Supplemental Attachment Information to NCDWR Triennial Review

* Use this document if the embedded links to comments in Attachment A are not working properly for your computer.

Manning, Jeff

From: Groome, Martie <Martie.Groome@greensboro-nc.gov>
Sent: Friday, August 22, 2014 7:29 PM
To: DWR_Classifications_Standards; stevewtedder@gmail.com; Brower, Connie
Cc: Drew, Steve; McDowell, Kenney; Williams, Elijah; Cooper, Lori W.; Osborne, Ed; Goots, Alicia; Skee, Joseph; 'chad.ham@faypwc.com'; Glenn McGirt; Scott Pickard; Joellen Gay(jgay@wilsonnc.org)
Subject: City of Greensboro Triennial Review Comments
Attachments: meg-August 2014 Triennial CommentsFINAL.doc

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Attached please find the City of Greensboro comments on the Triennial Review. If you have questions or need additional information, please do not hesitate to contact me.

Martie Groome, Laboratory and Industrial Waste Section Supervisor
Water Resources Department
City of Greensboro
Phone: 336-433-7229 Fax: 336-373-7720
Box 3136, Greensboro NC 27402-3136
www.greensboro-nc.gov

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City of Greensboro
North Carolina

Water Resources Department

August 22, 2014 [via email to DWR-Classifications-Standards@ncdenr.gov]

Steve Tedder [stevewtedder@gmail.com]
Hearing Officer –Triennial Review
NC Environmental Management Commission
c/o Connie Brower [connie.brower@ncdenr.gov]
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Re: City of Greensboro Water Reclamation Division Comments on the Proposed Water Quality Standards Regulations and North Carolina Triennial Review

Dear Mr. Tedder:

The City of Greensboro hereby submits the following comments in response to the Triennial Review of North Carolina Surface Water Quality Standards (WQS).

The City of Greensboro owns and operates two Wastewater Treatment Plants, the North Buffalo POTW with a design capacity of 16 MGD and the T. Z. Osborne POTW with a design capacity of 40 MGD. *In calendar year 2013, these two plants treated over 10.4 billion gallons of wastewater and returned the treated effluents to the surface waters of North Carolina with only one NPDES permit violation.* There are currently 30 Significant Industrial Users (SIUs) that discharge to the City of Greensboro POTWs, 21 of which are regulated by a Federal Categorical Pretreatment Standard. These SIUs include two Procter and Gamble facilities (pharmaceutical and personal care products); Lorillard (tobacco products); Cone Mills, Precision Fabrics, Elastic Fabrics (textile manufacturers); Lanxess, Chemol and Vertellas (organic chemical manufacturers); Shamrock Environmental I (Centralized Waste Treatment facility); Shamrock Environmental II and Express Container (Transportation Equipment Cleaning operation); Ashland Chemical/Solenis (chemical blending and repackaging); Zink (thermal paper manufacturer); Evonik Stockhausen (manufacturer of absorbent powder for diapers); RF Micro Devices and IQE (semi-conductor manufacturers); Aramark (industrial laundry); and 11 electroplating/metal finishing facilities.

We commend the Division of Water Resources (DWR) for their efforts and on-going dialogue during the recent portion of the Triennial Review process. Overall, the proposed changes to the standards will strengthen the state water quality program and provide a needed balance between environmental protection and reasonable/achievable limitations and regulations.

The City of Greensboro supports the following proposed changes to the North Carolina Surface Water Quality Standards and related implementation strategies:

- Supports the adoption of dissolved metals surface water quality standards and removal of all total recoverable metals water quality standards for those parameters in which dissolved standards are proposed. This change will satisfy the strong recommendation from EPA Region IV that North Carolina move to dissolved metal water quality standards and more importantly, better reflects the bioavailable fraction of the metals in aquatic environments.

- Supports the use of the specific EPA Translators provided by DWR and currently used in the "DWR Calculators" in deriving NPDES permit limits when converting dissolved metals standards to total recoverable metals as required by 40 CFR Part 122.

- Supports removal of state water quality standards for iron and manganese. The removal of these commonly found and naturally occurring parameters will eliminate unnecessary monitoring but not jeopardize water quality.

- Supports the removal of total recoverable chromium standard in response to the proposed Chromium III and Chromium VI water quality standards.

- Supports the continued use of Water Quality Action Levels for copper, zinc, silver and chloride for the purposes of NPDES permitting. North Carolina instituted Whole Effluent Toxicity (WET) testing and WET NPDES permit limits in the late 1980s and has successfully used the WET program in conjunction with the Action Level approach for decades. Over 600 WWTPs have WET monitoring requirements. As of CY 2013, the five-year compliance rate for these facilities was 97%. This is a proven water quality protection program with demonstrated control of potential sources of toxicity.

- Supports the use of *median* values for instream hardness and effluent hardness when calculating NPDES permit limits for hardness dependent metals.

- Supports the proposal to allow biological integrity to take precedence over ambient parameter concentrations in making impaired water/303(d) listing determinations.

- Supports the continued use of the current chlorophyll *a* standard until the completion of the final state nutrient criteria.

- Support the acute and chronic instream compliance evaluation criteria outlined in .0211(11)(e).

The Water Resources Department continues to have concerns about the following anticipated impacts to Greensboro regarding the proposed changes to the North Carolina Surface Water Quality Standards.

Water Quality Standards Used for NPDES Permit Limits and Pretreatment Program Calculations

Both of Greensboro's POTWs are located on small receiving streams, and thus, in most situations, the North Carolina Water Quality Standard *would be* the Greensboro NPDES permit limit, if a limit were imposed. *We are appreciative of the recent modifications made by DWR allowing the use of median effluent and instream hardness values. This one change made a dramatic difference in Greensboro's limit calculations, and virtually eliminated the nickel issue.* However, we are still very concerned about the cadmium and lead reductions. The chart below is a comparison of previous NPDES permit limits vs. those that could be imposed using the proposed water quality standards.

NORTH BUFFALO POTW	Cadmium	Lead	Nickel
Previous NPDES Limit	2.0 µg/l	25 µg/l	88 µg/l
NPDES Limit Based on Proposed WQS	1.23 µg/l	8.59 µg/l	84.6 µg/l
% Reduction	↓38.5%	↓65.6%	↓3.9%

T. Z. OSBORNE POTW	Cadmium	Lead	Nickel
Previous NPDES Limit	2.0 µg/l	26 µg/l	91 µg/l
NPDES Limit Based on Proposed WQS	1.24 µg/l	8.72 µg/l	85.6 µg/l
% Reduction	↓38.0%	↓66.5%	↓5.9%

Pretreatment Programs Impacts and Economic Development

Cadmium, lead and nickel are common metals used in many industrial and commercial processes, but are also commonly found in many households and household products. Considering the low microgram per liter (ug/l) concentrations proposed in the water quality standard revisions, even discharges from households can be a significant loading source to POTWs.

The 2004 EPA Local Limits Development Guidance Appendices include the following EPA published literature values for residential/commercial wastewater:

- Average Residential/Commercial Cadmium Concentration = 8 μg/l
- Average Residential/Commercial Lead Concentration = 58 μg/l
- Average Residential/Commercial Nickel Concentration = 47 μg/l

Conventional POTW wastewater treatment processes are not specifically designed to remove metals, although some incidental removal does occur. All of the EPA literature values are significantly higher than the proposed water quality standards and will require Greensboro to maintain a high level of removal in order to meet stringent NPDES permit limits even for the treatment of residential/commercial wastewater. The Federal Pretreatment Program does not currently include provisions for controlling, monitoring and permitting residential sources.

The Greensboro NPDES permit requires completion of a Headworks Analysis (HWA) which includes calculation of a Maximum Allowable Headworks Loading (MAHL) for each pollutant of concern that has a water quality standard. A MAHL calculation results in the amount of a pollutant (in pounds) that can be permitted to enter the POTW and still mathematically and theoretically meet the water quality standard. Pretreatment programs distribute the calculated MAHL between domestic, commercial and industrial users of the POTW (including septage haulers if applicable) and also typically set aside a significant portion for "future growth". This is particularly important if the POTW is not near hydraulic design capacity. The distribution of the MAHL to various sources is tabulated in an "Allocation Table".

The NPDES permit language includes: *"Permitted Industrial User loadings for each parameter cannot exceed the treatment capacity of the POTW as determined by the HWA."* [Part IV, Section D. (5.) – emphasis added]

DWR policy requires resolution of any over-allocation situation. This may include additional pretreatment processes for SIUs or even a process or SIU shut down. In the instance where domestic waste discharges alone cause over allocation, there is no available capacity for any industrial user. Industrial users would not be allowed to discharge detectable levels of cadmium, lead, or nickel when allocation is not available. Of equal importance, no new industrial discharges with detectable levels of these metals could locate in a city that is over allocated.

The City of Greensboro currently has ~50% of the total hydraulic capacity of both POTWs available for growth. The current MAHLs for cadmium, lead and nickel are all sufficient to allow growth up to the available hydraulic capacity. However, the proposed triennial review WQS changes for cadmium and lead will severely decrease allowable loadings, limit economic development and leave unused hydraulic capacity at both POTWs, resulting in a significant loss of revenue and tax base for the City of Greensboro.

Every portion of a pound of a MAHL represents the potential to recruit a new industry, or new housing development, or the expansion of an existing industry or commercial establishment. Alternately, the loss of even a portion of a pound of a MAHL correlates to a direct loss of that priceless potential.

The following chart illustrates the impacts of the proposed triennial review WQS changes on the City of Greensboro POTW Maximum Allowable Headworks Loadings (MAHL):

NORTH BUFFALO POTW	Cadmium	Lead	Nickel
Current MAHL	0.3483 pounds	3.6835 pounds	8.7185 pounds
% MAHL Capacity Available	70.8%	78.1%	93.0%
MAHL Based on Proposed WQS	0.1961 pounds	1.1591 pounds	7.6760 pounds
% MAHL Capacity Available	48.2%	30.4%	92.1%

T. Z. OSBORNE POTW	Cadmium	Lead	Nickel
Current MAHL	1.1934 pounds	12.6223 pounds	49.0874 pounds
% MAHL Capacity Available	45.7%	75.5%	52.4%
MAHL Based on Proposed WQS	0.6973 pounds	4.1490 pounds	44.9982 pounds
% MAHL Capacity Available	7.0%	25.6%	51.0%

As the chart indicates, there will be a significant loss of capacity at both POTWs for cadmium and lead.

As of CY 2013, there were 596 Significant Industrial Users discharging to POTWs and permitted by municipal pretreatment programs in North Carolina. Thirty-eight percent (38%) of the North Carolina SIUs are metal finishing/metal products facilities. This is the largest sector of the state's SIUs…*and* the ones most likely to use metals in their processes…*and* the ones most likely to have metals in their wastewater discharges…*and* thus, the ones most likely to see more stringent requirements in response to the proposed standards. Given the current economic environment and the significant loss of industrial jobs in North Carolina in the past 10 years, the state and local authorities must make every possible effort to prevent loss of this large segment of its workforce. Flexible implementation strategies and schedules will be required in order to accomplish this.

However, metal finishers/metal products facilities are not the only industrial category discharging detectable quantities of cadmium, lead and nickel. A review of historical industrial user data in North Carolina cities has shown trace/detectable levels of cadmium in the wastewater discharges from the following categories of industries:

.North Carolina Industries with Detectable Cadmium Levels at 2 ug/l (0.002 mg/l)		
Soft Drink Manufacturing	Meat Packing	Potato Chip Manufacturing
Personal Care/ Personal Hygiene Products	Industrial and Commercial Laundries	Bread and Bakery Product Manufacturing
Pharmaceutical Manufacturing	Circuit Board Manufacturing	Electrical & Electronic Components Manufacturing
Centralized Waste Treatment	Transportation Equipment Cleaning	Organic Chemical Manufacturing
Photofinishing	Metal Products & Machinery	Textiles
Inorganic Chemical Manufacturing	Chemical Repackaging	Tire Manufacturing
Printing & Publishing		

Septage Hauler Impacts

The City of Greensboro *voluntarily* accepts hauled waste from domestic septic haulers and waste activated sludge from small NPDES permitted domestic waste package plants (public school systems, trailer parks, small housing developments, etc.). No POTW is required to accept septage and in fact, some municipalities in North Carolina do not. Greensboro has for the past 40+ years, allowed septage haulers to discharge at our POTWs, considering it to be, by far, the most environmentally sound way to dispose of this waste.

Septage can contain high levels of all metals, (including cadmium, lead and nickel), particularly since some septic tanks are only pumped once in a decade, if that!

Greensboro regularly samples discharges from septage haulers and we have no reason to believe that septage from any other geographic area of the state would be any different. The following table summarizes the domestic septage data:

City of Greensboro Septage Sampling Study (29 random samples)				
Parameter	**Maximum**	**Minimum**	**Average**	**Median**
Cadmium	466 µg/l	<2 µg/l	30 µg/l	9 µg/l
Lead	1030 µg/l	<25 µg/l	204 µg/l	131 µg/l
Nickel	881 µg/l	32 µg/l	219 µg/l	150 µg/l

Since Greensboro is not required to accept septage and the program is not a major source of revenue, we may need to eliminate the septage hauler program in order to provide more of the MAHL for certain metals to our Significant Industrial Users. In July 2014, the City of Greensboro treated over 200,000 gallons of septage (200 trucks of hauled waste). Where will this septage go if Greensboro can no longer accept it?

Layering Conservative Assumptions in Development and Use of Water Quality Standards

Several layers of safety factors and conservative assumptions are included in the development and use of water quality standards in North Carolina. We request that a holistic review of the water quality standard development process, the NPDES permit process and the use of water quality standards in Pretreatment Program calculations be conducted by DWR to eliminate layering conservative assumption and safety factors that are not based on a reasonable risk

Stakeholder Participation in Implementation Strategies

Depending on the final implementation strategies utilized by DWR, the proposed changes to the water quality standards have the potential to dramatically impact the regulated community (both POTWs and industrial/commercial facilities discharging to POTWs). It is crucial for the DWR staff to provide continued stakeholder involvement in the rules and implementation procedures development process. If stakeholders have input and a full understanding of the implementation considerations for these new standards, lessons learned from the early stages of this Triennial Review can be used to create a more favorable response from the regulated communities.

The City of Greensboro appreciates the opportunity to comment on this topic of vital interest. We also hereby incorporate the comments of the North Carolina Water Quality Association and the North Carolina Pretreatment Consortium.

We look forward to working with the DWR and the EMC on the proposed changes.

Sincerely,

Martie Groome

Martie Groome
Laboratory and Industrial Waste Section Supervisor
martie.groome@greensboro-nc.gov 336-433-7229

cc: Steve Drew, Water Resources Department Director (via email)
Kenney McDowell, Deputy Water Resources Director (via email)
Elijah Williams, Interim Water Reclamation Manager (via email)
Lori Cooper, ORC T. Z. Osborne POTW (via email)
Ed Osborne, ORC North Buffalo POTW (via email)
Frank Skee, Pretreatment Coordinator (via email)
Alicia Goots, Laboratory Coordinator (via email)
Chad Ham, President, North Carolina Water Quality Association (via email)

Manning, Jeff

From: Sarah Collins <scollins@NCLM.ORG>
Sent: Friday, August 22, 2014 5:11 PM
To: 'benne.hutson@gmail.com'; 'Steve W Tedder (stevewtedder@gmail.com)'; 'Kevin Martin (Kmartin@sandEC.com)'; 'tcravenncemc@gmail.com'; 'dandersonemc@gmail.com'; 'gpcemc@gmail.com'; 'carterdenr@gmail.com'; 'tcravenncemc@gmail.com'; 'ddawson.emc@bellsouth.net'; 'eoferrell3@gmail.com'; 'billpuette@hughes.net'; 'lraymond@carolina.rr.com'; 'rubin@ncsu.edu'; 'manager@ccsdwater.com'; 'Jwilsey28 @hotmail.com'
Cc: Brower, Connie; Erin Wynia
Subject: FW: NCLM comments - Water Quality Standards (Triennial Review)
Attachments: NCLM Comments - Triennial Review.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Commissioners,

Forwarded are comments the N.C. League of Municipalities' submitted regarding the proposed changes to water quality standards regulations pursuant to the Triennial Review.

The comments do not reiterate all of our previous comments but rather highlight what we believe are key issues that the EMC needs to consider in their deliberations. Our comments include discussion of:

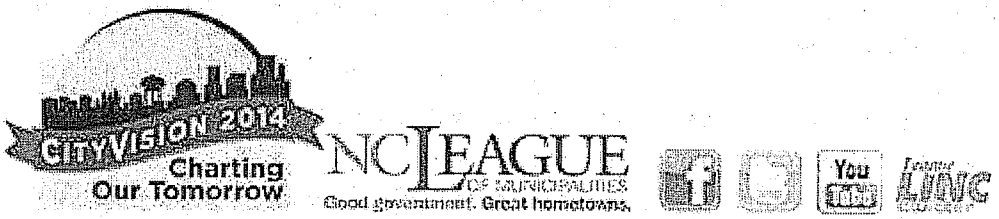
- **Change from Total Recoverable to Dissolved Metals**: The proposed changes reflect the latest guidance from the USEPA and with the associated rules/approaches guiding implementation represent a reasonable approach to protecting water quality in North Carolina.
- **Retention of Action Levels:** The proposed rules update the action levels to dissolved chronic criteria and propose to retain the language that allows compliance with whole effluent toxicity (WET) requirements to negate the need for permit limitations for copper, silver, and zinc in all waters plus chloride in freshwater. Elimination of the action level concept and requiring dischargers to do additional testing to adjust these criteria through development of a WER or other site specific approach is a waste of resources when the WET testing is already demonstrating that water quality is being protected.
- **Addition of Water Effect Ratio:** The proposed rules do not include a provision for using a water effect ratio (WER). Therefore, any special studies requiring consideration of site-specific requirements in development of effluent limitation will require modification of the applicable criteria through rule-making by the EMC. We believe it is a better use of resources by the staff, EMC and the regulated community to define a water quality criterion for a metal as the applicable criterion times a water effect ratio (WER), with the default WER value being 1.
- **Other Issues:**
    - Recalculation of the national acute criterion for Cadmium to reflect different protection needs in trout and non-trout waters is strongly supported.
    - Retention of the current chlorophyll *a* standard is supported since it seems appropriate to consider any changes to the standard in conjunction with the development of nutrient management requirements in conjunction with the recently approved Nutrient Criteria Development Plan (June 2014).

- We support continuation of previously approved variances until new information is developed and reviewed with the EMC.
- We do not support the inclusion of any flow requirement in the water quality standards for protection of ecological integrity as suggested by some commenters at the public hearings. Ecological flow requirements are being investigated as part of requirements for development of Basinwide hydrological models pursuant to Session Law 2010-143 and should continue being investigated in that context.

The League commends DWR and the EMC in their development of a reasonable rule package and associated implementation procedures to complete this delayed Triennial Review. The proposals, with the suggested changes, reflect a reasonable balance to water quality protection and environmental regulation.

Best,
Sarah

Sarah W. Collins
Regulatory Affairs Associate
NC League of Municipalities
215 North Dawson Street
Raleigh, NC 27603
919.715.2919 office
919.368.1269 cell
scollins@nclm.org



From: Sarah Collins
Sent: Friday, August 22, 2014 4:55 PM
To: 'DWR-Classifications-Standards@ncdenr.gov'
Cc: Erin Wynia
Subject: NCLM comments - Water Quality Standards (Triennial Review)

Attached are the North Carolina League of Municipalities' comments regarding the proposed changes to water quality standards regulations pursuant to the Triennial Review.

Best,

Sarah Collins

Sarah W. Collins
Regulatory Affairs Associate
NC League of Municipalities
215 North Dawson Street
Raleigh, NC 27603
919.715.2919 office
919.368.1269 cell
scollins@nclm.org

NC LEAGUE OF MUNICIPALITIES
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215 North Dawson Street
Raleigh, NC 27603
Post Office Box 3069 | 27602-3069
919-715-4000 | fax: 919-733-9519
www.nclm.org

August 22, 2014

Mr. Steve Tedder
Hearing Officer –Triennial Review
NC Environmental Management Commission
C/o Connie Brower
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Subject: Comments on the Proposed Changes to Water Quality Standards Regulations pursuant to the Triennial Review

Dear Mr. Tedder,

The NC League of Municipalities is a membership organization of over 540 municipalities and affiliate organizations, many of which are impacted by decisions made regarding amendments to the state's water quality standards regulations. The League's member cities, towns, and affiliates therefore appreciate the opportunity to comment on N.C. Environmental Management Commission's (EMC) proposed rule changes that represent the Triennial Review of Surface Water Quality Standards (WQS). The purpose of this letter is to provide some final comments regarding proposed changes. The League has actively participated in the process to develop these rules and has either directly or through our membership commented during earlier stages of the review process including comments provided at the public hearings in Raleigh on July 15, 2014 and Statesville on July 16, 2014.

The attached comments do not reiterate all of our previous comments but rather highlights what we believe are key issues that the EMC needs to consider in their deliberations. The League commends DWR and the EMC in their development of a reasonable rule package and associated implementation procedures to complete this delayed Triennial Review. The proposals, with the suggested changes, reflect a reasonable balance to water quality protection and environmental regulation. We recognize that there are additional issues to be considered in the water quality standards and look forward to working with DWR and the EMC as they embark on additional rules changes as part of the next Triennial Review or in conjunction with the legislatively required rules review process.

Respectfully Submitted,
Sarah W. Collins
Sarah W. Collins
Regulatory Affairs Associate

Change from Total Recoverable to Dissolved Metals

The proposed changes to several of the water quality standards for metals from a chronic criterion measured as the total recoverable form of the metal to acute and chronic criteria for dissolved metals is well over due. The proposed changes reflect the latest guidance from the U.S. Environmental Protection Agency (USEPA) and with the associated rules/approaches guiding implementation represent a reasonable approach to protecting water quality in North Carolina. Several points we want to emphasize relative to the metals criteria are as follows:

- There is no need to retain any total recoverable metals criteria in the water quality standards (other than for mercury and selenium as proposed). USEPA has determined that measurement of the dissolved form of metals most closely represent the bioavailable form of metals and are thus most appropriate as water quality criteria. These are then "translated" to total recoverable based limitations for the purpose of NPDES permits as supported by EPA guidance.
- The proposed application range for hardness dependent metals criteria of 25 to 400 mg/L as CaCO3 is appropriate since this is the range of hardness values used by USEPA in development the criteria. In applying these criteria for the purpose of developing NPDES permit limits, it is appropriate to use the median instream and effluent hardness values.
- The proposal for "demonstrated attainment of the applicable aquatic life use in a waterbody" to "take precedence over the application of the aquatic life criteria established for metals associated with these uses" is strongly supported. North Carolina Division of Water Resources (DWR) is still determining how it will re-implement metals monitoring through its ambient monitoring program and the coalition-based monitoring programs. Because DWR already has a comprehensive ambient biological monitoring program and aggressive whole effluent toxicity (WET) testing program, this proposal is a practical way to manage water quality assessments.

As the agency considers comments by other organizations, we would like to remind the EMC of the requirements of GS 150B-19.3 –that *"an agency authorized to implement and enforce State and federal environmental laws may not adopt a rule for the protection of the environment or natural resources that imposes a more restrictive standard, limitation, or requirement than those imposed by federal law or rule, if a federal law or rule pertaining to the same subject matter has been adopted."* We believe the proposed rules are consistent with this requirement.

Retention of Action Levels

The proposed rules update the action levels to dissolved chronic criteria (based on a hardness of 25 mg/L for the hardness dependent metals in freshwater) and propose to retain the language that allows compliance with whole effluent toxicity (WET) requirements to negate the need for permit limitations for copper, silver, and zinc in all waters plus chloride in freshwater. This concept has always made sense because the WET test organisms used for most dischargers, daphnia and ceriodaphnia, are among the most sensitive organisms for these substances and the toxicity of these substances is highly dependent on dissolved organic material and other complexing material in effluents and receiving waters. The North Carolina WET requirements are among the most comprehensive in the country and there is a high rate of compliance with these requirements.

Elimination of the action level concept and requiring dischargers to do additional testing to adjust these criteria through development of a WER or other site specific approach is a waste of resources when the WET testing is already demonstrating that water quality is being protected.

Addition of Water Effect Ratio

The proposed rules do not include a provision for using a water effect ratio (WER). Therefore, any special studies requiring consideration of site-specific requirements in development of effluent limitation will require modification of the applicable criteria through rule-making by the EMC. We believe it is a better use of resources by the staff, EMC and the regulated community to define a water quality criterion for a metal as the applicable criterion times a water effect ratio (WER), with the default WER value being 1. This will allow consideration of site-specific conditions effecting the toxicity of metals during the permitting process rather than through a rule-making process. This approach is allowed in EPA guidance and will allow appropriate Division of Water Resources (DWR), USEPA review or other public review. Attachment 1 provided an example of application of a WER for development of site specific criteria.

Other Issues

The following are several comments on other proposed requirements in the Triennial Review package:

- Recalculation of the national acute criterion for Cadmium to reflect different protection needs in trout and non-trout waters is strongly supported
- Elimination of the standards for Iron, Total Chromium and Manganese since they do not have a strong regulatory basis and could result in unnecessary monitory costs
- Retention of the current chlorophyll *a* standard is supported since it seems appropriate to consider any changes to the standard in conjunction with the development of nutrient management requirements in conjunction with the recently approved Nutrient Criteria Development Plan (June 2014).
- We support continuation of previously approved variances until new information is developed and reviewed with the EMC. We particularly support continuation of approved Federal 316a thermal variances. Elimination of these variances would require the implementation of additional cooling and result in significant increases in consumptive water use. Water is a precious commodity and requirements that increase consumptive use need to be closely scrutinized and discouraged where possible.
- We do not support the inclusion of any flow requirement in the water quality standards for protection of ecological integrity as suggested by some commenters at the public hearings. Ecological flow requirements are being investigated as part of requirements for development of Basinwide hydrological models pursuant to Session Law 2010-143 and should continue being investigated in that context.

Attachment 1

Application of a Water Effect Ratio (WER) in Deriving Site-Specific Criteria

Municipal Effluent

(Study report available - https://www.deq.idaho.gov/media/445303-boisecity_watereffectratio_project_report.pdf)

Background

- City of Boise, ID discharges from two wastewater treatment plants (WWTP) discharging to the Boise River - a coldwater stream supporting salmonids
- Study address development of acute and chronic dissolved criteria for Copper and Lead.

Study

- Approved study plan by State agency and US EPA Region 10 (permitting agency)
- Incorporated all elements of EPA checklist based on 1994 guidance for determination of WER
- Three field events – two at Type 1 (lower stream flow) conditions and one at Type 2 (higher stream flow) conditions)
- Toxicity testing was performed with the cladocern *Ceriodaphnia dubia* (copper and lead), fathead minnow (*Pimephales promelas*) (copper), and the amphipod *Hyallela Azteca* (lead) including reference toxicant tests (similar to those for criteria development) and WER tests (using river water from pre-approved sites)

Study Results

- Copper WER - ranged from 1.8 to 22.9
- Lead WER – ranged from 1.4 to 14.8
- Site-Specific Criteria used for Subsequent Permitting (at hardness of 50 mg/L $CaCO_3$)

	Dissolved Copper	Dissolved Lead
Water-Effect Ratio (WER)	2.578	2.049
Acute Criteria		
Current	8.9 µg/L	30 µg/L
Site-Specific Criteria	23 µg/L	62 µg/L
Chronic		
Current	6.3 µg/L	1.2 µg/L
Site-Specific Criteria	16 µg/L	2.4 µg/L

- Follow-up study was conducted to verify conditions for application of the WER and verify that confirmatory tests were not required

Manning, Jeff

From: Anne Coan <anne.coan@ncfb.org>
Sent: Friday, August 22, 2014 4:44 PM
To: DWR_Classifications_Standards
Cc: Mitchell Peele
Subject: Comments of NC Farm Bureau Federation on Triennial Review Rules - 8-22-14
Attachments: Water Quality - Triennial Review Comments of NCFB - 8-22-14.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Agriculture

Attached please find the comments of the NC Farm Bureau Federation on the proposed Triennial Review rule changes and the variances. If you have questions, please let me know. Anne Coan

NORTH CAROLINA
FARM BUREAU FEDERATION, INC.

PO Box 27766, Raleigh, NC 27611 Phone: 919-782-1705 Fax: 919-783-3593 www.ncfb.org

August 22, 2014

Connie Brower
DENR Division of Water Resources
Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Via email to: DWR-Classifications-Standards@ncdenr.gov

Dear Ms. Brower:

The North Carolina Farm Bureau Federation is our state's largest general farm organization, representing the interests of farm and rural people in North Carolina. This letter is to comment on some of the rule changes proposed due to North Carolina's Triennial Review of water quality standards, classifications and variances. The proposed rules and the list of the variances are published in the June 16, 2014, NC Register.

Organization of the Rules
NCFB appreciates the efforts made in the proposal to reorganize the rules in order to make them more clear and readable.

Allowing Assessment of Biological Integrity
NCFB supports the following statement in the rules regarding the application of metals standards, "An instream exceedance of the numeric criterion for metals shall not be considered to have caused an adverse impact to the instream aquatic community if biological monitoring has demonstrated attainment of biological integrity." As we understand this, if the criterion is exceeded, but the instream aquatic community remains healthy, that is not considered nonattainment of the applicable aquatic life use. NCFB appreciates the flexibility reflected in this approach, with biological assessment results being considered versus considering only the numeric metal standard and criterion when determining water quality. Where possible, this type of flexibility should be considered elsewhere in NC's water quality standards and criteria.

