrate the protectiveness and effectiveness of this approach and mutually agreed on a development plan and timelines on September 20, 2004, which was later revised in a mutual agreement letter dated June 27, 2006. In both

instances, EPA attached comments outlining the concerns with the adequacy of the response-only approach. In addition, further comments and concerns have been sent through email and discussed in face-to-face meetings.

Unlike most other states, North Carolina has had a state-wide Chl *a* water quality criterion of 40 ug/l (15 ug/l for trout) in its water quality standards for more than two decades. While certainly progressive at the time of its adoption, the State acknowledged in the NCIP that the Chl *a* criteria was in need of a revision, stating, "[t]he State of North Carolina recognizes that additional proactive nutrient control measures are warranted based upon the latest advances in the science of nutrient management and the continued eutrophication of waters." DWQ further stated that, "[i]t is the goal of this plan to reduce and protect surface waters from eutrophication by developing regionally-specific nutrient response criteria...."

Therefore, for non-flowing waters, the NCIP's stated goal was to "develop new instream criteria for chlorophyll a" and anticipated that there would be "significant modifications to the chlorophyll a criteria language." DWQ wrote that the State, "(a)nticipated [that] 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." According to the NCIP, the revision would be developed on a region-specific basis and "the final proposed parameters will have a unique value for ... mountains, piedmont, sandhills, coastal plains and estuaries." Projections also included region-specific values for estuaries.

The October 25, 2005, revision to the original NCIP took into account the need to reconcile EPA's request for criteria development with the State-mandated development of nutrient controls under Session Law 2005-190. A revision to timelines included a new commitment:

> "By May 2010 – Nutrient criteria adopted in NC Water Quality Rules for drinking water supply reservoirs. Criteria implementation plans finalized and initiated."

For flowing waters, the parameter was to be "based upon a quantifiable periphyton assessment." The pre-existing 40 ug/l Chl *a* criterion applies to all flowing waters in the State, but DWQ stated in the NCIP that, "...research has shown that chlorophyll a may not be the best estimate of nutrient enrichment in flowing waters." EPA generally concurred with that conclusion regarding limitation of water column Chl *a* measurement in many flowing waters, and took that into consideration in reaching its agreement with the State's 2005 revision of the NCIP.

Proposed Criteria

On January 21, 2010, DWQ forwarded draft revisions to the State water quality standards for EPA review. A summary of the new revisions for Chl *a* for Class C and SC waters as proposed is as follows:

- Trout waters: not greater than 10% of data shall exceed 15 ug/l,
- Mountain/Upper Piedmont waters: not greater than 10% of data shall exceed 25 ug/l,
- All other surface waters: not greater than 10% of data shall exceed 40 ug/l, and
- Sounds and Estuaries: not greater than 10% of data shall exceed 40 ug/l.

Except for the addition of the 25 ug/l Chl *a* in the mountain and upper piedmont waters of the State and the addition of 'not greater than 10%,' all other proposed values remain unchanged from the current water quality standards. No supporting data were provided to demonstrate the basis of selection for any of the Chl *a* values, the methodology utilized for the criteria derivation or the reasoning behind not including Region specific criteria outside of the mountains and upper piedmont. No supporting information was provided to demonstrate that 10% of samples exceeding the criteria would ensure that the designated use was still protected. It was also unclear if the values applied to both flowing and non-flowing waters in the mountains and upper piedmont and for the remainder of the State.

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 the 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. In should be noted that North Carolina's proposed threshold levels for Trout, mountains and upper piedmont, and other surface waters (which, again, are not being proposed as water quality standards and therefore would not be legally applicable for CWA purposes) are higher than some of the water quality criteria adopted in surrounding states.

During a follow-up conference call in January 2010, DWQ indicated 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. This is considered to be a change from the NCIP. The proposal to adopt lower threshold values was provided as the primary reason for this course of action, not a review of data.

During the January 2010 call, North Carolina stated that it does not typically monitor for Chl *a* in flowing waters. EPA inquired why DWQ proposed water column Chl *a* for flowing waters when they did not plan to monitor for Chl *a*, rather than some measure of periphyton Chl *a*, biomass, or community structure. DWQ stated that financial constraints had prevented the State from doing adequate research to develop the periphyton criteria. Prior to this call, 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.

Concluding the January 2010 call, EPA requested that North Carolina submit data and analysis to support the proposed nutrient criteria revisions along with the decision to not modify the magnitude of the existing criteria. The State requested examples of support documentation provided by other states. EPA provided by email, examples used by Georgia, Alabama and Tennessee. On June 11, 2010, DWQ provided a general summary of current nutrient management practices and historical documentation regarding the original derivation of the 1979 Chl *a* criterion. On June 18, 2010, EPA submitted comments indicating the level of effort for demonstration of scientific defensibility for the proposed criteria had not been met (Annie Godfrey to Alan Clark, enclosed.) EPA comments included, "(a)ny new or revised numeric criteria submitted to EPA for review should be accompanied by scientific data and analysis on how it was derived, similar to the examples provided (in May 2010). This information enables us to clearly determine how the criteria will be protective of the designated use and will accelerate the review process. It is very difficult for EPA to approve new or revised criteria if it is not accompanied with the data on which it is based." EPA further stated that the original data set, with data from 1971-75, was not sufficient for new criteria, since, as stated in the NCIP both the science and the conditions in the State have significantly changed since that time.

Conclusion/Recommendation

While North Carolina has invested in alternative strategies and approaches for dealing with nutrient over-enrichment, EPA sees these kinds of efforts as complimentary to numeric criteria development, and should not be *in lieu of* numeric nutrient criteria protective of all waters and applicable for all CWA purposes. The State's continued implementation of other innovative strategies and approaches is commendable, but cannot be considered a replacement for scientifically defensible numeric nutrient criteria. DWQ has also not provided data or analysis to EPA to demonstrate that these alternative management practices *prevent* excess eutrophication – but rather that they go into place only after impairment has already been determined to have occurred and then only in those waters that are covered under the State's monitoring program. That is, the State's proposed alternatives to numeric nutrient standards are not preventative in nature as intended for water quality criteria, but reactive and in practice can often be accompanied by significant expenditure of resources and potentially extended time delays before the response is addressed.

Based on EPA's assessment of the draft proposal, it is our position that North Carolina has made significant changes from what had been agreed to in the mutually agreed upon plan. EPA has not been provided with information that the criteria which the State is currently planning to take through rulemaking have been shown by DWQ to be developed based on scientifically defensible methods. Revised criteria must be based on sound scientific rationale and must contain sufficient parameters to protect the designated use, as required by 40 CFR 131.11. If the State intends to continue through rulemaking with the proposed criteria, the State should be prepared to submit to EPA the full data set on which they were based, the methods used and analyses conducted to support the scientific basis of the new proposed water quality standard (40 CFR 131.6),

and be aware that these criteria as currently drafted would not satisfy the expectations of EPA's 1998 National Nutrient Strategy.

EPA would like to work closely with the State to assist with the development of approvable numeric nutrient water quality criteria and a mutually agreeable NCIP. In order to facilitate that process, EPA recommends the following:

- North Carolina and EPA begin a series of meetings, both face-to-face and by phone, to work through and clarify North Carolina's approach to development of numeric nutrient criteria.
- North Carolina should develop numeric nutrient criteria fully protective of designated uses, based upon a sound scientific rationale. And such rationale, data, and analysis must be submitted to EPA with the criteria for EPA's consideration for approval/disapproval. EPA would also be willing to review these materials prior to adoption.
- North Carolina is encouraged to review the extensive data that has been generated in the development of TMDLs in drinking water reservoirs within the State to determine if numeric criteria, including criteria for nitrogen and/or phosphorus, can be set for those waterbodies based on those data.
- EPA encourages North Carolina to draw from the considerable experience of other states in Region 4, and other regions, to set protective numeric nutrient criteria for both causal and response parameters.
- EPA may be able to work with the State to enlist the support of an independent contractor to review historical, state-wide Chl *a* data for North Carolina and references to assist in the development of regional criteria as proposed in the current NCIP.
- The State should include an examination of downstream effects in the development of new criteria, and provide for the maintenance and protection of downstream uses.
- The NCIP should be revised and updated to reflect details of the State's current rationale, approach, and projected timeline for development and adoption of numeric nutrient criteria for use under the CWA with specific dated milestones.

Comments on NC Nutrient Submittal

Annie Godfrey to: Clark, Alan
Cc: Joanne Benante, Lisa-Perras Gordon

06/18/2010 12:08 PM

History: This message has been forwarded.

Thank you for the update regarding your activities under the Nutrient Criteria Implementation Plan (NCIP), sent by email and dated June 11, 2010. This update was provided to supplement information needed to evaluate North Carolina's progress under the NCIP as well as to provide EPA with background information on currently proposed nutrient criteria. The current criteria being proposed under the 2010 Triennial review, once finalized, will be sent to EPA for review in 2011.

The update included three short attachments. Our general comments on those attachments follow.

Attachment A: NC's Strong History of Nutrient Management and Criteria Implementation

This section provides a good overview and summary of what is currently being done with the existing criteria and the existing permit limits. We were expecting that there would be substantial new information, with data based on the last 30 years of record since the original criteria were developed, to document why the existing criteria are still appropriate and protective. Comments on the other revisions are discussed as part of Attachment C.

Attachment B: Review of Current Nutrient Criteria

EPA concurs that the work completed in the 1970's for the development of the current criteria was significant at that time and found the attached study of interest. However, the 1970's information alone is not necessarily relevant today to support the current criteria. Conditions have changed, including increased development, population growth and development of improved treatment technologies. Nationally nutrient pollution has increased and we have a better understanding of the science and the need for numeric criteria for causal and response variables. EPA has issued guidance on how to progress toward numeric nutrient criteria. The report references data from 1971 to 1975. That data could be included in a full period of record which should be updated and reviewed for the current criteria development. Based on the extensive programs and monitoring described in this document, the full period of record should have a significant amount of valuable data for the use in determining various useful statistics, as well as trend analyses.

Attachment C: Proposed Improvements to Nutrient Management in North Carolina

The section on the new criteria for the Mountain and Upper Piedmont Ecoregion states "[these waters] generally experience lower chlorophyll a concentrations than waters in the Eastern part of the state". However, it did not provide data to support that conclusion nor the derivation of the new criteria concentration.

EPA did not understand how the example in this section supported the 10% exceedance frequency. The distribution of the 22 samples over the 12 months was unclear, as was the use of the relevance to a geomean for comparison since NC is not considering a geomean for its criteria, nor is it the means for evaluating criteria in surrounding states. GA and AL, for example, use growing season averages. SC uses a 'not to exceed'.

It is EPA's understanding that the EMC has, for the time being, expressed that they do not support the use of thresholds and that they have asked for additional work to be completed before the State can move ahead with those proposals. EPA has also commented that the thresholds may end up applying to a very small sub-set of waterbodies and could involve significant time-delay before these reactive steps are taken to implement new permit conditions to limit nitrogen and phosphorus in enriched waters.

In May 2010, EPA sent PDF's to DWQ of Regional examples which demonstrates the level of effort required for sound, scientifically based derivation of numeric nutrient criteria for lakes and reservoirs. These examples from Alabama, Tennessee and Georgia, show in-depth reviews and analysis of data which result in the derivation of protective values to prevent impairment or restore waters. The numeric criteria for Alabama and Georgia were approved by EPA.

Any new or revised numeric criteria submitted to EPA for review should be accompanied by scientific data and analysis on how it was derived, similar to the examples provided. This information enables us to clearly determine how the criteria will be protective of the designated use and will accelerate the review process. It is very difficult for EPA to approve new or revised criteria if it is not accompanied with the data on which it is based. EPA remains concerned that NC may not have the information required for the revision of criteria. Taking into account this new summary, our conclusion is that revisions of the NCIP are warranted before extensions to the timeline can be granted. We are drafting a review of the NCIP and intend to have that to you in the next sixty days.

I would like to talk with you in more detail about these issues, if you like. Although I'll be out next week for training, I could arrange a time to call you. Please let me know.

Annie M. Godfrey
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NORTH CAROLINA CONSERVATION NETWORK • SOUTHERN ENVIRONMENTAL LAW CENTER

May 24, 2013

VIA EMAIL AND U.S. MAIL

Nikki Schimizzi
Division of Water Quality Planning
N.C. Department of Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617
nikki.schimizzi@ncdenr.gov

Re: North Carolina Nutrient Criteria Development Plan

Dear Ms. Schimizzi:

We appreciate the opportunity to comment on the proposed North Carolina Nutrient Criteria Development Plan. Together, we represent thousands of North Carolinians who drink, fish, swim, and paddle the state's rivers, lakes, and reservoirs; who place a high value on the quality of North Carolina's water resources; who have been adversely affected by nutrient pollution in the past; and who will continue to be adversely affected by nutrient pollution.

We appreciate DWQ's and the EMC's ongoing efforts to develop a plan to eventually control nutrient pollution. We particularly appreciate the commitment and expertise of Division of Water quality staff. While we raise serious and strongly felt objections to the draft Nutrient Criteria plan, we want to be clear that our frustration and skepticism are not directed at State employees, whom we respect and admire, but at the draft plan itself.

Unfortunately, the proposed Nutrient Criteria Development Plan is deeply flawed, both in its reluctance to move forward now with numeric nitrogen and phosphorus criteria and its untenable delays in developing nutrient criteria based on response variables. We agree wholeheartedly with the concerns and ideas expressed in the comment letters submitted by the WATERKEEPER® ALLIANCE and WATERKEEPERS® CAROLINA on February 4, 2013 and on May 24, 2013. In addition, we have the concerns described below.

Although North Carolina may once have been a leader in innovative approaches to nutrient management, it is currently lagging far behind other states in that regard. North Carolina is now many years behind other states, including many of its neighbors, in the development of necessary, required water quality standards to reduce nutrient pollution. Timely development of robust numeric criteria for nitrogen and phosphorous is especially important now in light of recent state legislative attacks on the State's plans to reduce nutrient pollution through

efforts such as the Jordan Lake rules that could have complemented the water quality improvements from numeric nutrient criteria.

Background:

Section 303(c)(1) of the Clean Water Act requires states to "hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards," "at least once each three year period." 33 U.S.C. § 1313(c)(1). The standards "shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of" the Clean Water Act. 33 U.S.C. § 1313(c)(2). North Carolina's last triennial review covered the years 2004-2006. Specifically, the last public hearings were held in July 2006, and the last changes to North Carolina's water quality standards went into effect in May 2007. Thus, the current triennial review is now nearly four years overdue, as the next round of public hearings should, by law, have been held by July 2009.

Among the changes proposed to be made during the current triennial review are changes to the chlorophyll-a standard and/or adoption of numeric nutrient criteria. These updates are now long overdue for public hearing and implementation. The U.S. Environmental Protection Agency ("EPA") determined as early as 2010 that "the existing mutually agreed upon plan with North Carolina" for developing and implementing nutrient criteria "no longer accurately reflects the current approach in use by the State and, as such, can no longer be used to assess and track the State's progress in meeting specific milestones necessary for timely development of numeric nutrient criteria." (Letter from Joanne Benante, EPA Region 4, to Coleen Sullins, DWQ, dated September 1, 2010.) Accordingly, in September 2010, EPA directed DWQ to submit a revised plan for developing numeric nutrient criteria "that is consistent with EPA's guidance and direction." (Id.) Two and a half years later, North Carolina still has not submitted a plan for developing numeric nutrient criteria, much less held a public hearing on proposed criteria or implemented such criteria, although it has now issued the current draft plan for public comment. Yet other states in the region implemented nutrient criteria for phosphorous and nitrogen years ago (South Carolina in 2004 and Georgia in 2002, for example). In sum, North Carolina is now lagging far behind other states in its efforts to develop scientifically defensible, numeric nutrient water quality criteria for the parameters recommended by EPA.

The Clean Water Act provides a solution to such delays. It mandates that EPA "shall promptly prepare and publish proposed regulations setting forth . . . revised or new water quality standard[s]" when it "determines that a revised or new water quality standard is necessary to meet the requirements of" the Clean Water Act, 33 U.S.C. § 1313(c)(4). EPA has made this determination and implemented nutrient criteria for other states, including Florida, and it has come very close to making the determination for North Carolina. For instance, in the September 2010 letter referenced above, EPA made such statements as:

- "For purposes of the Clean Water Act (CWA), EPA's primary focus and goal . . . has been the development of numeric nutrient criteria."
- "Activities nationally and experience here in the Region have reinforced for EPA the vital importance of the development of scientifically defensible,

numeric nutrient water quality criteria, including reports indicating that nutrient impairment is on the rise and likely to get significantly worse."

- "EPA would like to work closely with the State to assist with the development of approvable numeric nutrient water quality criteria . . . ."

Accordingly, North Carolina may risk EPA implementing numerical nutrient criteria directly if the State does not do so with appropriate speed.

Timeline:

The timeline of the draft plan envisions a seven-year process *before the State can even begin rulemaking* to set new nutrient criteria – criteria needed to protect waters that are already suffering from over-enrichment [draft plan at ii, Table 4]. That delay is unacceptable. Worse, the draft plan offers no guarantee that the seven-year process will yield data and analysis that DWQ or the EMC can act upon. Finally, rulemaking to formally adopt new criteria will take at least two more years, and then years and years after that to translate the standards into mandates for reductions in nitrogen and phosphorus discharges. North Carolina must not wait a generation to *begin* pollution reductions that are needed now. The plan, as proposed, takes so long and offers so little certainty of results that it effectively violates the Clean Water Act, inviting intervention by EPA and by the courts.

These delays are not necessary. More specifically:

- The draft plan budgets an initial six months even before "task 1" begins for "initial NCDP organizational efforts." [draft plan at Table 4] That should be cut. To the extent that some amount of set-up is required, it should be carried out concurrently with the initial literature review.

- The draft plan budgets one year for task 1, the "systematic parameter review," the purpose of which is to identify relevant literature, compile the status of criteria in other states (the short answer is that most are now way ahead), and review available data. [draft plan at 8-10.] We believe most of this task can and should be completed in a matter of months with assistance from interns or contract assistance from the environmental institutes at NC State, UNC Chapel Hill, or Duke.

- "It is understood," the draft plan says, that task 1 "may illuminate other functional approaches that are beyond the scope of what is presented in this current plan," at which point the State will introduce more delay and attempt to renegotiate the timeline with EPA. [draft plan at 10.] This is paralysis by analysis. A better approach would be, after task 1, to immediately begin task 4, criteria development, for parameters for which there are not fatal data gaps.

- Task 3, which is defined as "Determine Appropriate Parameters for Criteria Development" and scheduled to last eight months, is not necessary. EPA has been very clear on the point that North Carolina should be developing numeric criteria for

phosphorous and nitrogen, and there is no need for further determination or analysis of that point.

- The draft plan provides repeated opportunities for stakeholder review and comment. As stakeholders, we appreciate these opportunities. At the same time, it is unclear how these relate to the formal public comment periods required as a part of criteria adoption – they seem redundant and unnecessarily drawn out. We recommend condensing the process to allow for meaningful stakeholder comment on draft rules, but not multiple comment periods on the same questions.

Parameters:

The draft Nutrient Criteria Development Plan reveals DWQ's intent to rely heavily on response parameters (chlorophyll-a, phytoplankton community, algal toxins, etc.) rather than the causal parameters (phosphorous and nitrogen) recommended by EPA. We appreciate the value of response parameters, especially the potential to avoid either over-control (situations where waters could exceed numeric nutrient standards but happily meet their designated uses) or under-control (where waters could comply with numeric standards but fail to support their uses). We also understand that causal parameters can be difficult to measure, as nitrogen and phosphorus cycle rapidly. In contrast, some response variables, such as periphyton in flowing streams, offer an insight into conditions over time. Nonetheless, EPA has requested that North Carolina adopt causal parameters, and causal parameters offer great efficiency for implementation, as they can translate fairly directly into discharge limits on an individual permit basis. In addition, regulation of causal parameters is protective, proactive and can prevent eutrophication before it happens, while regulation of response parameters is reactive in that they only address impairment after it has occurred and only in waters covered by the State's monitoring program. We recommend the former approach over the latter; in other words, North Carolina's water quality standards should aim to prevent a problem rather than fixing it after it has happened.

We recommend that the State establish numeric criteria *now* (through the triennial review) right at the outset of the process, and hold out the possibility of alternative compliance *if* the criteria development process demonstrates that response parameters will be more accurate and more protective of North Carolina's waters. Such a posture would not only offer better protection of the State's waters in the near term; it would also create a strong incentive for all stakeholders to remain at the table in constructive roles, moving the criteria development along expeditiously.

We recommend adoption of interim criteria for some of the response parameters as well. We know existing data for pH exists from waters that have been listed as impaired for chlorophyll-a. To the extent that the data shows a close correlation between pH and chlorophyll-a exceedences, we recommend establishing pH criteria in the near term that correspond roughly to the 40 micrograms/liter response standard for chlorophyll-a (or 25 µg/l in the mountains and upper Piedmont). These standards will likely not be sufficiently protective in the long term, and will need to be tightened based on further study. But a provisional pH standard would at least offer a "belt-and-suspenders" in the meantime, helping to ensure that water bodies that are

already impaired by current standards do not escape protection as a result of inadequate chlorophyll-a data when pH data is available.

Prioritization:

The draft plan claims to "prioritize" streams and rivers and drinking water supplies [draft plan at 6]. It would be more apt to say it abandons everything else. Of the various parameters mentioned in the draft plan, only one – taste and odor species – is strictly relevant to drinking water. The rest all affect not just whether water is drinkable, but whether it is fishable and swimmable as well. Since the Clean Water Act requires protection of the latter goals (fishability and swimability) as a baseline condition for all waters, the Nutrient Criteria Plan should provide for the rapid establishment of water quality standards based on these parameters for all waters.

Even for drinking water, the draft plan leaves reservoirs currently operating under the chlorophyll-a standard in the lurch: "[w]aters classified for drinking water supply are covered fairly well by the current standards; therefore, further refinement of criteria of those waters will be addressed following refinement of the criteria for streams and rivers." (draft plan at 7.) In fact, drinking water supplies are not doing well under current standards; several large drinking water reservoirs that serve major population centers are impaired for chlorophyll-a, including Jordan and Falls Lakes.

Legislative Bars to Nutrient Pollution Control:

We believe our recommendations above stand on their own merits; however, North Carolina's current regulatory environment gives us added reason to favor an approach that combines study with prompt interim action. Recent legislative actions of the North Carolina General Assembly have exacerbated the delays and undermined the efforts of the DWQ staff to control nutrient pollution. DWQ's Nutrient Criteria Implementation Plan should take the legislation into account by, for instance, setting a schedule that results in the implementation of numeric nutrient criteria as quickly as possible.

1. Regulatory Reform Act of 2011: The process of conducting a triennial review and developing nutrient criteria has been slowed significantly by the passage of the "Regulatory Reform Act of 2011"[1] by the North Carolina General Assembly. That Act imposes on State agencies considerable new burdens that have substantially increased the time, effort, and resources required to codify new rules, even those mandated by federal law. For instance, the Regulatory Reform Act includes several provisions that make the process of preparing a fiscal note significantly more burdensome to the agency. They include provisions (1) shifting the preparation of fiscal notes to the agency proposing the rule (in the case of water quality standards, to DWQ), (2) requiring the preparation of a fiscal note and its approval by OSBM (including a certification by OSBM of compliance with the Act) *before* a proposed rule that will have a "substantial economic impact" may be published in the North Carolina Register, and (3) adding to the categories of information that must be included and analyzed in a fiscal analysis.

[1] North Carolina Session Law 2011-398 or Senate Bill 781.

N.C. Sess. L. 2011-398, Sections 2, 6. In addition, the Regulatory Reform Act requires that, for any proposed rule with a "substantial economic impact" of $500,000 as described above, the agency must consider at least two alternatives to the proposed rule, each requiring its own fiscal analysis. DWQ should adjust its schedule

2. Senate Bill 515, Jordan Lake Water Quality Act: Senate Bill 515, if enacted, would repeal the rules implementing the Jordan Lake Nutrient Management Strategy (the "Jordan Lake Rules"), which would severely undermine North Carolina's plan to comply with the TMDL for Jordan Lake. The two distinct arms of Jordan Lake – the Haw River and the New Hope Creek Arms – are both listed as impaired for chlorophyll-a on North Carolina's 303(d) list. DWQ established a federally mandated TMDL for Jordan Lake in 2007 to address the chlorophyll-a impairment, which assigns reduction targets for both total nitrogen and total phosphorus. EPA Region 4 approved the TMDL on September 20, 2007. In 2009, North Carolina adopted the Jordan Lake Nutrient Management Strategy ("Jordan Lake Rules") to codify the reduction goals set by the TMDL.[2] The Jordan Lake Rules passed after an extensive stakeholder process (including our organizations) with nearly unanimous support in the legislature and without objection from any of the local governments or developers in the watershed. In addition to codifying the TMDL, these rules include provisions requiring local governments to adopt post-construction stormwater standards for new development activities to prevent net increases in nitrogen and phosphorus loading over the sustainable levels established in the Jordan Lake TDML as well as provisions addressing nutrient loading from agricultural sources, point source dischargers, and fertilizer application. They also set forth a timeline for local governments to implement the rules.

Since 2009, the North Carolina General Assembly ("NCGA") has chipped away at the timeline for implementing the Jordan Lake Rules in each legislative session. Session Law 2009-216 allows wastewater dischargers with a permitted flow of greater than 100,000 gallons per day to meet the nitrogen requirements by 2016 rather than 2014. In 2011 the NCGA passed Session Law 2011-394, which provides an additional two-year delay for existing dischargers authorized to begin "construction, installation, or alteration of the treatment works" for the purposes of compliance. And 2012 brought two Session Laws that together delay by two years the timeline for local adoption of new development standards. Each of the delays implemented by the legislature since the 2009 passage of the Jordan Lake Rules violates the TMDL and results in further degradation of water quality in Jordan Lake. The legislature's attack on the Jordan Lake Rules through legislation continues in this legislative session with the introduction of Senate Bill 515, which has now been passed by the Senate and will move to the House. As revised by the Senate committee on Agriculture and Environment, the "Jordan Lake Water Quality Act" repeals rules for improving water quality in Jordan Lake in their entirety. While the bill focuses on the Jordan Lake Rules, if it passes it will likely be expanded to other buffer rules over time, as the policy arguments are the same for all buffer rules. In sum, the North Carolina General Assembly has passed four laws – Session Laws 2009-216, 2011-394, 2012-200, and 2012-201 – that have delayed the implementation of the Jordan Lake Rules, and it is now considering a bill that would repeal them entirely. Together, these legislative actions will impede North Carolina's ability to

[2] 15A N.C. Admin. Code 02B. 0262-.0273

meet the requirements of the Jordan Lake TMDL, and are causing the State to violate non-discretionary terms of the Clean Water Act. In the current legislative climate, it is foreseeable that DWQ's plans for other drinking water supplies will also come under attack.

3. H74, Periodic Review and Expiration of Rules: Designed by House moderates, H74 would establish a standing process by which any rule receiving complaints within a two-year period would trigger a requirement that the rule be readopted by the issuing agency, a process that, as noted above, takes an average of at least two years. The bill would thus keep the most complex and controversial rules – and virtually all rules addressing nutrient pollution or watershed management fall in this category – in a state of perpetual ferment. H74 affects the Nutrient Criteria Plan in two ways: first, because rules will be in perpetual review and readoption, there is no efficiency to be gained by delaying interim rules – "interim" is all any state rules can hope to be under a regime of perpetual review. Second, numeric nutrient criteria assume a particularly vital role, since they can be implemented directly through NPDES permit limits, and will not require increasingly unworkable efforts to develop and enact watershed management packages driven by ambient water quality.

In light of these legislative attacks and the additional bills that are sure to be introduced to weaken regulation of nutrient pollution, it is all the more important that DWQ implement numeric nutrient criteria and do so as quickly as possible. We recommend that DWQ consider how the final Nutrient Criteria Development Plan will work if EPA promulgates the various water quality standards currently caught up in the triennial review, and perhaps also modest numeric nitrogen and phosphorus standards. Such action by EPA is not improbable, given the paralysis afflicting the 2010 triennial review and the timeline envisioned in the draft plan. It would be a shame if DWQ's plan were so inflexible as to be thrown into disarray by such a promulgation. Thus, it makes sense for DWQ to think now about how to build options for speed into its plan, and especially options for a scientifically defensible periphyton standard to benefit dischargers who can demonstrate that they are over-controlled by numeric nitrogen and phosphorus standards.

Conclusion

We appreciate DWQ's and the EMC's ongoing efforts to protect our state's valuable water resources. If our recommendations are included in the final Nutrient Criteria Plan, DWQ could begin offering data-based proposals for new criteria for rulemaking in as little as a year, while continuing to work on the tougher issues in time for the next triennial review. Such an approach would, we think, better comply with the spirit and the letter of the Clean Water Act than the draft plan offered for public comment, and offer greater hope of protecting the "physical, chemical, and biological integrity" of North Carolina's waters.

Thank you for the opportunity to comment on the proposed Nutrient Criteria Development Plan and for your consideration of our comments.

Sincerely,

Julie Youngman
Senior Attorney
Southern Environmental Law Center

Grady McCallie
Policy Director
North Carolina Conservation Network

Albemarle-Pamlico National Estuary Partnership

N.C. Department of Environment and Natural Resources

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

May 24, 2013

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

Ms. Schimizzi,

Thank you for providing an additional opportunity to comment on North Carolina's Nutrient Criteria Development Plan. Initial comments from APNEP were developed to highlight gaps in our collective scientific knowledge regarding nutrient inputs to our estuaries. Recommendations included exploring improvements in nutrient-eutrophication modeling, improving estuarine water quality monitoring coverage, and quantifying the benefits of the ecosystem services provided by the Albemarle-Pamlico estuarine system, the second largest estuary in the United States and a nationally important economic asset.

In the draft plan, the NCDP workgroup undertook an analysis regarding the ability of current water quality standards to assess, restore, and protect surface waters from nutrient impacts. In this analysis, estuarine criteria were described as "adequate." We respectfully disagree. **Because this determination was the basis upon which further examination of estuarine criteria was excluded, we request that the final plan reconsiders this position.**

Existing nutrient TMDLs for the Neuse River Estuary and Tar River explicitly describe the challenges associated with the use of the chlorophyll a standard. The Neuse River Estuary TMDL concludes that the standard is "inadequate"[1] and includes a section entitled "Reservations about use of the chlorophyll a standard for regulatory decisions."[2] The Tar River TMDL notes that the estuary model "does not allow examination of the impacts of nutrient controls in the estuary portion of the watershed … there would be much uncertainty involved in an analysis which examined nutrient controls below Washington."[3] While calling for both model improvements[4] and extensive monitoring, [5] it finally emphasized the difficulty and importance of accounting for the impacts of nutrients on valuable submerged aquatic vegetation habitats.[6]

While assessment, restoration, and protection of waters were discussed in the NCDP, the ability to adequately monitor various criteria is of paramount importance in maintaining water quality. North Carolina's estuarine waters in general, and the open sounds (Pamlico, Albemarle) in particular, are inadequately monitored in space and time. Thus, conclusions of estuarine water quality and system health are seemingly based on extrapolations of riverine water quality measurements. This lack of monitoring also hinders the development and improvement of water quality models that might be called upon to

1 N.C. DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, PHASE II OF THE TOTAL MAXIMUM DAILY LOAD FOR TOTAL NITROGEN TO THE NEUSE RIVER ESTUARY, NORTH CAROLINA 49 (2001). "Everyone recognized that the (chlorophyll a) standard must be accepted in the near term, but that the stakeholder panel would comment on its inadequacy in their final report."
2 *Id.* at 60.
3 N.C. DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, TAR RIVER TOTAL MAXIMUM DAILY LOAD 6-18 (1994). "While it is extremely difficult to model and predict recovery of SAV and their effect on nutrient dynamics, it would not be prudent to support additional increases in a phosphorus rich estuary."
4 *Id.* at 6-24.
5 Id. at 6-24. "In addition, extensive monitoring should continue throughout the estuary."
6 Id. at 6-18. "Another important consideration associated with elevated concentrations in either or both nutrients in this estuary is the loss of important submerged aquatic vegetation (SAV). While it is extremely difficult to model and predict recovery of SAV and their effect on nutrient dynamics, it would not be prudent to support additional increases in a phosphorus rich estuary."

inform approaches for protective action. **As in our previous comment, we reemphasize the importance of monitoring nutrient-related parameters throughout the Albemarle-Pamlico estuary.**

Roughly 56% of North Carolina's land area drains into North Carolina estuaries and another 33% drains to the estuaries of our neighboring southern states. Given the high sensitivity of estuarine environments to nutrient inputs, the development of river and stream criteria without due consideration of downstream estuarine impacts could be a misguided and ultimately costly mistake. The lagoonal nature of the Albemarle-Pamlico estuary exacerbates this sensitivity, as it takes longer for nutrients to be flushed from the system.

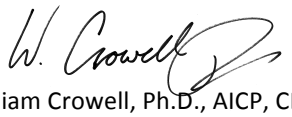
At this time, APNEP is not proposing alternate nutrient-related criteria or a change in the current chlorophyll a standard. However, we believe it is important to note current limitations and seek to overcome them in order to improve environmental and fisheries resource protection efforts. Significant work in North Carolina and worldwide has detailed relationships between key physical, chemical, and biotic constituents of our estuarine ecosystem, including nitrogen, phosphorus, dissolved oxygen, dissolved organic matter, salinity, flow rates, algal blooms, light attenuation, and submerged aquatic vegetation. While general relationships have been documented, significant gaps and uncertainty remain, particularly when considered in a regulatory context.

Because the Environmental Management Commission will ultimately review the revised version of this plan, we note its charge regarding implementation of the Coastal Habitat Protection Plan. Nutrient impacts to the water column, benthic, and submerged aquatic vegetation habitats are thoroughly documented and reviewed in the plan. Furthermore, threshold nutrient concentrations for submerged aquatic vegetation habitats are provided in that document, which may provide a starting point for further consideration of the relationship between nutrients and sensitive estuarine habitats.[7] Finally, the CHPP explicitly notes further study is required to protect SAV from the effects of water quality degradation.[8]

In light of these comments, we hope DWQ will reconsider its prioritization of estuarine nutrient criteria. At the very least, a dismissal of estuarine criteria seems premature. **We request that estuarine-related criteria be considered during the systematic parameter review (task 1). APNEP staff will provide support for this task, and both DWQ and APNEP stand to benefit greatly from broad stakeholder input into this area of study.**

We would like to thank the division for its decades of important work safeguarding estuarine water quality. APNEP's staff and scientific advisors look forward to working with DWQ further regarding the advancement of North Carolina's nutrient criteria development efforts.