Iron and Manganese
The standards for Iron and Manganese are proposed for removal. Both chemicals are federally designated "non-priority" pollutants. NCFB supports this proposed change.

Nutrient Criteria and Standards
Several commenters at the 2013 hearing called for the immediate establishment of numeric nutrient criteria for nitrogen and phosphorous. This would totally ignore NC's current or any future use of response criteria for nutrients or any use of biological assessments to determine water quality impacts of nutrients. An NC Nutrient Criteria Development Plan has been developed and was recently accepted by EPA. NC has already begun that process, and changes to nutrient criteria or changes to nutrient standards for N and P should not be adopted during this rulemaking. Also, we support the retention of the current chlorophyll-a standard at this time (not currently proposed for change.)

Numbers of Water Quality Standards
Several commenters at the 2013 hearing stated the numbers of chemical and elemental constituents for which EPA has guidance versus the number of standards that NC has adopted. Commenters may do so again in their comments on this rulemaking. It is not necessary for NC to adopt a standard for every constituent for which EPA has given guidance. Some standards will not be necessary for NC and additions of water quality standards not currently in place should be carefully considered as to whether they are scientifically necessary to protect NC's water quality.

Comparing the number of constituents for which EPA has guidance to our adopted number of water quality standards is just that, a numerical comparison without adequate consideration of necessity or scientific justification. Just because EPA has guidance for it does not necessarily mean NC needs to adopt a standard for it. Adoption of new standards should be carefully considered for their necessity in North Carolina and NC should not adopt a long list of new standards, just because EPA has guidance for them. That said, we appreciate that the proposal does not include a very long list of changes that may be unnecessary, solely to match the number of constituents for which EPA has guidance.

Variances
NC Farm Bureau supports the continuance of the reasonable variances that are in place for processing of agricultural and forestry products in NC. The three surface water standards exemptions consist of two variances from the chloride standard for Mt. Olive Pickle Company and Bay Valley Foods, LLC (formerly Dean Pickle and Specialty Products Company) (NC0001074 & NC0001970) and a variance from the color standard for Evergreen Packaging (d.b.a. Blue Ridge Paper Products) (NC0000272).

Speaking specifically to the pickle processing plant chloride variances, these variances should remain in place. These pickle processing plants are important to NC agriculture and extremely important to the State's cucumber producers. Further, these pickle plants are important to the local economies in the areas where they are located.

The color standard variance for the paper products plant has been in place for many years. Reasonable accommodation must be made for processing of paper. If the plant is not causing unreasonable water quality impacts under the variance, this variance should remain in place as well.

Thank you for the opportunity to comment on the North Carolina Triennial Review proposed rules and the variances.

Sincerely,

Anne Coan

Anne Coan
Director of Environmental Affairs

Manning, Jeff

From: Heather Deck <riverkeeper@ptrf.org>
Sent: Friday, August 22, 2014 4:28 PM
To: Brower, Connie
Cc: Giattina.jim@Epa.gov; Gordon.lisaperras@Epa.gov
Subject: NC Triennial Review Comments
Attachments: PTRF Triennial Review Comments_08_22_14.pdf; appendix A_mussel distribution in Tar River basin.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: NGOs

Ms. Brower,

Please find the attached comments from the Pamlico-Tar River Foundation re: NC Triennial Review.

Thank you,

Heather Jacobs Deck
Pamlico-Tar RIVERKEEPER
Pamlico-Tar River Foundation
P.O. Box 1854
Washington, NC 27889
(252) 946-7211 (office)
(252) 946-9492 (fax)
(252) 402-5644 (cell)
www.ptrf.org

Follow us on Facebook: http://www.facebook.com/pamlicotar
Follow us at Twitter: www.twitter.com/ptrfriverkeeper"
Like us at Tar-Pamlico Water Trail: www.facebook.com/TarPamRiverCamping

Pamlico-Tar River
FOUNDATION

August 22, 2014

Connie Brower
Water Quality Standards Coordinator
Water Quality Planning Section
N.C. Dept. of Environment & Natural Resources
1611 Mail Service Center
Raleigh, NC 27699-1617
connie.brower@ncdenr.gov

Re: North Carolina Surface Water Triennial Review

Dear Ms. Brower:

The Pamlico-Tar River Foundation (PTRF) appreciates the opportunity to comment on the most recent proposal by the Division of Water Resources to update the state's water quality standards and criteria. PTRF is a grassroots environmental organization representing more than 2,100 members and is a licensed member of Waterkeeper Alliance, Inc. Our mission is to monitor, protect, and enhance the Tar-Pamlico River and watershed while promoting environmental justice.

I. Introduction

As required by the Clean Water Act, North Carolina must continue to update numeric and narrative water quality criteria and keep pace with scientific advances, new information, and national recommendations. While this year's draft changes meet the mark on several of those necessary changes, North Carolina has failed to act on others.

The following comments focus on our partial support for the proposed changes for heavy metals, support for the changes to 2,4- D, and recommendations for removal of the biological qualifier language. The vast majority of the comments focus on the need for North Carolina to adopt acute and chronic criteria for ammonia, as recommended by EPA, in order to protect the state's vast and ecologically vital aquatic species.

Furthermore, PTRF fully endorses the comments submitted by the Southern Environmental Law Center for this public comment period.

II. Heavy Metals

As noted in our public hearing comments at the July 15 hearing in Raleigh, PTRF supports the state's proposal to tighten the metal standards to regulate metals on a dissolved basis. However, due to the fraction of metals that are bound to solids, it is imperative that the state continue to regulate total

recoverable metals as well. Sediments enriched with metals could accumulate to concentrations of concern. Without state sediment quality standards in place, DWR must continue to regulate both the dissolved and total recoverable metals in order to protect water quality and aquatic species.

Since DWR's analysis indicates that a significant portion of the state's waters can have hardness values less than 25 mg/L, or the proposed minimum default, the state must include a process to protect those streams where hardness values fall below the 25 mg/L threshold and metals can become increasingly toxic.

III. 2,4-D

The chemical compound 2, 4 D, is a herbicide that poses a serious public health threat if consumed. PTRF supports the changes proposed by DWR and supported by EPA to lower the standard from 100 ug/L to 70 ug/L for drinking water sources.

IV. Biological Trump

PTRF does not support and wholly rejects the proposal for biological trumping. It is our belief that the qualifier as proposed violates the Clean Water Act (40 C.F.R. § 131.11) where biological monitoring and narrative standards may be used only in instances where numeric criteria either cannot be established or used in a manner that is complementary. This proposal also runs counter to EPA recommendations, as stated in their 2010 letter to DWR. [1]

Biological field monitoring and the state's narrative standard for biological integrity currently serve the needed purpose and intent of the Clean Water Act as a comprehensive water quality standards program. The narrative criteria should not be a substitute for the state's numeric standards, especially as it relates to toxics. As EPA noted, biological monitoring and assessments "are considered more restorative in nature, rather than preventive." [2]Biological assessments cannot prevent or predict impacts.

Furthermore, as noted by the US FWS, North Carolina's biological assessments program does not adequately sample for or include appropriate metrics for mussels, snails and other aquatic crustaceans, some of the most sensitive aquatic species to metals. [3]

To summarize, the Clean Water Act prohibits the discharge of toxic pollutants in toxic amounts in order to maintain the biological integrity of the state's waters. The numeric criteria for toxins must not be trumped by biological assessments which are incomplete and do not prevent or predict impairment, resulting in the likelihood that impairment will occur. Biological assessments and the establishment of numeric criteria must continue to work together as parts of a comprehensive program.

---

[1] Letter from Annie M. Godfrey, US EPA Region 4 to Alan Clark, NC DWQ. August 20, 2010.
[2] Id. Pg 7
[3] Letter from Pete Benjamin, US FWS to Connie Brewer, NC DWR re: triennial review. January 3, 2014.

V. *North Carolina must proceed with adoption of numeric ammonia standards*

Ammonia, a constituent of nitrogen pollution, is a common pollutant and highly toxic to aquatic species. Anthropogenic sources of ammonia include municipal and industrial effluent discharges, and runoff. Ammonia has been a pollutant of concern for decades and is well documented to have deleterious impacts on freshwater mussel survival. [4,5,6]Furthermore, important mussel recovery efforts will be hampered without necessary protections and management of ammonia discharges.

a. EPA criteria development

In August of 2013, EPA published new recommended ambient water quality criteria for ammonia based upon the most recent scientific information. As noted by the US FWS, EPA's criteria document contains ammonia toxicity information and data for 17 freshwater mussel species, eight of which are known to exist in North Carolina and three that exist within the Tar-Pamlico River Basin.[7] The 2013 criteria includes the most recent and up-to-date science available on the toxicity of ammonia to aquatic life.

PTRF is recommending that North Carolina adopt the water quality standards state-wide for acute and chronic ammonia immediately. Furthermore, we strongly urge the state to develop more protective site specific standards in waters within the state that are essential for the protection and recovery of prioritized species. Due to the presence of two federally-listed freshwater mussel species and an additional 11 species of state endangered, threatened or species of concern, the Tar-Pamlico River Basin should be prioritized for the development of more protective criteria.

The comments below provide in greater detail the current distribution and status of sensitive mussel species in three Tar-Pamlico River sub-basins; the Upper Tar, Swift and Fishing Creek basins. These basins are priority areas for species protection and recovery and all would benefit greatly from the protections provided by ammonia water quality standards.

b. Tar River Basin supports critical mussel populations

North Carolina is home to more than 60 species of freshwater mussels. Unfortunately, 50% of these species are designated Endangered, Threatened, or Species of Special Concern within the state. [8] Freshwater mussels play an extremely important role within aquatic ecosystems. Not only are they an important component of many species' food chain, but they also help stabilize sediments and filter contaminants, sediment, and nutrients from water, thereby improving water quality. These water quality functions are of great important to the Tar-Pamlico River system, which continues to suffer from extensive nutrient pollution and sedimentation.

---

[4] Strayer DL, Malcom HM. 2012 Causes o-f recruitment failure in freshwater mussel populations in southeastern New York. Ecological Applications 22: 1780-1790

[5] Goudreau SE, Neves RJ, Sheehan RJ. 1993. Effects of wastewater treatment plant effluents on freshwater mollusks in the upper Clinch River, Virginia, USA. Hydrobiologia 252:211-230.

[6] Augsberger, T, et. al. 2003. *Water Quality Guidance for Protection of Freshwater Mussels (Unionidae) from Ammonia Exposure*, 22 ENVTL. TOXICOLOGY & CHEMISTRY, 2569–2575.

[7] Letter from Pete Benjamin, US FWS to Connie Brower, NC DWR re: triennial review. January 3, 2014.

[8] http://www.ncwildlife.org/Learning/Species.aspx#5528115-mollusks

As described in the NC Wildlife Resource Commission's "Wildlife Action Plan", the Tar-Pamlico River Basin is home to 39 priority aquatic species, including 16 freshwater mussel species.[9] Of those 16 mussel species, the NC Wildlife Resource Commission (WRC) and NC Natural Heritage Program (NHP) identifies 13 species that are either federally or state listed endangered, state or federal species of concern, or species that are classified as significantly rare. In total, 18 species of freshwater mussel either currently or historically existed within the river basin (Appendix A). The North Carolina Natural Heritage Program lists the upper Tar River as a "nationally significant aquatic habitat". The US FWS characterizes the Tar River as a "mussel refugium of national significance," which supports "one of the two remaining best populations" of the federally endangered dwarf wedgemussel in North Carolina."[10]

Figure 1 below was a mapping exercise conducted by the USFWS Raleigh Field Office, which yet again demonstrates the importance of the Tar-Pamlico River basin in aquatic species survival and recovery.

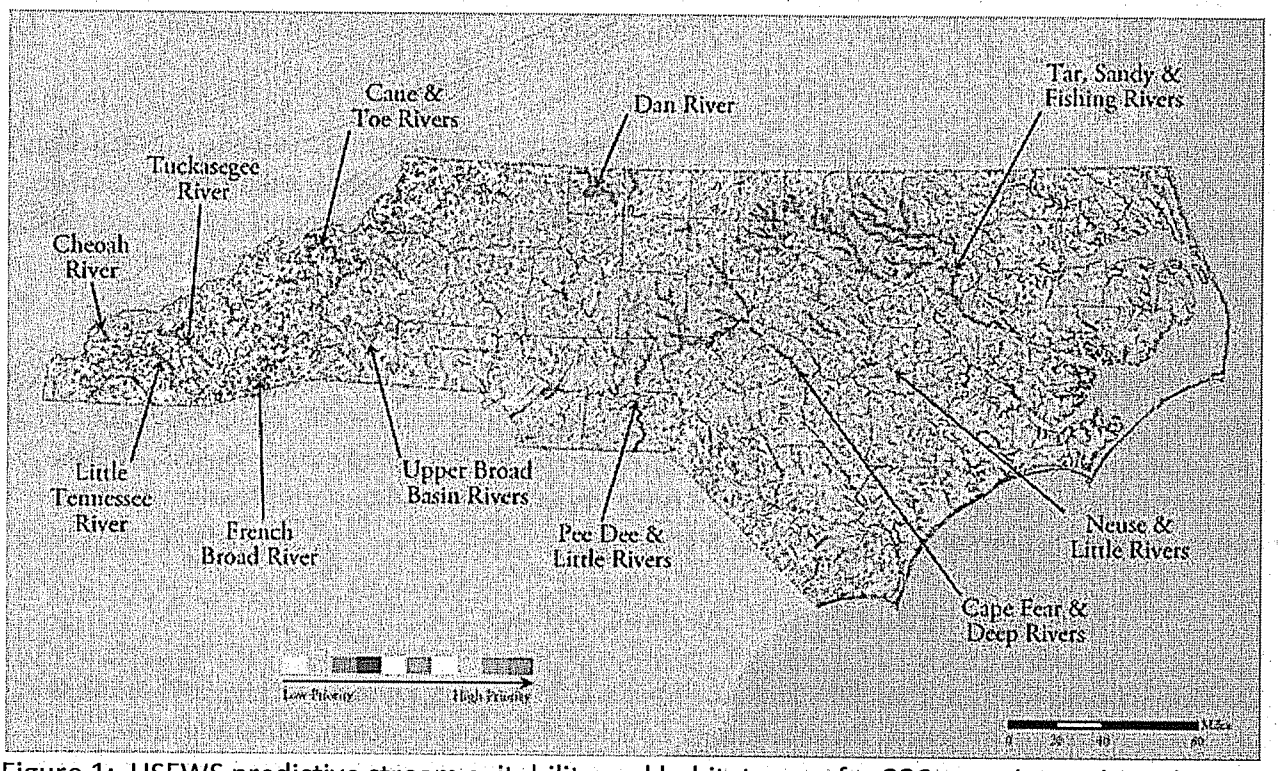

Figure 1: USFWS predictive stream suitability and habitat maps for 226 aquatic species using Maxent modeling.[11]

[9] NC Wildlife Resource Commission, "Wildlife Action Plan". 2005. http://www.ncwildlife.org/plan.aspx

[10] Letter from Pete Benjamin, U.S. Fish and Wildlife Service to Bruce Pleasant, USDA – Rural Development, Re: application by City of Creedmoor for funding for WWTP. January 24, 2013

[11] http://www.fws.gov/asheville/htmls/maxent/maxent.html . "These maps were derived by comparing known species occurrences with a suite of stream or landcover derived environmental variables. They provide a coarse-scale look at the potential stream suitability of many aquatic animals present and hope our mapping efforts help efforts to prioritize stream systems and help educate people on the spatial distributions and conservation needs of North Carolina aquatic species and habitats."

c. Federally Listed Endangered Species within the Tar-Pamlico Basin

The Tar-Pamlico River basin is home to two freshwater mussel species that receives protection under the Endangered Species Act. The Tar River spinymussel, which is endemic to North Carolina, and the dwarf wedgemussel. Additionally, several species have been petitioned for listing under the ESA and include the green floater and atlantic pigtoe, both found within the basin.

The Tar River spinymussel is a unique mussel and one of only three freshwater mussels with spines in the world. It is found only within the Neuse and Tar-Pamlico River basins, with a greater extent of distribution found within the Tar River and its tributaries. As noted by US FWS, the species is in great peril due to small, isolated populations. The 2009 review of the Tar River Spinymussel Recovery Plan states the need for improved water quality standards for this species' protection.

> "Also, recent studies indicate that current federal and state water quality standards for several pollutants commonly found in wastewater discharges and stormwater runoff are either not available (no criteria or standard derived) or likely not protective of freshwater mussels and current regulations controlling the discharge or runoff of these pollutants are not protective." [12]

The dwarf wedgemussel was historically found along the eastern seaboard, but is now in rapid decline. Most of the remaining populations within the Tar River basin are small and isolated. Threats include the toxic effects from industrial, domestic and agricultural pollution. [13]

d. Upper Tar River Basin

The upper Tar River watershed supports a diverse aquatic population and is the source of drinking water for the majority of communities located downstream. The upper Tar River has been generally characterized as having good water quality, but growth in the region has led to an increase in stressors that require additional management efforts and protections in order to maintain the integrity of the River system.

The Upper Tar River Subbasin in Person and Granville Counties is a globally significant freshwater resource. In fact, it is considered a "Hot Spot" for freshwater conservation by The Nature Conservancy (TNC). In terms of rare species richness, it is considered one of the top 72 out of 2,000 subbasins across the United States.[14]

The largest threat to the quality of the upper Tar is the rapid growth the region is experiencing. Research regarding the protection of aquatic species and water quality point to the threat of zinc and chlorine, both highly toxic to aquatic species.[15] The 2010 Basinwide Water Quality Plan[16] notes that the river has shown signs of stress due to an increase in organic nitrogen, turbidity, fecal coliform bacteria, copper and zinc.

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[12] US Fish and Wildlife Service, Tar River Spinymussel Recovery Action Plan, 2009 Review.
[13] http://www.fws.gov/raleigh/species/es_dwarf_wedgemussel.html
[14] Master, Lawrence L., Stephanie R. Flack and Bruce A. Stein, eds. 1998. *Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity*. The Nature Conservancy, Arlington, Virginia.
[15] US Fish and Wildlife Service. 1993. Dwarf Wedgemussel Recovery Plan. Hadley, Massachusetts. 52pp.
[16] 2010 Tar-Pamlico Basinwide Water Quality Plan. http://portal.ncdenr.org/web/wq/ps/bpu/basin/tarpamlico/2010

Recently a new threat is the proposed addition of new municipal wastewater discharge point by the City of Creedmoor. Currently, the City of Creedmoor is in a 6-month period of due diligence with the South Granville Water and Sewer Authority (SGWAS) for asset purchase of the City's infrastructure. However, the city continues to own the land where the new plant and discharge pipe location to the Tar River would be located. Furthermore, the City has joined the Tar-Pamlico Basin Association of dischargers and is an active member. Therefore, the threat of a new municipal or other industrial discharge remains should the city decide to either sell its property or SGWASA determines that a new discharge location would be appropriate.

An additional threat to mainstem populations of mussels is the expansion and discharge pipe proposed re-location to the Tar River by the Franklin County that currently discharges to Cedar Creek. The County has secured speculative limits from DWR.

Additionally, there are numerous wastewater discharges within the upper Tar River watershed. Within sub-basin 03-03-01, there are 10 individual NPDES permit sites and 14 General NPDES sites, dominated by Single Family Domestic Wastewater Discharge certificates of coverage.

Sensitive freshwater mussel species known to inhabit the Upper Tar River basin include the dwarf wedgemussel, atlantic pigtoe, triangle floater, yellow lance, yellow lampmussel, green floater, creeper and notched rainbow.

e. Swift & Fishing Creek Sub-basins

As noted in the Tar-Pamlico River Basinwide Plan, both Swift and Fishing Creek watersheds are a threatened and endangered species protection priority area.[17] Furthermore, the Natural Heritage Program has listed the mainstem of Swift Creek as an area of national significance and the lower portion of the basin contains a 2,000 acre natural area of regional significance.

Swift and Fishing Creek sub-basins support 10 rare mussel species, including the Tar River spinymussel and dwarf wedgemussel. There are an additional 8 mussel species, included 6 state threatened species. Research suggests that Swift Creek supports the best yellow lance and Atlantic pigtoe populations found throughout their distribution.[18] Both sub-basins are identified as priority areas for habitat protection. [19]

Along with populations of mussels, Swift Creek supports diverse populations of fish, amphibians, insects, crustaceans and plants. Even though Swift Creek's 270 square mile watershed is only 5% of the 5500 square mile Tar-Pamlico River watershed, it is home to 7% of all the fish species found in North America.

Threats to the sub-basins include both point and non-point source pollution, including numerous biosolid application fields, with currently unknown impacts.

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[17] 2010 Tar-Pamlico River Basinwide Plan. DWR.
[18] Prince, A. 1997. NC Natural Heritage Program. The Upper Tar River Basin: Swift Creek and Fishing Creek subbasins.
[19] NC WRC. 2005. Wildlife Action Plan.

VI. Conclusions

In summary, PTRF recommends that DWR adopt EPA criteria for acute and chronic ammonia without delay. The scientific background defending such a change is up-to date and accurately captures the minimum criteria needs for North Carolina's sensitive species. We further recommend that DWR initiate a process to collaborate with US FWS and NC WRC and other interested stakeholders to develop scientifically defensible site-specific criteria for priority areas important for aquatic species survival and recovery. We would recommend that the Upper Tar River and Fishing and Swift Creek sub-basins be considered a high priority for site-specific criteria.

Furthermore we support the change to lower the 2,4 D standard, changing to dissolved metal standards as well as maintaining standards for total recoverable metals. We do not support the additional of a biological qualifier and maintain that it is inconsistent with the requirements of the Clean Water Act.

I greatly appreciate your consideration of these comments. I would be happy to answer any questions or provide clarifications.

Sincerely,

Heather Deck
Pamlico-Tar Riverkeeper
Pamlico-Tar River Foundation

Cc (by email): Jim Giattina, EPA Region 4
Lisa Perras Gordon, EPA Region 4

Appendix A

Status and distribution of freshwater mussels in the Tar-Pamlico Watershed

Data derived from NC WRC and NC NHP

Common Name	Classification	Distribution	Notes
Dwarf Wedgemussel	E- ESA	Upper Tar River, Granville County; Cub Cr., Shelton Cr., Ruin Cr. , Little Ruin, Tabbs, Cedar Cr., Crooked Cr., Shocco Cr.,Little Shocco Cr., Fox Cr., Long Br., Maple Br., Rocky Swamp, Stony Cr.	Small and isolated populations.
Triangle Floater	T	Tar River- Granville/ Edgecombe Co., Shelton Creek , Tabbs Cr. , Ruin Cr, Fox Cr., Crooked Cr., Cedar Cr., Sandy Cr., Swift Cr, Stony Cr., Rocky Swamp, Little Fishing Cr.	
Box Spike		Generally found in the Pamlico River basin 1	
Carolina slabshell		Generally found in the Pamlico River basin 1	
Variable Spike		Generally found in the Tar-Pamlico River basin 1	

1 Bogan, A.E. 2002. *Workbook and key to the freshwater bivalves of North Carolina.* North Carolina Freshwater Mussel Conservation Partnership, Raleigh, NC 101 pp, 10 color plates.

Yellow Lance	E	Tar River- Granville / Franklin / Nash Co. Fox, Crooked, Sandy, Shocco, Tabbs, Fishing Stony, Swift Creek subbasins	Possibly extirpated from Ruin Creek, Vance County and the Tar River in Edgecombe Co.
Roanoke Slabshell	T	Tar River- Nash/ Edgeocmbe Co, Swift Cr. , Fishing Cr.	
Tar River Spinymussel	E-ESA	Tar River- Nash / Edgecombe Co.; Shocco Cr., Sandy cr., Swift Cr., Little Fishing	Endemic to Tar and Neuse Rivers. Possibly extirpated from mainstem of the Tar River . Populations small, fragmented and declining.
Atlantic Pigtoe	E, FSC	Upper Tar River, Fishing, Swift	Range declining. Petitioned for ESA.
Yellow Lampmussel	E	Tar River - Granville / Franklin / Nash / Edgecombe Co.; Sandy Cr., Swift and Fishing creek, L. Fishing creek subbasin	Possibly extirpated from Ruin Creek, Vance County
Eastern Lampmussel	T	Tar River, Edgecombe/Nash Co., Swift Cr, Sandy Cr, Fishing Creek	
Green Floater	E	Tar River -Granville and Nash Co.	Petitioned for ESA
Tidewater Mucket	T	Historically found in the Tar River	
Eastern Pondmussel	T	Extirpated from Tar-Pamlico River basin	
Creeper	T		Highly Vulnerable

(Squawfoot)		Upper Tar River, Person/Granville/Nash Co, Shelton, Cub, Ruin and Tabbs, Sandy, Fox, Crooked, Stony, Swift Fishing and Little Fishing creek subbasins	populations in the Tar River and listed sub-watersheds (NC WRC)
Notched Rainbow	SC	Tar River-Franklin/ Granville/ Nash Co. ; Crooked Cr, Fox Cr, Sandy Cr, Shelton Cr, Fishing Cr, Little Fishing Cr, Rocky Swamp, Stoney Cr., Shocco Cr, Little Shocco Cr., Fishing Cr, Long Branch and Little Fishing Cr.	
Undescribed lampsilis sp.		Found within the Tar River basin	
Brook Floater	E	Not currently found in the Tar River basin	May have historically been located in the Upper Tar River

[1] **Federal Species of Concern (FSC)** are defined as a species that is under consideration for listing for which there is insufficient information to support listing. FSCs are not afforded federal protection under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. However, the status of these species is subject to change, and so should be included for consideration

[2] **North Carolina Endangered (E), Threatened (T), and Special Concern (SC)** species have legal protection status in North Carolina under the State Endangered Species Act administered and enforced by the North Carolina Wildlife Resources Commission. Species listed as Significantly Rare are not afforded any protection.

Manning, Jeff

From:	Augspurger, Tom <tom_augspurger@fws.gov>
Sent:	Friday, August 22, 2014 4:18 PM
To:	Brower, Connie
Subject:	Re: Triennial Review Hearings
Attachments:	20140822_Letter_Benjamin to Brower_Proposed water quality standards amendments.pdf
Follow Up Flag:	Follow up
Flag Status:	Completed
Categories:	Federal Agency

Good afternoon Connie,

The attached letter conveys the U.S. Fish and Wildlife Service's comments on the July 1, 2014 Notice of Rule-making Action related to water quality standards amendments. Thanks for your diligence over the last couple years in getting the dissolved metals criteria changes proposed. Please give me a call if you have any questions about our input.

Regards,

Tom

Tom Augspurger
Ecologist / Environmental Contaminants Specialist
U.S. Fish and Wildlife Service
551-F Pylon Drive
Raleigh NC 27606
919-856-4520 x21
tom_augspurger@fws.gov

On Tue, Jul 1, 2014 at 11:34 AM, Brower, Connie <connie.brower@ncdenr.gov> wrote:

Good afternoon, everyone,

Public Notice of our Surface Water Triennial Review Public Hearings was made through the NC Register on June 16th. An announcement was also sent through our DENR/DWR Rulemaking List Serve and appears on both the DENR and DWR web pages/calendar of events in accordance with G.S. 150B. A DENR press release is scheduled for ~ 7 days prior to the scheduled hearings.

While these efforts have been effective, we may not be reaching all audiences. So, in an additional effort to assure that the interested parties are notified, we would like to ask the favor of your assistance. Would you please share the following information on your respective list serves and/or mail outs from your respective organizations or areas of expertise? As it is DWR's strong desire to provide the Environmental Management Commission with feedback from all interested parties, your efforts will aid us greatly in that purpose.

Thank you, again,

Fondest regards,

Connie Brower

Notice of Rule-making Action:

Notice is hereby given in accordance with G.S. 150B-21.2 that the Department of Environment and Natural Resources intends to amend the rules cited as 15A NCAC 02B .0206; .0211; .0212; .0214-.0216; .0218; .0220. The Environmental Management Commission (EMC) will conduct public hearings to consider proposed amendments to these rules that establish the surface water quality standards for North Carolina. These proposed amendments comprise the State's Triennial Review of Surface Water Quality Standards, which is mandated by the federal Water Pollution Control Act (Clean Water Act). Additionally, the Division will accept comments on the Fiscal Note prepared for this proposal. The Agency obtained G.S. 150B-19.1 certification of the Fiscal Note from Office of State Budget Management on April 23, 2014.

The complete text of the proposed rule revisions is available on the Division of Water Resources' Proposed Rules Website, *pursuant to G.S. 150B-19.1(c):* *http://portal.ncdenr.org/web/guest/rules*

Proposed Effective Date: *January 1, 2015*

Public Hearings:

Date: *Tuesday, July 15, 2014*

Time: *2:00 p.m.*

Location: *Ground Floor Hearing Room, Archdale Building, 512 North Salisbury St., Raleigh, NC*

Date: *Wednesday, July 16, 2014*

Time: *3:00 p.m.*

Location: *Statesville Civic Center, 300 South Center Street, Statesville, NC*

In case of inclement weather on either of the two published hearing dates, a continuance date for the public hearing has been established as July 29th , 1:30 p.m., Ground Floor Hearing Room, Archdale Building, 512 North Salisbury Street, Raleigh, NC. A recorded message regarding any continuance to the hearing record will be available at the below noted telephone number.

It is important that all interested and potentially affected persons or parties make their views known to the EMC whether in favor of, or opposed to, any and all of the proposed amendments and current regulations. The public hearing will be recorded. It will consist of a presentation by DWR staff, followed by an open comment period. The EMC appointed hearing officer may limit the length of time that you may speak, if necessary, so that all those who wish to speak will have an opportunity. You may attend the public hearing to make oral comments and/or submit written comments. You may present conceptual ideas, technical justifications, or specific language you believe is necessary and relevant to 15A NCAC 02B surface water quality classifications and standards regulations. No items will be voted on and no decisions will be made at this hearing.

How to Submit Comments:

As the state and US Environmental Protection Agency (US EPA) have a strong interest in assuring that the decisions are legally defensible, are based on the best scientific information available, and are subject to full and meaningful public comment and participation, clear records are critical to the administrative review by the EMC and the US EPA. All persons interested in and potentially affected by the proposal are strongly encouraged to submit written comments, data or other relevant information by ***5:00 p.m., Friday, August 22, 2014*** to Connie Brower at the postal address or e-mail address listed below.

Connie Brower,

DWR Water Planning Section,

1611 Mail Service Center,

Raleigh, NC 27699-1611

e-mail: DWR-Classifications-Standards@ncdenr.gov

Questions can be directed to Connie Brower at (919) 807-6416, main line (919) 707-9000; or fax (919) 807-6497.

www.portal.ncdenr.org/web/wq

Note: E-mail correspondence to and from this address is subject to NC Public Records Law and may be disclosed to third parties unless the content is exempt.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

August 22, 2014

Ms. Connie Brower
DENR/ Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Dear Ms. Brower:

This letter conveys the U.S. Fish and Wildlife Service's (Service) comments on proposed amendments to the North Carolina rules for surface water quality standards stemming from the 2008-2010 Triennial Review of Surface Water Quality Standards. Proposed changes are to 15A NCAC 02B .0206, .0211, .0212, .0214, .0215, .0216, .0218, and .0220. The Division of Water Resources (DWR), on behalf of the Environmental Management Commission, seeks comments on the proposed changes which were detailed in a July 1, 2014 Notice of Rule-making Action.

The Service is the principal Federal agency responsible for conserving, protecting and enhancing fish, wildlife and plants and their habitats for the continuing benefit of the American people. In North Carolina, we manage 11 National Wildlife Refuges, comprising over 400,000 acres. We also operate a national fish hatchery, two ecological services field stations and additional offices offering technical assistance on fisheries and migratory bird management. We enforce federal wildlife laws, administer the Endangered Species Act with a local focus on recovery of imperiled species, restore nationally significant fisheries, and conserve and restore wildlife habitat.

We have reviewed all proposed changes and are pleased to see the proposed adoption of water quality standards for metals (other than mercury and selenium) based on the dissolved metal fraction. We were supportive of this approach in comments provided on September 7, 2010, and January 3, 2014, and we appreciate the hard work of DWR to complete this rulemaking.

In those same letters, incorporated here by reference, the Service expressed concerns with several aspects of the current proposal and offered suggestions for addressing our concerns. We also made suggestions for additional rule changes which have not yet been acted upon. Briefly, those remaining concerns are as follows:

- We disagree with the proposal that aquatic life biological integrity criteria take precedence over ambient numerical water quality standards for water quality assessment. We note that important taxa of conservation concern, like mussels (50 species in NC), clams (15 species in NC), snails (66 species in NC), and reptiles and amphibians (98 species in NC) are not adequately covered through biocriteria.

- We disagree with the retention of action levels in lieu of standards for copper and zinc associated with permitted releases. Numeric standards should be enforceable instream targets.

- We note that waters with hardness less than 25 mg/L may continue to be under-protected unless site-specific hardness data are permitted to be used to tailor standards to local conditions.

- We continue to encourage development of guidance or procedures for addressing the fraction of metals bound to solids to manage metals accumulation in sediments or pore water – sources of exposure to sediment dwelling organisms like mussels which are of conservation concern.

- We encourage prompt adoption of USEPA's 2013 Ammonia Water Quality Criteria into State standards.

- We continue to encourage better use of antidegradation and use restoration tools aimed at ecologically significant species and their habitat, particularly 15A NCAC 02B .0110 *Considerations for Federally-Listed Threatened or Endangered Aquatic Species* and 15A NCAC 02B .0101 (e) (7) *Unique Wetlands.*

- We continue to encourage the establishment of flow criteria that protect the ecological integrity of streams and rivers in North Carolina.

- We continue to encourage revision to the dissolved oxygen standard to provide for higher concentrations in important fish spawning areas.

We reiterate the offer to participate in collaborative ventures with DWR and others to resolve these issues and explore future changes to the State's rules implementing maintenance and restoration of water quality for the benefit of fish, wildlife and people. If you would like additional detail on any of our recommendations or comments, please contact Tom Augspurger at tom_augspurger@fws.gov or 919-856-4520 x.21.

Sincerely,

Tom Augspurger

For Pete Benjamin
Field Supervisor

Manning, Jeff

From: Sam Perkins <sam@catawbariverkeeper.org>
Sent: Friday, August 22, 2014 3:34 PM
To: DWR_Classifications_Standards
Subject: 2014 NC Surface Water Triennial Review Comments
Attachments: 2014 NC Surface Water Triennial Review.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: NGOs

Please find attached our comments to supplement those we made orally in Statesville at the public hearing on July 16th, 2014.

Sincerely,
--
Sam Perkins

Catawba **RIVERKEEPER®**
Catawba Riverkeeper Foundation, Inc.
421 Minuet Lane, Suite 205
Charlotte, NC 28217-2784
Office: (704) 679-9494
Cell: (704) 651-5974

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August 22, 2014

Connie Brower
Water Quality Standards Coordinator
Water Quality Planning Section
N.C. Dept. of Environment & Natural Resources
1611 Mail Service Center
Raleigh, NC 27699-1611
DWR-Classifications-Standards@ncdenr.gov

Re: North Carolina Surface Water Triennial Review

Dear Ms. Brower:

Thank you for the opportunity to comment on North Carolina's surface water quality standards. Founded in 1997, the Catawba Riverkeeper Foundation ("CRF") is a 501(c)(3) nonprofit with 800 members and volunteers throughout the Catawba-Wateree River Basin. CRF is the only group completely dedicated to the protection of the basin's waterways for everyone who depends on and enjoys them.

The Clean Water Act of 1972 requires states to review water quality standards every three years. The last triennial review should have been held in 2009. North Carolina's failure to maintain this schedule is a concerning and unacceptable exercise in procrastination. Much of this state's reputation is staked in its environment, both as a place to live and a place to tour, from mountains to sea. North Carolina has also developed a reputation as an educated, technologically advanced state, particularly with its universities and research industry. However, the failure of the NC Department of Environment and Natural Resources ("DENR") to regularly revisit and update standards as experience and research advance our understanding is a tremendous setback for North Carolina. Furthermore, it exposes the state to a situation where the Environmental Protection Agency ("EPA") may take the unfulfilled role of DENR and itself update water quality standards. If DENR does not use its delegate authority, it can lose it.

Our comments will address various facets both of what was proposed and what continues to go completely unaddressed. Additionally, we would like to emphasize our support and wholehearted concurrence with the comments submitted by the Southern

A WATERKEEPER ALLIANCE® Member
421 Minuet Ln Ste 205 P.O. Box 11838
Charlotte NC 28217-2784 Charlotte, NC 28220
Phone: 704-679-9494 Fax: 704-679-9559
www.catawbariverkeeper.org

Environmental Law Center, with which we closely work on multiple issues. Our comments serve to expand on their own and emphasize what is important for surface water here in the Catawba-Wateree River Basin.

General Metals

For decades, North Carolina failed to significantly update its metals standards, despite libraries of research and experience that have prompted updates in national recommendations. North Carolina is now the only state in EPA Region 4 that has yet to adopt the EPA's recommended criteria for metals. Meanwhile, these metals continue to accumulate in our waterways, rendering our fish unsafe for consumption and the water we drink compromised.

We support hardness-dependent standards for metals, but the hardness calculation range is dangerously inappropriate. Understandably, curves must be calibrated for toxicity at certain hardness levels. However, refusing to acknowledge and figure out toxicity for water softer than 25 mg/L $CaCO_3$ (or Ca+Mg) is both scientifically ignorant and impractical. DENR owes it to the people of North Carolina – which has plenty of water softer than 25 mg/L – to be able to accurately determine toxicity. And if the state is ever truly unable to make a scientifically accurate calculation in any facet, it should be overly precautious, especially after enduring years of erring to the other end of the spectrum.

While DENR's proposed standards would bring North Carolina into conformity with EPA recommendations for beryllium, chromium III, chromium VI, copper, lead, nickel, silver and zinc, it is inexplicable why arsenic and cadmium standards would be relaxed and why iron and manganese standards would be completely nixed. Even at low levels, including those around the current standard (50 µg/L) arsenic can cause significant biological issues (Das et al., International Journal of Public Health, 2014). As with the entirety of their comments, we very much support the detailed metal-by-metal analysis provided by SELC.

Methylmercury (MeHg)

North Carolina has failed to specifically limit MeHg, which is a pervasive and dangerous form of mercury because of its ability to bioaccumulate. Mercury toxicological standards have not been updated since 1999. MeHg, a form of elemental mercury, is one of the toxic and bioaccumulating forms. Elemental mercury tests do not take MeHg into account because typically elemental mercury is found in the air or as metal form. MeHg, on the other hand, is the form that is mostly found in water, soil, and biota. Typically MeHg accounts for about 90% of total mercury that is found in fish muscle tissue. Other states have seen MeHg as a large concern and have elected for

stricter regulations on it. For instance, Tennessee requires that all fish MeHg levels be below 0.3 µg/L, as advised by the EPA. Virginia has set up a mercury advisory board to monitor the levels of mercury in the water. Oregon has set limits on MeHg at 0.012 µg/L in freshwater. The EPA has also published a MeHg report on the Water Quality Criteria for the Protection of Human Health in 2001. The minimal risk levels set by the EPA is 0.0003 µg mercury/g/day for chronic exposure to MeHg (Davidson et al., 1998). Without setting up these types of standards, the water quality of North Carolina will remain behind and pose a threat not only to the ecosystem, but also to humans.

MeHg is a direct byproduct from anthropogenic processes, like coal power plants, which enters the water as elemental mercury (Hg) and into the bacteria. The bacteria convert elemental Hg into MeHg by microbial methylation. Once in the bacteria, invertebrates will eat the bacteria, and the fish will eat the invertebrates (Stokes and Wren, 1987). The main organisms to bioaccumulate MeHg are the freshwater fish. For example, predatory fish typically have higher levels of MeHg because they eat smaller fish with MeHg concentrations. The MeHg is biomagnified, which means that there will be a larger amount of toxins in the larger fish (Garcia and Carignan, 2005). A study on bass found that MeHg affects the endocrine system of the fish, specifically with its hormone concentrations (Fynn-Aikens et al., 2012). It is important to consider the larger fish because they are predatory and are common game fish for North Carolinians. Bringing home a fish with high MeHg levels can put their families' health at risk.

MeHg causes adverse effects in humans. The toxin is absorbed through fish consumption and more than 90% of the MeHg will be attached to the hemoglobin in the blood. Another alarming result of high MeHg intake is the amount of neurological damage it causes. The most famous case is Minamata disease, which occurred in Minamata, Japan, following MeHg-containing fish consumption. This disease causes numbness, loss of feeling in hands, paralysis and death. One study demonstrated that MeHg-induced brain damage is a direct effect from children that are exposed to their mothers' fish consumption during pregnancy. The MeHg is able to move from the mother to the fetus (Davidson et al., 1998). The MeHg can cross into the placenta of the fetus, enter the brain, and initiate neuron necrosis of the brain cells. MeHg can also lead to loss of IQ, as demonstrated by Grandjean et al., 2010. In the study using Centers for Disease Control information, it found that approximately 480,000 children had blood mercury levels greater than 5.8 µg/L. Another study found that more than 75,000 newborn babies each year have a higher risk of learning disabilities due to the mothers' fish consumption (Martin et al., 2012). Adults can also have neuropsychological problems with low levels of MeHg exposure. The fine-motor skills decrease along with verbal memory. Furthermore, MeHg found in human hair was significantly correlated to the adults' performance on tests, including a change in concentration. Kidney damage and cardiac arrest have also been correlated with MeHg poisoning.

The health problems stemming from MeHg poisoning has an economic effect as well. A study was done on the economic cost based on the loss of IQ in infants. The study found that more than $1 million of expected income would be lost for a boy born in

2000 and $760,000 lost for a girl born in 2000 (Trasande et al., 2005). This was based on a real discount rate equation of 1% and 3%. These numbers would be even higher if you take into account the willingness to pay for social productivity of the child. The total loss of productivity in a year would amount to $8.7 billion. At the moment, $1.3 billion it attributed to coal power plants, which are emitting this mercury gas. North Carolina cannot sacrifice losing that much revenue for the state's economy.

North Carolina needs to move forward with MeHg limits in the water standards as stated above in the upcoming Triennial Review. Mercury has been found in 50% of the hazardous waste sites, which is listed on the national priorities list of the North Carolina Toxicology Report. Not having a MeHg limit is unacceptable to the well-being of the North Carolina residents. In addition to setting a MeHg limit, a spatially thorough monitoring program should be set up in North Carolina for the freshwater fish, including catfish and bass.

Nutrient Criteria Development Plan (NCDP)

Nitrogen and phosphorous themselves remain significant problems, and DENR needs a plan with metrics based on the roots of the nutrient problem – nitrogen and phosphorous – rather than metrics that reveal a problem after it is too late.

Specifically, the January 2014 draft of the NCDP raises the following concerns:

1. Most importantly, the draft NCDP still does not commit to developing a numeric phosphorous or nitrogen criterion for even a single water body in the state.

2. The draft NCDP still does not commit to developing any kind of improved nutrient criteria for the entire state.

3. The definition of "nutrient criteria" is overly broad and vague.

4. The NCDP now focuses on just three waterbodies (High Rock Lake, a central portion of the Cape Fear River, and Albemarle Sound), despite the fact that numerous other waterbodies throughout the state are impaired for chlorophyll a, pH, and/or turbidity, response variables that can be caused by nutrient over-enrichment.

5. The timetable for developing any new standard for even those three waterbodies is still excessively long given the amount of data already available, and still likely will not result in numeric criteria for nitrogen and phosphorous for those three waterbodies.

Multiple areas of the Catawba River basin are in dire need of TMDLs like the one described in the draft NCDP. The basin contains a relatively small drainage area but is

very densely populated and is extremely modified in the form of manmade dams. Additionally, the basin has approximately 787 poultry CAFO houses, operating under non-discharge (ND) permits but with observable effects on the water quality of nearby waterways. There is only a brief mention of a waste management plan in the draft NCDP. These ND permits, as well as others for activities such as municipal wastewater sludge spreading, need serious review for their contributions of both dissolved and particulate nitrogen and phosphorous, and nutrient budgets cannot remain naïve to the contributions of supposedly ND sources.

Lake Rhodhiss has long been plagued by nutrient problems and has been on the 303(d) list. The root of nutrient problems throughout the Catawba River basin remains the nutrients that feed algae and other constituents that contribute to metrics such as chl(a). Previous efforts with other metrics (not root-of-the-problem metrics, like nitrogen and phosphorous) have not cleaned up long-documented problems.

The draft NCDP does not address the majority of impaired water bodies in the state. It does not include any concrete plan for developing numeric nitrogen and phosphorous criteria for any other waterbody in the state, nor does it contain a plan to develop or update any nutrient criteria – whether for a response or causal variable, numeric or narrative, default or waterbody-specific. It is facially inadequate for the NCDP to aim to address nutrient pollution in just three waterbodies, at some unidentifiable point in the future, when nutrient pollution is currently such a widespread endemic; currently, more than one-third of the land area in the state drains to waters classified as nutrient sensitive, and many waters in the state are listed as impaired for chlorophyll a, a causal variable indicating nutrient pollution.

Yet, instead of address the pervasive, intractable nutrient pollution problem throughout the state, DENR devotes the bulk of the draft NCDP to a 17-page Appendix A that summarizes "existing North Carolina nutrient management programs," in which DENR describes prior efforts to address nutrient pollution with waterbody-specific nutrient management strategies, water quality standards that address response variables, and other such efforts. This lengthy discussion of prior efforts to address nutrient pollution without numeric criteria for causal variables appears to be designed to justify the NCDP's failure to include a plan for developing numeric criteria for nitrogen and phosphorous to control nutrient pollution statewide.

The clearest problem with the strategies described in Appendix A is that **none of them complies with EPA's directive to adopt nitrogen and phosphorous numeric criteria in the state's water quality standards**. In addition, they lack the authority of a formal water quality standard and are therefore too easily delayed and avoided. The Jordan Lake Rules, which have been repeatedly delayed and undermined by the legislature before they can be fully implemented, are a prime example. The rules and plans for other waterbodies have experienced similar excessive delays during their development, before implementation has even begun.

The state must set a statewide default numeric criteria standard for nitrogen and phosphorous in 2014 as part of the triennial review. The criteria should be 0.05 mg/l for phosphorous and 0.35 mg/l for nitrogen, as the level with a 95% chance of not generating an exceedance of the current statewide 40 µg/l chlorophyll-a standard (15A N.C. Admin. Code 02B .0211(3)(a), .0220(3)(a)). The criteria could remain in place for all waterbodies not covered by a site-specific standard and could provide needed motivation for stakeholders to help with speedy development of site-specific criteria.

Particulate Transport

In any case – nutrients, metals or any regulated element or molecule – DENR needs to regulate and measure total recoverable amounts. Solely considering the dissolved state is just scientifically inaccurate, it truly hinders the ability of the state to improve our waterways and leads to ineffective policies and regulations.

For many atoms and molecules, transport occurs primarily in the particulate phase. A material (an atom or molecule) can sit sorbed to the surface of a particle or perhaps captured within an organic matrix coating a sediment particle. However, this particulate state is by no means permanent. Transported materials – especially metals and nutrients – will deposit and ultimately decouple and become dissolved/bioavailable (Shuman et al., 1978; Mayer et al., 1998; Meybeck 1982; Seitzinger et al., 2005).

A prime example is found in in a review of water treatment plant residuals (sludge) from Charlotte-Mecklenburg's water intakes, which indicate that arsenic accumulated on the bottom of Mountain Island Lake and Lake Norman erupts during warmer and more hypoxic conditions, as predicted by Ruhl et al., 2012. The arsenic buildup on the lake bottom is the result of decades of discharge from coal ash ponds immediately upstream. Elsewhere in North Carolina, where water intakes are not immediately downstream of coal ash discharges (and when data for that sludge is separate from wastewater treatment plant sludge), arsenic levels in sludge are an order of magnitude lower.

In the case of nutrients, total recoverable standards are equally important, as phosphorous and nitrogen transport significantly in the particulate phase and during a time when conditions are not favorable to algal blooms (and thus high chl-a levels). However, post-deposition, phosphorous and nitrogen can leave the particulate phase, enter the water column and fuel algal blooms toward the surface, where sunlight is abundant.

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Conclusion

We very much appreciate the opportunity to help advance North Carolina's water quality standards. Bringing these standards up to a scientifically modern and respectable point will reap benefits in all water-dependent facets – ecology, economy, public health and recreation.

Please do not hesitate to contact me (sam@catawbariverkeeper.org or 704-651-5974) if you have any questions or would like to discuss this further.

Sincerely,

Sam Perkins, Catawba RIVERKEEPER®

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Works Cited

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Manning, Jeff

From: Buchan, Edward <Edward.Buchan@raleighnc.gov>
Sent: Friday, August 22, 2014 3:25 PM
To: DWR_Classifications_Standards
Subject: comments on triennial review
Attachments: 201408221521.pdf; ATT00001.c

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Please find attached the City of Raleigh's comments on the proposed rule changes as described in the triennial review.

Best regards,

Ed Buchan
Environmental Coordinator
City of Raleigh - Public Utilities Department
(919) 996-3471

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North Carolina

August 22, 2014

Mr. Steve Tedder
Hearing Officer –Triennial Review
NC Environmental Management Commission
C/o Connie Brower
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

RE: Triennial Review Impacts Assessment

Dear Mr. Tedder,

Thank you for the opportunity to provide comments on the proposed revisions to wastewater NPDES permit limits and pretreatment requirements as outlined in the triennial review. As you know, even minor changes to NPDES limits can have profound financial and operational impacts on municipal permittees.

First, we would like to express our strong support of the comments submitted by the North Carolina League of Municipalities and the North Carolina Water Quality Association. Specifically, we are supportive of the following proposed changes:

- Switch from a recoverable metals criteria to a dissolved metals criteria
- Retention of current chlorophyll *a* standard
- Calculation of permit limits using median instream hardness data
- Use of biological integrity for water quality assessment purposes
- Elimination of non-priority pollutant (Magnesium, Iron, Total Chromium) criteria
- Continued application of action level approach for Silver, Zinc, Copper and Chloride
- Adoption of new Cadmium criteria as developed by DENR
- Limit application of dissolved metals criteria to hardness rang of 25-400 mg/l
- Formal recognition that unregulated non-point sources are significant contributors to storm related fecal coliform exceedances.

In addition to the cited revisions, we feel it is also important to consider using water effect ratios to determine site specific limits, removal of the chronic silver standard, adopt a four day average methodology for developing waste load allocations and using the practical quantification limit for reasonable potential assessments.

Finally, we would like to highlight the potential financial impacts of not adopting the proposed changes and other suggested policies. Based on an evaluation of the potential facility upgrades needed if certain hardness related permit limits are exceeded, the City of Raleigh would have to invest between $134,000,000 to $667,000,000 to ensure compliance. Moreover, as cited in a 2010 technical evaluation from Stearns & Wheeler, if reasonable permit criteria were not developed it could cost North Carolina municipalities between $600,000,000 to $6,000,000,000,000 over 20 years. With such substantial fiscal and practical impacts in mind, we urge you to accept and implement all prescribed revisions to the identified surface water quality standards.

If you should have any questions regarding these critical issues, please do not hesitate to contact me directly at (919) 996-3489 or via e-mail: Kenneth.waldroup@raleighnc.gov

Sincerely,

Kenneth Waldroup, P.E.
Assistant Public Utilities Director
City of Raleigh Public Utilities Department

Manning, Jeff

From: Lou Ann Phelps <lphelps@selcnc.org>
Sent: Friday, August 22, 2014 2:55 PM
To: DWR_Classifications_Standards
Subject: North Carolina Surface Water Triennial Review
Attachments: 08-22-14 Comments to Connie Brower re triennial review.pdf; EPA letters re WQS - NC, AL, GA.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: NGOs

Dear Ms. Brower,

Attached are comments submitted by Julia Youngman of the Southern Environmental Law Center, on behalf of the North Carolina League of Conservation Voters, Cape Fear River Watch, River Guardian Foundation, Appalachian Voices, Winyah Rivers Foundation, American Rivers, Neuse Riverkeeper Foundation, Eno River Association, and Waterkeeper Alliance. Also attached are enclosures referenced in the comments. A hard copy will follow by regular mail.

Thank you in advance for your thoughtful consideration of these comments.

Best regards,

Lou Ann Phelps
North Carolina Certified Paralegal
Assistant to Julia F. Youngman
Southern Environmental Law Center
601 W. Rosemary St., Suite 220
Chapel Hill, NC 27516-2356
Tel: (919) 967-1450
Fax: (919) 929-9421
www.southernenvironment.org

SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 919-967-1450 601 WEST ROSEMARY STREET, SUITE 220 Facsimile 919-929-9421
CHAPEL HILL, NC 27516-2356

August 22, 2014

VIA U.S. MAIL AND E-MAIL

Connie Brower
Water Quality Standards Coordinator
Water Quality Planning Section
N.C. Dept. of Environment & Natural Resources
1611 Mail Service Center
Raleigh, NC 27699-1611
DWR-Classifications-Standards@ncdenr.gov

Re: North Carolina Surface Water Triennial Review

Dear Ms. Brower:

We appreciate the opportunity to comment on North Carolina's Water Quality Standards, and proposed amendments thereto, as part of the triennial review process. These comments are submitted on behalf of the North Carolina League of Conservation Voters, Cape Fear River Watch, River Guardian Foundation, Appalachian Voices, Winyah Rivers Foundation, American Rivers, Neuse Riverkeeper Foundation, Eno River Association, and Waterkeeper Alliance. Together, we represent many 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 water pollution in the past; and who will continue to be adversely affected by poor water quality and lenient water quality standards until North Carolina promulgates much-needed and long-overdue updates to its current water quality standards.

We write to express our concern that the State has failed to conduct a review of State water quality standards every three years, as required by the Clean Water Act. Section I of the comments that follow addresses the noncompliant status of the State's current triennial review. Section II includes our response to the proposed revisions to the standards for metals. Section III addresses the State's need for numeric criteria for nitrogen, phosphorus, and dissolved oxygen. Section IV discusses the need for ammonia standards; Section V, cyanide; Section VI, 2, 4 D; and Section VII, numerous other pollutants for which North Carolina currently has no standard. Section VIII proposes explicit protections for instream flow. Section IX addresses the regulation of hydraulic fracturing fluids and related wastewater. Finally, Section X discusses the role of climate change as it affects surface waters and water quality standards.

A plentiful supply of clean water is crucial to the state's environment and its economy. Our growing population depends upon ample supplies of clean drinking water and access to unpolluted lakes and rivers for recreation. Businesses rely on access to dependable supplies of uncontaminated water. Corporate decisions about whether to locate their facilities here or elsewhere can be affected by the quality of the state's natural resources.

North Carolina's tourism industry especially depends on high-quality water, from coastal sounds and estuaries to the mountain trout streams. According to a report by the Outdoor Industry Association, in North Carolina in 2012, recreational tourism (fishing, boating, camping, wildlife-viewing, and other activities that depend directly on clean water bodies) provided $19.2 billion in consumer spending, 191,500 direct jobs, $5.6 billion in wages and salaries, and $1.3 billion in State and local taxes.[1] In 2011, freshwater fishing alone directly accounted for over $1.2 billion in economic benefits to the state, 11,193 jobs, and $80,734,150 in State and local tax revenue, and North Carolina ranked as the fourth most popular state in the nation for "non-resident fishing destinations."[2]

Ample supplies of clean water, in turn, depend on strong, up-to-date, scientifically supportable water quality standards. For the first time in eight years, the State is proposing amendments to its water quality standards. Some of these proposals increase environmental protection; they are overdue. Others threaten additional harm to our waters; they are misguided. And the current proposals fail to include many necessary and long-overdue revisions, so the proposed amendments are, on the whole, inadequate. We offer the following comments and suggestions for improving North Carolina's water quality standards to address those deficiencies.

I. The Triennial Review Process

Before expressing support for, or criticism of, the specific amendments under consideration, we begin by noting the State's failure to act sooner to ensure that our water quality standards are up to date. We are very concerned that North Carolina's Department of Environment and Natural Resources ("DENR") is already five years overdue in completing the triennial review of its water quality standards required by the Clean Water Act ("CWA"),[3] and that the current review will not be completed until some time next year. DENR does not currently anticipate updating North Carolina's water quality standards until 2015 at the earliest, and some within the agency anticipate the delay to continue well into next year.[4] Moreover, that

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[1] Outdoor Industry Association, The Outdoor Recreation Economy 1 (2013), *available at* http://www.outdoorindustry.org/images/ore_reports/NC-northcarolina-outdoorrecreationeconomy-oia.pdf.

[2] American Sportfishing Association and Southwick Associates, Sportfishing in America: An Economic Force for Conservation (Jan. 2013), *available at* http://asafishing.org/uploads/2011_ASASportfishing_in_America_Report_January_2013.pdf.

[3] 33 U.S.C. §§ 1251 *et seq.*

[4] *See* DENR, Division of Water Resources, *Surface Water Triennial Review of Standards*, http://portal.ncdenr.org/web/wq/ps/csu/swtrirev (last visited Aug. 10, 2014) (predicting that rule

protracted timeline only addresses the amendments that the State is currently considering; other necessary updates to our water quality standards are not expected for decades. For instance, the process of deciding whether to codify statewide nutrient criteria is currently planned to extend into 2023 at the earliest.[5] These delays are untenable, and the agency's glacial pace is indefensible in light of applicable law, as explained below.

A. Legal Background

The CWA is a "comprehensive water quality statute designed to 'restore and maintain the chemical, physical, and biological integrity of the Nation's waters.'"[6] The CWA "seeks to attain 'water quality which provides for the protection and propagation of fish, shellfish, and wildlife.'"[7]

Pursuant to CWA section 303,[8] each state must adopt and implement water quality standards to protect navigable waters within its borders, subject to oversight and approval by the U.S. Environmental Protection Agency ("EPA"). State water quality standards must (1) classify water bodies and designate beneficial uses for a water body to achieve, (2) set narrative and numeric water quality criteria to protect and achieve those uses, and (3) avoid degradation below 1975 water quality levels.[9] Such standards "play a central role in a State's water quality management program, which identifies the overall mechanism States use to integrate the various Clean Water Act quality control requirements into a coherent management framework."[10]

North Carolina has taken steps to fulfill its initial duties under the federal CWA to classify water bodies, designate beneficial uses, and set initial water quality criteria for certain pollutants. However, in addition to adopting water quality standards initially, states must periodically review and update those standards. North Carolina has fallen behind in its duty to do so.