Sincerely,



William Crowell, Ph.D., AICP, CEE
Director
Albemarle-Pamlico National Estuary Partnership

7 A. S. DEATON ET AL., NORTH CAROLINA COASTAL HABITAT PROTECTION PLAN (2010) 257.
8 *Id.* at 259. "Knowing that water quality degradation is the largest contributor to declines in SAV, and that North Carolina's growing coast will likely lead to additional water quality degradation, North Carolina needs to investigate the best method to protect SAV habitat from water quality degradation."

DURHAM
1869
CITY OF MEDICINE

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May 23, 2013

Ms Nikki Schimizzi
Planning Section
NC Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Dear Ms. Schimizzi:

The City of Durham Stormwater & GIS Services Division of the Public Works Department appreciates the opportunity to provide comments on the draft Nutrient Criteria Development Plan (dated April 15, 2013). The City has a unique perspective on nutrients and nutrient management due to its location on a ridge line between two river basins that contain multiple Nutrient Sensitive Waters. Public Works staff members are on Falls Lake weekly to collect samples per the requirements of the National Pollutant Discharge Elimination System Permit for wastewater discharge from the North Durham Water Reclamation Facility. While on the lake, staff members observe the various types of wildlife present in Upper Falls Lake above Cheek Road and any unusual conditions (e.g., pollen scum, low water conditions, algae blooms, etc.).

The City of Durham is currently subject to three nutrient management strategies: Jordan Lake and Falls Lake, and the Neuse Strategy for the Neuse River Estuary. Each of these strategies has been progressively more stringent, with Stage II of the Falls Lake strategy providing some of the strictest nutrient targets in the country. The estimated cost of the rule to the residents of the watershed is over $1 billion dollars, with a majority of the cost borne by the City of Durham residents. The nutrient management strategy targets arise from an interpretation of the existing chlorophyll *a* water quality standard that is more strict than any other interpretation of this standard in North Carolina. Thus, the City of Durham is understandably concerned when the state begins to consider additional water quality standards for nutrients, particularly when the implementation costs for those standards must be borne by the local governments.

The City of Durham is disappointed that the Division of Water Quality (DWQ) does not intend to re-evaluate the current chlorophyll *a* standard in piedmont reservoirs, nor provide a clear process for developing site-specific standards. Current standards are not always indicative of nuisance algae blooms or impacts to aquatic life. For example, upper Falls Lake frequently has chlorophyll *a* levels exceeding the current water quality standard of 40 µg/L, yet there have been no fish kills and rarely have there been visible nuisance algae blooms. It appears that a site-specific standard or re-interpretation of the existing standard could be supported in this case.

The draft Nutrient Criteria Development Plan describes a process that the DWQ will follow to develop additional criteria. A majority of the plan is necessarily vague because the DWQ has additional work to complete in order to clarify the direction that will be taken. Since the plan is so vague, additional communication with the citizens of North Carolina, including the regulated

community, should occur at each step of the process in order to seek feedback or additional information.

The City of Durham understands that the US Environmental Protection Agency has a national priority to adopt nutrient criteria. Other states have adopted criteria in response to this priority. The DWQ has protected and used chlorophyll *a* criteria to manage nutrients in the state. For management of nutrients, the City of Durham supports the use of response criteria that reflect adverse impacts. The City of Durham also supports refinement to site-specific criteria when economic or environmental conditions support such an analysis. If you have any questions about these comments, please contact Michelle Woolfolk at (919) 560-4326 ext. 30219 or John Cox at extension 30212.

Sincerely,

Paul Wiebke, P.E.
Assistant Director of Public Works

c: Marvin Williams, Director of Public Works
Vicki Westbrook, Deputy Director of Water Management
Don O'Toole, Senior Assistant City Attorney

Comments on specific sections of the nutrient criteria development plan.

- **Strengths and Weaknesses Analysis**.

  Retitle this section to more accurately describe the content, such as "Evaluation of Current Nutrient-Related Criteria". The section as currently written does not provide a strengths and weaknesses analysis. It does provide an evaluation of the current criteria.

  Second paragraph. Revise the text regarding nutrient management strategies. Nutrient management strategies have generally been developed reactively as a result of either violations of the existing chlorophyll *a* standard due to existing nutrient enrichment (e.g., Chowan River, Tar-Pamlico Estuary, Neuse Estuary, Jordan Lake, or Falls Lake) or an expansion to a wastewater discharge (Lake Wylie). Protective actions have generally been in wastewater permitting strategies, not in nutrient management strategies that include nonpoint sources.

  Revise end of second sentence to say "best indicators of *adverse impacts* of nutrient enrichment."

  Third paragraph. Dissolved oxygen and pH water quality standards may be used to analyze nutrient enrichment for streams. The current dissolved oxygen standard includes both a daily minimum and a daily average. However, there is very little diurnal dissolved oxygen monitoring that occurs in streams in the state. It would be useful to perform diurnal dissolved oxygen monitoring, with nutrient and periphyton monitoring, prior to considering additional stream criteria. It may be that the current criteria is sufficient.

  Table 1. Refine contents to be less subjective and more objective. The words "Adequate" and "Inadequate" are subjective and do not have any criteria against which to measure. For example, the City of Durham would easily argue that the existing reservoir criteria are "Inadequate" because the designated uses are present and sustained even though the criteria have been violated; in other words, the criteria are too stringent. The table should provide objective criteria to describe these subjective words. Also, the explanations of "Assess", "Protect" and "Restore" are also subjective. For example, the explanation of "Assess" states the following: "Assess refers to the ability to effectively use standards to determine if the water is experiencing undesired responses to nutrient enrichment." What is effective? Is it judged by ease of use (i.e., numeric criteria can be compared), or ease of measurement (e.g., chlorophyll *a* is readily measured in laboratories), or the ability to derive point source permit limits to achieve the criteria (i.e., numeric criteria can be used in wasteload allocations), or some other criteria? Objective statements are needed in order to judge how nutrient criteria development should be approached and what criteria to use to judge success.

  Table 1. Remove the column entitled "Restore". This column is redundant with "Assess" and uses almost identical, subjective language.

- **Parameters Targeted for Evaluation**

  Second Paragraph. Revise last sentence to read "… canopy cover, precipitation, and wind can support or hinder the expression of severe nutrient responses."

  Second paragraph. Delete "increased biomass production." The adverse impacts that may accompany increased biomass production are already listed. Absent such adverse

consequences, increases in primary productivity or biomass production are not by themselves adverse impacts.

- **Investigation Approach**

  The approach should include additional collaboration with both academia and the regulated community. Others have suggested an advisory group should be convened (Appendix B of the document) and this seems a reasonable approach. The City of Durham would like a process that includes not only "technical experts", but also representatives of fisheries and water suppliers, and members of the regulated community expected to implement changes. There are very few opportunities for the regulated community to comment on results, documents, and directions in the current approach. While it may not be feasible to have comprehensive and regular stakeholder meetings throughout the process, some opportunity for comment, input and recommendations is needed prior to completing the process.

  Task 1. Review of Progress in other States. Clarify this section so that it is not contradictory with DWQ comments made in Appendix B, or revise comments in Appendix B. This section appears to include constant review of progress to control nutrients in other states. However, stakeholder comments in Appendix B that are related to implementation were deemed "beyond the scope of the NCDP (Nutrient Criteria Development Plan)".

  Task 1. Review of Available Data. DWQ should seek data from surface water intakes. Permitted surface water intake locations may maintain monitoring records in paper format rather than in a more accessible electronic format.

  Task 1. Geographic Scale. The exploratory nature of Task 1 should encompass exploring other variations in local spatial scales, such as variations by stream order, and variations within a lake or reservoir (e.g. center of lake, arms, shallow regions, coves, etc.) If data is not available to support such exploration, then the scope of any criteria that are derived should be circumscribed to conditions that have been adequately evaluated.

  Task 1. Results of Task 1. Two outputs of this task should be a report summarizing the literature and a data review document. Both should be made available for public review and comment prior to going to the EMC. EMC approval should be required before moving to Task 2.

  Task 4. EMC approval, not input, should be required before finalizing the criteria. Simply providing information items for the EMC at selected points in the process does not constitute approval to finalize the criteria. This should come before the DWQ begins the process of modifying any state water quality standards.

  The document is missing Table 3.

  Table 4. Add additional time to produce reports in Task 1. Add additional time to provide meaningful public review and input to each task following the release of draft reports.

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

May 21, 2013

Ms. Nikki Schimizzi
NCDENR – DWQ Planning
1617 Mail Service Center
Raleigh, N.C. 27699-1617

Re: Comments on Nutrient Criteria Development Plan

Dear Ms. Schimizzi:

On behalf of the Neuse River Compliance Association, I am submitting the attached comments on the Draft Nutrient Criteria Development Plan.

If you require any additional information, please contact either Haywood Phthisic or me.

Sincerely,

Daniel F. McLawhorn, Chairman

Attachment

cc: NRCA Board

May 21, 2013

NRCA's Draft Comments Regarding N.C. Nutrient Criteria Development Plan

In response to DWQ's notice and request for comments and after public meetings, the NRCA (Neuse River Compliance Association) submitted several comments regarding the contents of a Nutrient Criteria Development Plan (NCDP). Those comments are in the appendix to the Draft NCDP.

The NRCA wants particularly to emphasize its comment endorsing what it has understood to be the Division's position that any revisions to the nutrient criteria will not impact water bodies that have implemented a TMDL and that because the Neuse Management Strategy has been in place for 10 years any revisions should be implemented through the TMDL process. The NRCA assumes that DWQ's position has not changed in this regard, but the Draft NCDP is not clear on this point. The NRCA requests that the Draft NCDP include a statement that the NCDP does not apply to water bodies that have implemented a TMDL and are subject to a nutrient sensitive waters management strategy since nutrient criteria have been developed for those water bodies and management of such water bodies is being implemented pursuant to the applicable TMDL and management strategy.

The NRCA also previously commented that there should be financial support for monitoring programs (such as ModMon and FerryMon in the Neuse River Basin) in order to evaluate accomplishment of criteria, and further commented that there should be a focus on non-point sources of nutrients and trading between point and non-point sources should be allowed. The NRCA acknowledges that the immediate reaction may be such comments are more related to management than to criteria development; however, if the selected criteria cannot be

effectively monitored especially for recovery decisions, than another means of setting criteria should be adopted.

May 28th, 2013

By Email

Nikki Schimizzi
NC DENR
1601 Mail Service Center
Raleigh, NC 27699-1601

Re: Nutrient Criteria Development Plan

Dear Ms. Schimizzi,

The North Carolina Water Quality Association (NCWQA) comprises publicly owned water, sewer and stormwater utilities statewide. Our members serve a substantial majority of the sewered population in the state. Our mission is to protect public health and the environment efficiently and cost-effectively, and to help ensure that North Carolina's water quality programs are based upon sound science and regulatory policy. The Nutrient Criteria Development Plan could affect every community in the State implicating potentially enormous public infrastructure and operational costs statewide.

On behalf of the North Carolina Water Quality Association, I would like to thank NC DENR for providing the opportunity for stakeholder comment on the proposed Nutrient Criteria Development Plan. Accordingly, we ask for the Division's careful consideration of the attached NCWQA comments.

Respectfully yours,

Charles Ham

Charles Ham
North Carolina Water Quality Association
President

NORTH CAROLINA WATER QUALITY ASSOCIATION

MAY 28, 2013

COMMENTS ON THE APRIL 2013 DRAFT NORTH CAROLINA NUTRIENT CRITERIA DEVELOPMENT PLAN

1. ***NCWQA supports the Division of Water Quality's (DWQ) goals and general approach outlined in the draft NCDP***. NCWQA shares DWQ's goals for science-based water quality standards that are useful for assessment, restoration, and protection of beneficial uses. In its broad outline, the draft NCDP offers a measured and thoughtful approach for evaluating and strengthening North Carolina's nutrient-related criteria. We find the following aspects of the plan to be particularly commendable:
    a. The intent to base any new criteria on "defensible linkage[s] of cause to response to effect" (p. 1), with "strong scientific merit." (p. 8).
    b. A staged approach that places review and research tasks before criteria development tasks.
    c. A multi-year schedule to provide time for the planned data analysis and investigations.
    d. The intent to pursue "collaborative work with other agencies, local governments, other stakeholders, and universities." (p. ii)
    e. The commitment of 1-2 full time employees (FTE) to this effort.

2. ***The NCDP approach should be broadened to explore other water quality standards-related implementation options.*** DWQ states that the NCDP is intended to "focus on strengthening the portion of North Carolina's nutrient management program which relates to the development of *water quality standards* [emphasis added] to control nutrients." (p. 1). As the plan describes, water quality criteria are only one of the four elements of water quality standards, with the others being designated uses, antidegradation requirements, and implementation policies. However, the overwhelming emphasis of the NCDP is the evaluation of new parameters for criteria adoption. It is recommended that the approach be broadened to state DWQ's intention to explore other water quality standards-related options that might improve the scientific basis and implementability of any new criteria. Examples of such options include:
    a. Designated use refinement, such as tiered aquatic life use (TALU) framework that acknowledges variation in the biological potential of different water bodies

based on items such as the geologic attributes of the watershed , the waterbody residence time, etc,

b. Assessment protocols that emphasize response variables (e.g., biological status) or other direct measures of use attainment over nutrient concentrations, where the latter are unreliable indicators of use attainment.
c. Regulatory mechanisms to derive site-specific criteria where appropriate.
d. Implementation policies that would allow total maximum daily loads and/or basin plans to remain the primary nutrient control program, where they have already been established.

NCWQA's comments to the Division dated January 21, 2013 provide additional details on most of these recommendations, all of which have been successfully pursued by other states. Technical guidance exists on these approaches from USEPA, states or other organizations. States such as Minnesota and New Jersey have published documents on the application of TALU. States such as Florida, Maine, Virginia, and Ohio have developed approaches for using biological data to reduce errors in the assessment of instream nutrient impairments. And the Water Environment Research Federation (WERF) has recently published guidance[1] on the use of models to set site-specific nutrient goals.

It is understood that the draft NDCP is intended to describe a general study approach rather than specific methods or outcomes. However, we believe it is appropriate for the document to describe the categories of alternatives that will be considered. Evaluation of the options listed above are distinct enough from the parameter-focused tasks in the NDCP to merit being called out as an additional, separate task. Alternatively, the names and descriptions of the existing tasks 1-4 should be broadened as appropriate. If called out as a separate task, we offer the following language for the Division's consideration:

Task X. Evaluate Designated Uses and Implementation Policies

In parallel with the parameter review and criteria development tasks, the Division will evaluate other aspects of water quality standards that might facilitate the development/implementation of nutrient-related criteria. This will include an evaluation of whether North Carolina's existing designated uses are sufficient for assessing nutrient impairment, or conversely, whether designated use refinement would improve the scientific basis of nutrient-related criteria. This task will also include the evaluation of potential implementation policies including but not limited to:

- Assessment protocols, including methods for employing direct measures of use attainment (e.g. biological status) to minimize assessment errors;
- Regulatory mechanisms for deriving site-specific criteria;
- Protective/proactive measures; and
- Policies for preserving established TMDLs and/or basin plans.

Task X will include a review of implementation policies considered or adopted by other states. The Division will work closely with other agencies and stakeholders to identify the most useful implementation approaches, and will communicate findings to the EMC and the public.

[1] Bierman, V.J., DePinto, J.V., Dilks, D.W., Moskus, P.E., Slawecki, T.A.D., Bell, C.F., Chapra, S.C., and Flynn, K.F. 2013. *Modeling Guidance for Developing Site-Specific Nutrient Goals*. Water Environment Research Foundation Report LINK1T11. 366 p.

3. ***The NCDP should clearly state the intent to adopt numeric nutrient (concentration) criteria only where they are useful indicators of waterbody responses***. The draft NCDP states that "the primary purpose of Task 1 is to assure that there are established scientific relationships between the various indicators of eutrophication and the concentrations of nitrogen and phosphorus". Although this is an important statement, the draft NDCP does not identify the consequences of *not* finding such relationships, which is a very real possibility for rivers, streams, and estuaries. Research from many states has shown that nutrient concentrations are highly unreliable indicators of eutrophic responses in many hydrologic settings, and this may turn out to be the case in North Carolina as well. NCWQA strongly recommends that DWQ clarify that (1) numeric nutrient criteria would only be adopted if they were reliable indicators of response indicators; and (2) lacking such relationships, DWQ would pursue an approach that emphasized response variables and other more direct indicators of use attainment.