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amendments will be reviewed by the Rules Review Commission as late as March 2015, and failing to state an anticipated date of rule adoption); *see also* Tom Reeder, Remarks at the Public Hearing for Triennial Review of Surface Water Quality Standards (Nov. 19, 2013) (opining that North Carolina would not adopt new rules pursuant to the triennial review until the end of 2015).

[5] *See* DENR, North Carolina Nutrient Criteria Development Plan (June 20, 2014), *available at* http://portal.ncdenr.org/c/document_library/get_file?uuid=fda0bd83-a5cc-454a-b035-11979364f80f&groupId=38364

[6] *PUD No. 1 of Jefferson Cnty. v. Wash. Dep't of Ecology*, 511 U.S. 700, 704 (1994) (quoting 33 U.S.C. § 1251(a)).

[7] *Id.* (quoting 33 U.S.C. § 1251(a)(2)).

[8] 33 U.S.C. § 1313,

[9] 33 U.S.C. § 1313(c)(2)(A), (d)(4)(B) (2013); 40 C.F.R. § 131.12 (2013).

[10] EPA, Water Quality Standards Handbook: Second Edition Int-13 (1994) (hereinafter, "WQS Handbook").

CWA section 303(c)(1) 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."[11] The standards "shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of" the CWA.[12] According to DENR, the last triennial review covered the years 2004-2006. Specifically, the last public hearings (before the July 2014 hearings regarding the current proposals) were held in July 2006,[13] and the last changes to North Carolina's water quality standards went into effect in May 2007.

The current triennial review is now five years overdue, as the next round of public hearings on proposed revisions should, by law, have been held by July 2009. According to DWR, it attempted a triennial review covering the period of 2008-2010 (inexplicably skipping 2007 altogether). However, the resulting proposals were neither enacted nor rejected, so, according to EPA guidance, the "review" initiated in 2010 may be ongoing still. To determine when a triennial review has been completed, the WQS Handbook states,

> The 3-year period is measured from the date of the letter in which the State informs EPA that revised or new standards have been adopted for the affected waters and are being submitted for EPA review or, if no changes were made in the standards for those waters, from the date of the letter in which the State informs EPA that the standards were reviewed and no changes were made.

WQS Handbook at 6-1. DWR has not clarified whether it has abandoned efforts to complete the 2008-2010 triennial review, or whether its current activities are a continuation of that review. For the sake of these comments, however, we will assume that the State aborted the previous review and intends to be starting from scratch with the proposed revisions announced in June 2014 and hearings held in July 2014. Regardless, we are relieved that the State is finally taking steps to fulfill its obligations under the law. We are also mindful that, if the State continues to delay the adoption of the proposed revisions and other necessary changes, the federal government can act to protect North Carolina's waters.

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[11] 33 U.S.C. § 1313(c)(1) (2013).

[12] *Id.* § 1313(c)(2) "Serve the purposes of the Act" means that state water quality standards must, among other things, "include provisions for *restoring* and maintaining chemical, physical, and biological integrity of State waters" and "*wherever attainable*, achieve a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water." WQS Handbook at Int-8 (Sept. 15, 1993) (emphasis added).

[13] DENR, Report of Proceedings on the Proposed Changes to the Surface Water Quality Standards and Classifications Rules for the Triennial Review, at S-1 (July 2006), *available at* http://portal.ncdenr.org/web/wq/ps/csu/swtrirev.

B. EPA Promulgation of Water Quality Criteria

Where a state fails to conduct a triennial review and fails to submit revised water quality standards that are consistent with the CWA after notice by EPA, EPA may update a state's water quality standards itself. CWA section 303 states, "The [EPA] Administrator shall promptly prepare and publish proposed regulations setting forth a revised or new water quality standard . . . in any case where the Administrator determines that a revised or new water quality standard is necessary to meet the requirements of" the CWA. 33 U.S.C. § 1313(c)(4) (2013). For the past four years, EPA has observed pointedly and repeatedly that North Carolina's standards lag far behind scientifically supportable national recommendations and the standards of its neighboring states, and that revisions to North Carolina's standards are necessary to satisfy the CWA.[14] All that remains to trigger EPA's intervention to promulgate standards under section 303(c)(4) is for the EPA Administrator to make that formal determination – a determination that it has hinted at repeatedly for the past four years – in writing.

If the State does not end its delay – by codifying updated criteria as quickly as possible – EPA will be forced to promulgate updated standards for North Carolina. Indeed, EPA already promulgated many of the same standards discussed in these comments for California years ago. 40 C.F.R. § 131.38. It should do so for North Carolina unless the State takes long-overdue action.

That said, to its credit, the State has finally proposed to take some of the action required. As such, in addition to pointing out the foregoing procedural problems, we provide the following comments on the substance of the proposed amendments to North Carolina's water quality standards. Where appropriate, we express support for the long-awaited changes that will improve our waters. However, we also note concerns related to the proposed amendments and highlight the areas in which the State, by limiting its proposed amendments, missed yet another opportunity to act to protect our waters.

II. Metals

The State's metals standards have failed to keep up with EPA's national recommendations, with other states in the region, and with scientific progress over the last three decades. For instance, our water quality standards for toxic metals have not been significantly modified since the mid-1980's, and the State does not even have standards for certain toxic metals. Meanwhile, EPA has developed new recommended standards for many of these metals based on improvements in the scientific understanding of how toxic metals affect aquatic life and human health.

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[14] Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ (Aug. 20, 2010); Letter from Joanne Benante, EPA Region 4, to Coleen H. Sullins, NCDENR-DWQ (Sept. 1, 2010); Letter from James D. Giattina, EPA Region 4, to Thomas Reeder, NCDENR-DWQ (July 31, 2013). Copies of these letters are enclosed.

EPA requires states to develop numeric water quality standards based on (1) EPA's guidance issued under section 304(a) of the CWA, (2) site-specific conditions, or (3) other scientifically defensible methods.[15] EPA issued significant modifications to its guidance for metals in the late 1980's and early 1990's, pursuant to section 304(a) of the CWA. All other states in EPA's Region 4 – and most states around the country, for that matter – have adopted EPA's recommended metals criteria. Of the states in Region 4, only North Carolina still has standards that are not informed by EPA's decade-old recommendations, and our State standards are no longer scientifically defensible.

In 2006 and again in 2010, North Carolina proposed changes to its metals criteria which, although imperfect, signaled significant progress toward protecting our state's waters. These proposed revisions were never adopted. The science has continued to develop, linking metals to serious adverse effects on aquatic life and ecosystems. Metals can also affect human health by causing numerous cancers, reproductive and developmental disorders, and harmful effects on the skin, blood, bones, liver, intestines, stomach, lungs, and brain. After decades of delay, it is time for North Carolina to update its standards for toxic metals to reflect the current science and EPA's recommendations.

The State has once again proposed revisions to its water quality standards for metals. Indeed, these revisions constitute the bulk of the proposed amendments under consideration. We make six primary observations regarding these proposed amendments. First, we generally support the proposal to adopt hardness-dependent standards for certain toxic metals, though we have some concerns related to the application of these standards. Second, we support the adoption of the proposed standards proposed for arsenic, chromium III, chromium VI, copper, lead, nickel, silver, and cadmium, but oppose the proposal to delete existing water quality standards for manganese and iron. Third, we oppose the use of a biological qualifier as a loophole to excuse noncompliance with numeric chemical criteria. Fourth, we disagree with the use of action levels in NPDES permitting for copper, silver, chloride, and zinc. Fifth, we believe dissolved metals standards should supplement, not supplant, total recoverable metals standards. Finally, we support the adoption of a methylmercury standard in addition to the current mercury standard.

A. DENR should adopt truly hardness-dependent standards for metals that vary in toxicity based on water hardness.

Many of North Carolina's proposed standards for toxic metals are hardness-dependent, meaning they use an equation that calculates a particular criterion based on the toxicity of the metal at the hardness of a specific water body. EPA expressed strong support for the hardness-based standards for cadmium, chromium III, copper, lead, nickel, silver, and zinc that were proposed in 2010.[16] We understand that all of the other Region 4 states have adopted such

[15] 40 C.F.R. § 131.11(b) (2013).

[16] Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ, at 8 (Aug. 20, 2010).

standards for these metals. It is past time for North Carolina to adopt hardness-dependent equations to produce scientifically supported water quality standards.

Hardness is typically measured as the concentration of calcium carbonate ($CaCO_3$) or calcium and magnesium ions (Ca+Mg). Each of these hardness-dependent metals becomes more toxic and bio-available to aquatic life as hardness decreases (i.e., in softer water), and less toxic as hardness increases. EPA has stated that the reduction of a metal's toxicity with the increase in water hardness could be caused by the associated increase in alkalinity, which allows for the formation of metallic hydroxides and carbonates when metal ions bond with calcium (or other ions) to create less toxic and less bio-available substances.[17] Since the metals can be more or less harmful to aquatic life based on water hardness, North Carolina should adopt the proposed standards and embrace the equations as a more accurate measure of safe water quality.

The current proposals include hardness-dependent acute and chronic standards for cadmium, chromium III, copper, lead, nickel, and zinc.[18] The State also proposes hardness-dependent standards to protect freshwater aquatic life from acute exposure to silver and acute exposure to cadmium in trout waters.[19] We generally support the State's underlying recognition that water quality standards should take into account the effect of water hardness on the toxicity of these substances.

However, notwithstanding this recognition, the State proposes to ignore hardness calculations below certain minimum and maximum thresholds. The proposed revisions set a minimum of 25 mg/l and a maximum of 400 mg/l $CaCO_3$ (or Ca+Mg) beyond which actual water hardness will not be considered. We are particularly concerned by the minimum of 25 mg/l, because, as noted above, toxicity of the substances in question increases in softer water. EPA recommends, and we agree, that North Carolina should adopt an equation that can accurately protect aquatic life at hardness levels lower than 25 mg/l, levels at which these metals will be most toxic.[20] North Carolina has a significant number of State waters with a hardness below 25 mg/l $CaCO_3$.[21] If DWR insists on having a minimum cut-off, it should support the cut-off with current data on North Carolina's water hardness levels and allow calculations incorporating hardness levels as low as those observed in North Carolina's softest water bodies. We believe

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[17] EPA, Quality Criteria for Water 145-46 (May 1, 1986) (hereinafter "The Gold Book"), *available at* http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#gold.

[18] 28 N.C. Reg. 3009 (June 16, 2014).

[19] *Id.*

[20] Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ, at 5 (Aug. 20, 2010) ("EPA strongly recommends that the State revise the criteria for these metals to delete the minimum hardness cutoff from the criteria equations so as to not be under protective of North Carolina's many waters with low hardness.").

[21] *Id.*

that, if a limit is implemented, it should be lowered to at least 20 mg/l, as recommended by EPA, or even lower as justified by the data.

We are also concerned about the proposal governing monitoring. Notably, the proposed rules state that "[c]ompliance with the instream metals standards shall only be evaluated using averages of a minimum of four samples taken on consecutive days, or as a 96-hour average."[22] When a similar proposal was made in 2010, EPA expressed concern because "several states which have adopted similar provisions around the country have not been able to successfully carry out the strategy of monitoring on four consecutive days and can, therefore, never assess compliance with the water quality standard."[23]

The proposed rules do not explain how the State intends to ensure that the required monitoring will be conducted. We ask DENR to consider more achievable sampling and monitoring requirements to ensure that compliance assessment can actually occur with the mandated frequency. If, when implementing the rule, the State intends to incorporate new monitoring requirements into NPDES permits, then permittees should be aware so they can submit informed comments. If the State intends to conduct the contemplated monitoring, DENR should explain how it plans to do so effectively after cutting staff and rejecting federal funding specifically earmarked for water quality monitoring.[24]

B. North Carolina should adopt the proposed standards for beryllium, chromium VI, copper, lead, nickel, silver, and zinc, and a standard at least as protective as EPA recommendations for arsenic, cadmium, manganese, and iron.

North Carolina proposes changes to the water quality standards for many toxic metals. For the most part, those proposals would bring North Carolina into conformity with EPA's recommendations and should be adopted. We support the proposed standards for beryllium, chromium III, chromium VI, copper, lead, nickel, silver and zinc. However, the proposal to relax the arsenic standard is not scientifically based, and the proposed cadmium standard

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[22] 28 N.C. Reg. 3009 (June 16, 2014)..

[23] Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ, at 6 (Aug. 20, 2010)

[24] *See* Tyler Dukes, *DENR Shed Regulators From Regional Offices Since 2013* (May 13, 2014), http://www.wral.com/denr-shed-regulators-from-regional-offices-since-2013/13630090/ (last visited Aug. 18, 2014) (noting that 68 positions were eliminated from DWR and that DWR staff cuts in regional offices were twice as high as cuts to any other division within DENR); Mark Binker, *DENR Turns Down Grant for Water Monitoring in Gas Drilling Areas* (Sept. 23, 2013), http://www.wral.com/denr-turns-down-grant-to-help-with-water-monitoring-in-fracking-areas/12917090/ (last visited Aug. 18, 2014) (reporting DENR's decision to refuse a "$222,595 grant for water quality monitoring in areas seen as candidates for hydraulic fracturing").

proposed is inadequate to protect aquatic life. Also, we oppose DENR's recommendation to remove the standards for iron and manganese. North Carolina should adopt standards for cadmium, iron, and manganese that are at least as protective as EPA's current recommendations and should refrain from relaxing the current arsenic standard.

To begin, we support the proposal to establish separate water quality standards for chronic and acute exposure to these substances, reflecting EPA's national recommendations. We also support the underlying recognition that metals differ in their acute and chronic effects on the environment and human health. With the exception of silver, EPA recommends an acute and chronic standard for each of these metals, and all states in Region 4 other than North Carolina and Florida have adopted acute and chronic standards.

Arsenic: North Carolina proposes changing the arsenic standard from 50 ug/l to 340 ug/l for acute exposure and 150 ug/l for chronic exposure. North Carolina should not relax the standard for arsenic. In recent years, scientists exploring the human intestinal microbiome have discovered that certain human gut bacteria may transform inorganic arsenic into different compounds that pose variable risks to human health.[25] Until we have a better understanding of the effects of arsenic as mediated by the human microbiome, the State should leave the arsenic standard at the current level in the interest of protecting human health from a known carcinogen.[26]

Beryllium: North Carolina's current beryllium standard is 6.5 ug/l. The State proposes keeping the chronic standard at 6.5 ug/l but adding an acute standard of 65 ug/l. EPA's Integrated Risk Information System (IRIS) states that beryllium can cause serious human health effects.[27] The effects of the ingestion of beryllium are unclear, but the inhalation of beryllium has been tied to lung and bone cancer.[28] Beryllium standards are also necessary to protect

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[25] K.S. Betts, *A Study in Balance: How Microbiomes Are Changing the Shape of Public Health*, 119 ENVTL. HEALTH PERSP. vol. 8, 340, 343 (2011) ("[T]hese results suggest interindividual differences among human microbiomes may make a significant difference in the toxicity of metals and their contributions to chronic diseases associated with these metals, such as cardiovascular disease and type 2 diabetes mellitus."); *see also* Van De Wiele, T. et al., *Arsenic Metabolism by Human Gut Microbiota Upon In Vitro Digestion of Contaminated Solids*, 118 ENVTL. HEALTH PERSP. vol 7, 1004 (2010).

[26] Betts, *supra* note 25, at 343.

[27] EPA, Integrated Risk Information System (IRIS), *Beryllium and compounds*, http://www.epa.gov/iris/subst/0012.htm (last visited Jan. 2, 2014).

[28] The National Toxicology Program lists beryllium and certain beryllium compounds (beryllium-aluminum alloy, beryllium chloride, beryllium fluoride, beryllium hydroxide, beryllium oxide, beryllium phosphate, beryllium sulfate, beryllium zinc silicate, and beryl ore) as human carcinogens. Moreover, the Agency for Toxic Substances and Disease Registry has catalogued the public health dangers of beryllium. *See* Agency for Toxic Substances & Disease Registry. *Public Health Statement, Beryllium*, Cas#: 7440-41-7 (Sept. 2002), *available at* http://www.atsdr.cdc.gov/ToxProfiles/tp4-c1-b.pdf.

aquatic life, as data indicates that chronic toxicity to freshwater aquatic life can occur at concentrations as low as 5.3 ug/l.[29]

DENR should adopt the proposed acute beryllium standard to provide better protection for the environment and human health. EPA has not set a national recommended water quality standard, but it has set a maximum contaminant level (or "MCL") and a maximum contaminant level goal (or "MCGL") under the federal Safe Drinking Water Act, 42 U.S.C. § 300f *et seq.* (2013), of 4 ug/l.[30] North Carolina's proposal to keep the current chronic standard and set an acute standard is a step in the right direction, but it should consider lowering its chronic standard (to 4 ug/l) as well.

Chromium: North Carolina currently has a total chromium standard of 50 ug/l.[31] The proposed revisions would improve this standard in several ways.

First, the State proposes to follow EPA's recommendation by splitting the total chromium standard into two new standards: one for chromium III (trivalent chromium) and one for chromium VI (hexavalent chromium). Chromium VI has been linked with more serious human health effects.[32] Unless the water quality criteria are broken down into these two categories, the total amount of chromium found in the water will not accurately reflect its potential harm to aquatic life and human health. We therefore support DENR's proposal to adopt separate standards for chromium III and VI.

Second, the proposal recommends a hardness-dependent standard for chromium III. The proposal recommends criteria derived from an equation recommended by EPA. For instance, the proposed standards at a water hardness of 25 mg/l $CaCO_3$ would be 24 ug/l (chronic) and 180 ug/l (acute) for chromium III. As explained in section II(A) above, this will more accurately describe the potential toxicity of chromium III based on the hardness of the water at the specific site, and should be adopted.

Finally, the proposal suggests more protective standards for both forms of chromium, in line with the standards recommended by EPA and adopted by the other Region 4 states. Like the chromium III standards, the proposed standard for chromium VI would be lowered; the chronic

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[29] The Gold Book, *supra* note 17, at 412.

[30] EPA, *Basic Information About Beryllium in Drinking Water*, http://water.epa.gov/drink/contaminants/basicinformation/beryllium.cfm (last updated Oct. 2013).

[31] 15A N.C. Admin. Code 2B .0211.

[32] Agency for Toxic Substances & Disease Registry, *Public Health Statement, Chromium*, Cas#: 7440-47-3 (Sept. 2012), *available at* http://www.atsdr.cdc.gov/ToxProfiles/tp7-c1-b.pdf.

standard would be 11 ug/l and the acute standard would be 16 ug/l for chromium VI. These standards closely track the EPA national recommendations, and we support their adoption.[33]

These three changes will make the North Carolina chromium standard better reflect the actual toxicity to aquatic life and therefore render it more protective. When updating the chromium VI standard in 1986, EPA noted that toxicity was found in some freshwater aquatic species at 23.07 ug/l chromium VI (acute) and as low as 2.5 ug/l chromium VI (chronic).[34] Chromium VI exposure reduced the growth of several freshwater fish, and chromium III may affect plant growth and reproduction in certain species. We recommend that DENR adopt the proposed standards for acute and chronic exposure to chromium III and VI, and the proposed hardness-dependent equation as the standard for chromium III at other hardness levels.

Copper: Currently, North Carolina has no water quality standard for copper in Class C waters, but does have an "action level" set at 7 ug/l (see section II(D) on page 16 of this letter for a discussion of action levels). North Carolina is currently the only Region 4 state without a copper standard. DENR should adopt the proposed amendment to add a copper standard of 3.6 ug/l (acute) and 2.7 ug/l (chronic) at 25 mg/l $CaCO_3$, with an equation to calculate the standard at other hardness levels. The proposed standard would bring North Carolina in line with EPA's recommendation and the other Region 4 states. According to IRIS, copper in water can cause gastrointestinal effects and damage to the kidneys and liver.[35] In its national recommended water quality criteria, EPA recommends 3.6 ug/l as an acute standard and 2.7 ug/l as a chronic standard (calculated at 25 mg/l $CaCO_3$ hardness).

Notably, the State also proposes to allow the use of the Biotic Ligand Model, instead of hardness equations, to calculate Class C water quality standards for copper. To the extent this second option is supported by scientific data, we support its use.

Prior to 2007, the EPA expressed recommended water quality standards for copper as a function of water hardness. However, in 2007, EPA recommended the use of the Biotic Ligand Model to calculate water quality standards protecting aquatic life from *acute* exposure to copper in freshwater.[36] Yet the EPA also cautioned that "further development [of the model] is required

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[33] For instance, at a hardness of 50 mg/l $CaCO_3$, the proposed change would strengthen the chromium III chronic limit to 42 ug/l.

[34] The Gold Book, *supra* note 17, at 90-91.

[35] EPA, Integrated Risk Information System (IRIS), *Copper*, http://www.epa.gov/iris/subst/0368.htm (last visited Jan. 2, 2014). Moreover, certain individuals, such as people with Wilson's Disease, may be particularly vulnerable to the ingestion of copper. At least one in 30,000 people, across all races and nationalities, has Wilson's Disease, so out of 9,000,000 North Carolinians, that would account for approximately 300 residents. Wilson Disease Association, *How is Wilson's Disease Inherited?*, http://www.wilsonsdisease.org/wilson-disease/wilsondisease-inheritance.php (last visited Jan. 2, 2014).

[36] EPA, Office of Water, Office of Science and Technology, Aquatic Life Ambient Freshwater Quality Criteria-Copper 10 (Feb. 2007), *available at*

before it will be suitable for use to evaluate . . . Criterion Continuous Concentration (CCC) or chronic value (freshwater or saltwater WQC)."[37]

Since making this observation, the EPA has not published any information constituting "further development" of the Biotic Ligand Model, so we question the scientific justification for the State's proposal to permit use of the model to calculate water quality standards related to *chronic* copper exposure. And even with respect to acute water quality standards, the Biotic Ligand Model's strength (i.e., that it "allows prediction of metal effect levels to a variety of organisms over a wide range of water quality conditions" including, but not limited to, water hardness) can be a fatal flaw, because use of the model requires data[38] that the State does not typically gather. Accordingly, we believe the proposed rule should be amended to clarify that use of the Biotic Ligand Model will only be appropriate where the necessary data are made available to DENR.

Lead: Lead is one of the most toxic and damaging heavy metals. Currently, North Carolina has a lead standard of 25 ug/l at a hardness of 50 mg/l $CaCO_3$. This limit is about 20 times higher than EPA's recommended chronic standard of 1.2 ug/l at that hardness level. North Carolina now proposes strengthening the standard and adopting EPA's recommendation. At a hardness of 25 mg/l $CaCO_3$, the proposed standard would be 0.5 ug/l (chronic) and 14 ug/l (acute). The proposal includes a hardness-dependent equation identical to EPA's recommendation.

Lead's effects on human health and aquatic life have been extensively studied. EPA has listed 777 scientific articles on lead toxicity that demonstrate that lead can cause serious harm to fish and other aquatic species.[39] In humans, lead causes significant developmental and neurological problems for children, lowering IQ, learning ability, and attention span. Adults exposed to lead may see an increase in high blood pressure and reproductive problems. Lead is likely a human carcinogen according to the IRIS database, which cites studies and recommendations of the National Toxicology Program. There is no safe level of lead, and those effects can occur at a very low level. Given the extreme dangers associated with lead, North Carolina urgently needs to adopt the proposed standards. Every other Region 4 state has adopted

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http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/copper/upload/2009_04_27_criteria_copper_2007_criteria-full.pdf

[37] *Id.* at 10-11.

[38] For the model to work as proposed by EPA, the necessary calculations depend on accurate data regarding water quality input parameters such as "temperature, pH, dissolved organic carbon, major geochemical cations (calcium, magnesium, sodium, and potassium), dissolved inorganic carbon (DIC, the sum of dissolved carbon dioxide, carbonic acid, bicarbonate, and carbonate), and other major geochemical anions (chloride, sulfate)." *Id.* at 12.

[39] EPA, *Aquatic Life Criteria – Lead*, http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/lead/index.cfm. (last updated Oct. 16, 2012).

a chronic standard of 0.54 ug/l at a hardness of 50 mg/l $CaCO_3$. North Carolina's current chronic standard of 25 ug/l is clearly inadequate.

Nickel: North Carolina's current water quality standard for nickel is 88 ug/l, calculated at a hardness of 50 mg/l $CaCO_3$. At that hardness, EPA recommends a standard of 28.9 ug/l (chronic) and 260 ug/l (acute). North Carolina now proposes to adopt EPA's recommendation, including a chronic level of 16 ug/l and an acute level of 140 ug/l, calculated at a hardness of 25 mg/l $CaCO_3$, and a hardness-dependent equation to set the standard at other hardness levels.

IRIS addresses the adverse health effects of nickel found in nickel carbonyl, nickel subsulfide, soluble salts, and refinery dust.[40] Several of these nickel-based substances are Class A human carcinogens. There is also evidence linking nickel to neonatal mortality and skin reactions. DENR should adopt the proposed standards for nickel, and come into conformity with EPA's national recommendations and the other Region 4 states.

Silver: North Carolina currently has no water quality standard for silver in Class C waters, except for an "action level" of 0.06 ug/l. North Carolina now proposes adding an acute standard of 0.3 ug/l at a hardness of 25 mg/l $CaCO_3$, with a hardness-dependent equation. This new acute standard would comply with EPA's recommendations and bring North Carolina into the range of standards adopted by other Region 4 states. We recommend that DENR adopt this proposed standard.

Curiously, however, the proposed chronic standard for silver is <u>not</u> hardness dependent. Instead, the State recommends adoption of a static standard of 0.06 ug/l to prevent harm caused by chronic exposure to silver.[41] The State makes no attempt whatsoever to explain why the toxicity of silver is hardness-dependent in the context of acute exposure but not hardness-dependent in the context of chronic exposure.

The likely root of this inconsistency is the fact that EPA has not proposed a hardness-dependent equation to inform a chronic standard for silver. But EPA has not updated its National Recommended Water Quality Criterion for silver since 1980. Insofar as the State and EPA recognize that the toxicity of silver is hardness-dependent, the chronic standards should, like the acute standard, be dependent on the hardness of the water body in question. While we concede that finally adopting *any* water quality standard (rather than just an action level) would be step toward adequate regulation of silver, we are concerned by the State's unwillingness to

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[40] EPA, Integrated Risk Information System (IRIS), *Nickel Carbonyl*, http://www.epa.gov/iris/subst/0274.htm (last visited Jan. 2, 2014); EPA, Integrated Risk Information System (IRIS), *Nickel refinery dust*, http://www.epa.gov/iris/subst/0272.htm (last visited Jan. 2, 2014); EPA, Integrated Risk Information System (IRIS), *Nickel subsulfide*, http://www.epa.gov/iris/subst/0273.htm (last visited Jan. 2, 2014); EPA, Integrated Risk Information System (IRIS), *Nickel, soluble salts*, http://www.epa.gov/iris/subst/0271.htm (last visited Jan. 2, 2014).

[41] 28 N.C. Reg. 3008 (June 16, 2014).

take further measures to better tailor the chronic standard to the actual toxicity of prolonged exposure to silver.

Zinc: North Carolina currently has no water quality standard for zinc in Class C waters, except for an "action level" of 50 ug/l. North Carolina proposes to add a zinc standard of 36 ug/l (acute and chronic) at a hardness of 25 mg/l $CaCO_3$, with a hardness-dependent equation that differs slightly for the acute and chronic standards. The proposed standard adopts EPA's national recommendations, which are based on data documenting the effects of zinc on 43 freshwater animals.[42] Some sensitive fish showed adverse reaction to toxicity at 36 ug/l at a hardness of 50 mg/l, and certain aquatic plants suffered at even lower concentrations.[43] DENR should follow the lead of EPA and all the other Region 4 states by adopting its proposed criteria or even more protective criteria.

Cadmium: While we generally support DENR's proposed revisions to North Carolina's metals criteria, DENR's proposed cadmium standard is not sufficiently protective of water quality. North Carolina's current cadmium standard is 2 ug/l for non-trout waters and 0.4 ug/l for trout waters at a hardness of 50 mg/l $CaCO_3$, recognizing that trout are particularly vulnerable to cadmium toxicity.

North Carolina's proposal maintains a distinction between trout and non-trout waters for the acute standard. DENR's proposed acute standard for cadmium is 0.82 ug/l for non-trout waters and 0.51 ug/l for trout waters at a hardness of 25 mg/l $CaCO_3$, with a hardness-dependent equation to calculate the standard at other hardness levels. The agency also suggests a chronic standard of 0.15 ug/l at 25 mg/l $CaCO_3$ hardness for all fresh waters, with a hardness-dependent equation.

These revisions were first proposed in 2006, but after two proposals DENR still has not taken action. Moreover, EPA's national recommendation is far lower: 0.52 ug/l for all fresh waters (acute) and 0.09 ug/l (chronic) at that same hardness level. DENR's proposed revision is an improvement over the current standard, but the State should take this opportunity to make its cadmium criteria at least as protective as EPA's national recommendations.

According to EPA's IRIS database, cadmium can have chronic effects on the kidney, liver, lung, bone, immune system, blood, and nervous system of animals.[44] Cadmium is also a probable human carcinogen. North Carolina should bring its standard fully into compliance with EPA's national recommendation to provide adequate protection for aquatic life and human health.

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[42] The Gold Book, *supra* note 17, at 474.

[43] *Id.* (noting that "the sensitivity range of freshwater plants to zinc is greater than that for animals")

[44] EPA, Integrated Risk Information System (IRIS), *Cadmium*, http://www.epa.gov/iris/subst/0141.htm (last visited Jan. 2, 2014).

Iron: North Carolina currently has no water quality standard for iron, although it does have an "action level" set at 1 mg/l. Now, DENR proposes to remove even this action level, leaving no restrictions on the amount of iron in state waters. EPA recommends a chronic iron criterion of 1000 ug/l (that is, 1 mg/l). North Carolina should adopt the recommended iron criterion in lieu of the current action level.

Manganese: North Carolina currently has water quality standards applicable to sources of drinking water (Class WS-I, Class WS-II, Class WS-III, Class WS-IV, and Class WS-V waters) that limit the amount of manganese to 200 ug/l. This is four times higher than EPA's recommendation of 50 ug/l and, if anything, the standard should be lowered to align with this guidance.

Instead, DENR proposes to remove even this lenient standard, leaving no restrictions on the amount of manganese in state waters. This proposal is particularly concerning in light of documented human health effects, including research linking manganese to decreased mental development in juveniles.[45] North Carolina should be strengthening its manganese regulations, not removing them entirely. We would support the adoption of the national recommended manganese criteria; we oppose the State's proposal to ignore entirely the risks posed by manganese.

C. DENR should not apply a biological qualifier as an alternative to the water quality standards.

North Carolina's proposed revisions to the water quality standards include a loophole for all of the metals criteria (except for mercury and selenium) that would apply if "biological monitoring has demonstrated attainment of biological integrity."[46] Essentially, this means that if a water body appears to be supporting a population of aquatic life based on biological monitoring, the concentration of metals in the water is permitted to exceed the standards. We strongly oppose this loophole, which potentially violates North Carolina's responsibilities under the CWA, undermines the effectiveness of the numeric criteria, and relies on a misunderstanding of the scientific basis for the standards.

The biological qualifier, called "biological trumping" by EPA in its August 2010 response to similar proposals made by the State in 2010, may violate federal law and runs contrary to EPA's interpretation of CWA requirements.[47] The regulation in 40 C.F.R. § 131.11 establishes guidelines for how states should determine their criteria for water pollutants. It

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[45] *See* Maryse Bouchard, et al, "Intellectual Impairment in School-Age Children Exposed to Manganese from Drinking Water", 19 *Environmental Health Perspectives* 138 – 143 (2011).

[46] 28 N.C. Reg. 3009 (June 16, 2014).

[47] 40 C.F.R. § 131.11.

specifically allows states to "[e]stablish narrative criteria or criteria based upon biomonitoring methods where numerical criteria cannot be established or to supplement numerical criteria."[48]

Here, it is not the case that "numerical criteria cannot be established." In North Carolina, it is possible to set numerical criteria for each of the metals in question, so those numerical criteria must apply regardless of the results of biological monitoring. Stated differently, the biological qualifier may only be used to *supplement* North Carolina's numeric criteria for heavy metals, but cannot be used to *replace* them or trump them altogether.

This is consistent with the purpose of the CWA, which is to maintain and improve water quality. DENR's proposed use of a biological qualifier would allow for water quality in a stream to be degraded until the day that monitoring results for the stream demonstrate that it has already been biologically impaired. The CWA does not allow states to wait until the damage is complete and obvious before requiring remediation. Instead, the law requires compliance with scientifically justified water quality criteria to prevent the impairment in the first place.

Moreover, allowing a biological qualifier to trump numerical criteria is not a cost-effective approach to implementing environmental regulations. Preventing future water quality damage is generally much cheaper and more effective than reacting and remediating after damage has been done. Allowing biological damage to occur until it is noticed through biological monitoring is an inefficient way to protect state waters. Preventative measures (that is, numeric chemical criteria) will maintain safe water quality and avoid the risk of irreversible damage to an aquatic ecosystem or the health of the people who rely on it.

In addition, North Carolina's proposed biological loophole is based on a misunderstanding of the scientific rationale for water quality standards. Even if the waterways were monitored daily, damage could occur without obvious signs of biological impairment. Toxic metals can cause subtle effects on aquatic organisms, such as reductions in growth and reproductive success. This is particularly true for chronic effects. While extreme acute exposure could start killing organisms immediately, the chronic standards operate to prevent more subtle, long-term harms that necessarily take more time to reveal themselves.

In some instances, these effects may not be easily traced to one particular substance. Once the cause is determined, lowering the levels of that substance in the water will take time and could be very costly, and a substantial, possibly irreversible, amount of the damage may have already been done. To actually protect aquatic species, all metals should be kept at safe levels set by numeric chemical criteria, regardless of whether biological monitoring has detected an impairment to biological integrity. North Carolina should not adopt this proposed loophole to allow non-compliance with water quality criteria.

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[48] 40 C.F.R. § 131.11(b)(2) (2013).

D. DENR should use the "reasonable potential" analysis, rather than "action levels," for NPDES permitting for copper, silver, chloride, and zinc.

DENR also proposes to continue the use of "action levels" rather than numeric criteria for copper, silver, and zinc when issuing NPDES permits.[49] Instead of setting separate action levels, DENR should use the adopted criteria for all CWA purposes, including permitting and assessments. Under the proposal, if these action levels are exceeded in the water receiving a discharge, the discharger "shall monitor the chemical or biological effects of the discharge" and try to reduce the substances from their effluents.[50] According to the proposed revision, the NPDES permit should require action if any of the discharged substances "may be a causative factor resulting in toxicity of the effluent."[51]

The action levels are unnecessary, inadequate, and inconsistent with the CWA regulations and EPA's recommendations.[52] The quality of the receiving waters will be best managed by applying the numeric water quality criteria and using the "reasonable potential" analysis described in federal regulations to determine the discharger's responsibility.

According to federal law, NPDES permit limitations "must control all pollutants . . . which the Director determines are or may be discharged at a level which will cause, *have the reasonable potential to cause*, or contribute to an excursion above any State water quality standard."[53] This regulation explicitly references the "State water quality standard," not a separately determined "action level." The regulation also requires that any substance which may be discharged at a level that has the *reasonable potential* to cause an exceedance of the water quality standard must be limited by the NPDES permit. We agree with EPA's recommendation that North Carolina use this "reasonable potential" analysis, instead of requiring a demonstration that the discharge is a causative factor in the ensuing exceedance of the standard.[54]

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[49] 28 N.C. Reg. 3012 (June 16, 2014).

[50] *Id.*

[51] *Id.*

[52] *See* Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ, at 9 (Aug. 20, 2010) ("The State should not adopt and/or retain these provisions given their inconsistency with 40 CFR 122.44(d)(1)(i), the CWA and EPA national recommendations.").

[53] 40 C.F.R. § 122.44(d)(1)(i) (2013) (emphasis added).

[54] *Id.* at 10.

E. North Carolina should adopt the national recommendations for dissolved metal standards while continuing to regulate the total recoverable amount of metals

Generally speaking, we support the State's decision to adopt dissolved fraction criteria for metals, as doing so is consistent with EPA recommendations.[55] However, in light of the recent coal ash spill into the Dan River, coupled with the State's failure to adopt plans to remove this toxic substance from unlined pits adjacent to waterbodies, we fear that exclusively measuring the dissolved fraction of metals will provide inadequate protection of waters downstream from coal ash ponds. Even absent catastrophic spills like one that dumped tens of millions of coal ash and polluted wastewater into the Dan River, coal ash ponds have leaked arsenic, selenium, thallium, and mercury into our state's waters. Many of the metals released as a result remain in solid form and would not be detected, much less regulated, if the State focuses exclusively on the dissolved fraction of metals in the water column.[56] Moreover, these solids often settle into, and increase the toxicity of, sediment. As such, we believe that, until coal ash is moved into lined storage facilities away from waterways, it remains necessary for the State to consider the total recoverable metal when measuring and protecting water quality downstream of coal ash ponds.

F. DENR should adopt a methylmercury standard.

In addition to the foregoing concerns about what DENR is proposing, we are concerned by necessary amendments that the agency has not proposed. For instance, the proposed amendments do not include a water quality standard for methylmercury, the mercury compound that is most bio-available and most toxic to aquatic life, and that poses the greatest threat to human health. The state should not forego the opportunity, during this triennial review, to update its water quality standards to regulate this toxic compound.

Mercury is highly toxic in both its elemental (metallic) form and as the organic compound methylmercury. Mercury deposited into water bodies can be transformed into methylmercury via microbial activity. In aquatic animals, methylmercury has the highest chronic toxicity of any tested mercury compound.[57] Methylmercury bioaccumulates and biomagnifies in aquatic food chains, so predatory fish will have much higher concentrations of

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[55] *Id.* at 2.

[56] Carol Babyak et al, Preliminary Summary Report from Water, Sediment and Fish samples collected at the TVA Ash Spill by Appalachian State University, Appalachian Voices, Tennessee Aquarium and Wake Forest University 3 (2009) (noting that the results from water samples for dissolved metals taken downstream of the TVA ash spill revealed no exceedances of water quality standards but that tests for total recoverable metals revealed exceedances of water quality standards for arsenic, barium, cadmium, lead, and selenium), *available at* http://www.appvoices.org/ftp/AppVoices_TVA_Ash_Spill_Report_May15.pdf.

[57] The Gold Book, *supra* note 17, at 172.

methylmercury in their tissue than organisms that are lower in the food chain and the concentration will increase with age.[58] Accordingly, larger fish, which are more likely to be caught and eaten by people, will generally contain higher concentrations of methylmercury.[59] EPA has found that nearly 100% of the mercury that bio-accumulates in predatory fish is methylmercury.[60]

People who eat fish or shellfish containing methylmercury will then be exposed to toxic methylmercury concentrations. Ingested methylmercury is almost completely absorbed into the bloodstream, which allows it to be distributed throughout the body.[61] Neurotoxicity is the greatest health concern from mercury poisoning. It can cause a variety of serious health effects in humans, including permanent damage to the brain, kidneys, and developing fetuses, harm to the nervous system, and learning disabilities.[62] It is particularly harmful to pregnant women, infants, and young children. "Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage."[63] Infants and children exposed to methylmercury can suffer lifelong impairments, including problems with neurological development. Adults may suffer from sensory and motor impairments and mood alteration.

While well-intentioned, fish consumption advisories often do not reach (and likely cannot reach, with available agency resources) the populations most at risk from bioaccumulated mercury.[64] That means fish advisories, while laudable and required by law, are no substitute for a numeric water quality standard.

EPA issued its "Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion, EPA 823-R-10-001," in April of 2010. In other words, it has been years since EPA provided all of the information necessary for North Carolina to establish a methylmercury

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[58] EPA, *Water Quality Criterion for the Protection of Human Health: Methylmercury*, EPA-823-R-01-001 (Jan. 2001), *available at* http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/methylmercury/document.cfm.

[59] Dana Sackett et al, The Influence of Fish Length on Tissue Mercury Dynamics: Implications for Natural Resource Management and Human Health Risk, 10 INT'L. J. ENVTL. RESEARCH & PUB. HEALTH 638-59 (Feb. 2013), available at http://www.mdpi.com/1660-4601/10/2/638.

[60] *Id.*

[61] *Id.*

[62] Agency for Toxic Substances & Disease Registry ("ATSDR"), *Mercury*, Cas# 7439-97-6 (Apr. 1999), *available at* http://www.atsdr.cdc.gov/tfacts46.pdf.

[63] *Id.*

[64] Catherine E. LePrevost, Need for Improved Risk Communication of Fish Consumption Advisories to Protect Maternal and Child Health: Influence of Primary Informants, 10 INT'L J. ENVTL. RESEARCH. & PUB. HEALTH 1720-34 (Apr. 2013), available at www.mdpi.com/1660-4601/10/5/1720/pdf.

water quality criterion. Therefore, although North Carolina should retain the current standard for inorganic mercury, the State should also adopt a methylmercury standard that meets or exceeds EPA's recommendation of 0.3 mg/kg of fish tissue. Research into the human microbiome suggests that gut bacteria may routinely convert methylmercury back into highly toxic inorganic mercury, increasing risks to human health in ways not accounted for by current risk assessment protocols. To compensate, North Carolina should build in an extra margin of safety in setting a methylmercury standard.[65]

III. Nutrients

North Carolina also missed yet another opportunity to respond to the growing problem of nutrient pollution. Over the last year, we have sent multiple letters and comments urging the State to adopt numeric criteria promptly for nitrogen and phosphorus to address excessive nutrients in North Carolina's streams, rivers, lakes, and estuaries. We adopt those prior comments here, and summarize their main arguments below. In addition, we offer comments on other aspects of standards related to nutrients, including the benefits of establishing numeric standards for nutrients in benthic sediments, and in tightening the way the dissolved oxygen standard is measured (since hypoxic and anoxic conditions are a frequent impact of nutrient over-enrichment).

A. North Carolina must adopt numeric nitrogen and phosphorus criteria.

We provide the following summary of points made in our previous comments, which we still support:

- DENR should adopt proactive numeric standards for phosphorus and nitrogen to prevent impairment instead of relying on reactive chlorophyll a standards to identify impairment.
- Excess nutrients (nitrogen and phosphorous) cause algal blooms that foul clear water, reduce the amount of dissolved oxygen available for aquatic life, cause eutrophication and fish kills, and potentially endanger human health.
- Nitrogen and phosphorus pollution hurts businesses, costs jobs, reduces property values, ruins recreational opportunities, and otherwise degrades the quality of life for all North Carolinians.
- Nutrient pollution costs North Carolina an extraordinary amount of money for treating water before it can be used.

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[65] Betts, *supra* note 25, at 343; *see also* Liebert, C.A., et al., *Phylogeny of Mercury Resistance (mer) operons of Gram-Negative Bacteria Isolated from the Fecal Flora of Primates*, 63 APPLIED & ENVTL. MICROBIOLOGY 1006-1076 (Mar. 1977) (discussing ability of intestinal bacteria to demethylate methyl mercury), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC168397/pdf/631066.pdf.

- Reducing nitrogen and phosphorous pollution is more cost-effective than treating its effects. Thus, we support regulation of those causal variables, instead of only chlorophyll a, the response variable that the State currently regulates.

- North Carolina should adopt default nitrogen (0.35 mg/l) and phosphorous (0.05 mg/l) criteria now, to apply to all water bodies statewide while site-specific criteria are developed.

B. North Carolina should adopt numeric criteria for concentrations of nitrogen and phosphorus in benthic sediments.

In addition to adopting criteria for total nitrogen and phosphorus in the water column, North Carolina should propose and adopt criteria for nutrients in benthic sediments. Since this has not been a part of the years-long discussion of nutrients in North Carolina, it is worth explaining why this matters, and why a standard is needed beyond the water column.

Most of the state's waters have accumulations of sediment on the bottom. These sediments are washed down from uplands, or abraded from banks and bottoms upstream during heavy rains or floods. In relatively pristine streams and rivers, these benthic sediments play important ecological roles. More commonly – since relatively few waters of the state are still pristine – the benthic sediments reflect the impacts of erosion and excessive runoff. The sediments also collect contaminants, including nitrogen and phosphorus. Depending on how firmly pollutants are attached to the sediments – either adsorbed on particles or in solution in the pore spaces between particles – they can flux in and out of the water column more or less readily.

Studies have suggested that nutrients do not easily accumulate in fast-flowing streams. The same cannot be said for lentic waters – lakes and estuaries, where the flow slows and large quantities of sediment end up. Scientists studying the Neuse and Pamlico estuaries, and such inland water bodies as Jordan and Falls Lakes, have found substantial fluxes of nutrients from benthic sediments into the water column.[66] When the State addresses impairment, these nutrients are called "legacy nutrients," and they can have a significant impact on the dynamics of

[66] *See, e.g.*, D.R. Corbett, *Resuspension and Estuarine Nutrient Cycling: Insights from the Neuse River Estuary*, 7 BIOGEOSCIENCES, 3289–3300 (2010), *available at* http://www.biogeosciences.net/7/3289/2010/bg-7-3289-2010.pdf.

recovery.[67] The State has assumed that, once the ongoing excess contribution of nutrients is removed, the lake or estuary will eventually rebound, though it may take several decades.[68]

In the great majority of watersheds in North Carolina – all those not under an active nutrient management plan –those "legacy" sediments are not simply a historical artifact.[69] They are still accumulating, and State standard-setting cannot prevent future degradation without taking them into account, in two ways:

- Year over year, nutrient concentrations in benthic sediments should not show a net increase. From day to day, nutrients may flux in and out of the water column, driven by flows, temperature, and seasonal patterns. But if average annual nitrogen or phosphorus concentrations are increasing over time, even if the water is not showing violations of response variables, the water body is on borrowed time, threatened with inevitable impairment unless management measures are adopted.

- The nutrient concentration in the benthic sediments should remain below an absolute level. That is because, in an environment that has become hypersaturated with nutrients (such as the upper end of Falls Lake), the sediment may not show changes in concentrations. Thus, the criteria should include a ceiling for nutrient concentrations in benthic sediments.

C. North Carolina should apply its dissolved oxygen standard throughout the water column.

Dissolved oxygen is essential to the survival of fish and shellfish in North Carolina's waters. Among other impacts, excessive nutrients lower dissolved oxygen levels. North Carolina has a dissolved oxygen (DO) standard for trout water (6 mg/l), other fresh water (daily average 5 mg/l with no value less than 4 mg/l), and salt water (5 mg/l).[70] All these standards

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[67] *See, e.g.*, L.M. Malecki et al, *Nitrogen and Phosphorus Flux Rates from Sediment in the Lower St. Johns River Estuary*, 33 J. ENVTL. QUAL. 1545-55 (Jul-Aug 2004) (noting that "the internal flux from sediments may be a significant portion of the total load" to an impaired water body).

[68] *But see* Stephen Carpenter, *Eutrophication of Aquatic Ecosystems: Bistability and Soil Phosphorus*, 102 PROC. NAT'L ACAD. SCI., 10002-05 (July 19, 2005) (suggesting with modelling that some lakes may take hundreds of years to recover naturally from phosphorus-driven eutrophication, or require special soil management measures. This poses a challenge for fixing impaired waters; it also highlights the importance of preventing waters from sliding into phosphorus-driven impairment).

[69] The key question is whether the nutrient-loading reduction measures are in effect. So, for example, even in the Jordan Lake watershed, where new development rules have been adopted but delayed for three years, the existing nutrient loading is not in fact a "legacy," but a burden that continues to grow over time.

[70] 15A N.C. Admin. Code 02B .0211(3)(b) (2013) (Class C freshwater); *Id.* 02B .0220(3)(b) (Class C saltwater).

exempt lower values in estuarine and lacustrine "bottom waters" "if caused by natural conditions." However, neither the water quality standards nor the State's assessment methodology indicates the depth at which samples should be taken.[71] We understand that they are often taken at the surface, masking the presence of hypoxia or anoxia through much of the water column.

For comparison, a number of other states' standards explain precisely how dissolved oxygen samples are to be taken. Virginia and Pennsylvania apply dissolved oxygen standards to the epilimnion of a water body, or to the bottom of the water column when waters are not stratified.[72] Maryland takes a similar approach in its DO standards to protect fish and shellfish in the Chesapeake Bay and its tidal tributaries.[73] Tennessee and Alabama take a weaker but still explicit approach of requiring sampling at five feet for waters greater than 10 feet deep, and at the midpoint for shallower waters.[74]

We recommend that North Carolina, given our strong tradition of recreational and commercial fishing industries, follow the lead of the mid-Atlantic states. We urge the State to revise our dissolved oxygen standard to apply from the surface down to the thermocline or pycnocline, and down to the bottom if there is no barrier to oxygen replenishment.

IV. Ammonia

DENR should adopt ammonia standards to protect aquatic life. Currently, North Carolina does not have a water quality standard for ammonia. However, studies have noted the harmful effects of ammonia on aquatic life.[75] As early as 1989, EPA recommended water quality criteria for ammonia in salt water.[76]

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[71] N.C. Envtl. Mgmt. Comm'n, *2014 303(d) Listing Methodology* (Mar. 14, 2013), *available at* http://portal.ncdenr.org/c/document_library/get_file?uuid=8a8849a1-ff8a-4038-8e26-6493b00246c6&groupId=61581.

[72] 9 Va. Admin. Code § 25-260-50 n.**** (2011) (stating Virginia's water quality standards); 25 Pa. Code § 93.7 (2013) (stating Pennsylvania's water quality standards).

[73] Md. Code Regs. 26.08.02.02-1 (2013) (stating Maryland's water quality standards adopted in support of estuarine and marine aquatic life).

[74] Tenn. Comp. R. & Regs. 1200-4-3-.03(3)(a) (2008) (stating Tennessee's dissolved oxygen standard for fish and aquatic life); Ala Admin. Code r.335-6-10.09(5)(e)(4)(iv) (2011) (stating Alabama's criteria for fish and wildlife (November 2011). Georgia takes a similar approach, but at one meter rather than five feet. Ga. Comp. R. & Regs. 391-3-6.03(5)(g)(2012) (stating Georgia's water quality standards).

[75] *See, e.g.*, A.K. Mummert, R.J. Neves, T.J. Newcomb, and D.S. Cherry, *Sensitivity of Juvenile Freshwater Mussels (Lampsilis fasciola, Villosa iris) to Total and Un-ionized Ammonia*, 22 ENVTL. TOXICOLOGY & CHEMISTRY 2545-2553 (2003); T.J. Newton, J.W. Allran, J.A. O'Donnell, M.R. Bartsch, and W.B. Richardson, *Effects of Ammonia on Juvenile Unionid Mussels (Lampsilis cardium) in Laboratory Sediment Toxicity Test*, 22 ENVTL. TOXICOLOGY & CHEMISTRY 2554-2560 (2003); Tom

In 2010, DENR declined to adopt new ammonia standards on the grounds that it preferred to await EPA's issuance of a nationally recommended criterion for ammonia for fresh water. In 2013, EPA published recommended water quality criteria for ammonia in fresh water.[77] The U.S. Fish and Wildlife Service subsequently wrote to urge North Carolina to adopt the EPA's recommended criteria.[78] The criteria are based on measurements of total ammonia nitrogen (TAN) in the tested water. Notably, the criterion magnitude is affected by temperature and pH of the water in question. For instance, "at an example of pH 7 and temperature of 20°C, the 2013 acute criterion magnitude is 17 mg TAN/l and the chronic criterion magnitude is 1.9 mg TAN/l."[79] Notwithstanding EPA's recommendation and the scientific support for it, still North Carolina did not propose a new ammonia standard. Now that there is no excuse for delay, and in order to protect aquatic life in our state, DENR should adopt scientifically supported acute and chronic standards for ammonia that take into account pH and temperature as appropriate.

V. Cyanide

In order to protect aquatic life, North Carolina's current rules establish the maximum permissible level of cyanide as 5.0 ug/l, "unless site-specific criteria are developed based upon the aquatic life at the site utilizing The Recalculation Procedure in Appendix B of Appendix L in the Environmental Protection Agency's Water Quality Standards Handbook hereby incorporated by reference including any subsequent amendments."[80] Now DENR proposes removing the quoted language from the cyanide regulations.

However, EPA specifically recommended retaining the caveat "for ease of developing site-specific criteria for cyanide in the future."[81] We recommend that DENR retain language permitting the adoption of site-specific criteria for cyanide.

Augsberger, et. al., *Water Quality Guidance for Protection of Freshwater Mussels (Unionidae) from Ammonia Exposure*, 22 ENVTL. TOXICOLOGY & CHEMISTRY, 2569–2575 (2003).

[76] EPA, *Ambient Water Quality Criteria for Ammonia (Salt Water)-1989* (Apr. 1989), *available at* http://water.epa.gov/scitech/swguidance/standards/upload/2001_10_12_criteria_ambientwqc_ammoniasalt1989.pdf.

[77] EPA, *Aquatic Life Ambient Water Quality Criteria for Ammonia- Freshwater* (Apr. 2013), *available at* http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/ammonia/upload/AQUATIC-LIFE-AMBIENT-WATER-QUALITY-CRITERIA-FOR-AMMONIA-FRESHWATER-2013.pdf.

[78] *See* Letter from Pete Benjamin, U.S. Fish and Wildlife Service, Raleigh Field Office, to Connie Brower, NCDENR-DWR, at 1-3 (Jan. 3, 2014).

[79] *Id.* at xi.

[80] 15A N.C. Admin. Code 02B .0211(3)(l)(vi) (2013).

[81] Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ (Aug. 20, 2010).

VI. 2,4-D (chlorophenoxy herbicide)

The chemical compound 2,4-D is an herbicide that, when consumed by humans, may cause serious health problems affecting the liver, kidney, and adrenal glands. In 2010, DENR proposed to revise the fresh surface-water-quality standards for sources of drinking water (Class WS-I, Class WS-II, Class WS-III, Class WS-IV, and Class WS-V waters) by lowering the permissible amount of 2,4-D (chlorophenoxy herbicide) in these waters from 100 ug/l to 70 ug/l. EPA expressed support for these revisions.[82] However, the rule was never amended.

We support the State's renewed proposal to change the 2,4-D standard. Notably, although EPA's national recommended water quality standard is 100 ug/l, the maximum contaminant level or MCL under the Safe Drinking Water Act for 2,4-D is 70 ug/l.[83] Lower, more stringent criteria may be justified.[84] DENR should lower the amount of 2,4-D permitted in sources of drinking water to comply with federal law and protect the health of North Carolinians. We urge DENR to lower the permissible amount of 2,4-D in waters used as sources of supply for drinking, culinary, and food-processing purposes (that is, water classified as WS-I through WS-V).

VII. Other Pollutants

In addition to the specific pollutants for which new and updated criteria are discussed above, EPA has also published national recommended criteria for numerous other pollutants for which North Carolina has no water quality standard whatsoever. North Carolina should adopt the national recommended water quality criteria for each of those pollutants unless it can document a sound rationale for declining to do so, based on the best available science and data for each pollutant criteria that it declines to adopt. EPA publishes these recommended criteria pursuant to section 304(a) of the CWA. They "reflect[] the latest scientific knowledge" on the effects of pollutants on human health, welfare, public water supplies, aquatic wildlife, biodiversity, recreation, and other uses of receiving waters. 33 U.S.C. § 1314(a). They are designed to "provide guidance for states and tribes to use in adopting water quality standards."[85]

The pollutants for which North Carolina has no criteria and should adopt the national recommended water quality criteria include the following:

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[82] *Id.*

[83] 40 C.F.R. § 141.61(c) (2012).

[84] J.F. Fairchild et al., An Ecological Risk Assessment of the Exposure and Effects of 2,4-D Acid to Rainbow Trout (Oncorhynchus mykiss), 56 ARCHIVES OF ENVTL. CONTAMINATION AND TOXICOLOGY 754-60 (May 2009); Xing, L, et al., pH-Dependent Aquatic Criteria for 2,4-Dichlorophenol, 2,4,6-Trichlorophenol, and Pentacholorophenol, 441 SCIENCE OF THE TOTAL ENV'T, 125-31 (Dec. 2012).

[85] EPA, *Water: Current Water Quality Criteria: National Recommended Water Quality Criteria*, http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm (last updated Aug. 22, 2013).

Acenaphthene
Acrolein
Acrylonitrile
Alpha-BHC
Aluminum pH 6.5-9.0
Anthracene
Antimony
Asbestos
Benzidine
Benzo(a) Anthracene
Benzo(a) Pyrene
Benzo(b) Fluoranthene
Benzo(k) Fluoranthene
beta-BHC
Bis(2-Chloroethyl) Ether
Bis(2-Cloroisopropyl) Ether
Bis(2-Ethylhexyl) Phthalate
Boron
Bromoform
Butylbenzyl Phthalate
Carbaryl
Chloropyrifos
Chlorodibromomethane
Chloroform
Chrysene
Diazinon
Dibenzo(a,H)Anthacene
Dichlorobromomethane
Diethyl Phthalate
Dimethyl Phthalate
Di-n-Butyl Phthalate
Dinitrophenols
Endosulfan Sulfate
Endrin Aldehyde
Ether, Bis(Chloromethyl)
Ethylbenzene
Fluoranthene
Fluorene
Heptachlor Epoxide
Hexachlorobenzene
Hexachlorocyclo-hexane-Technical
Hexachlorocyclopentadiene
Hexachloroethane
Ideno(1,2,3-cd) Pyrene
Isophorone
Malathion
Methyl Bromide
Methylene Chloride
Nitrobenzene
Nitrosamines
Nitrosodibutylamine, N
Nitrosodiethylamine, N
Nitrosopyrrolidine, N
N-Nitrosodimethylamine
N-Nitrosodi-n-Propylamine
N-Nitrosodiphenylamine
Nonylphenol
Pentachlorobenzene
Pentachlorophenol
Pyrene
Sulfide-Hydrogen Sulfide
Tetrachlorobenzene, 1,2,3,4,5
Thallium
Trichlorphenol, 2, 4, 5
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1-Dichloroethylene
1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2-Diphenylhydrazine
1,2-Trans-Dichloroethylene
1,3-Dichlorobenzene
1,3-Dichloropropene
1,4-Dichlorobenzene
2,3,7,8-TCDD
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methyl-4,6-Dinitrophenol
3,3-Dichlorobenzidine
4,4-DDD
4,4-DDE

VIII. Flow

The toxicity of pollutants in a water body is inextricably tied to the amount of water in that water body.[86] Flow alterations, including unnatural flow patterns and persistently low flows, contribute directly to the impairment of many streams.[87] Instream flow also affects the recreation quality of water bodies, so flow regulation is critical for waters designated for recreational use.[88]

Accordingly, we make two recommendations related to the preservation of water quality through the appropriate consideration of instream flow in North Carolina's water quality standards. First, we support the proposal to use the 1Q10 flow measurements instead of the more lenient 7Q10 flow measurements when designing water quality standards to protect aquatic life from acute toxicity. Second, we recommend that North Carolina follow national trends to provide explicit protections for adequate instream flows in its waters.