4. ***Tasks 1-2 should be expanded to include research on linkages between eutrophic responses and designated uses***. As discussed under comment #3, the draft NCDP currently emphasizes linkages between nutrient concentrations and eutrophication (response) indicators. It is perhaps even more important to link response indicators with designated uses. For example, regardless of whether nutrient concentrations are a useful predictor of algae in streams, a key question would be what types and levels of algae actually impact aquatic life, recreation, drinking water, etc. Experience in other states has shown that statistical/graphical analysis of ambient monitoring datasets is often insufficient to establish these linkages, partly due to confounding factors such as multiple correlated stressors. Accordingly, NCWQA recommends that Tasks 1 and 2 be modified to (1) state the intent to explore the linkages between response variables and designated uses; and (2) design studies to investigate response-use relationships, including controlled research that reduces the confounding effect of multiple stressors.

The draft NDCP prioritizes rivers/streams and drinking water supplies for criteria development. Although NCWQA supports this prioritization, we also recommend that the NCDP re-evaluate North Carolina's ability to correctly assess/restore reservoirs and estuaries. Of particular interest is whether the existing chlorophyll-a standard is a meaningful measure of impacts to fisheries and recreation, both in terms of magnitude and frequency/duration components.

5. ***NCWQA recommends that DWQ establish a technical advisory group with representation from scientists/engineers from the water/wastewater community***. The draft NCDP states DWQ's intent to communicate and collaborate with other agencies, local government, and universities. NCWQA welcomes this open approach, and looks forward to working with DWQ to make the NCDP a success. To this end, we recommend that the NCDP provide additional detail on the means and schedule for engaging stakeholders and soliciting input.

The NCDP study plan is ambitious and will require technical and financial resources from multiple arenas. NCWQA recommends that the study approach include the establishment of a technical advisory group to identify high-priority activities, assist DWQ with the technical execution of the study, and develop alternatives for consideration. The study schedule should include at least semi-annual meetings of the technical advisory group. The group should include technical professionals who are familiar with a variety of hydrologic settings in North Carolina. It is also recommended that the technical advisory group include representation from scientists/engineers from the water/wastewater community, who can bring both considerable technical expertise and a strong understanding of the ultimate regulatory applications.

6. ***DWQ should continue to utilize other successful nutrient management programs and policies, and refine those programs where necessary***. As discussed in the draft NCDP, water quality standards are only one of North Carolina's nutrient-related programs and policies. Although new water quality criteria may provide some benefits, other regulatory and non-regulatory approaches are also important to controlling nutrients in a cost-effective, equitable manner. In communications with USEPA, we encourage DWQ to continue to emphasize the state's long history of progress on nutrients, effective use of existing water quality criteria, and achievements in all eight of EPA's recommended elements for a state nutrient management framework. These combined achievements support the appropriateness of a measured schedule for criteria adjustments, providing time for high-quality research.

   NCWQA acknowledges that it is not the purpose of the NCDP to address all nutrient-related programs. However, we encourage the state to preserve its successful programs while continuing to refine them where necessary. NCWQA considers it especially important to maintain a flexible, basin-specific planning approach for nutrients. We also reiterate the importance of:

   - Allowing trading/offsets to facilitate affordable and cost-effective compliance by regulated entities;
   - Identifying and crediting all effective nutrient reduction strategies (e.g. septic system hook-ups, non-point source pollution management strategies);
   - Conducting cost-benefit analyses to support implementation strategies; and
   - Developing equitable implementation strategies that address all sources.

May 24, 2013

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Re: North Carolina's Nutrient Criteria Development Plan

Dear Division of Water Quality Staff:

Thank you for the opportunity to comment on the North Carolina Division of Water Quality ("NCDWQ") Nutrient Criteria Development Plan (NCDP). 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.

I. NCDP Unreasonably Delays Development of Numeric Nutrient Criteria

As documented in our previous comments in February 2013, North Carolina has improperly delayed implementation of numeric standards for years.[1] After nearly nine years of studying the issue and fifteen years after EPA first directed states to adopt nutrient criteria, the NCDWQ has developed a NCDP that simply delays proposing

[1] Waterkeeper Alliance/Waterkeepers Carolina letter to NC EMC and NC DWQ February 4, 2013.

nutrient criteria indefinitely. At best, the "first **potentia**l criteria" would be proposed "**by around** 2020." No justification is provided for additional delay and, in fact, there is no reasonable basis for continuing to avoid adoption of numeric criteria necessary to protect and restore North Carolina's water resources.

At best, the NCDP calls for an additional seven-year extension to begin to propose some potential criteria. The nature and applicability of criteria that would be proposed "by around 2020" is not identified. Thus, it is not clear whether the NCDWQ would propose narrative or numeric criteria, whether criteria will be based on response or causal parameters, which waterbodies the proposed criteria would apply to, or what use the criteria would be designed to protect.

The NCDP also indicates that the NCDWQ intends to consider land use and the presence of nutrient excess in relation to crop needs in certain geographic areas as factors in criteria development but it provides no details on the proposed analysis. The existence and magnitude of pollution sources in a watershed should not be considered in criteria development. 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).

Additionally, the second task under the NCDP seeks to develop study designs and then to implement those studies, however, the plan does not take into account the financial resources to do so. The lack of both human and monetary resources to carry out studies will likely result in further unwarranted delay. Recent actions by NCDWQ provide justification for this concern. In 2010, NC DWQ communicated to EPA that "financial constraints had prevented the State from doing adequate research to develop the periphyton criteria."[2] While it may be important to assess where data gaps may exist, there is substantial information available that provides the necessary scientific justification to move forward on numeric nutrient criteria development without additional delay. To the extent there is some limited data gap that is reasonably identified, a tiered approach should be utilized to immediately develop protective nitrogen, phosphorus, chlorophyll-a, and transparency criteria for all of North Carolina's waters and criteria for other response parameters in areas where data is readily available. In areas where data is limited for other response parameters, NCDWQ should prioritize basins that are currently experiencing nutrient enrichment, serving as drinking water supplies and/or protected by the most stringent antidegradation protections.

II. The NCDP does not meet North Carolina's Legal Obligations to Protect its Waters

[2] 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).

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.[3]

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.[4] Nutrient strategies had to be implemented in Chowan, New River, Randle Reservoir, Deep River, Abbotts Creek, and Twelve Mile Creek watersheds.[5] 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.[6]

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). However, 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. The NCDP only proposes to delay the adoption of nutrient criteria even further without providing any reasonable assurance that any criteria will even result from the proposal. 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

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[3] 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

[4] http://portal.ncdenr.org/web/wq/ps/mtu/tmdl/tmdls

[5] Briefing Package - NC Nutrient Activities (NCDENR April, 24, 2012)

[6] http://portal.ncdenr.org/web/wq/ns

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).

III. The NCDP fails to develop causal nutrient criteria for all waters

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 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.[7] 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 advances in the science of nutrient management and the continued eutrophication of waters."[8]

Attachment 1 within the NCDP again demonstrates North Carolina's unwillingness to implement numeric nutrient criteria and its continuance with nutrient strategies that are mainly reactive in nature. As stated in the attachment, "The underlying principle guiding this strategy and the number one priority for North Carolina's program has always been to develop flexible nutrient control approaches to prevent future impairments." However, the document does not provide any data that confirms that the state's current approach will prevent future impairments. To the contrary, North Carolina's approach to nutrient has resulted in additional impairments and has completely failed to address existing impairments in important basins like the Tar-Pamlico, Neuse and Cape Fear.

The documented successes noted in the attachment point to the Neuse, Tar-Pamlico and Chowan nutrient management approaches. These strategies were implemented in response to nutrient pollution and, thus, are not evidence that supports the effectiveness of North Carolina's existing chlorophyll-a criteria. Neither do these facts in these basins support the assertion that the nutrient management strategies adopted in response to the pollution were successful. In both the Neuse and Tar-Pamlico River basins, even after two decades of management strategy implementation, estuarine

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

impairment has not improved at all.

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 enterococci) levels (Figure iii).[9] . . . 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."[10] 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.[11] 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 as described in the 1994 Basinwide Plan and is covered by the estuarine response modeling and TMDL strategies described in the 1994 Basin Plan."[12]

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

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[9] 2009 Neuse River Basinwide Water Quality Plan, http://portal.ncdenr.org/c/document_library/get_file?uuid=a8681cfe-0b28-4322-939e-2ae200a7d6fd&groupId=38364

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

[11] Id.

[12] 2010 Tar-Pamlico Basinwide Water Quality Plan, http://portal.ncdenr.org/c/document_library/get_file?uuid=fac63441-e4c6-479f-98df-17e3bdbb17f0&groupId=38364

> (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." [13]

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** (emphasis added) that contribute nutrient loadings to our waterways."[14] 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*."[15] 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 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.

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

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

[15] 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

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).[16] 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).

The EMC's failure to adopt numeric nutrient criteria is the primary reason that North Carolina's waters are severely impaired by nutrients. Adequate water quality criteria form the basis of the entire Clean Water Act approach to protecting and restoring water quality. They are mandatory components of state delegated programs and, without them, state delegated programs will not adequately protect and restore water quality. North Carolina does not have adequate criteria for nutrients and large segments of its waters are impaired by nutrients and its plans to address the pollution have not reduced the pollution. Accordingly, the EMC should take immediate action to adopt scientifically defensible nutrient criteria.

IV. The NCDP should include plans to develop both N & P numeric criteria for all waters

It is well known that nitrogen has typically been identified as a major limiter of nuisance algal growths in estuaries and phosphorus in freshwater systems. This broad generalization has come under much scrutiny over the past decade. Accelerating anthropogenic N & P loading has altered nutrient limitation and eutrophication dynamics thus requiring reductions in both nitrogen and phosphorus in order to protect or restore impaired waters. This is especially true for coastal waters draining to the state's estuaries, where research has noted that algal blooms within estuaries has been exacerbated due to the result of upstream removal of P but no corresponding N reduction management measures. [17]

[16] 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.*

[17] Paerl, H.W. 2009. Controlling Eutrophication along the Freshwater-Marine Continuum: Dual Nutrient (N and P) Reductions are Essential. Estuaries and Coasts. DOI 10.1007/s12237-009-9158-8

Research has also indicated that management for nitrogen as well as phosphorus is essential in protection of freshwater lakes and reservoirs, including the numerous run of the river reservoirs located within the state. A study of North Carolina piedmont lakes noted a positive correlation between TN and TP with Chlorophyll *a*.[18]

Reduction of P, but not N, causes a cascade of undesirable impacts in aquatic ecosystems, both in the immediate area and in downstream waters. Principles of ecological stoichiometry show that food quality is negatively affected at the base of the food web that affects higher trophic levels such as beneficial fish species. Ecological stoichiometry relates changes in the relative composition of N and P in cells and tissues of aquatic organisms versus the water column. Reduction of one nutrient but not the other changes the N:P ratio which, in turn, alters metabolism, species composition across trophic levels, and food webs.[19,20]

The NCDP should therefore include plans to develop both N & P numeric criteria for all waters.

V. Nitrogen & Phosphorus numeric criteria are necessary in order to keep waters from becoming impacted by nutrients.

Table 1 of the NCDP states that for most waters, North Carolina's existing nutrient criteria would be protective and avoid future nutrient impairment.[21] However, based on current data for North Carolina waters that are suffering from nutrient impairment, the evidence is strong that current response criteria are indeed not protective. The current approach to water quality is reactive and ineffective.

By establishing nutrient concentration or loading standards for nutrients, DWQ will be able to determine which streams pose the greatest potential to develop problems as well as loading to downstream waters (estuaries, reservoirs, etc.). This information

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[18] Touchette, B.W. et al. 2007. Eutrophication and cyanobacteria blooms in run-of-river impoundments in North Carolina, U.S.A. Lake and Reservoir Management 23:179-192.

[19] Elser et al. (2007). Global analysis of nitrogen and phosphorus limitation of primary producers in freshwater, marine and terrestrial ecosystems. *Ecol. Lett.* 10: 1135-1142.

[20] Sterner and Elser (2002) *Ecological Stoichiometry: The Biology of Elements from Molecules to the Biosphere*. Princeton Univ. Press, NJ, 439 pp.

[21] Except as noted in Table 1 of the NCDP for Mountain and Upper Piedmont water bodies and drinking water supplies

allows the state to allocate limited resources for the protection of waters and allows managers to get ahead of the curve before impairment response begins. Tools may include both voluntary and regulatory means in order to prevent nutrient impairment or to reduce nutrient export to impaired waters downstream, thereby protecting the designated uses of all waters.

VI. The NCDP does not include revisions of the chlorophyll *a* standard

In developing its original state Nutrient Criteria Implementation Plan (NCIP) in 2004, North Carolina chose to use only a single response-only variable, chlorophyll *a,* which was already currently being used in state water quality standards, despite the recommended parameters from EPA.[22] 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."[23] 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.[24] Specifically, the NCIP divided waters into two groups: flowing waters and non-flowing waters.[25] 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 chlorophyll *a* criteria will be developed for the mountains, piedmont, sandhills, coastal plains, and estuary regions of North Carolina.[26]

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

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[22] 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
[23] 2010 comments from EPA
[24] Id.
[25] Id.
[26] Id. at 3.

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.[27]

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."[28] EPA considered this to be a change from the NCIP, and did not see adequate data to support the state's change in direction.[29]

VII. Summary

- NC DWQ should begin to develop and implement numeric N & P criteria without delay.
- To the extent there is some limited data gap that is reasonably identified, a tiered approach should be utilized to immediately develop protective nitrogen, phosphorus, chlorophyll-*a*, and transparency criteria for all of North Carolina's waters and criteria for other response parameters in areas where data is readily available.
- The NCDP should prioritize promulgation of criteria in impacted waters where adequate scientific justification for criteria exists. This information is readily available in North Carolina's Coast Plain and in many other areas of the state.[30]

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[27] 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).

[28] Id. at 4

[29] Id.

[30] 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

- The NCDP should include plans to develop both N & P numeric criteria for all waters.

- The NCDP should be revised to include development of numeric criteria for all waters of the state. Prioritization of types of water bodies for numeric criteria is justifiable, but continuing to rely on response parameters for most waters is not protective of water quality, will delay restoration of impaired waters and will result in currently supporting waters to become impaired.
- The NCDP should include re-evaluation of the chlorophyll *a* standard for non-flowing waters, as was expected via the NCIP.

WATERKEEPER® ALLIANCE and WATERKEEPERS® CAROLINA appreciate the opportunity to comment on the NCDP. Please feel free to contact Kelly Hunter Foster at kfoster@waterkeeper.org or David Emmerling at david@waterkeeperscarolina.org if you have any questions.

Sincerely,

Kelly Hunter Foster
Senior Attorney
Waterkeeper Alliance

David Emmerling
Executive Director
Waterkeepers Carolina

(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

City of Greensboro
North Carolina

May 24, 2013

Ms. Nikki Schimizzi
Planning Unit
State of North Carolina DENR / Division of Water Quality (DWQ)
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

RE: Comments regarding the North Carolina Nutrient Criteria Development Plan

Dear Ms Schimizzi:

The City of Greensboro is appreciative of the opportunity to provide feedback on the draft copy of the North Carolina Nutrient Criteria Development Plan (NCDP). Overall the NCDP is well thought out and shows much effort on the part of the DWQ. To that point, the City would like to submit the following comments.

1) Requests that data show a statistically valid correlation between the response variables and the casual parameters.

2) In Task 2: Design and Implement Study Plans, the City suggests that more emphasis should be placed on the number of valid data points rather than a specific time period (2 years) for additional data collection. Given the reliance on outside funding sources (i.e. 106, 104(b), and 319 grant funds) the City is concerned that if funding is not available or insufficient, that the collection of data identified during the gap analysis may not be completed.

3) Supports inclusion of a cost benefit analysis as part of the criteria development process. Additionally, before publishing the final criteria, a thorough analysis of costs associated with implementation should be conducted and peer reviewed.

4) Requests that the NCDP stakeholder group consist of a diverse set of individuals from different organizations and agencies (regulated, non-regulated, academics, etc…) as to provide balanced and legitimate direction to DENR. Furthermore, the NCDP should be more detailed on the role of the stakeholder group and how that role plays into the nutrient criteria development process.

5) Requests the stakeholder and EMC update timeline for all tasks be increased as the City feels 2 months is insufficient and that more time will be needed for review and comment. To this point, the City also suggests an avenue to update entities after each task that are not on the stakeholders group but are affected by the NCDP and provide an opportunity for input.

6) Prior to publishing the rules, provide a before and after list showing the number of streams segments impacted by the new criteria which would ultimately be added to the 303(d) list.

7) The NCDP should provide further explanation regarding the referenced Section 106 commitments so as to inform the regulated entities of all stated obligations by DENR to the EPA. Furthermore, given the events in Florida and the status of other region 4 States, more explanation should be given on why North Carolina is currently moving forward with the NCDP.

8) In the interest of full transparency, DENR staff names and position titles that have been directly involved in the nutrient criteria development process should be listed in the plan.

9) Supports a site specific approach for establishing criteria.

10) Supports the addition of another task which will explore ways to practically implement measures based on the regulatory implications of the nutrient criteria.

Thanks again for providing an opportunity for the City of Greensboro to submit comments regarding the North Carolina NCDP. If you have any questions regarding these comments please feel free to contact me at (336) 373-2737/peter.schneider@greensboro-nc.gov or David Phlegar at (336) 373-2707/david.phlegar@greensboro-nc.gov.

Sincerely,

Peter W. Schneider, Water Quality Supervisor
City of Greensboro, Water Resources Department

Cc: Kenney McDowell PE, Deputy Director, Water Resources Department
David Phlegar, Stormwater Manager, Water Resources Department
Tom Carruthers, Associate General Counsel, Legal Department
File

From: Larry F. Baldwin, CPSS/SC <LBaldwin@ec.rr.com>
Sent: Sunday, April 21, 2013 9:00 PM
To: Schimizzi, Nikki
Subject: Comments regarding NC Nutrient Criteria Development Plan (NCDP)

TO: Nikki Schimizzi, NCDENR-DWQ

Thank you for the opportunity to comment on NCDWQ's proposed Nutrient Criteria Development Plan (NCDP):

1---What provisions are being made for NCDP to be fully compliant with Session Law 2011-398 (SB-781), especially as to full disclosure, documented cost vs. benefits, full economic impact analysis, and not exceeding currently specified Federal mandates?
See SL 2011-398: http://www.ncleg.net/Sessions/2011/Bills/Senate/PDF/S781v6.pdf

2---Direct point and non-point nutrient reduction initiatives have been implemented on some watersheds for ~15 years (eg. Neuse 1998) without significant reductions, or discernable / meaningful trends.
See study: http://www.sciencedirect.com/science/article/pii/S0043135400004024
The current NCDP deliberations have also raised these and additional concerns regarding:
---which parameters to measure;
---ability to consistently measure a parameter;
---ability to interpret a parameter's significance and trends within a given section of a watershed;
---ability to consistently discern between natural vs. artificial / man-induced fluctuations of a parameter within a watershed.
Is the science and/or understanding of the data, sufficiently mature, and legally defendable with a +90% probability to proceed to policy or rule-making?

3---Are there documented and known reference benchmarks for the natural background characteristics of each parameter being considered? Especially as to each section of a given watershed's statistical range and mean for every parameter being considered? Without well documented baseline or benchmark references, there can be no comparison to determine natural background fluctuations from artificial / man-induced fluctuations. News article example:
http://www.jdnews.com:80/news/local/water-quality-monitoring-helps-researchers-analyze-area-fish-kills-1.85708
If baseline monitoring had been available along the Neuse, similar types of incidences could have been documented, irregardless of water quality parameters. After flooding events (eg. Hurricanes Floyd, Irene, etc) major portions of the organic leaf litter layers from natural woodlands were transported by floodwaters into the adjacent watersheds, where it degraded into its' natural mineral N, P, K, etc parameters with major water quality impacts. Can the NCDP monitor, discern, and measure these and similar natural events? Are these type of events even known or documented into any database?

These are some of the broad concerns regarding the proposed NCDP policy draft and possible rule-making. I may have additional concerns and will try to submit prior to the May 24th comment deadline. Thank-you.

Larry F. Baldwin, CPSS/Sc; NCLSS
(910) 471-0504

From: Jay Jennings <hja@esinc.net>
Sent: Friday, May 24, 2013 10:49 AM
To: Schimizzi, Nikki
Subject: NC NCDP

Follow Up Flag: Follow up
Flag Status: Flagged

Please consider my comments relating to the NC NCDP. I believe accurate water quality data, at the watershed sub-basin level, should be the beginning point of any new plan. In reviewing the DRAFT, I find that the comments submitted by City of Salisbury, NC Farm Bureau and NC League of Municipalities most closely reflect my opinion. Cost-benefit analysis, accurate data, education of the public and realistic
goals should be included as part of any action plan or new regulations. I would also request local public hearings be scheduled across the State before plans are drafted/adopted or new regulations implemented.

Thank you.
Jay Jennings
Hamlett-Jennings & Associates
336-599-8742 office
336-597-0720 cell
hja@esinc.net

From: Bob Miller <sailingbob@embarqmail.com>
Sent: Friday, May 24, 2013 12:18 PM
To: Schimizzi, Nikki
Subject: NC Nutrient Criteria Development Plan

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Ms. Schmizzzi:

In reading the draft NC Nutrient Criteria Development Plan I find that not enough attention is being paid to the economic impact of nutrient loading on coastal estuaries and coastal communities. As a person who lives on the Neuse at Oriental I can say with conviction that local people (and visitors) are very concerned with the impact of poor water quality on local commercial and recreational fisheries, real estate values, quality of time on the water for all who come to enjoy the Sounds, and the frequency of fish kills in summer. I'm not too sure of the politics of all this in Raleigh, but clean water is the life blood of coastal communities. Current management practices are inadequate at best and are an embarrassment to our state. Windrows of rotting fish on our beaches is not a tourist attraction and does not attract people or economic development to our region. We need standards that reflect the biological and chemical differences of estuaries compared to flowing fresh water systems, and that reflect the social and economic needs of our coastal communities.

Robert W. Miller
5613 Styron Drive
Oriental, NC 28571

North Carolina
Coastal Federation
Working Together for a Healthy Coast

May 23, 2013

Ms. Nikki Scimizzi
DWQ Planning
1617 Mail Service Center
Raleigh, NC 27699-1617

RE: Comments on NCDWQ Nutrient Criteria Development Plan

Dear Ms. Scimizzi:

Please accept the following comments from the N.C. Coastal Federation in regards to the Nutrient Criteria Development Plan (NCDP) proposed by the N.C. Division of Water Quality (DWQ). The federation takes an active role in the protection of N.C.'s coastal water quality and sees the advancements in the NCDP as a terrific stepping-stone towards maintaining clean and healthy waters. The federation has worked to safeguard North Carolina's coastal water quality for more than 30 years and has worked in the past with NCDENR to establish water quality standards. Therefore, we appreciate the opportunity to comment on the NCDP.

As addressed in the NCDP, improvements in the science of nutrient management allow the opportunity for DWQ to refine the nutrient management process. Thus, we first want to express our support for the implementation of a more comprehensive water quality monitoring plan that uses relevant monitoring parameters and is based on the best available science. The inclusion of causal variables as criteria, such as nitrogen and phosphorus, will help indicate current or potentially impaired water bodies so that action can be taken to improve these waters. Additionally, the proposed four-step process in the NCDP to develop nutrient criteria is rigorous and will result in identification of appropriate criteria for monitoring the health of rivers and streams and drinking water sources. However, because of the prioritization of these waters and the consequent lack of consideration of estuarine waters, appropriate monitoring standards for our estuaries will not be developed under the current NCDP.

A lack of monitoring in estuarine waters will hamper coastal management efforts. Therefore, the federation encourages reconsideration of the need for estuarine monitoring in the NCDP before it is made final.

Northeast Regional Office
128 Grenville Street
Manteo, NC 27954
252.473.1607

NC Coastal Federation Headquarters and Central Regional Office
3609 Highway 24 (Ocean) • Newport, NC 28570 • 252.393.8185 • www.nccoast.org

Southeast Regional Office
530 Causeway Drive Suite F1
Wrightsville Beach, NC 28480
910.509.2838

Over Enrichment of Estuaries With Nutrients Will Have Severe Economic, Cultural and Biological Effects

N.C.'s estuarine waters provide a multitude of economic, cultural, and biological benefits. These waters serve as important nursery grounds for young fish and support a number of local fisheries, including the flounder, crab, and shrimp commercial industries. Not only do estuaries provide protection to juvenile species, but they also offer recreational opportunities and aesthetic delight. For instance, birders enjoy the migrating waterfowl that frequent the North Carolina coast annually. Estuarine systems also afford the opportunity for scientific study and expanding our knowledge of the importance of these areas to coastal fisheries and wildlife.

Filter feeders, such as oysters and clams, are critical to water quality as they constantly remove nitrogen-containing compounds from estuarine waters. Oysters were once so abundant in North Carolina in the 1700 and 1800's there are stories of how ships became immovable due to the number of oyster reefs. Oyster populations have since dwindled as a result of poor water quality and overfishing. Healthy oyster reefs, beds of submerged aquatic vegetation, and salt marshes prevent excessive shoreline erosion.

These critical resources in coastal waters are affected by upland practices. Runoff and drainage carry nutrients, sediments, and many other pollutants that end up in estuaries. Runoff from urban, suburban, and agriculture operations is a major contributor to high nitrogen and phosphorus levels. The NCDP's inclusion of nitrogen and phosphorus indicators in the water quality monitoring standards will increase the ability to manage the health of rivers, streams, estuaries, and drinking waters. Nutrient loading of these critical waters can cause damaging algal blooms. Blooms produce toxic substances that directly affect the surrounding water. Indirectly, large algal blooms affect water quality through the resulting decomposition event, which reduces dissolved oxygen levels, suffocating fish and other animals.

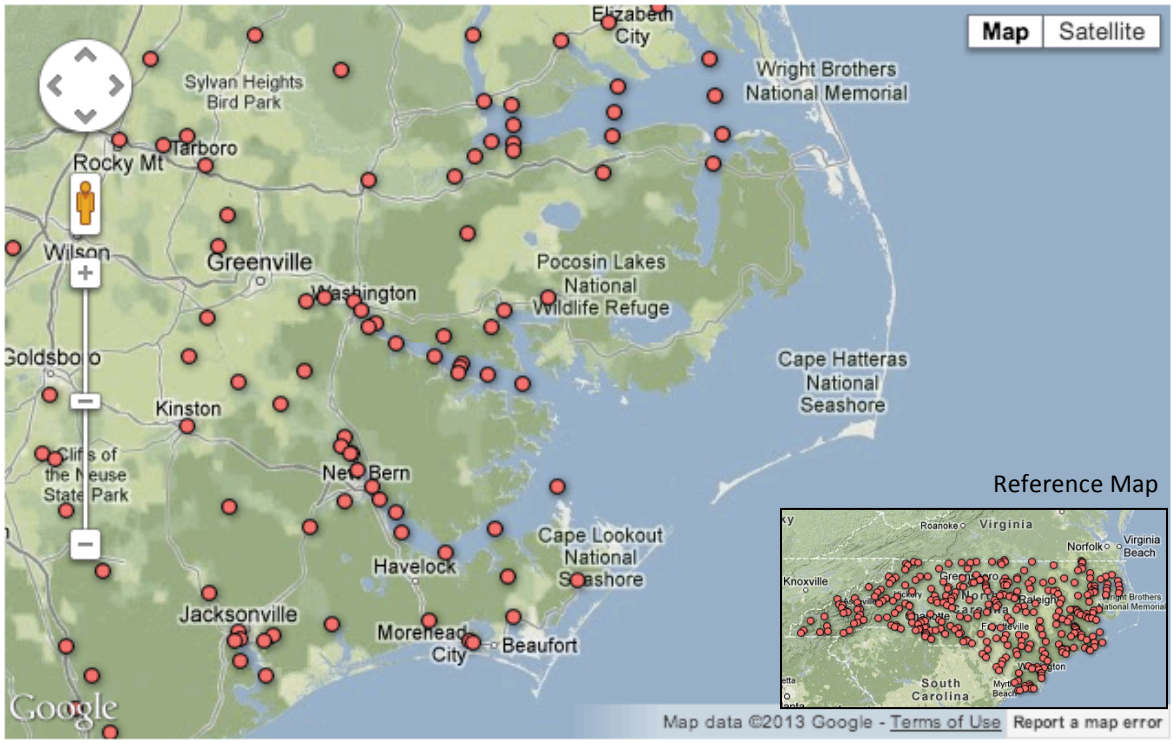
Low levels of nutrient loading can also be detrimental to estuarine waters. These alterations of nutrient composition, which are not significant enough to cause harmful algal blooms, can result in changes in the composition of the primary producer community. This shift in the make-up of the bottom of the food web impacts the balance of consumers in higher trophic levels. In California, researchers have shown that these types of effects in estuaries are linked to the collapse of pelagic fish populations. More locally, detrimental nutrient loading effects may contribute to the lack of recovery of river herring, Atlantic and shortnose sturgeon, blue crab, and shad in the Albemarle Sound, according to the Albemarle Sound pilot project for the National Monitoring Network. These trends are occurring despite the 2007 National Estuary Program Coastal Condition Report that found the Albemarle-Pamlico estuary system to be the healthiest estuary in the United States.

The addition of nutrient enriched water also has significant effects on salt marshes. These areas provide important ecosystem services, cycling nutrients and efficiently transforming biologically available nitrogen compounds into nitrogen gas, thereby reducing nitrogen loading to the coastal ecosystem. However, prolonged nitrogen additions to coastal

wetlands have been shown to degrade the integrity of the marsh complex, leading to lowered nutrient cycling and the loss of salt marsh area. Healthy systems are able to filter pollutants and clean the waters. There is also evidence that elevated nutrient levels can be damaging and even toxic to submerged aquatic vegetation in higher salinity waters of our estuaries. The nitrate standard that is set to ensure the safety of potable water supplies is 1,800 times above the acceptable nitrate level within N.C.'s estuaries according to Richard T. Barber, Professor Emeritus at Duke University Marine Laboratory. When managed in an effective way, estuaries provide a myriad of benefits to North Carolina.

Current Monitoring Efforts Are Inadequate To Accurately Assess The Health Of Our Estuaries And Coastal Water Quality

The Albemarle Sound Pilot for the National Monitoring Network study of the Albemarle Sound shows that consistent monitoring is important in gauging the health of estuaries and in determining the causes of disconcerting trends. However, there is minimal long term monitoring in our state's estuaries. The Albemarle-Pamlico system is the second largest estuarine system in the United States. However, of the 323 ambient monitoring stations in the state, only a handful of ambient monitoring stations are within the estuarine system (see map below). Bogue, Back, Core, Croatan, Currituck, and Roanoke Sounds do not currently posses ambient monitoring stations according to Albemarle-Pamlico National Estuary Program.



Ambient Monitoring Stations in Albemarle-Pamlico estuarine system. Source: NCDWQ

Other programs that have conducted monitoring in the estuarine waters of North Carolina have been limited and have not gained sustained state support. The data used in the 2007 Coastal Condition report by the National Estuary Program provided a snapshot into the conditions of the estuary, with sampling done once at each site. This sampling procedure makes it impossible to assess seasonality and trends in biological, chemical, and physical parameters. A program called FerryMon, which monitors surface water quality through sampling performed by ferries during their transit, lost its funding in 2011. This program was able to continue running at a limited capacity due to other funding and has since secured some short term funding to increase their efforts through a grant from the N.C. Department of Environment and Natural Resources. However, its future remains uncertain.

It is clear that the state needs better plans to improve the monitoring of estuaries. If these data are acquired and utilized, they can help ensure that the waters of coast remain healthy.

Our Recommendations

1. **Consider estuaries as equally important as rivers, streams, and drinking waters in the NCDP.**

The equal prioritization of estuarine waters in the NCDP would improve the efficacy of water quality management within North Carolina. Through the first task in the NCDP, the relationships between specific parameters and detrimental results would be rigorously established and the breadth and significance of gaps in monitoring data would be uncovered. The NCDP has a procedure that addresses this shortfall of the data that is expressed in Task 2:

> *If the results of Task 1 indicate the need for additional data collection to accommodate the identified data gaps in order to support the nutrient criteria investigation, resources may be sought. These funding sources may include 106 grants, 104(b) grants, 319 grant funds, and other sources that may be available for nutrient criteria development efforts.*

Thus, the NCDP is already suited to develop nutrient criteria for estuarine waters and these waters should be included.

2. **Continue partnerships with APNEP and the Albemarle Sound Pilot for the National Monitoring Network to increase monitoring of the health of our coastal waters.**

Outside support for the study and creation of criteria for estuarine systems is available. During the previous public comment period, the APNEP expressed that it will provide science and policy expert support and that it is considering providing some financial assistance. Similarly, APNEP is beginning a pilot study in more comprehensive monitoring that may result in an expanded monitoring system throughout the estuary complex. These

types of support will alleviate some of the financial and personnel stress identified in the NCDP that resulted in the decision to prioritize efforts away from estuarine waters.

3. **Maintain an open public comment period at various intervals throughout the 6.7-year implementation phase.**

This is needed to allow for improvements in our understanding of estuarine science to be discussed, reviewed, and integrated into the resulting nutrient criteria.

We appreciate the opportunity to comment on the NCDP. Please do not hesitate to contact me if you need any clarification or have any questions.

Thank you.

Sincerely,

Ana Zivanovic-Nenadovic
Program and Policy Analyst

Victoria Grose, Intern
Kimberly Hernandez, Intern
Morgan Piner, Intern
Peter Zaykoski, Intern

Charlotte-Mecklenburg STORM WATER Services

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Tel 704.336.2291
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May 23, 2013

Ms. Nikki Schimizzi
Division of Water Quality, Planning Unit
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. Schimizzi:

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.

Generally, the City does not object to the plan for developing nutrient criteria.

The City of Charlotte appreciates that comments from the previous public comment period were addressed and included. Generally, the approach for developing the criteria: parameter review, study plans, selecting parameters and then developing criteria, is sound.

Regular opportunities for stakeholder involvement and comment are critical to the success of the plan.

The City of Charlotte is encouraged by the suggested use of stakeholder, EPA and EMC input. We continue to encourage DWQ staff to use additional subject matter experts in addition to themselves and other stakeholders as resources throughout the process of developing the nutrient criteria.