In 2010, DENR considered revising 15A N.C. Admin. Code 02B .0206 (Flow Design Criteria for Effluent Limitations) to state that "[t]oxic substances standards to protect aquatic life from acute toxicity will be protected using the 1Q10 flow." EPA expressed support for this revision.[89] However, the rule was not amended. Instead, the rule still only imposes standards to protect aquatic life from "chronic toxicity" using a 7Q10 flow.[90] We support the State's renewed attempt to adopt the proposed revision.[91]

The distinction between acute toxicity and chronic toxicity underscores the need for this revision. Acute toxicity is the ability of a substance to cause adverse effects on aquatic life within a short time of dosing or exposure. In contrast, chronic toxicity is the ability of a substance to cause adverse effects over a long period of time. Where aquatic life may be harmed by brief exposure to a toxic substance, it is necessary to establish standards more stringent than

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[86] Christer Nilsson & Birgitta Malm Renöfält, *Linking Flow Regime and Water Quality in Rivers: a Challenge to Adaptive Catchment Management*, 13 Ecology & Society 18 (2008) (noting that "quantity and quality of water are closely linked" and concluding that many water quality problems are associated with low-flow conditions), *available at* http://www.ecologyandsociety.org/vol13/iss2/art18/.

[87] *See* N. LeRoy Poff et al., *The Natural Flow Regime* 47 BioScience 769 (Dec. 1997) ("Streamflow quantity and timing are critical components of water supply, water quality, and the ecological integrity of river systems.").

[88] *See* Doug Whittaker et al, *Flows and Recreation* 1 (Oct. 2005) ("[F]lows determine whether a river is boatable, fishable, or swimmable, and they affect attributes such as the challenge of whitewater or the aesthetics of the 'riverscape.'"), *available at* http://www.nps.gov/ncrc/programs/hydro/flowrec.pdf.

[89] Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ (Aug. 20, 2010).

[90] 15A N.C. Admin. Code 02B.0206(a)(2) (2013).

[91] *See* 28 N.C. Reg. 3006 (June 16, 2014) (proposing the same revision to 15A N.C. Admin. Code 02B .0206 that the State recommended in 2010).

those designed solely to prevent harm from chronic exposure. Moreover, because toxicity typically increases with concentration and acute toxicity can occur in a shorter time frame, it is preferable for standards designed to prevent acute toxicity to be based on the 1Q10 flow rather than 7Q10 flow.[92] Similarly, evaluation of compliance with acute metal standards should be based on samples collected within a shorter time frame (e.g., one hour) whereas such time-compressed sampling is inappropriate to test for compliance with the chronic standard.[93]

In addition, because water quantity has a direct impact on water quality, DENR should add explicit protections for instream flow instead of relying on "regulation by implication." Revisions to North Carolina's water quality standards are necessary to ensure adequate quantity, timing, and quality of water flows to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on North Carolina's waters. The current water quality regulations implicitly protect instream flows insofar as they aim to preserve designated uses of water bodies that are unsupportable if flows are too low, such as primary and secondary recreation, fishing, aquatic life, drinking water supply. However, to ensure adequate flow to support those and other designated uses, DENR should *explicitly* protect instream flow, as have at least 13 other states.[94]

EPA has explained the importance of protecting instream flow through water quality standards, in letters to various state environmental protection agencies, including Alabama, Georgia, and North Carolina.[95] We agree, and ask that DENR develop water quality criteria to protect instream flows. Ideally, instream flow protection would be accomplished by adopting numeric criteria, such as a percentage of "natural flow"[96] or a percentage of annual low-flow

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[92] The 1Q10 is the lowest one-day average flow that occurs (on average) once every 10 years. The 7Q10 is the lowest seven-day average flow that occurs (on average) once every 10 years. Thus, 1Q10 flow is a better predictor of low-flow conditions over brief intervals, when acute toxicity is more likely.

[93] However, EPA has cautioned that mandated specific multi-day windows for sampling have presented sampling problems in other states that result in difficulty in testing for compliance with chronic standards.

[94] Vermont and Maine have adopted numeric criteria to protect instream flow. *See* 12-004 Vt. Code R. § 052-3-01(c) (2013); 06-096-587 Me. Code R. § 4 (2013). Eleven other states have adopted narrative criteria, including our neighboring states of South Carolina, Tennessee, and Virginia, as well as Kentucky, Arkansas, Louisiana, Massachusetts, Missouri, New Hampshire, New York, and Rhode Island.

[95] *E.g.*, Letter from Jim Giattina, EPA Region 4, to Lance LeFleur, Alabama Department of Environmental Management (Nov. 19, 2012); Letter from Jim Giattina, EPA Region 4, to Linda MacGregor, Georgia Department of Natural Resources (Mar. 15, 2012); Letter from Joanne Benante, EPA Region 4 to James McIndoe, Alabama Department of Environmental Management (Aug. 26, 2010); Letter from Annie M. Godfrey, EPA Region 4, to Alan Clark, NCDENR-DWQ (Aug. 20, 2010). Copies of these letters are enclosed.

[96] *See, e.g.*, 06-096-587 Me. Code R. § 4 (2013) (stating that, in Class AA waters (outstanding resource waters), flows "shall be maintained as they naturally occur," unless the natural flow is higher than the median seasonal flow, in which case "90% of the natural flow shall be maintained.")

statistics.[97] Alternatively, DENR could consider the adoption of narrative criteria, although we strongly prefer and recommend numeric criteria.[98] Either way, DENR should develop criteria that provide for natural flow variability and ensure adequate flow to sustain stream ecology, maintain and restore natural riverine processes, and support the beneficial uses of each river.[99]

DENR should not adopt 7Q10 or other similarly low flows as a default; such low flows mimic drought conditions and are not adequate to protect aquatic life or other uses. Such low flows "are relevant only for designating the lowest discharge into which a pollutant discharge can be allowed [and] should not be approved as the instream flow for any other stream management purpose."[100] Moreover, as "a minimum flow standard to sustain aquatic life, 7Q10 lacks any scientific or common sense foundations and can be expected to result in severe degradation of riverine biota and processes" by effectively imposing a "permanent drought."[101] EPA agrees that 7Q10 is not an appropriate paradigm, stating, "While a low flow value such as the 7Q10 has been used as a critical flow value for developing waste load allocations for industrial and municipal discharges, it was never intended as a value to protect ecological integrity."[102]

Rather, any water quality criteria that DENR develops to protect instream flow should provide for flows that more closely resemble natural conditions and should provide adequate flow to protect the designated uses of water bodies.

IX. Hydraulic Fracturing Fluids and Wastewater

The North Carolina Mining and Energy Commission ("NCMEC") has proposed regulations related to potential oil and gas development activities in North Carolina and the

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[97] *See, e.g.*, 12-004 Vt. Code R. § 052-3-01(c) (2013) (stating that, in Class A(1) waters (essentially, waters in their natural condition; not available for water supply or irrigation), the natural flow regime may not be diminished, in aggregate, by more than 5% of 7Q10 at any time).

[98] *See, e.g.*, S.C. Code Ann. Regs. 61-68(D)(1)(b) (2013) ("The stream flows necessary to protect classified and existing uses and the water quality supporting these uses shall be maintained consistent with riparian rights to reasonable use of water.").

[99] *See* Timothy M. Mulvaney, *Instream Flows and the Public Trust*, 22 Tul. Envtl. L.J. 315, 317 (2009) ("Failure to preserve sufficient instream flows can result in a variety of harmful effects, including reduced marine habitats, lower seafood production, higher concentrations of pollutants in waters utilized for human consumption, and diminished capacity of waterways to support recreational activities such as fishing, boating, and swimming.").

[100] Tom Annear et al., Instream Flows for Riverine Resource Stewardship at 29 (2004).

[101] *Id.* at 86, 131.

[102] Letter from Jim Giattina, EPA Region 4, to Lance LeFleur, Alabama Department of Environmental Management, at 12 (Nov. 19, 2012).

related use of horizontal drilling and hydraulic fracturing (also known as "fracking").[103] Hydraulic fracturing uses a wide variety of chemicals to extract natural gas from shale formations, and the State should adopt water quality standards to ensure that the addition of these chemicals to our waters does not endanger aquatic life or human health.

EPA has identified at least 930 compounds reported to have been used in hydraulic fracturing fluids between 2005 and 2011.[104] This list is not comprehensive, as the identities of some compounds are withheld by gas companies as "trade secrets" and therefore not reported to EPA.[105] An additional 96 chemicals have been identified in wastewater generated following hydraulic fracturing treatments.[106]

While some states are making every effort to end such practices, the NCMEC has proposed regulations that would allow for treatment and discharge of wastewater generated from oil and gas development into North Carolina's rivers and streams.[107] North Carolina must therefore adopt water quality standards in the form of numeric criteria for each of the hundreds of chemicals known to be used in hydraulic fracturing fluids or detected in wastewater generated by oil and gas development activities. If DENR lacks the technical capacity or information necessary to establish such standards, it should establish a default standard of zero (effectively, no detection) until safe levels of those chemicals, if any, are scientifically determined.

X. Climate Change

DENR should increase the adaptive capacity of water quality regulations in order to mitigate the potential effects of climate change. Climate change is expected to impact surface waters in several ways. According to EPA, warmer temperatures may lead to increased algal blooms, decreased instream flows, increased salinity, increased runoff, and higher concentrations of harmful substances generally.[108]

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[103] 29 N.C. Reg. 106-162 (July 15, 2014).

[104] EPA, Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Progress Report 197-228 tbl.A-1 (Dec. 2012), *available at* http://www2.epa.gov/sites/production/files/documents/hf-report20121214.pdf.

[105] North Carolina recently criminalized the disclosure of confidential information related to hydraulic fracturing to any person not specifically authorized by law to see it. N.C. Gen. Stat. § 113-391.1(d) (2014).

[106] *Id.* at 240-243 tbl.A-3.

[107] *See* 29 N.C. Reg. 156-157 (July 15, 2014).

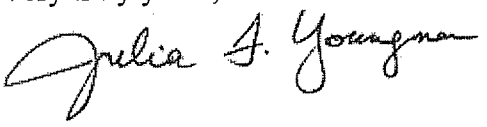
[108] EPA, National Water Program 2012 Strategy: Response to Climate Change 55 (Dec. 2012), *available at* http://water.epa.gov/scitech/climatechange/upload/epa_2012_climate_water_strategy_sectionIV_water_quality_final.pdf.

At the federal level, President Obama recently issued an executive order with explicit instructions for EPA and other federal agencies to "complete an inventory and assessment of proposed and completed changes to their land- and water-related policies, programs, and regulations necessary to make the Nation's watersheds, natural resources, and ecosystems, and the communities and economies that depend on them, more resilient in the face of a changing climate."[109] That review will inevitably identify state water quality standards as one of the areas of delegated authority that will need revision. DENR can get ahead of the process, and likely retain greater control over it, by proactively amending North Carolina's water quality standards to include consideration of the effects of climate change when, for instance, issuing NPDES permits, calculating the total maximum daily loads for water bodies, and establishing the designated use of certain water bodies.

XI. Conclusion

For too long, North Carolina has failed to make improvements to its water quality criteria, despite changes to the national recommendations and scientific progress indicating that North Carolina's current water quality standards do not adequately protect state waters. We respectfully ask that North Carolina use this triennial review process to make the long-overdue changes recommended in these comments.

Very truly yours,



Julie Youngman

Enclosures

cc (without enclosures, by email):
Tom Reeder, NCDENR-DWR
Jim Giattina, EPA Region 4
Lisa Perras Gordon, EPA Region 4
Peter Raabe, American Rivers
Amy Adams, Appalachian Voices
Kemp Burdette, Cape Fear Riverkeeper
Carrie Clark, North Carolina League of Conservation Voters
Paula Reidhaar, Winyah Rivers Foundation
Robin Jacobs, Eno River Association
George Matthis, River Guardian Foundation
Matthew Starr, Upper Neuse Riverkeeper
Travis Graves, Lower Neuse Riverkeeper
Gray Jernigan, Waterkeeper Alliance

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[109] Exec. Order No. 13653, 78 Fed. Reg. 66819 (Nov. 6, 2013), *available at* http://www.whitehouse.gov/the-press-office/2013/11/01/executive-order-preparing-united-states-impacts-climate-change .

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

AUG 20 2010

Alan Clark, Chief
Planning Section
Division of Water Quality
North Carolina Department of
Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

Dear Mr. Clark:

Section 303(c)(1) of the Clean Water Act (CWA), requires that a State or Tribe shall, from time to time, but at least once every three (3) years, hold public hearings to review its water quality standards and, as appropriate, modify and adopt those standards. Based on this requirement, North Carolina has been in the process of evaluating the State's current water quality standards found in *Surface Waters and Wetlands Standards, NC Administrative Code 15A NCAC 02B .0100, .0200 & .0300 (amended effective: May 1, 2007)*, and developing draft revisions and proposing changes to these standards.

North Carolina Division of Water Quality's (DWQ's) Classification and Standards Unit staff does an outstanding job of keeping up with U.S. Environmental Protection Agency (EPA) websites, toxicological updates and Federal Register notices for all applicable and relevant information under the CWA. North Carolina's staff demonstrates considerable knowledge in technical issues relating to water quality standards and should be commended for their diligence in this program area.

On numerous occasions, North Carolina and EPA have met and discussed the State's proposed changes for this triennial period. In January 2010, North Carolina sent a draft rule package to EPA for review. Since that time, Connie Brower of your staff has sent frequent updates regarding the rules revision, which are informative and appreciated. One of those updates, an email dated April 21, 2010, indicated that State staff made a presentation to the Environmental Management Commission (EMC) on March 11, 2010. The minutes of that meeting, which included background information on the development of the proposed changes to standards became available on-line on May 13, 2010. EPA has reviewed the proposed changes posted on the webpage along with the additional information that DWQ provided to the EMC, which DWQ also made available on-line in May. EPA's comments to these proposed changes are attached. EPA is also including some additional comments on other sections of the regulations for your consideration during the 2011 – 2014 triennial review.

Based on a recent revision to the triennial schedule posted on the web, it is EPA's understanding that the dates for the public hearings on these proposed standards revisions have not yet been set. The State has indicated that in order to follow its Administrative Procedures Act, it may not hold public hearings until after the Office of State Budget Management approves the Division's financial review (commonly referred to as a "Fiscal Note"). The State anticipates that the public hearings will take place late in this calendar year or early in 2011. Given the length of time that has passed since the State last held a public hearing relating to review of the State's water quality standards, EPA urges the State to hold the hearings as soon as practicable.

The State anticipates that, if adopted, the proposed standards revisions would not be adopted and submitted to EPA for approval until 2011. In consideration of CWA time constraints for EPA action on any new standards, EPA is committed to working with the State in an effort to address and resolve any outstanding issues and concerns EPA may have prior to adoption and submission of a final standards revisions package by the State. EPA looks forward to attending the public hearings and continuing to work with North Carolina on this triennial. Please do not hesitate to contact me at 404-562-9967, or have your staff contact Lisa Perras Gordon at 404-562-9317 to discuss the comments.

Sincerely,

Annie M. Godfrey

Annie M. Godfrey, Chief
Water Quality Standards Section

Enclosures (2)

EPA Comments and Recommendations
North Carolina 2008 – 2010 Triennial Review of Water Quality Standards

The U.S. Environmental Protection Agency's (EPA's) review covers various revisions that North Carolina is considering and/or has already proposed to *Surface Waters and Wetlands Standards, NC Administrative Code 15A NCAC 02B .0100, .0200 & .0300 (amended effective: May 1, 2007)*, as reflected in the draft (marked-up) version of these regulations that was linked to the North Carolina Division of Water Quality (NC DWQ) webpage available as of May 15, 2010. (Enclosure 1, for reference).

Flow Design Criteria

Revisions proposed to ***Flow Design Criteria for Effluent Limitations 15A NCAC 02B .0206*** includes addition of "Toxic substance standards to protect aquatic life from acute toxicity will be protected using the 1Q10 flow."

EPA supports this revision.

Nutrients

Revisions proposed to ***Fresh Surface Water Quality Standards (WQS) for Class C Waters 15A NCAC 02B .0211(4) Chlorophyll a.***

EPA is participating in on-going discussions with DWQ staff and management regarding the development of numeric nutrient criteria. These discussions are in conjunction with revisions to the North Carolina Nutrient Criteria Implementation Plan. EPA will provide separate comments on these revisions to North Carolina.

Cyanide

Revisions proposed to ***Fresh Surface Water Quality Standards for Class C Waters 15A NCAC 02B .0211(5) Cyanide, total: 5.0 ug/l.***

Although not listed as a change, the current water quality standards (WQS) include the following language after the numeric criteria for cyanide, "... unless site-specific criteria are developed based upon the aquatic life at the site utilizing The Recalculation Procedure in Appendix B of Appendix L in the Environmental Protection Agency's Water Quality Standards Handbook hereby incorporated by reference including any subsequent amendments."

This language has been removed in the updated revisions. North Carolina may want to consider retaining the original language for ease of developing site-specific criteria for cyanide in the future.

2, 4 D (chlorophenoxy herbicide)

Revisions proposed to ***Fresh Surface Water Quality Standards for Class WS-1, Class WS-II, Class WS-III, Class WS-IV and Class WS-V Waters 15A NCAC 02B .0212, 0214, .0215, .0216 and 0218.*** North Carolina has proposed a revision from 100 ug/l to 70 ug/l for 2, 4 D.

EPA supports this revision.

Metals: General Comments

Revisions proposed to ***Fresh Surface Water Quality Standards for Class C Waters 15A NCAC 02B .0211(11) Metals***

EPA supports the addition of up-to-date criteria for metals, including the adoption of acute metals criteria, the use of dissolved fraction criteria and the use of the hardness-based equations. EPA does not support the biological qualifier for assessment or action levels used for permitting. Details for this position are outlined below.

Background: EPA's development of water quality standards for toxic criteria, including metals, evolved during the late 1980's and early 1990's, and resulted in significant updates to EPA's CWA Section 304(a) criteria guidance for metals at that time. EPA's updates, based on numerous scientific studies, expert panel reviews and recommendations from the Science Advisory Board, included recommendations and criteria which would most accurately identify the biologically available fraction available for uptake by organisms and therefore most likely to cause a toxic effect.

Since the early 1990's, EPA recognized the challenges involved with the transition to the new criteria and, at that time, held numerous workshops and conferences and issued guidance to assist the states in the adoption and implementation of these updated criteria. The guidance to the states during that time period included procedures, such as the EPA-approved Water Effects Ratio, or WER, which further take into account site-specific conditions affecting metals toxicity. By the early 1990's, most of the states in the country adopted the new criteria, including the seven other Region 4 states except for North Carolina. In the ensuing years, the other Region 4 states phased these metals criteria into expiring permits, often using compliance schedules, to allow facilities time to come into compliance with the new limits. North Carolina is the only Region 4 state which has not adopted the nationally recommended criteria and has not used these values for permitting or assessment under the Clean Water Act.

North Carolina's revisions would bring its water quality criteria for metals in-line with the national recommended criteria, and EPA commends the State for taking this necessary step. The addition of the criteria (listed below) and the inclusion of the equations allowing for development of alternative standards for hardness dependent metals is a significant revision to North Carolina's standards program. North Carolina's current proposed criteria also include the important addition of acute criteria for metals

and the use of the dissolved fraction for measurement for metals (other than selenium and mercury.)

However, EPA has substantial concerns that, although the State has added the updated metals criteria, it is simultaneously considering retaining and adding other provisions which may negate the use of the new criteria, specifically the 'biological trump' and 'action levels.' EPA does not support North Carolina's new provision to allow biological 'trumping' of the new metals criteria for assessment purposes. EPA also no longer supports the use of action levels in lieu of the reasonable potential (RP) analysis for NPDES permitting for copper or zinc. The updated metals criteria should stand on their own to be used for all CWA purposes, including assessment and permitting, as is done in the surrounding states. The new metals criteria should be used in a manner consistent with federal recommendations and the CWA. Details on EPA's concerns are discussed in the sections below.

North Carolina has indicated that there is significant concern within the regulated community regarding the costs associated with the revisions. EPA acknowledges the very real concerns facing DWQ as it prepares its State-required fiscal review of the proposed rule. Many of the Region 4 states raised similar issues almost twenty years ago as they sought to adopt these same requirements. However, after adoption, the costs and the effect were, in many cases, not as significant as feared.

As stated, North Carolina has not had the same metals criteria as surrounding states. This difference between states was considered in May 2000, when EPA promulgated toxic criteria for the State of California (California Toxics Rule, May 18, 2000, 65 FR 31682), which included the promulgation of metals criteria. In that determination, the preamble explained that "(t)oday's action will help restore equity among states," and the water quality standards should be implemented "in a manner that provides for a level playing field." It further stated that implementing numeric water quality standards for toxics in California "would not impose an undue or inappropriate burden on the State of California or its dischargers. It merely puts in place numeric criteria for toxic pollutants that are already used in other States in implementing CWA programs." That rule, in 2000, put in place for California most of the values which North Carolina is now adopting in 2010.

There is a good deal of experience in the surrounding states and in the Region's permitting staff in implementation of these criteria. Please let us know how we can use that experience to assist North Carolina's permitting staff in developing compliance schedules, recommending appropriate testing techniques and, if necessary, developing WERs and other mechanisms which will allow sound and proven methods for appropriate implementation of the metals criteria.

Metals: Specific Comments

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (a)

"With the exception of mercury and selenium, water quality standards for metals in surface waters shall be based upon measurement of the dissolved fraction of the metal. Mercury and Selenium must be based upon measurement of the total recoverable metal. Alternative site-specific dissolved standards require studies designed according to the "Water Quality Standards Handbook Second Edition" published by the U.S. Environmental Protection Agency (EPA 823-B-94-005a) hereby incorporated by reference including any subsequent amendments;"

This revision brings North Carolina in-line with other Region 4 states and with EPA's national recommendations. EPA supports this revision.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (b)

"Hardness dependent metals standards listed in Subsection (e) of this Rule are established at 25 mg/l hardness. Alternative standards shall be derived using the equations specified in Table A – Dissolved Freshwater Standards for Hardness Dependent Metals. For NPDES permitting purposes, application of the equations requires hardness values established using the tenth percentile of hardness data within the local U.S. Geological Survey (USGS) and Natural Resources Conservation Services (NRCS) 8-digit Hydrologic Unit (HU). The equations are applicable for instream hardness ranges from 25 mg/l to 400 mg/l expressed as $CaCO_3$ or Ca+Mg;"

This revision brings North Carolina in-line with other Region 4 states and with EPA's national recommendations. EPA supports this revision with the following recommendations listed in the paragraphs below.

As stated in EPA's April 30, 2009, letter to North Carolina regarding metals, EPA's national recommended criteria for cadmium, chromium, copper, lead, nickel, silver and zinc are expressed as hardness dependent equations. (EPA and all other Region 4 states include a calculated value for example purposes only, and adopted the equations as the actual criteria.) EPA reads North Carolina's draft revisions to have default criteria set state-wide at 25 mg/l $CaCO_3$ with the ability to calculate alternative criteria using the equations where hardness is found to be above 25 mg/l $CaCO_3$. EPA is very encouraged that the State has revised its default values from 50 mg/l $CaCO_3$ to the newly revised language. However, EPA strongly supports the inclusion and use of the nationally recommended equations for the derivation of criteria where the hardness is other than (higher or lower) 25 mg/l $CaCO_3$. Use of the equations to derive criteria in these waters will ensure that the State is neither *under protective in low hardness waters* or *overprotective in high hardness waters*, as discussed further below.

Low-end Hardness Cap On May 25, 2005, EPA published a compilation of national recommended water quality criteria in a summary table, including the hardness dependent metals. (See http://www.epa.gov/waterscience/criteria/wqctable/). The freshwater aquatic life criteria for these parameters published by EPA do not include a minimum hardness cutoff. In the California Toxics Rule (CTR, May 18, 2000. Pg. 31692), EPA states, "[I]n the past, EPA generally recommended that 25 mg/l as $CaCO_3$ be used as a default hardness value in deriving freshwater aquatic life criteria for metals when the ambient (or actual) hardness value is below 25 mg/l as $CaCO_3$. However, use of the approach results in criteria that may not be fully protective. Therefore, for waters with a hardness of less than 25 mg/l as $CaCO_3$, criteria should be calculated using the actual ambient hardness of the surface water." North Carolina has a significant number of state waters with hardness below 25 mg/l $CaCO_3$. EPA strongly recommends that the State revise the criteria for these metals to delete the minimum hardness cutoff from the criteria equations so as to not be under protective of North Carolina's many waters with low hardness. At a minimum, EPA recommends that North Carolina allow the equations to be used to calculate criteria to a hardness of 20 mg/l $CaCO_3$, consistent with several other states.

Overprotection in High Hardness Waters On the other end of that spectrum, EPA supports the use of the new provision which allows that, "*Alternative standards shall be derived using the equations specified in Table A.*" The use of the equations are encouraged where the hardness is above 25 mg/l $CaCO_3$, so that the State does not have criteria that are *overprotective* at higher hardness values, which may have happened in the past when the State's criteria were set at 50 mg/l $CaCO_3$. In fact, the use of the equations should provide a sound scientific approach for evaluating waters for the CWA Section 303(d) list using hardness measured in surface waters, which more accurately assesses the potential for impairment and does not incorrectly add waters for which there may not be a threat to impairment. For example, when assessing copper in waters with high hardness, i.e. 150 mg/l $CaCO_3$, copper would not be considered to have exceeded the acute value at 19.7 ug/l or the chronic value at 12.7 ug/l. This is a significant change from the State's current value of 7 ug/l copper, which was calculated at a hardness of 50 mg/l $CaCO_3$. The use of the equations may expedite the process to review the Section 303(d) list in future cycles and may result in fewer waters listed for hardness dependent metals.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (c); and,
Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0211(11) Metals (b)

"Acute metals standards shall be evaluated using an average of two or more samples collected within one hour. Chronic metals standards shall be evaluated using averages of a minimum of four samples taken on consecutive days, or as a 96-hour average. Samples collected within a one hour time frame shall not be used to determine compliance with the chronic standards;"

This language has been forwarded to EPA Region 4's monitoring staff for review. EPA has concerns with this language as several states which have adopted similar provisions around the country have not been able to successfully carry out the strategy of monitoring on four consecutive days and can, therefore, never assess compliance with the water quality standard. North Carolina may want to submit information indicating if the monitoring program will face similar challenges or how they will be addressed. It was not clear if this sampling requirement also applied to NPDES permittees.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (d)

"With the exception of mercury and selenium, demonstrated attainment of the applicable aquatic life use in a waterbody will take precedence over the application of the aquatic life criteria established for metals associated with these uses. An instream exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the instream aquatic community if biological monitoring has demonstrated attainment of biological integrity;"

and,

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0211(11) Metals (c)

"With the exception of mercury and selenium, demonstrated attainment of the applicable aquatic life use in a waterbody will take precedence over the application of the aquatic life criteria established for metals associated with these uses. An exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the in situ aquatic community if biological monitoring has demonstrated attainment of biological integrity;"

EPA does not support the inclusion of these revisions. These draft provisions allowing for "biological trumping" should not be adopted into the State's water quality standards regulations based on their potential inconsistency with the CWA and EPA's interpretation of 40 CFR Part 131.

North Carolina's narrative for biological integrity and its field monitoring and assessment program have been regarded as a model for the nation for more than a decade. (*Water Quality Standards Advanced Notice of Public Rulemaking, ANPRM, 63 FR 36771*, July 7, 1998.) However, EPA views biological criteria as one component of a comprehensive water quality standards program that works in concert with – *not in place of* – the use of water quality criteria for toxics.

Chemical parameters v. Biological As stated above, North Carolina is adopting criteria for metals which will bring its water quality standards program in-line with other Region 4 states and EPA's nationally recommended criteria. This is significant in that

chemical specific numeric criteria are considered a vital component of the CWA program for protection of the nation's waters for both assessment and permitting. The 1998 ANPRM states that "chemical specific assessments are ideal for predicting the likelihood of ecological impacts where they may not yet have occurred because...critical exposure conditions have not yet been experienced by the aquatic community." It further states "Basing regulatory and management decisions on chemical assessment of water quality is an important and proven aspect of water quality assessment and protection." (ANPRM, pg. 36796).

Once criteria are established, assessment for purposes of listing under section 303(d) of the CWA and for permitting under the National Pollutant Discharge Elimination System (NPDES) program must be based on all applicable water quality criteria. (ANPRM, pg. 36798.) This approach is considered preventive.