Sincerely,

Daryl Hammock, PE
Water Quality and Environmental Permitting Manager

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

NC LEAGUE OF MUNICIPALITIES

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Raleigh, NC 27603
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May 24, 2013

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

Dear Ms. Schimizzi,

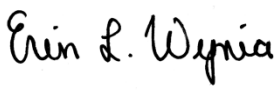
The NC League of Municipalities is a membership organization of over 550 municipalities and affiliate organizations. The League members have identified nutrient management as their top regulatory concern, recommending the following goal: "Support solutions addressing nutrient impairment in waters that 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 input to the state's revisions to its Nutrient Criteria Development Plan (NCDP). These comments are intended to be read in tandem with comments the League submitted in January in advance of publication of this plan. Both sets of comments draw on the experience of League member cities and towns, who 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.

Again, thank you for the opportunity to provide input at this stage of nutrient criteria development. The League members look 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
Legislative & Regulatory Issues Manager
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(919) 715-4126

General Comments

Acquiescence to EPA's recommended nutrient criteria approach. The League's overarching concern with the draft NCDP is that the plan indicates a commitment to follow EPA's failed approach to eutrophication management. From either a scientific or legal perspective, an approach to nutrient management that depends on specific statewide or regional numeric nutrient water quality standards for total nitrogen (TN) and total phosphorous (TP) isn't appropriate or realistic. In addition, statewide or regional standards for other related parameters may not be appropriate, either.

However, if the term "nutrient criteria" is related to the general set of parameters, guidelines and procedures for identifying surface waters where eutrophication management may be needed, then that understanding of the concept reflects a more reasonable approach to a potential nutrient-related water quality concern. But the draft plan's wording lacks clarity on this point. Therefore, it is troubling because the word "criteria" in relation to water quality parameters has traditionally meant numeric levels of certain pollutants that result in specific numeric water quality standards. Further, EPA's Criteria Development Process has historically been directed at setting in-stream values for specific pollutants like TN and TP.

The EPA references in the draft NCDP indicate that the state's objective remains TN and TP in-stream numeric values, an approach the League does not recommend. Further, the NCDP links this criteria development process to the CWA State Program Plan. While the League members appreciate the importance of program funding under Section 106 of the federal CWA and the need for an approved 106 Workplan between the state and EPA, the commitments in the current 106 Workplan related to eutrophication management are based on a direction established by EPA in 2000, which if taken, will result in requirements beyond technology, excessive economic impact, and limited or nonexistent water quality improvement relative to the level of effort required.

Certain sections and statements in the plan provide an encouraging indication that DWQ recognizes the need for a process superior to EPA's approach. For example, parts of the draft NCDP itself state that a path toward general or regional numeric nutrient standards is not the best way to address eutrophication concerns. Both the Executive Summary and the Introduction section of the plan describe the general approach this state has always followed in addressing eutrophication management as reasonable and effective. Specifically, the document states:

> "North Carolina has established itself as a leader in site-specific, flexible nutrient control strategies through the implementation of a comprehensive nutrient management program for its surface waters."

While debate about the application of North Carolina's current chlorophyll *a* standard continues and there is concern about plans the state may have to revise this standard, the League generally supports a

response to specific eutrophication issues with nutrient management programs based on biological impacts as they relate to real use support impacts. The draft plan's general objective of expanding the list of the factors and water quality characteristics used to determine use support relative to the trophic status of surface waters is an appropriate step and consistent with eutrophication science. The League members support nutrient management strategies based upon such factors.

However, the League does not support the establishment of generic, numeric water quality standards for TN and TP and other parameters. Nutrient levels are certainly important as guidelines in determining trophic status and in evaluation of management options. However, as demonstrated repeatedly in presentations at last year's NC Forum on Nutrient Over-Enrichment (Nutrient Forum), in-stream nutrient levels alone cannot be used for setting reasonable and appropriate water body management requirements. Without endorsement of specific programs or management requirements currently implemented in North Carolina now, the League believes the State should focus on nutrient management in surface waters where:

- Site-specific data and analysis supports action
- Proposed controls address waters where there is demonstrated use impairment
- Management actions are proportionate to the sources causing impairment, and
- Management requirements are equitably applied to all contributors to the impairment.

This established path of "fitting the solution to the problem" underlines the principle of not trying to "make one size fit all." The League firmly believes that this principle is an essential component of adaptive management. Such an approach – not evidenced in the draft NCDP – represents a more thoughtful and realistic response to potential over-enrichment situations than the blanket numeric TN and TP in-stream standards the draft plan seems to suggest for the state.

Despite the draft NCDP's general endorsement of North Carolina's historic approach to nutrient management – described as one that uses (1) comprehensive evaluation, (2) a determination of need, (3) public review, and (4) the establishment of appropriate management actions with adaptive management provisions to address nutrient over-enrichment – the draft plan puts forward statements indicating the state is ready to depart from this thoughtful path and follow EPA down the wrong road. Most obviously, after outlining North Carolina's historic approach, the document states, "North Carolina recognizes that additional nutrient criteria are warranted as the current criteria may not adequately address protections for all waters of the state."

This statement sends exactly the wrong message and represents an endorsement of EPA's scientifically unsound policies. The League supports working toward a reasonable and fact-based approach to nutrient over-enrichment concerns in the state's surface waters, as outlined in our previous NCDP comments. In that vein, the League suggests modifying the draft NCDP to clearly state that its objective is to establish site-specific nutrient management where such strategies are justified.

The draft NCDP states that EPA required states to develop a plan to adopt their own numeric nutrient standards by 2004 or to use the EPA-developed criteria. Of course, in the intervening years, North Carolina argued for its different approach, pointing out that the state has addressed site-specific eutrophication issues since the late 1970s using its water quality standards and stream classifications. The League urges the state to continue arguing against EPA for its alternate approach. This approach should use science and a solid use support connection to nutrient levels, rather than in-stream standards, which have been shown to provide no real measure of water quality impact. EPA's narrow approach to nutrient management, based solely on measurements of TN and TP, will result in such a paltry level of nutrient reduction that such regulations cannot be supported from a technical standpoint. Further, these efforts would not succeed in protecting the established uses of the target waters. In pushing for in-stream standards, EPA made a wrong turn. There is no reasonable basis for North Carolina to follow the agency down that road.

In fact, the Nutrient Forum provided North Carolina excellent scientific and public policy scholarship on which to draw when describing an approach different from that insisted upon by EPA. The draft plan seems to take a step in this direction by describing the Nutrient Forum as follows:

> "This forum provided attendees with a review of the relevant science, regulatory issues, economic considerations, and other policy issues related to nutrient over-enrichment and options for avoiding water body impairments. Recognized experts presented their ideas and experience with nutrient issues to a Forum panel (consisting of two EMC members, one representative of local government and one environmental advocacy group representative) and the Forum's attendees."

Further, in describing how members of the NC Environmental Management Commission (EMC) requested this in-depth look at various approaches to nutrient management across the country, the draft plan states, "The EMC assigned the Division the task of revisiting the original NCIP [Nutrient Criteria Implantation Plan, precursor to the NCDP], taking into consideration the information gathered at the Nutrient Forum and additional stakeholder input."

Yet while the draft NCDP references this directive to host the Nutrient Forum and glean insights from that event, the plan essentially follows the same nutrient criteria approach originally laid out by EPA. The League strongly encourages the state to rely more heavily on its well-established general approach and adjust that approach based on the information provided in the Nutrient Forum.

In sum, the League recommends that the state develop a NCDP that firmly places it on a path of management actions based on site-specific information and demonstrated use impairment. Such management programs should equitably and cost-effectively assign responsibility for nutrient control activities. The plan should incorporate language that clearly reflects these principles.

Need for face-to-face stakeholder input. Further, the League members believe that the plan would be strengthened by an additional, collaborative effort between the state and affected stakeholders that has not happened to date. Numerous League representatives would appreciate an opportunity for such collaboration.

Preserve existing nutrient management strategies. And finally, the League members caution the state not to develop an NCDP that conflicts with existing management efforts already underway in the state. Any eutrophication management development process that establishes requirements different than those already in place could cause critical implementation issues and generate uncertainty in the affected communities. As a result, the League recommends that the final NCDP specifically address management strategies already in place and confirm that the adoption of an NCDP will not adversely alter those strategies.

Specific Comments

Clearly define "Nutrient Criteria Development" under the Plan to reflect the process of identifying critical parameters and water body/watershed characteristics that will be used to guide the need for site-specific management actions. In providing this clarification, the state will likely need to expand the scope of the NCPD and present a more comprehensive and detailed process. In order to build on the historic site-specific approach North Carolina has used, and to incorporate the principles from the Nutrient Forum, the NCDP should focus on specific steps to the overall goal of addressing over-enrichment problems that are impacting surface water uses:

1. Follow the steps necessary to establish a final list of water quality parameters and watershed/waterbody characteristics (see the following comment relative to the addition of these characteristics) that will be used to evaluate specific surface waters. The preliminary identification of the twelve response and causal parameters is a reasonable list; however, nothing in the process should restrict the addition of other parameters and characteristics as the effort moves through the steps. The four-task plan in the draft is a good list of tasks for this effort and the draft includes appropriate commitment to a stakeholder-based collaborative process with EMC review of each task outcome. The League members support this general process.

2. Incorporate a systematic methodology linked to established use-support problems for identifying target waterbodies/watersheds for evaluation using the parameters and characteristics developed above. The draft NCDP specifically notes a priority of looking at riverine systems first followed by waters classified for water supply use. However, the difficulty of evaluating riverine systems for eutrophication problems is noted in the Draft and will continue to be a challenge (see following comment on additional parameters/characteristics for

rivers and streams). The League urges caution in pursuing management strategies in riverine environments. Regardless of the final priority system used, the trigger for focus of limited resources has to be waters with established use-support problems. A stakeholder-based, collaborative, and publicly-reviewed process followed by EMC approval must accompany this waterbody identification process and the establishment of the review list.

3. Develop a priority-based schedule for study and examination of each of the surface water systems connected to the identified target waterbody. Critical to a realistic schedule is an evaluation of the capabilities and resources available to do this work. This step would establish a site-specific schedule for each situation. Depending on the complexity and implementation impacts of the regulatory decisions that may come from this examination, the schedule will have to be "fitted" to the site. This step would identify the need for management action and a description of the actions that would be necessary to restore uses and address the nutrient over-enrichment problems directly related to the impacts.

4. Develop specific over-enrichment management strategies, implementation steps, and schedules for each waterbody for review and adoption by the EMC. The strategies would have to include actions that fairly and equitably assign responsibility to all sources in the drainage area contributing to the problems. The impact of these strategies would require an assessment of the effects of the requirements on affected communities and property owners, the programmatic impacts, technology considerations, and cost-benefit components of the proposed management program. Proposed strategies would have to include specific and understood adaptive management components to allow for adjustments to the strategy as implementation proceeds. Ongoing implementation must be assessed using monitoring and use-support evaluations to support adaptive management provisions.

Include watershed/waterbody physical characteristics as part of the parameter list for evaluating at-risk surface waters. Issues such as ecoregion location, local weather patterns, drainage area, rainfall characteristics, land use, riparian area condition, landscape slope, stream slope, elevation change, land cover, source contribution types, management challenges, jurisdictional considerations, established uses, and other characteristics need to be added to the parameter list, especially as the evaluation moves into the potential development of management actions. The success of eutrophication management goes well beyond just identifying over-enrichment. If there are physical, program, economic capability, and cost-benefit concerns, or other impediments to achieving effective management, these factors should be considered for regulatory decision-making.

Include more riverine physical and biological factors in the assessment of rivers and streams. For relatively shallow free-flowing systems, benthic macroinvertebrate data is an excellent source of

ecological quality. Often, the aquatic insect populations and species distribution can help to establish general trophic health (nutrient enrichment is typically indicated from this information) of a stream or river. Habitat characteristics such as substrate condition, depth, flow velocity, and other information normally developed during macroinvertebrate sampling will be helpful as well. Fish community sampling should also be a part of determining if a river or stream should be included for additional evaluation relative to over-enrichment.

Identify more specifically how stakeholders can engage during the evaluation of a potential water body for the development of a nutrient management strategy. In addition to providing a clear description of how the state plans to evaluate surface waters for over-enrichment in the NCDP, the plan should describe the steps that will be taken to present the results of its evaluation and initiate the next steps for a site specific management plan. The state has used with success the Nutrient Sensitive Waters (NSW) stream classification process to bring those directly impacted by application of this classification – the interested public and other stakeholders – into a public review process that allows the whole process to be vetted by everyone with an interest in the final decision. The NSW process provides a public review and regulatory process framework. The NSW or another existing rule may be a reasonable component vehicle for effective implementation of the NCDP. Considering the scope of work needed and the timeframe of the NCDP, modification of existing rule(s) may need to be factored into the NCDP. The appropriateness of this consideration needs to be discussed during additional stakeholder input to finalization of the ECDP.

Strengthen the NCDP process by balancing the decision-making steps with participation in working groups that include water quality policy experts, eutrophication specialists, professionals with program implementation experience, economic and financial experts, wastewater treatment professionals, and non-point source treatment/BMP specialists. The factors affecting eutrophication are complex and involve many biological and chemical interactions. Additionally, as noted, the components of a management program cut across several areas of expertise. Sometimes, past water quality management decisions seem to have been more focused on just the “measurement” of water quality and conclusions about results as compared to standards. The management of eutrophication cannot be looked at using a limited list of parameters or by limiting management actions. Instead, the process should fully integrate a wide variety of experts.

Provide edits to clarify the insert box on “What is a Water Quality Standard?” in the Introduction section of the draft NCDP. The definition of a Water Quality Standard (WQS) offered in the draft NCDP is confusing and inappropriately “blends” together several important water quality management terms that serve distinct and separate roles in the Water Quality Programs under the CWA and state law. WQS, designated uses and classifications work both independently and together in the regulatory framework used to direct efforts toward the maintenance of the quality of surface waters and in working toward restoration of waters where designated uses are impaired. A WQS is not in any practical sense a

"use." The working definition of a WQS is a numeric or narrative chemical, biological or physical characteristic or parameter that is established to "allow" a waterbody to achieve its designated use. As presented in the NCAC 15A 02B .0200 rules, classifications and WQS are addressed separately. Stream classifications establish the appropriate uses of state waters and the WQS "apply" to those waters. The issue of meeting designated uses as related to nutrient over-enrichment continues to be a central issue in developing future program direction. It is essential to carefully make the distinction between WQS, classifications and uses.

Legislative Affairs for Coastal North Carolina Real Estate & Building Industries

BUSINESS ALLIANCE FOR A SOUND ECONOMY

May 23, 2013

Nikki Schimizzi
Classification and Standards Unit
Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Subject: Preliminary Comments N.C. Nutrient Criteria Development Plan

Dear Mrs. Schimizzi:

The Business Alliance for a Sound Economy (BASE) is an organization of trade associations formed to take collaborative action on issues of concern to their broad membership engaged in residential and commercial real estate sales, land development, economic development, finance, property management and leasing. BASE represents the members of the Brunswick County Home Builders Association, the Brunswick County Landowners Association, the Topsail Island Association of REALTORS®, the Jacksonville Board of REALTORS®, the Pitt County Economic Development Partnership, the Wilmington-Cape Fear Home Builders Association and a number of individuals and independent businesses.

BASE submits the following preliminary comment in response to draft North Carolina Nutrient Criteria Development Plan.

After attending the stakeholder meeting that was held in Wilmington and reviewing the draft plan BASE would echo the comments that were received from the NC Farm Bureau, AWWA, and NCWQA. We believe that North Carolina's existing approach to nutrient management and control has been an effective, targeted approach, preferable to, and certainly less costly on a programwide basis, than the numeric water quality standards that EPA has effectively imposed on Florida and seeks to impose on all states, notwithstanding the lack of scientific justification.

The levels and concentrations of nitrogen and phosphorus influence water quality in a complex and site-specific manner. Attempts to approach the issue in a one-size-fits-all manner will not only be less effective, but also needlessly costly. This is evident in the State's experience in the Neuse River basin, where across-the-board nutrient reductions have resulted in more debate than results, in terms of actual effectiveness. The very nature of the complex interaction of nitrogen and phosphorus compounds, temperature, flow rate, stratification, dissolved

oxygen range, pH range, solids, and other parameters such as the geographic location of the water body, corresponding land use and habitat characteristics commends a site-specific and iterative approach.

At the present time North Carolina's approach of utilizing response criteria has served it well. Further efforts to identify data gaps, along with the examination of additional or refined parameters, may be constructive.

BASE would highlight the Mission Statement of NCDENR which emphasizes that NCDENR *"will be continually cognizant that an economic cost/benefit analysis is an integral component of DENR's public service endeavor [and] that all decisions are made with a respect and understanding that environmental science is quite complex, comprised of many components, and most importantly, contains diversity of opinion."* With that in mind, BASE hopes that, in keeping with this statement of its mission, NCDENR will conduct its inquiry into the development of nutrient criteria in a measured and scientifically justifiable manner, keeping in mind that speculative benefit without regard to cost is simply not supportable.

In closing BASE would thank the Department for allowing us the opportunity to respond to the draft plan and as an identified stakeholder we look forward to further review of plan as it continues to move forward.
In the interim, should you have any questions in regards to our comments please feel free to give us a call at (910) 799-2611.

Sincerely,

Cameron Moore, AICP
Governmental Affairs Director

May 16th, 2013

Nikki Schimizzi,
DWQ Planning
1617 MSC
Raleigh, NC 27699

Subject: Comments on the NC Nutrient Criteria Development Plan

Dear Ms. Schimizzi,

After reviewing the DRAFT NC Nutrient Criteria Development Plan (NCDP), I would like to echo the recommendations made by the North Carolina Water Quality Association (NCWQA) for the public comment period ending May 24th, 2013. I understand that the North Carolina Division of Water Quality (DWQ) will be submitting a revised plan to the Environmental Management Commission and the US Environmental Protection Agency later this summer. I would hope that DWQ will continue to be committed to a science based process for refining this nutrient plan. I believe the following recommendations seek to retain the strengths of North Carolina's existing approaches while making additional progress in key areas.

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. Although there are opportunities to improve these elements, it is recommended that the NCDP emphasize the effective leveraging, coordination, and refinement of existing programs.

2. *Refinements to the NCDP should retain North Carolina's focus on response criteria over numeric nutrient criteria*. Response variables are superior predictors of use attainment in most hydrologic settings. NCWQA also encourages North Carolina to explore approaches for incorporating biological information into assessments to correct false positive findings of impairment.

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3. *The option for site-specific criteria should be provided*. However, such a provision would also be useful for addressing site-specific variability in the relation between response variables and higher-level biological responses.

4. *Any new response criteria should be mechanistically linked to designated use attainment*. NCWQA supports the investigation of alternative response variables, but 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.

5. *Criteria frequency and averaging periods should acknowledge environmental 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.

6. *Proactive/preventative strategies should retain flexible implementation mechanisms and not default to limit-of-technology treatment requirements*. Any default technology-based requirements for point sources should be set at moderate treatment levels, and that more stringent treatment levels only are imposed if the need and cost-effectiveness can be demonstrated on a basin-specific level. Point source controls should not be imposed in the absence of a basinwide planning methodology that addresses all major sources.

7. *Proactive/preventative strategies should include the confirmation of increasing trends in response variables*. The planning response should also include an investigation of why response variables are changing before it is determined that aggressive nutrient controls are necessary.

8. *Implementation approaches should include 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. It is recommended that the NCDP identify the need for a statewide review of nutrient reduction practices and how they can be credited.

9. *The NCDP should include a realistic, staged schedule that makes near-term progress while providing sufficient time for needed research*. 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. It is recommended that the NCDP provide short- and moderate-term milestones that emphasize leverage/refinement of the state's existing programs, and longer-term milestones for elements for scientific research components.

Sincerely,

Brad Boris
Water Resources Director

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From: Tim Spruill <tbspru@gmail.com>
Sent: Friday, May 24, 2013 11:16 AM
To: Schimizzi, Nikki
Cc: Carpenter, Dean; Tim Spruill; Larry Baldwin; Heather; matthew@neuseriver.org; mitch@neuseriver.org; toddm@nccoast.org; Brower, Connie; Wakild, Chuck; erinr@ptrf.org; Whitehurst, David (DEQ); Carlton Hershner; joann_burkholder@ncsu.edu
Subject: Comments on North Carolina Nutrient Criteria Development Plan April 15, 2013 Draft Copy

Ms. Schimizzi,

I appreciate the opportunity to comment on Draft North Carolina NCDP, as I believe that this is potentially a very important step in advancing North Carolina's ability to protect and preserve water quality with an effective and fair regulatory framework to control nutrient discharges in the State. The following general comments on the NCDP are admittedly long, and some might say, prematurely specific. In the interest of brevity, my primary comments are summarized below with my general comments appended following the body of this letter.

- The state should already have adopted the four recommended parameters for numeric standards. Allowing 7 years for a study to just reconsider parameters for establishing nutrient standards is too long. No more than four years should be the target from beginning to actual adoption of nutrient criteria for North Carolina. This task should have been accomplished by 2004.

- Numeric standards should seriously be considered in the NCDP. It is clear from the current plan that past biases against adoption of general standards are still in the plan. Also, there needs to be serious discussions about general versus watershed specific numeric nutrient standards with proponents for both sides.

- The approach of establishing standards for nitrogen and phosphorus with the objective of protecting the most vulnerable water bodies in each basin-lakes, reservoirs and estuaries and applied to all rivers should be included in the discussions. This approach is in contrast to the more accepted view in North Carolina that watershed-specific standards be the preferred approach. The ultimate receivers of stream flow are estuaries and minimum nutrient standards for streams should protect all segments of the estuary from eutrophication due to both excess phosphorus and nitrogen. These standards should be applied generally, at least at the physiographic region scale, much as EPA originally recommended.

- The scientific basis for establishing numeric standards for phosphorus and nitrogen is sound and very appropriate, although the few researchers that have been involved for years in North Carolina maintain that it is not. This very explicit discussion needs to take place as part of the NCDP or else North Carolina will continue to follow the same path that it, and other states, have for decades. The basic prediction model of chlorophyll a for phosphorus and to a lesser extent nitrogen, is linear over the range 0.01 to 0.1 and has been duplicated many times over the last 30 years. Although the predicted means are

imprecise, the predicted maximum concentrations at given total phosphorus concentrations are consistently accurate. It is the maximum predicted concentrations that are most useful for establishing maximum standards and not the mean concentrations.

Timothy B. Spruill,
Hydrologist USGS-Retired, email: tbspru@gmail.com

General Comments:

The 1972 Clean Water Act directed that all waters be fishable and swimmable by 1985 with no discharges to waters of the United States permitted. Although "no discharges" were clearly not possible literally, the intent was to stop pollution to the Nation's waters by those industries, cities, farmers, and citizens who saw streams and lakes as a no-cost disposal option, if not a right, and a way to minimize costs to them personally and corporately while maximizing profits. The costs, however, are born by every other tax-paying citizen in the form lost economic and recreational opportunities through damaged natural resources by degrading water quality and wildlife and fisheries through loss of organisms and habitat as a consequence of pollution. The Clean Water Act of 1972 was intended to ensure beneficial uses of waters of the United States for all of its citizens and prevent their loss by an uncaring and unscrupulous few.

Standards, required by the Clean Water Act, are the cornerstone of a water quality based control program (USEPA 821-F-08-007). Without them, the ability of polluters to damage the Nations waters at little or no cost to them is perpetuated and allows the States the "flexibility" to not enforce pollution limits. Nutrients (nitrogen and phosphorus) have been the primary cause of water quality impairments in in the United States for many years largely as a result of increased use and application of fertilizers since the 1950s and from point source discharges. Specifically, four numeric nutrient standards (2 causal (nitrogen and phosphorus) and chlorophyll a, and water clarity have been recommend to be adopted by the States since 2001 and reiterated formally in memorandum by Assistant EPA Administrator Benjamin Grumbles in 2007). As recommended by EPA, adopting all four would be the most effective. North Carolina has adopted only chlorophyll a (response variable) to indicate impaired waters. Many flowing waters do not exhibit eutrophic effects because of either short residence time or turbidity. Thus without numeric water quality standards for nitrogen and phosphorus specifically, gross nutrient pollution is allowed in some flowing streams which moves downstream to lakes, reservoirs and estuaries, which are the most sensitive to nutrient pollution. The results of eutrophication can periodically be devastating to most uses of the waters including wildlife and fisheries propagation, aesthetics, and human health.

EPA has ultimately not required the states to do what is right (to provide protection of state waters, the job with which they are charged) and has several times excused the states of their responsibility to protect their waters by implementing standards which are uniform and enforceable. The States were to adopt nutrient standards by 2004. This has not happened. Instead, 9 years after North Carolina and other states should have adopted the recommended nutrient parameters and established criteria and final regulations, the States are again allowed to resubmit new plans to evaluate nutrient criteria. The North Carolina Nutrient Criteria Development Plan is such an example and is one more attempt to put off and delay adoption of

nutrient water quality standards. The NCDP is proposed to take almost 7 years just to develop criteria once again (and not to adopt revised nutrient standards as regulations!) after having nearly 12 years to do so. This should not be permitted to happen again.

The excessive time that North Carolina and other States have taken to adopt standards for phosphorus and nitrogen is not justified and there is no reason for North Carolina not to adopt broadly applicable standards. However, in the current NCDP draft, it is stated in the NCDP that broad standards are not appropriate because of environmental variability. This statement is not in agreement with very definitive findings based on more than 15 years of research funded by EPA and the OECD between 1968 and the mid-1980s that a consistent positive relationship exists between phosphorus, nitrogen, and primary productivity as measured first by semi quantitative assessments of lake trophic states and second quantitative measurements of chlorophyll a concentrations in clear lakes in Europe, United, Canada, and Japan. This relationship was formulated first by Vollenweider in 1975 and modified by many researchers, primarily Rast, Lee, and Jones (1983) since the 1970s. More than 200 lakes were used to develop the original relationship between P loading and eutrophication measures and subsequently between P loading and chlorophyll a for water with low non-biological turbidity. This general relationship has been subsequently verified with data from over 700 lakes worldwide (G. Fred Lee, 2009) and duplicated independently by several researchers, most recently by researchers in Florida (Brown et. al. 2000) who summarized similar predictive equations based on work beginning in the early 1970s. Although the 95% confidence interval for prediction about the regression for Florida and other clear lakes from around the world is relatively wide, information from both regressions, which were done independently, show the very same relationship as well as the same 95% prediction intervals (Figure 1).

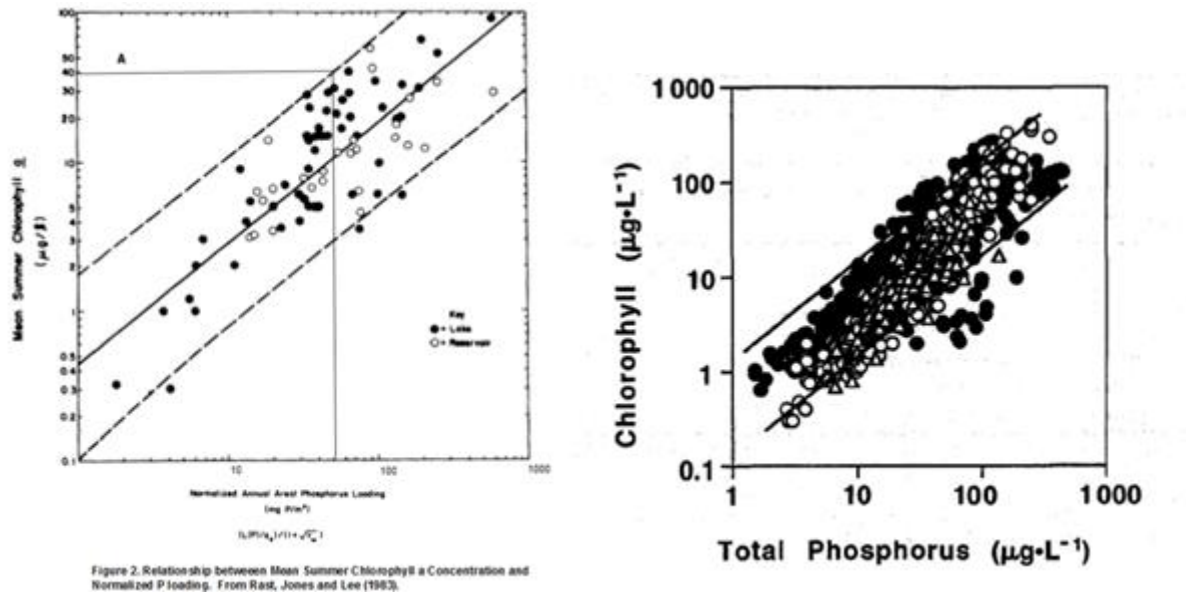

Figure 1. Relationship between chlorophyll a and total P loading from Rast et al, 1983 (right hand diagram and from Brown et al., 2000 (left hand diagram) in lakes, reservoirs, and estuaries which exhibit no or low non-biological turbidity. These diagrams are almost identical

in information content and show that the relationship and the prediction intervals from United States, Europe, Canada and lakes in Florida (right hand diagram closed circles) are the same.

Thus, the firm scientific basis for establishing numeric standards for phosphorus and nitrogen that was demonstrated more than 30 years ago was again confirmed independently in 2000. If the impairment criterion is defined (40 ug/L of chlorophyll a in North Carolina) and there is an established relationship between the causal variables phosphorus and nitrogen and the response variable, chlorophyll a, then the critical loading or concentration that causes the occurrence of 40 ug/L of chorophyll a can be established as a standard that cannot legally be exceeded. From Figure 1, approximately 5% of the samples will exceed 40 µg/L of chlorophyll a in water that has a total P concentration of about .05 mg/L. Therefore, the logical and scientifically defensible standard for total P is about 0.05 mg/L and the only discussions by DWQ that should take place is whether the standard might be slightly higher-to relieve some of the pain for polluters but that would still offer adequate protection of water quality of the most sensitive water bodies of each drainage—lakes reservoirs, and estuaries. To prevent overproduction by nitrogen availability, the elemental mass ratio of about 7-10:1 would yield a maximum allowable nitrogen concentration or loading (if 0.05 for total P, then 0.35-.5 for total N).

The reason that general standards are proposed for the most susceptible water bodies is that streams don't respond very well to many criteria used to evaluate the health of lakes, particularly algal growths, and are, as mentioned above, due to flow and sediment transport (measured by turbidity). These factors and how they affect eutrophication in flowing and calm waters are known and have been known for decades. The bottom line is defined by the concept that all river systems are a continuum and that everything upstream affects everything downstream. The argument that a single nutrient standard is not appropriate for broad application because of differing environmental rates and processes is apparently based on the assumption that all of the different streams of a watershed are disconnected and each stream and tributary is an ecosystem unto itself-pollution in an upstream tributary somehow does not affect a downstream main stem or receiving lake or estuary. By allowing different streams to have different pollution levels based on differing uses and aquatic ecosystem responses to nutrient pollution (some will exhibit nuisance growths and others will not depending on nutrient and sediment loads and depth and water residence time), it allows justification of more pollution in some catchments and less in others. Particularly in cases where only a response variable is used (like chlorophyll a for North Carolina and many other states) and no response to over-fertilization with phosphorus and/or nitrogen is exhibited, dischargers in such basins are unfairly allowed to pollute because there is no visual evidence of local damage (and no numeric standards that would prevent it) until it exits the watershed and moves to slower moving waters where the effects will be visible.

However, based on a hydrologic conceptualization, all of these streams, lakes, and the terminal estuary are very much connected. While the concept of targeting different levels of pollution for streams that have differing use-designations may seem logical, and, from an engineering and policy standpoint, very handy, the fact is that all streams will ultimately flow into a lake, reservoir, or ultimately, an estuary which are the most sensitive to nutrient pollution and susceptible to eutrophication. As noted, susceptibility of quiescent waters to nutrient pollution relative to moving waters has been quantitatively demonstrated by many researchers and most definitively by Vollenweider. Therefore, if quiescent waters are the most sensitive to nutrient

pollution, then nutrient concentrations/loads of all upstream water streams should not result in concentrations that can create eutrophic conditions in the receiving lakes/estuaries in the downstream portions of the watershed.

The concentrations that are sufficient to cause eutrophication are between .02 and 0.1 mg/L for total P, with between 0.05 and 0.1 for most of the Piedmont and Coastal Plain and 7-10 times those concentrations for total nitrogen 0.35-1 Mg/L. Using the least stringent concentrations that would offer protection are a maximum of about 0.1 mg/L for total P and 1 mg/L for total N for all lakes reservoirs and estuaries. Appropriate loading from streams, in tons per square mile (also derived from Vollenweider's work), would be a maximum allowable load of about 0.1 tons per square mile for total P and about 1 tons per square mile for total N. All upstream flowing waters should be protected to just above these levels established for clear lakes and major estuaries of the eastern part of the state, not to individual standards for each stream. These standards *are* appropriate for all waters of the Piedmont and Coastal Plain and near-shore coastal waters where general requirements of the Clean Water Act are to achieve, fishable, swimmable, and drinkable quality. For the mountains, where sustaining a trout fishery to encourage a vibrant and productive tourist economy and healthy environment, the standards (that should be generally applied to the entire physiographic region) would need to be closer to the lower limit for the range shown above for nitrogen and phosphorus to be more protective for streams and lakes. By applying reasonable across-the-board standards for the Piedmont/Coastal Plain (one set of nutrient standards) and the Mountains (another set of nutrient standards).

Proposed investigation

While some very limited additional study might be necessary to fully develop standards, the study being proposed is certainly not warranted, at least 7 years of it. By ignoring research that is already available and maintaining that there is a need to establish criteria that have strong scientific merit, it assumes that new data and information must be developed. This does not agree with the available facts. The data and quantitative information are already available for developing standards for the causal variables phosphorus and nitrogen as indicated in the overview section. The resulting predictive model is as scientifically defensible as is possible. Although other investigators have demonstrated poor predictive capability for North Carolina lakes of the Piedmont and Southeast, the regression models of Vollenweider, Rast, Lee, Jones, Rigler, Brown and Dillon were not intended for lakes that are turbid (already in violation of turbidity criteria) and which limit light penetration. In fact, because turbid streams and lakes severely limit light penetration, high quantities of phosphorus and nitrogen can be transported and stored without showing evidence of water quality degradation due to eutrophication. In these cases, the masking of eutrophication effects would be a strong reason to hold all streams and lakes to enforceable chemical nutrient standards that are independent of other complicating factors associated with response variables..