On the other hand, biological assessments are considered more restorative in nature, rather than preventive. EPA has stated that, "...while biological assessments can provide information in determining the cumulative effect of past or current impacts from multiple stressors, these assessments may be limited in their ability to predict, and therefore *prevent*, impacts" (emphasis added. ANPRM, pg. 36795.) And, in fact, once biological impairment has been found, by definition, that impact was not prevented and costs for determining the cause and source and needed restoration can be prohibitive.

Reconciling differences. The ANPRM (pg. 36801) further discusses how results of different tools should be reconciled should they indicate different outcomes, such as passing a biological assessment, while exceeding a chemical criteria. "Where biological impact is not detected using biological assessment methods, it is possible that impairment that is projected and plausible, may simply have not yet occurred....EPA's view is that it would be inappropriate to ignore projected impairment simply because the impairment has not yet been observed in the environment."

One of the goals stated in Section 101 of the CWA is that the biological integrity of the Nation's waters be maintained, specifically stating the national policy that the discharge of toxic pollutants in toxic amounts be prohibited in order to maintain biological integrity. To meet that goal, 40 CFR 131.11 provides that criteria for toxics be established, including the use of recommended Section 304(a) criteria intended for the *prevention* of impairment of waters. It is unacceptable to not act until biological impairment has already occurred.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (e)

(i) Arsenic, acute: 340 ug/l;
(ii) Arsenic, chronic: 150 ug/l;
(iii) Beryllium, acute: 65 ug/l;
(iv) Beryllium, chronic: 6.5 ug/l;
(v) Cadmium, acute: 0.82 ug/l;

(vi) *Cadmium for trout waters, acute: 0.51 ug/l;*
(vii) *Cadmium, chronic; 0.15 ug/l;*
(viii) *Chromium III, acute: 180 ug/l;*
(ix) *Chromium III, chronic: 24 ug/l;*
(x) *Chromium VI, acute: 16 ug/l;*
(xi) *Chromium VI, chronic: 11 ug/l;*
(xii) *Copper, acute: 3.6 ug/l, or an alternative criterion derived in accordance with the US. EPA aquatic life criteria document titled, "Aquatic Life Ambient Freshwater Quality Criteria – Copper 2007 Revision" (EPA-822-R-07-001);*
(xiii) *Copper, chronic: 2.7 ug/l, or an alternative criterion derived in accordance with the US EPA aquatic life criteria document titled, "Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision" (EPA-822-R-)&-001);*
(xiv) *Lead, acute: 14 ug/l;*
(xv) *Lead, chronic: 0.54 ug/l;*
(xvi) *Mercury, total recoverable, chronic: 0.012 ug/l;*
(xvii) *Nickel, acute: 140 ug/l;*
(xviii) *Nickel, chronic:16 ug/l;*
(xix) *Selenium, total recoverable, chronic: 5 ug/l;*
(xx) *Silver, acute: 0.30 ug/l;*
(xxi) *Silver, chronic: 0.06 ug/l;*
(xxii) *Zinc, acute: 36 ug/l;*
(xxiii) *Zinc, chronic: 36 ug/l;*

This revision brings North Carolina in-line with other Region 4 states and with EPA's national recommendations. EPA strongly supports this revision. A comparison of the North Carolina criteria and national recommended criteria is enclosed.

Note: North Carolina has chosen to revise cadmium using a recalculation used by Chadwick Ecological Consultants, Inc. In October, 2009, DWQ provided all of the relevant documentation to EPA to support their use of the alternative criteria.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (e)
Table A: Dissolved Freshwater Standards for Hardness Dependent Metals.

Table A includes the hardness based equations for cadmium, chromium III, copper, lead, nickel, silver and zinc.

This revision brings North Carolina in-line with other Region 4 states and with the EPA national recommendations. EPA strongly supports this revision to include the equations for hardness based metals.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(22) Action Levels for Toxic Substances Applicable to NPDES permits:

(a) Copper: 2.7 ug/l
(b) Silver; 0.06 ug/l;
(c) Zinc; 36 ug/l;
(e) Chloride; 230 mg/l.

If the Action Levels for any of the substances listed in this Subparagraph (which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream characteristics or associated waste characteristics) are determined by the waste load allocation to be exceeded in a receiving water by a discharge under the 7Q10 flow criterion for toxic substances, the discharger shall monitor the chemical or biological effects of the discharge; efforts shall be made by all dischargers to reduce or eliminate these substances from their effluents. Those substances for which Action Levels are listed in this Subparagraph shall be limited as appropriate in the NPDES permit if sufficient information (to be determined for metals by measurements of that portion of the bioavailable instream concentration of the Action Level parameter attributable to a specific NPDES permitted discharge) exists to indicate that any of those substances may be a causative factor resulting in toxicity of the effluent.

For purposes other than consideration of NPDES permitting of point source discharges as described in this Subparagraph, the Action Levels in this Rule shall be considered as numerical ambient water quality standards.

And,

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0220 (20)

(a) Copper: 3.1 ug/l
(b) Silver; 0.1 ug/l;
(c) Zinc; 81 ug/l;

EPA does not support this proposed revision of the North Carolina water quality standards or retention of any provisions relating to action levels for metals. The State should not adopt and/or retain these provisions given their inconsistency with 40 CFR 122.44(d)(1)(i), the CWA and EPA national recommendations.

EPA's Section 304(a) criteria were developed to take into account the factors listed above, such as solubility and chemical form, in determining the fraction biologically for uptake by aquatic organisms and therefore most likely to cause a toxic effect. The use of the hardness-based equations for hardness dependent metals, such as copper and zinc, further addressed variability caused by stream characteristics. Hardness

is used as a surrogate for a number of water quality characteristics which affect the toxicity of metals in a variety of ways. (California Toxics Rule, pg. 31692). North Carolina's adoption of the hardness dependent equations negates the need for the continued use of action levels. This is particularly true as North Carolina is adopting the procedures for the use of the Biotic Ligand Model for copper as well as including a reference for EPA approved site-specific criteria development under 15A NCAC 02B .0211(11)(a).

North Carolina's action level requirements, stated above, indicate that NPDES limits must be set for metals if information exists to indicate that a particular substance may be a *causative* factor resulting in the toxicity of the effluent. 40 CFR 122.44(d)(1)(i) states that limits must be put in place to control pollutants which may be discharged at a level "which will cause, have the reasonable potential to cause or contribute to an excursion above any State water quality standard." This regulation does not indicate that the effluent must be the sole cause of toxicity before the parameter should be limited. The provision states that the pollutant should be limited under NPDES if it could cause or even if it could *contribute* to a water quality standards excursion.

This is significant in that there may often be multiple sources of pollutants in receiving waters, from non-point source run-off, point sources and storm water. Single facilities or sources are often not the sole cause of an impairment, but rather multiple discharges contribute to the toxicity and excursion of water quality standards. Therefore, when a point source discharges zinc levels with a reasonable potential to cause or contribute to an exceedence of water quality standards, it must be limited. Surrounding states have limited zinc and copper in permits where there is reasonable potential to cause or contribute to the excursion of a water quality standard.

North Carolina has one of the strongest programs for whole effluent toxicity (WET) testing, recognized as such by both the Region and EPA Headquarters. WET testing can be "effective for controlling discharges containing multiple pollutants. It can also provide a method for addressing synergistic and antagonistic effects on aquatic life" from multiple pollutants. (ANPRM, 63 FR 36768, July 7, 1998). However, where criteria exist to directly control toxic pollutants, those criteria should be used to limit the discharge of pollutants. WET should be used to address those instances where criteria may not be available to limit toxicity. The ANPRM's extensive discussion of reconciling biological data, such as WET, with 'reasonable potential' analysis concludes that "EPA would not support a radical shift away from chemical criteria and limits or toxicity criteria and limits. Those tools are simply too important as proven tools for assessing potential impact to surface waters and improving water quality." If needed, an effort should be made to refine the applicable criteria, through WERs and other tools, to ensure that appropriate criteria are developed for each facility.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(22) Action Levels for Toxic Substances Applicable to NPDES permits.

North Carolina has proposed removal of the action level for iron. Iron is the one action level which is not being replaced with a criteria value in an alternative section of the water quality standards. North Carolina is removing iron after a review of data indicated that iron may occur naturally at high levels in the State.

EPA does not oppose this revision.

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0220(9) Metals (d)

(i) Arsenic, acute: 69 ug/l;
(ii) Arsenic, chronic: 36 ug/l;
(iii) Cadmium, acute: 0.40 ug/l;
(iv) Cadmium, chronic; 8.8 ug/l;
(v) Chromium VI, acute: 1100 ug/l;
(vi) Chromium VI, chronic: 50 ug/l;
(vii) Copper, acute: 4.8 ug/l;
(viii) Copper, chronic: 3.1 ug/l;
(ix) Lead, acute: 210 ug/l;
(x) Lead, chronic: 8.1 ug/l;
(xi) Mercury, total recoverable, chronic: 0.025 ug/l;
(xii) Nickel, acute: 74 ug/l;
(xiii) Nickel, chronic: 8.2 ug/l;
(xiv) Selenium, total recoverable, chronic: 71 ug/l;
(xv) Silver, acute: 1.9 ug/l;
(xvi) Silver, chronic: 0.1 ug/l;
(xvii) Zinc, acute: 90 ug/l;
(xviii) Zinc, chronic: 81 ug/l;

This revision brings North Carolina in-line with other Region 4 states and with the EPA national recommendations. EPA strongly supports this revision. A comparison of the proposed North Carolina criteria and national recommended criteria is enclosed. (Note: the metals listed above are listed in consecutive Roman numeral order, however, the proposed regulations do not have the numbers listed consecutively.)

Additional comments

The following section addresses areas not currently proposed for revision. North Carolina is asked to consider including these suggestions in this revision, if possible, or during the 2011-2014 triennial.

Flow

EPA led a discussion at the May 2010 meeting with States and Tribes in Atlanta, Georgia relating to flow (water quantity) and water quality. Drought, floods, water disputes and the development of regional and state water plans have brought water quantity/quality issues into sharp focus - including impacts of both extreme low and high flows on habitat and aquatic life. Around the country and here in Region 4, states and tribes have begun to address flow through the water quality standards program. Existing water quality standards implicitly protect flow through narratives for protection of aquatic life, protection of designated uses, biological integrity, habitat protection and antidegradation policies. Region 4 is encouraging all of our states and tribes to consider explicit expression of flow as a water quality standard, either through a narrative standard, (i.e. such as used by Tennessee "...flow shall support the aquatic criteria...") or through a numeric standard (i.e. such as used by Vermont, "no more than 5% 7Q10 change from natural flow regime..."). The Region can provide you with full examples in use by other states or additional information as needed.

Methylmercury

Section 303(c)(2)(B) of the Clean Water Act requires states and authorized tribes to adopt numeric criteria for §307(a) priority toxic pollutants for which the Agency has published §304(a) criteria, if the discharge or presence of the pollutant can reasonably be expected to interfere with designated uses. EPA has published Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion, EPA 823-R-10-001. The April 2010 document provides guidance for states, territories and authorized tribes on how to use the new fish tissue-based criterion recommendation in developing water quality standards for methylmercury and in implementing those standards in Total Maximum Daily Loads and NPDES permits. Based on the finalization of the aforementioned implementation guidance, all of the components necessary for North Carolina to adopt the 2001 methylmercury water quality criterion are now in place. EPA strongly recommends that the State adopt a water quality criterion, consistent with the 2001 criterion and the 2010 implementation guidance.

Trout Waters

Currently, North Carolina's water quality standards include definitions for Trout waters and High Quality Waters as follows:

15A NCAC 02B .0101 General Procedures

(e)(1) Trout waters (TR): freshwaters protected for natural trout propagation and survival of stocked trout.

(e)(5) High Quality Waters (HQW): waters which are rated as excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, native and special native trout waters (and their tributaries) designated by the Wildlife Resources Commission....

Suggestion 1: From past submissions for Trout water reclassifications, it appears that some, but not all, Trout waters are also HQWs. It would be helpful to clarify when a Trout water is or is not a HQW.

Suggestion 2: It would be helpful to clarify how to define and identify what information is used to determine how and when a water meets the definition of "native and special native trout waters...designated by the Wildlife Resource Commission" (WRC). EPA has not been able to consistently find reference to 'native and special native trout waters' on the WRC's webpage.

15A NCAC 02B .0202, Definitions

(65) "Trout waters are those waters which have conditions which shall sustain and allow for trout propagation and survival of stocked trout on a year-round basis."

Suggestion 3: This definition differs slightly from the definition at *15A NCAC 02B .0101(e)(1) General Procedures.* DWQ may want to consider revision of one or both of the two definitions to be the same or to clarify the distinction between the two.

15A NCAC 02B .0211, Fresh Surface Water Quality Standards for Class C Waters

Suggestion 4: This section includes criteria applicable to Trout waters which are interspersed with other criteria not applicable to trout waters. Trout waters are the only supplemental classification without its own section. DWQ has mentioned the possibility of grouping the criteria in a separate section for Trout waters, including the applicable numeric criteria, as follows:

a. Chlorophyll a,
b. Dissolved oxygen,
c. Temperature,
d. Turbidity,
e. Cadmium, and
f. Toluene.

EPA strongly agrees that revision would provide more consistency with the organizational structure of the other criteria and make it easier to know what is applicable to Trout waters.

<u>High Quality Waters (HQW)</u>

Suggestion 5: In *15A NCAC 02B .0101(e)(5), General Procedures*, it states that HQW's include WS-I, WS-II and SA waters. It would be helpful to cross reference that statement by including a reference to HQWs under the sections for WS-I, WS-II and SA. For instance, for SA waters it currently reads, "Water quality standards applicable to Class SC and SB waters...also apply." Could that be amended to say, "...Class SC, SB *and HQWs* also apply"?

Suggestion 6: The section on HQW found at ***15A NCAC 02B .0101(e)(5), General Procedures*** does not list Outstanding Resource Waters (ORW) as being a HQW. The DWQ webpage indicates that ORWs are a subset of HWQs. The only statement regarding the connection between the two types of waters in the Water Quality Standards is the Antidegradation Policy *(Antidegration Policy 15A NCAC 02B 0.201(e))*, which states, *"Outstanding Resource Waters (ORW) are a special subset of High Quality Waters with unique and special characteristics as described in Rule .0225 of this Section."* EPA recommends explicitly defining the relationship between the two water classifications under the ORW and/or HQW sections in General Procedures and/or under the ORW and HWQ sections found at 15A 02B .0225 and .0224.

General References to Other Applicable Requirements

Suggestion 7: For many of the supplemental classifications, there are rules which apply that are found under other DWQ regulations or even regulations outside of DWQ. In most cases, they are mentioned, but there are some that are not. It would be helpful for all of the supplemental classifications to mention all the other applicable standards both within and outside of the Water Quality Standards. For instance,

a. If Trout waters were to be placed in its own section, it could list the other requirements which also apply, such as the Department of Land Resources (DLR) requirements for 25-foot minimum width buffers *(15A NCAC 4B .0125)* and, as applicable, the Buffer requirements at *NCGS 113A-57 (Mandatory Standards for Land Disturbing Activity)*.

b. The ORW section lists references to *15A NCAC 2H .1007 (Stormwater Requirements for ORWs)*. Packages sent to EPA have also included references to *15A NCAC 04B .0124 (Design Standards in Sensitive Waters)* and *15A NCAC 02N .0301 (Performance Standards for New UST Systems)*, which are not mentioned in the ORW section.

c. The HQW section lists references to 15A NCAC 2H .1006 (Stormwater practices applicable to HQW). There may also be other requirements that apply in HQWs, such as buffer requirements that could be referenced as applicable.

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

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.

<u>The NCIP</u>

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 06/18/2010 12:08 PM
Cc: Joanne Benante, Lisa-Perras Gordon

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
US EPA, Water Quality Standards Section
61 Forsyth Street, SW
Atlanta, GA 30303
Phone: 404-562-9967
Fax: 404-562-9224

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

JUL 31 2013

Mr. Thomas A. Reeder
Director
Division of Water Quality
North Carolina Department of Environment
and Natural Resources
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Dear Mr. Reeder:

I want to formally welcome you as the Director of North Carolina's Division of Water Quality. We certainly appreciate the efforts of your predecessors and we look forward to building on past successes as we continue to work in partnership with you to protect and restore the waters of North Carolina. As you noted in our July 12, 2013, teleconference, we have several outstanding issues that we are working on and a number of them were specifically addressed in a March 20, 2013, letter from the Southern Environmental Law Center (SELC) to our Regional Administrator. I wanted to solicit from you input to address the concerns raised by SELC and to also confirm with you our perspective and where we stand on those issues.

(1) North Carolina's Water Quality Standards (WQS) Triennial Review

NCDWQ Classification and Standards Unit staff performs outstanding technical work in keeping abreast of the latest scientific revisions issued by the U.S. Environmental Protection Agency. North Carolina's staff demonstrates considerable knowledge in technical issues relating to water quality standards (WQS) and should be commended for their diligence in this program area. However, their technical work has not resulted in a triennial review public hearing or adoption of updated WQS. Section 303(c)(1) of the Clean Water Act (CWA), requires that a State or Tribe shall, at least once each three year period, hold public hearings to review its applicable WQS and as appropriate, modify and adopt standards. NCDWQ last held a triennial review public hearing to review the state WQS in July 2006. That hearing resulted in revisions to the *Surface Waters and Wetlands Standards, NC Administrative Code 15A NCAC 02B .0100, .0200 & .0300,* which became effective in May of 2007. The State is currently four years behind schedule for holding a hearing. The delays in North Carolina's performance of its triennial review requirements under the CWA were addressed in SELC's letter.

Given that the triennial review hearing is a fundamental requirement of the CWA, we are extremely concerned about further delays. We note that NCDWQ has faced challenges the past three fiscal years in meeting its CWA Section 106 workplan commitments for this activity and currently does not have a date scheduled this fiscal year for conducting a hearing. Therefore, we stand ready to assist you in any way possible to expedite a hearing as soon as possible and I urge you to move forward with this action.

(2) Adoption and Submittal to the EPA of WQS Revisions for Toxic Metals Criteria

We recognize that NCDWQ developed proposed revisions to your toxic metals criteria in January of 2010 and that progress in moving these proposed revisions to finalization has been held up in a financial review. We ask for your commitment to move this process ahead so that the appropriate public hearings can be held and the results of the triennial review submitted to the EPA as required by the CWA. Currently, North Carolina is the only remaining state in Region 4 that has not adopted toxic metals criteria consistent with CWA Section 304(a) national criteria. Additionally, the SELC letter outlines a number of requirements as part of the State's Regulatory Reform Act of 2011 (RRA) which it believes may hamper the process. We would appreciate your interpretation of the RRA's impact on North Carolina's ability to adopt WQS in the future.

I want to alert you to two aspects of your proposed toxic metals criteria which were discussed with Chuck Wakild and staff at our meeting on May 14, 2013, that raise concerns with regard to their scientific defensibility and consistency with the CWA. These are the continued use of "action levels" and the requirement for biological confirmation. We noted our concerns in our August 2010 comments and we will be closely monitoring your proposal following public review and submittal to the EPA.

(3.) North Carolina's Nutrient Criteria Development Plan

NCDWQ posted its revised Nutrient Criteria Development Plan (NCDP) recently for public review. Our respective staffs are discussing possible revisions to the North Carolina NCDP and I am looking forward to the successful resolution of this issue. The lack of a mutually agreed upon plan for development of numeric nutrient criteria was also noted by SELC.

As always, we stand ready to assist you on any of these matters. I will plan to schedule a call with you and appropriate staff in mid-August. Please do not hesitate to contact me at (404) 562-9345 to discuss any of these issues further.

Sincerely,

Gail Mitchell, for

James D. Giattina
Director
Water Protection Division

Enclosures

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

NOV 19 2012

Lance LeFleur
Director
Alabama Department of Environmental Management
Post Office Box 301463
Montgomery, Alabama 36130-1463

Dear Mr. LeFleur:

Thank you for the opportunity to provide input into the State of Alabama's development of a comprehensive statewide water management plan. The Environmental Protection Agency strongly supports Governor Bentley's directive to develop a plan that is based on sound science and that will "benefit Alabamians now and for generations to come." As we have discussed at the most recent State Directors meetings, our stewardship of water resources in the Southeast is facing new challenges from increased demands on limited freshwater supplies. Your effort acknowledges that competing uses of ground water and surface water for industrial, municipal and agricultural uses, power generation, new reservoirs, inter-basin transfers and water diversions are all bringing this issue into sharp focus. Planning is further complicated by droughts, floods, climate change and existing hydrologic modifications.

Fortunately, our understanding of the science of water management has evolved significantly over the past decade. We applaud your efforts to bring this science to bear in assisting Alabama's efforts to balance multiple water needs. Long-term planning for the stewardship of Alabama's waters will serve to protect the significant ecological resources of the state, as well as ensure future delivery of drinking water, power generation and sustainable economic development.

The EPA has been working to better understand the complex issues of addressing water quantity and water quality effectively under the existing authorities of the Clean Water Act (CWA). The EPA Region 4 has had the benefit of working with other state and federal partners that have long been involved in this issue. For instance, population pressures and water disputes compelled many states in New England to begin development of water plans more than twenty years ago. All six of the New England states have developed hydrologic protection of state waters either through their state water quality standards program under the CWA and/or through state water allocation and permitting programs. The eight states surrounding the Great Lakes, facing challenges of competing water uses, spurred development of water plans under the Great Lakes and St. Lawrence Seaway Compact, including innovative tools such as Michigan's Water Withdrawal Assessment Process and Internet Screening Tool. Alabama can draw on such tools, expertise, innovation and success both here in the Region and nationally. We have provided several examples in our comments and would welcome the opportunity to share with you any of these resources and contacts in the coming year as you develop and refine your plan.

As requested, the EPA has completed a review of the *Water Management Issues in Alabama* report. Our comments include recommendations about how Alabama could utilize tools that are already available under the CWA to address many of the State's water resource issues, with a focus on efficiency, conservation and reuse, and development of instream flow water quality standards under the CWA. We support Alabama's water conservation and efficiency efforts, which can be a key component in water resource management. In addition, the EPA recommends that the State consider using its CWA authority under the water quality standards program to develop "instream flows which can serve as a cornerstone

of a statewide water management plan" (*Water Management Issues in Alabama*, Alabama Water Agencies Working Group, pg. 6). We further support the proposal to examine and recommend "appropriate flow dynamics for rivers and streams to support biological, recreational, and industrial/transportation needs and requirements" (Id., pg. 4), and have included examples of successful flow standards from throughout the country. We share with you the expectation, as you move forward, that all newly developed water plans and policies will of course be consistent with your state water quality standards under the CWA.

Our enclosed comments follow the format of the Water Issues Area Summaries while also addressing the 2009 recommendations from the Permanent Joint Legislative Committee on Water Policy and Management and the areas of stated importance from the Governor in his charge to the Alabama Water Agencies Working Group in April 2012.

With the benefit of evolving research in this area, we believe it is possible to develop the tools needed to protect, and where possible restore, the hydrologic condition and ecological integrity of state waters, while efficiently carrying out necessary and important water supply planning and economic development. We stand ready to assist your group in any way possible, and please do not hesitate to contact me at (404) 562-9470 or Ms. Lisa Perras Gordon at (404) 562-9317 if you have any questions.

Sincerely,

James D. Giattina
Director
Water Protection Division

Enclosure

cc: Glenda Dean

Alabama Water Agencies Working Group
EPA Region 4 Stakeholder Comments
November 2012

The Region 4 office of the Environmental Protection Agency (EPA) has reviewed the report entitled *Water Management Issues in Alabama* (the WMI Report) by the Alabama Water Agencies Working Group (AWAWG) and offers the following stakeholder input.

General Stakeholder Input

The EPA supports the development of a statewide water management plan as detailed in the WMI Report. The EPA's two primary issues for stakeholder input are conservation and reuse, and the recommendation to develop instream flow water quality standards. The EPA is also providing comments below in seven other areas. In addition to those comments, the EPA is providing information regarding the significance of Alabama's aquatic ecology that was not included in the WMI Report.

Alabama's globally significant aquatic biodiversity

The United States is often cited as one of the top countries in the world for aquatic biodiversity, ranking 1st for crayfishes, freshwater mussels, freshwater snails and many aquatic insects and 7th for fish diversity. In fact, whereas the U.S. has over 300 species of freshwater mussels, all the rivers of Europe have only 10 and the entire continent of Africa just 56. There is no question that Alabama is at the heart of the U.S. freshwater diversity, with more species of mollusks (180 species of both snails and mussels) and fish (>300 species) than any other state (ADCNR 2012). *Rivers of Life*, a NatureServe report on aquatic biodiversity, highlights the state of Alabama in general and the Mobile River basin in particular as having "extraordinarily diverse assemblages of freshwater animal species..." and also references the Cahaba River which it describes as a "treasure trove of botanical life" (Master et al. 1998). However, the report notes that many of Alabama's species are vulnerable. In fact, Tennessee and Alabama came in 1st and 2nd for the greatest number of imperiled freshwater species nationally. The report finds that just two regions of the U.S., one of which is the Mobile River Basin, are home to 35% of all vulnerable species in the U.S. Seventy percent of those species occur nowhere else in the world. Conservation practices and development of instream flow protections may provide the safeguards needed for many of these species that make Alabama a unique ecological treasure.

Freshwater ecosystems, as a whole, have suffered more decline than terrestrial ecosystems in recent decades (Master et al. 1998). Nationally, aquatic systems are under significant stress, and particularly in the Southeast, with the largest number of imperiled species. More than two centuries of alterations to aquatic habitat, such as dams, surface water and ground water withdrawals, impervious cover, introduction of non-native species and channelization have significantly altered the aquatic environment. Only recently have scientists begun to quantify the extent of that alteration. In a national assessment, the U.S. Geological Survey found that alteration of waterways has impacted the magnitude of minimum and maximum streamflows in more than 86% of monitored streams nationally and may be the primary cause of ecological impairment in river and stream ecosystems (Carlisle et al. 2011). Every aspect of the lives of aquatic plants and animals is cued by and inextricably linked to the natural variability of our rivers and streams (Southern Instream Flow Network 2010). Alterations and reductions in stream flow and fragmentation of our waterways concentrate toxic and conventional pollutants, reduce fish passage, increase stream temperatures, increase predation, reduce access to stream bank habitat, eliminate the

connectivity to feeding and breeding locations in the flood plain and in some instances even eliminate stream flow altogether.

The EPA supports Governor Bentley's efforts to create a statewide comprehensive water plan that includes instream flow protection which may provide protection for Alabama's significant aquatic biodiversity. The EPA applauds this movement towards greater stewardship of these resources and hopes that with public outreach citizens can take even greater pride in their state's ecological riches.

Little was mentioned of Alabama's global significance in this area in the WMI Report. EPA encourages the AWAWG to acknowledge and support the exceptional aquatic biodiversity of Alabama as it works toward the completion of the statewide water management plan.

Water Issue Area Specific Comments

Water Resources Management

As a means of managing and planning for water supply while minimizing impacts to public resources such as streams and wetlands, we encourage the state to place up-front emphasis on conservation and management principles.

Fixing leaking infrastructure and incentivizing efficient use can free up significant supply already in the treatment and distribution system, often closing demand-supply gaps at a fraction of the cost of developing new supply. Whereas many distribution systems have unaccounted-for water (UAW) volumes upwards of 20-30%, states that have UAW goals generally target losses of no more than 10-15% (EPA 2010a). With its *Water Conservation Standards* of 2006, for example, Massachusetts established that water suppliers should conduct annual audits and semi-annual system-wide leak detection surveys with a goal of reducing UAW volumes to below 10%. Suppliers must then work towards fixing system leaks and reducing unaccounted-for water, with regular reporting requirements. Fixing leaks and managing system losses can increase financial benefits because water treated and transported through the distribution system, but lost before reaching an end user, is unbilled and thus represents revenue loss that could be recovered. In the mid-1990s, for example, Gallitzin, Pennsylvania's small distribution system was experiencing high water losses exceeding 70% (EPA 2002). After a thorough leak detection and mapping effort, the authority initiated a leak repair program and a corrosion control program at the water treatment plant. Just four years after implementation, delivery had decreased by 68%, with UAW down to 9%. Chemical treatment and energy cost decreases were 47% and 61%, respectively, which allowed the authority to keep water rates down.

Projects that impact hydrology, such as new or expanded water supply, development, and recreational or amenity impoundments, often require Clean Water Act (CWA) Section 404 permits, making them subject to review for compliance with the 404(b)(1) Guidelines. In reviewing such projects EPA considers whether the applicant has demonstrated adherence to the mitigation sequence, with avoidance and minimization of impacts to aquatic resources as the first two steps. EPA also reviews proposed projects for full consideration of alternatives in selection of the Least Environmentally Damaging Practicable Alternative. For water supply project proposals, full implementation of conservation and

efficiency measures, including water reuse options, is a primary alternative that could have a fraction of the impacts to aquatic resources of developing new supply infrastructure. A study that surveyed multi-family residential units across several cities found that the introduction of sub-metering reduced water consumption by 10-26% (Mayer et al. 2004). EPA looks for such measures to minimize or altogether avoid aquatic resource impacts. A state water management plan can serve as the policy basis for prioritizing projects that use and improve upon existing infrastructure, and make use of existing investments so that they have less impact to aquatic resources. A state plan can facilitate such measures being considered together as a comprehensive approach rather than in isolation.