Additional Comments

The investigation should last no more than two years with final drafting and adoption of standards in the third and fourth year and should focus entirely on available data and literature, which are extensive.

The study should focus on the concept of protecting the most vulnerable water bodies-getting great detail in what controls productivity in streams will not be helpful in maintaining overall health of a basin. Standards for streams should be set in accordance with protecting the most vulnerable waters-lakes, reservoirs and estuaries.

Stick with the tried and true parameters for use as water quality standards (the four proposed by EPA long ago). This should not be used as another opportunity to investigate all possible combinations of parameters and what they might be able to do.

There is no stated purpose and objective for the study. The subject matter is unfocused. The purpose of a nutrient study would be to determine at what level of nutrients, light, and temperature algal growths become a nuisance and how hydrologic factors affect the expression of nuisance growths. Luckily these studies have already been done and there are abundant references in the literature of the not too distant past which I have referred to *ad nauseum*. This purpose of controlling nutrients in water is to protect water bodies so that there uses are not impaired. What I see presented in the NCDP is an unrealistic assortment of a multitude of possible factors and conditions in a variety of situations that can be considered. Trying to focus on multiple processes and understanding each one and then trying to customize some specific standard for each water body, environmental condition, and particular situation is unfortunately results in no standards and plenty of unresolved confusion, to the delight of both regulated community stakeholders and folks in academic research alike…. a win-win situation for parties that often are at odds. Not only can more studies be funded, taking several years during every iteration, but at the same time, result in no standards being implemented. This is a great set up, but it demonstrates that EPA and the state environmental agencies are not doing their jobs. A room full of bright engineers and scientists sitting around in meetings discussing how complex the world is is not helpful.

General statistical approaches, such as those used by virtually all of the researchers that I have referred to result in the ability to devise broad standards that cover *most* situations adequately, but not perfectly. It should be a compilation and synthesis exercise, not a discovery of wonderful new techniques and methods. This type of research is certainly necessary, and should be funded by the state and federal government, but it should not be done specifically for the purpose of establishing standards for water quality. In addition, the proposed standards should be simple enough to administer and practical in solving the primary water quality problems of unwanted overproduction of algae. This should be the goal and it shouldn't take 7 years to do it.

As already mentioned, 2 years maximum should be allowed for the study and no more. The actual group involved with proposing the standards should be a few scientists who know not only phytoplankton ecology and physiology and, generally most freshwater and marine systems, but who also know some history of the Clean Water Act and the history of eutrophication research as it applies to development of water quality standards. Refrain from including multiple stakeholders and politician's influence (difficult to do, but necessary) in these discussions and analysis. The results can be discussed at the end of the study after the actual proposed standards are in place for adoption for implementation.

NORTH CAROLINA
SOIL & WATER
CONSERVATION COMMISSION
Yours for Life

May 15, 2013

Mrs. Dianne Reid, Chief, Planning Section
NC Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Dear Ms. Reid,

The Soil and Water Conservation Commission has for more than twenty five years demonstrated its commitment to addressing water quality concerns related to nutrient losses from agriculture and other nonpoint sources. The Commission and local soil and water conservation districts have supported hundreds of millions of dollars and nearly 55,000 contracts to enable agricultural and non-agricultural landowners to voluntarily implement practices to manage nutrients and sediment, and other pollutants. However, the Commission objects to the proposed North Carolina Nutrient Criteria Development Plan. The Commission's objection is based on the following:

1. **Insufficient science.** There is not sufficient scientific justification to support the decision to move forward with specific water quality criteria for nutrients. The plan assumes there is broad agreement that that there is a direct cause and response relationship that can be scientifically justified.
2. **Lack of opportunity for stakeholder involvement.** The Commission objects strongly that the plan does not include a broad stakeholder process to develop workable solutions to address the concerns related to nutrient inputs. These solutions may or may not involve specific numeric nutrient criteria.
3. **Full Time Employee Needs are severely underestimated.** The Commission believes that a workable plan to address the nutrient concerns requires far more than the 2 FTEs estimated in the proposed plan.

The Commission appreciates the working relationship it has had with the Environmental Management Commission over the years, and we seek to strengthen our partnership as we work together to address this and other mutual concerns.

Sincerely,

Vicky Porter

Vicky Porter, Chair
NC Soil & Water Conservation Commission

North Carolina
Soil and Water
Conservation Commission

1614 Mail Service Center
Raleigh, NC 27699

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NORTH CAROLINA
SOIL & WATER
CONSERVATION COMMISSION
Yours for Life

cc: Commissioner of Agriculture Steve Troxler
DENR Secretary John Skvarla, III
Chuck Wakild, Division of Water Quality
Members of the Environmental Management Commission
Leadership of the NC General Assembly
Members of the NC Soil and Water Conservation Commission
Jennie Hauser, NC Dept. of Justice
Larry Wooten, NC Farm Bureau Federation
Anne Coan, NC Farm Bureau Federation
Erin L. Wynia, NC League of Municipalities
Dr. Richard Reich, NCDA&CS
Tina Hlabse, NCDA&CS
Pat Harris, NCDA&CS
David Williams, NCDA&CS
Melvin Womack, NRCS

North Carolina
Soil and Water
Conservation Commission

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THE UNIVERSITY OF NORTH CAROLINA AT WILMINGTON

Memo to:
Ms. Nikki Schimizzi
DWQ Planning, 1617 Mail Service Center
Raleigh, NC 27699-1617

Date: May 23, 2013

From:
Dr. Michael A. Mallin, Research Professor
Center for Marine Science
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Phone: 910 962-2358, Email: mallinm@uncw.edu

Subject: Comment on North Carolina Nutrient Criteria Development Plan

Dear Ms. Schimizzi,

I read with interest the April 15 draft of the Nutrient Criteria plan, and I am happy that steps are being taken to address this issue. Based on the available scientific published data, I am strongly supportive with the notion that nutrient limits will need to differ among water body types due to their differing sensitivities. As a starting point, it is clear that many estuarine waters have demonstrated extreme sensitivity to fairly low levels of nitrogen inputs. This comment is based on nutrient addition bioassays that have been performed by various researchers for as long as three decades. Concentrations of inorganic nitrogen (as nitrate or ammonium) as low as 50 µg-N/L have been demonstrated to stimulate a significant chlorophyll *a* response in the lower Neuse estuary (Rudek et al.1991, the coastal ocean (Paerl et al. 1990), and tidal creeks in New Hanover County (Mallin et al. 2004a). However, in blackwater rivers, inorganic N concentrations of at least 200 µg-N/L were required to elicit significant chlorophyll *a* responses (Mallin et al. 2004b).

Regarding the chlorophyll *a* standard, in the draft Plan it was noted that there is concern that the 40 µg/L standard is too high in mountain and upper Piedmont areas to prevent over-enrichment. I echo these concerns, and want to add that in blackwater rivers and streams algal blooms with chlorophyll concentrations considerably lower than this can be problematic, especially since such streams are already stressed by low dissolved oxygen, especially in summer (Mallin et al. 2004b, Mallin et al. 2006).

My final comments at this point again concern low dissolved oxygen. It is well known that hypoxia can definitely be caused by decay of algal blooms driving high BOD (Mallin et al. 2006). However, loading of phosphorus has also been shown to directly stimulate bacterial growth (Chudoba et al. 2013), and thus BOD by driving up respiration (Mallin et al. 2004b). I have attached some relevant PDFs for your perusal,

Best regards,
Michael A. Mallin, Ph.D.

References Cited

Paerl, H.W., J. Rudek, and M.A. Mallin. 1990. Stimulation of phytoplankton productivity in coastal waters by natural rainfall inputs; nutritional and trophic implications. *Marine Biology* 107:247-254.

Rudek, J., H.W. Paerl, M.A. Mallin, and P.W. Bates. 1991. Seasonal and hydrological control of phytoplankton nutrient limitation in the Neuse River Estuary, North Carolina. *Marine Ecology-Progress Series* 75:133-142.

Mallin, M.A., D.C. Parsons, V.L. Johnson, M.R. McIver and H.A. CoVan. 2004a. Nutrient limitation and algal blooms in urbanizing tidal creeks. *Journal of Experimental Marine Biology and Ecology* 298:211-231.

Mallin, M.A., M.R. McIver, S.H. Ensign and L.B. Cahoon. 2004b. Photosynthetic and heterotrophic impacts of nutrient loading to blackwater streams. *Ecological Applications* 14:823-838.

Mallin, M.A., V.L. Johnson, S.H. Ensign and T.A. MacPherson. 2006. Factors contributing to hypoxia in rivers, lakes and streams. *Limnology and Oceanography* 51:690-701.

Chudoba, E.A., M.A. Mallin, L.B. Cahoon and S.A. Skrabal. 2013. Stimulation of fecal bacteria in ambient waters by experimental inputs of organic and inorganic phosphorus. *Water Research* 47:3455-3466.

UNRBA Draft NCDP Comments

From: Forrest Westall <Forrest.Westall@Mcgillengineers.Com>
Sent: Friday, May 24, 2013 1:07 PM
To: Schimizzi, Nikki
Cc: Reid, Dianne; Wakild, Chuck; Bush, Ted
Subject: Draft NCDP Comments
Attachments: UNRBA Nutrient Forum Comment Letter 82212.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Ms. Schimizzi,

The Upper Neuse River Basin Association (UNRBA) appreciates the opportunity to comment on the DWQ's Draft Nutrient Criteria Development Plan (NCDP). We understand that there remains a high level of interest in the State's efforts to expand agency action relative to surface water nutrient over-enrichment in North Carolina (NC). As the Division knows, the UNRBA is working closely with your agency and the Department relative to implementation of the Falls Lake Rules. We also remain very interested in your ongoing efforts to define how NC will address eutrophication problems in the State moving forward. We will continue to track the development of the NCDP and participate as appropriate in what we hope will be continued stakeholder input before NC finalizes its Plan.

Our specific comments will be limited at this time to the major points made in this correspondence and to reiterate our recommendations to you that are reflected in the Association's comments following the NC Nutrient Over-Enrichment Forum in May 2012 (Nutrient Forum). I have attached our Nutrient Forum comment letter for reference and to ask that the principles in this letter be used to refine and modify the Draft NCDP. We strongly recommend that the DWQ initiate additional stakeholder collaborative processes to allow for clarification of the Plan's objectives and to encourage specific comments and edits to the Draft. An editing process with provisions for "give and take" between the Division and the stakeholders needs to occur before this document moves forward. The implications of the NCDP are too important to limit collaboration at this point. There has been significant effort by the DWQ and the EMC to give input opportunities prior to the development of the Draft NCDP, but specifics of what NC planned to do using this input was not available until the Draft NCDP was issued. It isn't appropriate to move this forward without more consideration of the implications of the Plan and to give the impacted stakeholders a chance to recommend changes.

In addition to the attached letter, the UNRBA offers the following points:

- The Draft NCDP doesn't address at all the implication of this process on existing eutrophication management efforts underway in NC, including Falls Lake. There is a tremendous amount of work and commitments in place related to existing nutrient management programs and these investments must be protected. Eutrophication management in the State following the issuance of a final NCDP could put pressure on the State to "revise" existing programs and if the State were to proceed with this approach that would be ill advised. The NCDP should specifically address current management programs for nutrient over-enrichment and how a NCDP may effect these efforts.

- The Draft NCDP reflects a process driven by EPA's numeric TN (total nitrogen) and TP (total phosphorus) initiative. This federal direction was initiated more than a decade ago and has proven to be an

ineffective approach to the complex issue of eutrophication. The NCDP should undertake the most appropriate and effective route to the goal of addressing real use support problems related to eutrophication and not "follow" EPA's ineffective approach.

- The development of "nutrient criteria" needs to be limited to determining a comprehensive list of chemical, biological, physical and waters/watershed characterizes that can "guide" the State in making comprehensive management decisions. A approach based on instream standards for TN and TP has been shown to be technically inappropriate and public policy-wise ineffective.

- The guidance criteria development process needs to include watershed/waterbody physical characteristics as well as analytical and biological parameters.

- The NCDP proposes to expand the list of parameters that would be used in developing "criteria." The process described appears in general to be four reasonable tasks. However, the Plan needs to clarify that these "criteria" will be used to identify specific waterbodies for evaluation and not for the development of numeric water quality standards. Additional steps need to be included to identify waters for evaluation, development of proposed management actions (if needed), implementation of the management plan, and a program to evaluate success and apply adaptive management during implementation.

- Adaptive management is noted in the Draft as being important but it is unclear from the document how this factor will play into the process. There needs to be some specific provisions of appropriate adaptive management included and how these provisions will be incorporated into management decisions for each situation.

As a reminder, the four principles we garnered from the Nutrient Forum are:

- Eutrophication management has to be case-by-case and site-specific.
- Assessment methodology needs to include a wide range of characteristics for the waters and watershed being examined.
- Adaptive management provisions are essential.
- Flexibility is needed in applying the right management strategy/process for each situation.

We express our thanks again for the efforts made by DWQ to "open" the eutrophication management discussion to stakeholders and believe that this should be continued in finalizing the NCDP. If you have any questions concerning these comments, please let me know.

Sincerely,
Forrest Westall

Forrest R. Westall, Sr.
Executive Director

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Town of Hillsborough

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City of Raleigh

Town of Stem

Wake County

Town of Wake Forest

South Granville Water and Sewer Authority

Soil and Water Conservation Districts

August 21, 2012

Mr. Dee Freeman, Secretary, NCDENR
1601 Mail Service Center
Raleigh, N.C. 27699-1601

Mr. Steve Smith, Chairman, EMC
NCDENR - DWQ
1617 Mail Service Center
Raleigh, N.C. 27699-1617

Re: North Carolina Forum for Nutrient Over-Enrichment, May 29-30, 2012

Dear Secretary Freeman and Chairman Smith:

On behalf of the Board of Directors for the Upper Neuse River Basin Association (UNRBA), I would like to commend the Department, the EMC and the Division of Water Quality for the recent Nutrient Forum. Several of our member governments were represented at the sessions on May 29 and 30 and our Executive Director was also in attendance. The reports we have received from those individuals have been very complimentary of the program and the speakers. The issues and subjects addressed during the Forum are at the heart of the efforts underway in our watershed to address nutrients and we believe that the themes and conclusions discussed at this program should be used as the general foundation for the State's efforts to address the complex water quality concerns involved with eutrophication throughout the State.

The UNRBA is keenly interested in the State's efforts to address nutrient over-enrichment in our waters. Based on the information presented by several of the presenters based outside of NC, the Falls Lake nutrient control requirements are some of the most stringent in the entire country. As a result, our organization is closely tracking and evaluating the ongoing scientific, regulatory and public policy discussions that are continuing about how best to address over-enrichment concerns.

In regard to this extremely important public policy development process we would like to encourage the Department, the EMC and the Division of Water Quality to carefully incorporate the concepts that emerged at the Forum. While there was a large amount of useful information provided at this meeting, those individuals from our organization

present at the Forum identified the following few key points that warrant further discussion and consideration:

- Because of the complexity and variability of the eutrophication process within each individual hydrologic system, nutrient management decisions should be made on a case-by-case basis. These decisions may need to be physiographic region-specific, considering the natural variability of water bodies within the coastal plain, piedmont, and mountain areas. Piedmont created reservoirs present unusual challenges and require focused attention to determine the appropriate uses required to be protected under the Clean Water Act.

- On a case-by-case basis, the State should carefully study multiple site-specific factors when considering approaches to nutrient management. These factors include the conditions within a specific watershed, all related water quality measurements and data on trophic status, impacts to drinking water supplies, and the overall health of fish and wildlife populations. When information on these factors is lacking or insufficient, the State should perform detailed site monitoring and evaluation studies before implementing regulatory measures. The history and knowledge base related to the study of over-enrichment clearly illustrate that programs need to take into consideration individual watershed characteristics, water chemistry and biological conditions in determining a water body's trophic condition. In-stream numeric nutrient standards cannot be used alone to accurately develop realistic management programs. Site-specific considerations are essential to developing effective nutrient control programs.

- The principle of "adaptive management" must be used in designing management programs within specific watersheds. Managing nutrients for one use can result in a detrimental effect on another use (or uses). For that reason, it may be important for the State to identify the uses to be given priority which may require reconsideration of the current system of classifications. The process for evaluating the outcomes of a nutrient strategy need to consider the triple bottom line of environmental, social, and economic impacts. Effective programs will be those that incorporate new information to adjust control actions as management efforts progress. The lengthy attenuation time for nutrients in the systems along with the decades long process for groundwater recharge makes adaptive management a matter of increased importance.

- Regulatory and statutory mechanisms for management of nutrient over-enrichment and eutrophication need to include a variety of administrative and legal procedures for addressing specific situations. There should be no one answer for all situations. No viable mechanism should be "taken off of the table" when developing management strategies.

I appreciate the opportunity to share these comments with you and would welcome the opportunity to discuss these matters. If either of you or members of you staff would like to explore these points in more detail please contact our Executive Director, Forrest Westall at 828-252-0575 or forrest.westall@unrba.org.

Sincerely,

Pam Hemminger, Chair
Upper Neuse River Basin Association

cc: Forrest Westall, Executive Director
UNRBA Board