When water supply projects are determined to be necessary, demonstrated maximization of conservation and efficiency measures can facilitate federal permit review. Any new supply development (such as a reservoir) should be sized appropriately for the documented purpose and need, and designed to mimic the natural conditions as closely as feasible in the downstream waters. Dewatering of the downstream segments should not be allowed during the filling stages of impoundments. Many of these projects require long-term financial and maintenance obligations, which should be outlined and accounted for in all applications to ensure protection of the water quality necessary to protect designated and existing uses throughout the life of the project. The maintenance of impoundments, including the costs for activities such as dredging of sediments, is often not adequately considered, and can lead to degradation of resources. Whereas free-flowing streams can be economic boons by bringing recreational users and tourism, with associated hospitality and recreational gear business, reservoirs can be an economic liability. One such example is that of the Hickory Log Reservoir in Canton, Georgia. Costs for that reservoir have increased to more than five times the original estimate, creating an economic burden threatening other fundamental needs of the city. *The Atlanta Journal-Constitution* reported in June 2012 that water bills for city of Canton customers have increased 30% to pay for expenses for the reservoir, which is full but not yet delivering water (Scott 2012).

Incorporating protection for aquatic species is a critical element of a good water resource management plan. Impoundments, for example, represent a significant threat to connectivity of Alabama's exceptional aquatic resources, including the many threatened and endangered species of freshwater mussels found in the state.

Therefore, the EPA would like to encourage the State to give priority to maximizing efficiency measures and the possible expansion of existing facilities versus building new reservoirs in order to avoid impacts to aquatic resources such as streams and wetlands, and to protect overall ecological/environmental integrity. My staff would be happy to work with the AWAWG and member agencies to provide technical support of the state's efforts.

As the WMI Report recognizes, water resource management "needs to be holistic across an entire watershed or drainage basin due to the interrelationship of the natural and human processes and activities that can impact each other, in some cases from a great distance. This includes both land and water resources, since land use can have significant impacts on water resources and related ecosystems." A water management plan that incorporates all uses should give equal consideration to instream uses, e.g., aquatic life, aesthetic values, physical stability, and ecological viability (habitat, water quality) as it does to anthropogenic off-stream uses (supply, impoundment), as recognized for some time by western

states and more recently by eastern states and the Instream Flow Council (Breckenridge 2004). The CWA provides that each state must specify appropriate water uses to be achieved and protected for each waterbody (40 CFR 131.10(a)). The state must take into consideration the use and value of water for public water supply, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agriculture, industrial uses and other purposes including navigation. For the past 30 years, North Carolina has successfully utilized the designated use provisions under its water quality standards (WQS) program to work with local jurisdictions to directly address issues where land use affects water use. For instance, a use designation for Class WS-II Waters provides additional protections for drinking water supplies by requiring local jurisdictions to adopt "nonpoint source and stormwater pollution control criteria for the entire watershed" (NCDWQ 2007). Once the use designation is adopted, those provisions are placed into ordinances of local jurisdictions, which are then responsible for their implementation. These provisions also include best practices such as buffers, housing density options or advanced storm water management. The state is careful to point out that these practices do not limit economic development, but rather ensure sustainable development in sensitive areas. *Alabama could review North Carolina's use designations and consider more fully developing its designated uses under the CWA to provide protection for an entire watershed rather than just the waterbody, and require those provisions be adopted by local jurisdictions.*

Expanded Certificates of Use/Permitting:

The EPA strongly supports a comprehensive program for permitting and accounting for both ground water and surface water use in Alabama. Understanding water availability and use is essential to managing the resource (USGS 2012). Understandably, Alabama also would like to keep 'the regulatory burden to a minimum' (WMI Report p.12).

The EPA has three recommendations in this section:

- As other states have faced this challenge, new innovative tools have evolved that Alabama may want to explore. Michigan has developed an innovative and national award winning ground water withdrawal permitting system that provides detailed information on ground water use while keeping the regulatory burden to a minimum. Michigan's Water Withdrawal Assessment Process and Internet Screening Tool was developed collaboratively over six years by the Groundwater Conservation Advisory Council representing water users, state officials, technical experts and conservationists. This tool allows citizens to go on-line, type in information on proposed ground water use, and get instantaneous feedback to determine if the water withdrawal will affect local streams. If it does not, they need only complete forms to get permitted. If it does, they may try to change the location or withdrawal rate to get the "go-ahead." No direct government review is needed for the majority of the permits. Only those few wells that may cause biological effects on streams need to proceed to the more detailed site-specific permit review (Ruswick et al. 2010; Hamilton et al. 2011).

- As Alabama considers how to move ahead with issuing a Certificate of Use (COU) that 'will not interfere with an existing legal use of the water' we ask that you also consider a requirement that

the permitted use not cause or contribute to a violation of water quality standards, including any existing implicit protections for instream flow, such as support for aquatic life.

- In other states, authorities have found it important not to set the threshold too high for capturing withdrawals and impacts via a permitting system. In Massachusetts, for example (Breckenridge 2004), higher permit thresholds led to not capturing data on many withdrawals, compromising understanding of the total anthropogenic uses and impacts on systems, and increasing uncertainty in planning. An effective plan would incorporate estimates of unpermitted uses (e.g., those below the threshold and illegal withdrawals) to more accurately gauge impacts. A plan and permitting system that allows for periodic review and adaptive management will provide for more effective protection as lessons are learned, systems adjust to alterations and impacts, and new monitoring and scientific information becomes available, especially given the variability of hydrographs that is essential to maintenance of the physical/chemical system and aquatic life.

Economic Development

As indicated in Alabama's proposal, protecting the health of freshwater ecosystems is not only critical to biodiversity and ecology but also to the support of a thriving economy. Maintaining the integrity of natural biological and physical systems provides significant economic benefits to state and local economies. In July 2012, EPA Headquarters published a document entitled, *The Economic Benefits of Protecting Healthy Watersheds* (EPA 2012b). This fact sheet, based in part on a study that included data from Alabama entitled, *Forests for Water: Exploring Payments for Watershed Services in the U.S. South* (Hanson 2011) states that healthy intact watersheds provide many ecosystem services that are necessary for our social and economic well-being. These services include water filtration and storage, nutrient cycling, soil formation, flood prevention, food production and timber.

Protection of natural and aquatic resources can also be directly tied to the creation of jobs and a strong economy. For example:

- A 2012 report found that outdoor recreation contributed $646 billion in direct sales and services to the U.S. economy annually, supporting an estimated 6.1 million jobs, generating $39.9 billion in federal tax revenue and $39.7 billion in state/local tax revenue, and providing sustainable growth in rural communities (Outdoor Industry Foundation 2012). Outdoor recreation jobs numbering 215,126 were found in the East South Central states (AL, KY, MS and TN) (Outdoor Recreation Industry 2006).
- Twenty-four million Americans participate in paddling sports (kayaking, canoeing, rafting). Despite the national recession, the outdoor recreation economy grew approximately 5 percent annually between 2005 and 2011 (Outdoor Industry Association 2012).
- Local hydrologic restoration projects are bringing economic development to smaller communities in our region. A project to remove aging dams and restore naturalized white water flow to the Chattahoochee River on the Georgia/Alabama border is projected to bring 144,000 new visitors annually, create 700 jobs and add $42 million additional yearly revenue from recreational tourism (Adams 2011).

- Healthy estuaries, such as the Mobile Bay and coastal communities dependent on the natural timing and delivery of freshwater flows, contribute billions of dollars to state economies.

Protection of adequate instream flow also provides economic certainty to municipal and industrial dischargers. In recent years, there has been a trending downward of freshwater flows in many freshwater rivers and streams – much of which is anthropogenic in origin, such as over-pumping of ground water or surface water withdrawals. Some of these reductions may persist long enough to cause revisions to the calculated 7Q10 (the lowest recorded 7 days of flow in a ten year period). In addition, prolonged droughts have prompted those who control regulated rivers to consider dropping the low flow minimums or revise drought control manuals to allow for further reductions of the low flow values. National Pollutant Discharge Elimination System (NPDES) permits issued under Section 402 of the CWA use critical low flow values such as 7Q10s or negotiated low flows on regulated rivers to calculate a permittee's discharge limits. In areas where those low flow values are causing long-term changes, permits will have to be recalculated to protect for the new critical low flow. Where possible, protection of instream flows from anthropogenic alteration may prevent unnecessary and often costly additional treatment for those permittees.

Whereas resource management can often be portrayed as protection of ecology vs. protection for economic development, new data and studies indicate that they are quite often linked. Therefore, *the EPA encourages the AWAWG to acknowledge as they develop their plan that there may be significant economic benefits, in both ecosystem services, jobs and revenue, to protecting and maintaining intact aquatic ecosystems.*

Surface Water and Ground Water Availability

The EPA supports Alabama's approach of developing comprehensive scientific knowledge of surface water and ground water availability. The EPA recommends that as Alabama explores ground water development policy, it ensure that it addresses the linkages between ground water and surface water. Alabama notes surface water and ground water concerns in this section separately, but they should be treated in most areas as a single resource. Nearly all surface water bodies interact in some manner with ground water (Winter 1998). Withdrawal of surface water can deplete ground water and there are numerous areas in the Southeast where pumping of ground water has been known to directly affect surface water. Ground water depletion may cause significant reductions of surface water flow which may impair or remove designated uses without going through the provisions of the CWA (40 CFR 131.10 (g)). It should be noted that under the CWA, existing uses generally cannot be removed (40 CFR 131.10(h)).

The EPA recommends that newly developed ground water withdrawal policy directly link to Alabama's water quality standards so that any withdrawals will not cause or contribute to a loss of the water quantity needed to support the water quality, including support for meeting aquatic life uses, drinking water, recreation, etc.

The EPA will work with the State to explore any potential assistance that we can provide on funding options for maintenance of gaging stations, water quality and biological assessments and ground water and surface water assessments.

Water Conservation and Reuse

When it comes to protecting our limited fresh water supply, development and expansion of efficiency and conservation programs and efforts is an essential first step as we noted above, and we applaud the recognition in the *WMI Report* of the major impacts of water usage, and benefits of water conservation and reuse. Conservation not only reduces volumes requiring treatment (for consumption and as waste), but also reduces energy required to distribute and treat water. Conservation also preserves in-stream values such as water quality, habitat, physical stability, and aquatic life.

Water reuse, as recognized in the *Water Conservation and Water Reuse* section of the report, can be implemented in many settings. It can benefit municipal, agricultural, environmental, industrial, and private entities through uses such as those identified as well as through protection of environmental values. It can also represent an economic development advantage by reducing infrastructure and energy costs and resource demands in both public and private capacities. In September, EPA released its 2012 update of its manual *Guidelines for Water Reuse ("2012 Guidelines")*. This update includes new information on efforts by states across the country to develop water reuse, including regulations adopted by 30 states and one territory, and an inventory of diverse case studies (EPA 2012a). It can serve as a valuable resource and addresses two issue areas identified as considerations in the WMI Report. The first consideration given is:

- A tension exists within public water systems between the need to conserve water and a financial model predominantly based on water sales.

When water is reused as one measure for avoiding new withdrawals, this conflict is reduced; Chapter 7 of the *2012 Guidelines* addresses financial aspects of water reuse, including rate and fee structures. Other considerations describe success of these approaches as tied to public understanding and acceptance, for example:

- The public's perception of water reuse may be less receptive if they believe the recycled water is from a common public waste source.

This is a challenge that has played out nationally and in many communities as water reuse has been implemented, and Chapter 8 of the *2012 Guidelines* provides an excellent discussion of the issue and various approaches to public outreach and engagement. Much of this discussion, including the importance of proactively providing information to the public, is also translatable to conservation and efficiency programs.

An excellent example of a successful water reuse initiative is the Mobile Area Water and Sewer Systems (MAWSS) demonstration project funded by EPA through a $1.1 million National Community Decentralized Wastewater Demonstration Project grant. To deal with municipal treatment capacity overloads, the utility diverted wastewater to four satellite cluster facilities. Some of that diverted water is

then treated and used in a state-of-the-art underground drip irrigation system for a municipal park, decreasing the burden on the central treatment facility and reducing wastewater discharges to Mobile Bay (MAWSS 2005).

We have provided each of the southeastern states with a copy of EPA Region 4's 2010 *Guidelines on Water Efficiency Measures for Water Supply Projects in the Southeast* ("*WEGs*"). The *WEGs* emphasize many of the same goals expressed in the Alabama WMI report, and provide recommendations for effective implementation of conservation and efficiency measures (EPA 2010b). EPA is continually working to update these guidelines to incorporate more refined and quantifiable approaches and will continue to provide those as revised. The WMI Report issue area on conservation mentions measures such as fixing leaks, turning off water when not in use, rain barrel use, and non-potable water reuse in agricultural and industrial settings. We would highly recommend implementation of much more comprehensive measures (such as those identified in the *WEGs) and incentivizing them via funding programs and permitting requirements*. We especially endorse fixing leaking infrastructure, using an integrated resource management approach across residential, industrial, agricultural, and commercial settings, full-cost pricing, conservation pricing, metering of all water users, low-impact development and green infrastructure, retrofitting all buildings, water reuse, landscaping to minimize demand and waste, and efficient irrigation practices. Many state approaches can provide good examples of conservation and efficiency programs, such as the standards and recommendations in ten key areas in Massachusetts' *Water Conservation Standards* of 2006.

These approaches can conserve resources, reduce treatment costs, and reduce releases of pollutants into streams and rivers, as well as reduce unbilled losses. Conservation and efficiency measures can be promoted directly with residential, industrial, agriculture, commercial, municipal and local users, as well, not just public utilities, through establishment of codes, policies, and incentive programs, as demonstrated by many successful programs across the country. As recognized in the WMI report, developing a new water supply can be costly and time consuming, whereas demand can often be met for a fraction of the cost via conservation and efficiency measure implementation. Ashland, Oregon, for example, was facing a demand-supply gap and initially considered an $11 million reservoir or $7.7 million for 13 miles of new pipeline to withdraw from the Rogue River (EPA 2002). Instead they implemented an efficiency program comprised of system leak detection and repair, conservation-based water rates, a high-efficiency showerhead replacement program, and toilet retrofits and replacement. The cost of the program was just $825,875—less than 10% of the estimated cost of a reservoir—and less than a decade later demand was down considerably (16% of winter use), wastewater flow was reduced by 58 million gallons annually, and the town had realized considerable energy savings primarily associated with efficient showerhead replacement. Savings to utilities from avoiding additional infrastructure development can also be considerable. The WMI Report refers to the potential use of the Water Supply Assistance Fund; this presents an opportunity whereby efficiency-first guidelines could be established as part of this program. Additionally, the Regulated Riparian Model Water Code bolsters this emphasis by specifying a water authority's ability to "promulgate and establish guidelines and procedures relating to loans or grants" (ASCE 2004).

Again, EPA recommends that the state place up-front emphasis on conservation and efficiency as integral to water resource management. We highly recommend that the measures implemented be a far more comprehensive approach than that identified in the WMI Report, and that they be incentivized

through funding programs and permitting requirements. States such as Florida, Kansas, Colorado, Pennsylvania, Vermont, and Nebraska have used State Revolving Fund (SRF) programs to provide audit and leak detection programs, metering, and to improve efficiency in irrigation (EPA 2003). Kansas and Texas require implementation of approved water efficiency plans in order to receive SRF funding.

EPA welcomes the opportunity to work with Alabama to explore potential funding options to support Alabama's efforts to implement water efficiency measures and conservation and reuse programs. Nationally, the EPA already provides funding for efficiency, including reuse, through mechanisms such as the State Revolving Fund.

Interbasin Transfers

The EPA recommends that Alabama consider the procedures set out in Massachusetts' Interbasin Transfer Act (MGL Ch 21 Section 8B-8D), which governs water and wastewater transfers between river basins of the Commonwealth. This Act has been in effect for over 25 years and is considered part of an overall plan which has led Massachusetts to be considered a model for water supply efficiency. (See http://www.mass.gov/dcr/watersupply/intbasin/index.htm.) This well–established program includes many features that Alabama is considering, including defined basin units for evaluating and accounting for interbasin transfers and a "regulatory mechanism that provides for existing transfers and establishes criteria for new or expanded transfers." The Act also requires that efficiency measures be in place prior to approval of a transfer, such as conservation, leak detection, more accurate metering, etc. These efficiency measures correlate well with Alabama's stated goals regarding conservation.

Instream Flows

Under the WMI Report's Findings and Policy Options (pp.4-7) it recommends that the state:

- *Develop a policy concerning instream flows which can serve as a cornerstone of a statewide water management plan, and*
- *Develop an acceptable legal and regulatory framework for implementation of an instream flow policy.*

Under the issues identified by the Permanent Joint Legislative Committee on Water Policy and Management (2009) it recommended:

- *Examining and recommending appropriate flow dynamics [instream flows] for rivers and streams to support biological, recreational, and industrial/transportation needs and requirements.*

EPA concurs with these statements and recommends that Alabama utilize the well understood and well established tools under the CWA to develop instream flow water quality standards (WQS) for the protection of all designated uses and for application in all other purposes under the CWA. Under the CWA, WQS include the designated use of a waterbody, narrative and/or numeric criteria to protect those designated uses and the state's antidegradation requirements. All three of these WQS components can be used by Alabama as relevant and vital tools to protect and restore healthy hydrology in the state.

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The WMI Report to the Governor states that "environmental legislation such as the Clean Water Act...often play[s] a major role in protecting instream flows in rivers and stream reaches but in a very indirect manner..." (WMI Report, p. 26). However, the EPA notes that the tools available under the CWA are increasingly being used to protect and restore the hydrology of waterbodies.

Many states have considered that the CWA is only concerned with water *quality* and does not regulate water *quantity*. However, the U.S. Supreme Court specifically addressed this under the CWA in PUD No. 1 of Jefferson County v. Washington Department of Ecology ("PUD"), 511 U.S. 700 (1994). In that case, the Court found that the distinction between water quality and quantity was "an artificial distinction" and that "[i]n many cases, water quantity is closely related to water quality..." (*PUD* at 1912-13). The linkage between water quality and water quantity has been well documented by the scientific community. Bunn and Arthington (2002) concluded that flow is a major determinant of physical habitat in streams and rivers and directly affects biological composition. Modifying flow regimes alters habitat and influences species diversity, distribution and abundance (Bunn and Arthington, 2002). Aquatic plant and animal species have evolved life cycle patterns directly tied to the frequency, magnitude, duration, timing and rate of change of natural flows. Ecologists now understand that flows following the range of the natural hydrograph are important for maintaining structure and function of aquatic ecosystems (Freeman and Marcinek, 2006). The *Regulated Riparian Model Water Code* recognizes the critical interconnectedness of water quantity and water quality at Section 1R-1-09, stating:

> Water allocation is inseparable from the regulation of water quality. Regardless of whether both functions are vested in a single agency, water allocation must be coordinated with water quality for effective management of a water source and to comply with federal laws and regulations. ... Two programs...will particularly affect State water allocation: 1. ambient water quality standards; and 2. effluent discharge standards for "point sources."

At this time, eight states and three tribes have adopted explicit narrative water quality criteria for protection of instream flows into their state WQSs under the CWA. Many more states are in the process of developing hydrologic standards under the CWA. Table 1 provides examples of how narrative criteria have been developed to protect not just the ecological conditions necessary to protect vital fisheries and aquatic life, but also recreation and all other designated uses under the CWA.

State/Tribe	Terms in WQS
NH	"surface water quantity shall be maintained at levels adequate to protect existing and designated uses"
RI	"quantity for protection of... fish and wildlife...adequate to protect designated uses" "For activities that will likely cause or contribute to flow alterations, streamflow conditions must be adequate to support existing and designated uses."
VT	Class A(1)- Changes from natural flow regime shall not cause the natural flow regime to be diminished, in aggregate, by more than 5% 7Q10 at any time; Class B WMT 1 Waters - Changes from the natural flow regime, in aggregate,

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State/Tribe	Terms in WQS
	shall not result in natural flows being diminished by more than a minimal amount provided that all uses are fully supported; and when flows are equal to or less than 7Q10, by not more than 5% of 7Q10. Class A(2) Waters and Class B Waters other than WMT1 - Any change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria.
NY	For both Class N fresh surface waters and Class AA(S) fresh surface waters … "There shall be no alteration to flow that will impair the waters for their best usages."
VA	"Man-made alterations in stream flow shall not contravene designated uses including protection of the propagation and growth of aquatic life."
KY	"Aquatic Life. (1) Warm water aquatic habitat. The following parameters and associated criteria shall apply for the protection of productive warm water aquatic communities, fowl, animal wildlife, arboreous growth, agricultural, and industrial uses:...(c) Flow shall not be altered to a degree which will adversely affect the aquatic community."
TN	Criteria for Water Uses "(3) Fish and Aquatic Life (n) Habitat- The quality of stream habitat shall provide for the development of a diverse aquatic community that meets regionally-based biological integrity goals. Types of habitat loss include, but are not limited to: channel and substrate alterations… stream flow changes…. For wadeable streams, the instream habitat within each subecoregion shall be generally similar to that found at reference streams. However, streams shall not be assessed as impacted by habitat loss if it has been demonstrated that the biological integrity goal has been met. (o) Flow- Stream or other waterbody flows shall support the fish and aquatic life criteria." "(4) Recreational. (m) Flow- Stream flows shall support recreational uses."
MO	"Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community."
Seminole Tribe of FL	"Class 2-A waters shall be free from activities...that …Impair the biological community as it naturally occurs… due to …hydrologic changes"
Mole Lake Band of the Lake Superior Tribe of Chippewa Indians	"prohibited…human induced changes to … area hydrology that alter natural ambient conditions…such as…flow, stage…. Natural daily fluctuations of flow, stage… shall be maintained."
Bad River Band of the Lake Superior Tribe of Chippewa Indians	"Water quantity and quality that may limit the growth and propagation of, or otherwise cause or contribute to an adverse effect to wild rice, wildlife, and other flora and fauna of cultural importance to the Tribe shall be prohibited." "Natural hydrological conditions supportive of the natural biological community, including all flora and fauna, and physical characteristics naturally present in the waterbody shall be protected to prevent any adverse effects." "Pollutants or human-induced changes to waters, the sediments of waters, or area hydrology that results in changes to the natural biological communities

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State/Tribe	Terms in WQS
	and wildlife habitat shall be prohibited. The migration of fish and other aquatic biota normally present shall not be hindered. Natural daily and seasonal fluctuations of flow (including naturally occurring seiche), level, stage, dissolved oxygen, pH, and temperature shall be maintained."

Table 1: Narrative language in WQS of select states and tribes relating to hydrologic criteria. See EPA website for full text of specific criteria: http://water.epa.gov/scitech/swguidance/standards/wqslibrary/index.cfm)

It should be noted that some other states have set instream flow standards that are implemented through provisions other than the state WQSs. Should Alabama choose to develop instream flow standards outside of the CWA, it should ensure that those instream flow standards are consistent with the state WQSs. That is, Alabama should not set conditions which would be less stringent than or in conflict with the state WQSs under the CWA. The EPA recommends setting the instream flow standard through existing CWA provisions in order to avoid that confusion. Specifically, EPA suggests that Alabama develop instream flow water quality criteria into the state WQSs (Chapter 335-6-10). Once approved, those standards would be in use for all purposes under the CWA in Alabama, such as Section 401, Section 404, etc.

The WMI Report states that the use of the public trust doctrine to protect instream flows often does not take into account the inter- and intra-annual flow variability needed to support stream ecology (p. 26). That is true of many state water policies or specific 'negotiated instream flow requirements' for regulated rivers that have historically focused on protecting a minimum or base flow. As Alabama succinctly captures, there is now a better understanding of the importance of addressing the seasonal, intra-annual and inter-annual variable flow patterns needed to maintain or restore processes that sustain natural riverine characteristics (Instream Flow Council 2009). The EPA concurs with Alabama and supports the approach that does not focus solely on the necessary minimum flows. While a low flow value such as the 7Q10 has been used as a critical flow value for developing waste load allocations for industrial and municipal dischargers, it was never intended as a value to protect ecological integrity.

The EPA Region 4 encourages states to consider adopting environmental flow standards under the CWA based on a "natural flow paradigm" that more closely resembles natural conditions (Poff et al. 1997). Where resources are available, site-specific environmental flow determinations can be made. When such studies are not practicable, the use of tools such as the "Ecological Limits of Hydrologic Alteration" (ELOHA; Poff et al. 2010) could be used which provides a scientifically sound means to assess environmental flows across large regions. Other natural flow approaches can be used where site-specific data are not available, such as using a Percent-of-Flow (POF) approach. The POF approach "explicitly recognizes the importance of natural flow variability and sets protection standards by using allowable departures from natural conditions, expressed as percentage alteration" (Richter et al. 2012). The POF approach is relatively simple to implement and may provide a high degree of protection for designated uses that are dependent on natural flow variability. Region 4 notes that the POF approach may need to be modified to be more protective for certain categories of highly sensitive or ecologically significant water bodies. This could include waters designated as Outstanding Alabama Waters or Outstanding National Resource Waters or waterbodies that have a significant contribution of base flow from ground water. The concept of supporting a "natural flow paradigm" as an important ecological objective fits in

naturally with the structure of CWA WQS as it can be explicitly stated as a narrative or numeric criterion with frequency, duration and magnitude, utilized to protect designated uses and evaluated during antidegradation reviews.

Development of an instream flow WQS under the CWA would address many of the concerns stated in the Instream Flows section of the WMI Report (pgs. 26-27), including the following:

- *Consistency with fulfilling the trustee resource conservation requirements for the Alabama Department of Conservation and Natural Resources regarding wildlife (Code of Alabama, 1975, §9-2-2).*
- *Relieving concerns regarding 'complex and cumbersome' implementation and enforcement and multi-agency coordination. Use of WQSs under the CWA is an established and well understood process. Other agencies could rely on the standards as the metric to be used in other state programs.*
- *Providing clear definition of the needed natural, variable instream flows versus static minimum flows which do not afford adequate protection.*

Interstate Coordination

EPA would welcome the opportunity to participate in any way with other state and federal agencies to facilitate coordination of interstate issues. EPA has access to facilitation services that could be utilized as needed for resolution of interstate issues.

As well, we encourage all states to keep in mind the CWA provision to protect all downstream uses, including the hydrologic conditions needed to meet the designated uses (40 CFR 131.10(b)) of downstream states.

Water Resources Data

EPA welcomes the opportunity to work with Alabama and other federal partners to explore potential funding options in Alabama's efforts to acquire quality surface water and ground water data.

The EPA also notes that there is a wealth of data and research that is already being developed in the area of water management, water efficiency, the flow-ecology relationship and ground water/surface water interactions that can be used by the state to supplement its own data and research, including work being done by the Southern Instream Flow Network, the USGS, the US Fish and Wildlife Service and academic researchers. Research that is taking place in neighboring states may also be of use to Alabama in those areas with similar physical and geological formations.

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

MAR 15 2012

Linda MacGregor, Chief
Watershed Protection Branch
Environmental Protection Division
Georgia Department of Natural Resources
4220 International Parkway, Suite 101
Atlanta, Georgia 30354

Dear Ms. MacGregor:

The purpose of this letter is to summarize the Environmental Protection Agency's review of the Georgia Environmental Protection Division's (EPD's) revisions to Chapter 391-3-6-.03 of Georgia's Rules and Regulations for Water Quality Control. The revisions were adopted as a result of the EPD's triennial review of water quality standards (WQS), as required under the provisions of Clean Water Act (CWA or the Act) section 303(c).

The State held public hearings on the proposed triennial review revisions on January 27, 28 and 31, 2011. The revisions were published for public review and comment and thereafter adopted by the Board of Natural Resources on March 23, 2011. EPD submitted new and revised WQS to the EPA by letter dated November 7, 2011 and, received by the EPA on November 14, 2011. The State's submittal included a certification letter dated October 25, 2011, signed by Samuel Olens, Georgia Attorney General, which stated that the revisions were duly adopted in accordance with State law.

New and Revised Standards that are Approved by the EPA

Based on the review of the State's submittal, the EPA has determined the six categories of new and revised standards listed below are consistent with 40 CFR Part 131 and section 303 of the CWA. Therefore, the EPA is approving the following new and revised water quality standards:

- Removal of the minimum and maximum hardness bounds from the aquatic life-based water quality criteria equations that apply to all waters of the State for six parameters in subparagraph (e)(ii) of Rule 391-3-6-.03(5);

- Revision of the water quality criterion for 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD) that applies to all waters of the State in subparagraph (e)(vi) of Rule 391-3-6-.03(5);

- Clarification of subparagraph (c)(iii) of Rule 391-3-6-.03(6) to state that the bacteria criteria for protection of coastal areas where shellfish may be harvested apply to "shellfish growing areas", and to update the reference manual for bacteria requirements listed in this Rule;

- Updating designated uses for streams and stream reaches in Rule 391-3-6-.03(14) to assign the Drinking Water use and/or the Recreation use;

- Revisions to Rule 391-3-6-.03(16) to clarify the qualification criteria for waters to be listed as "Waters Generally Supporting Shellfish" in this Rule as well as to state that it may not be legal to harvest shellfish from those waters; and

- Revisions of certain water quality criteria for chlorophyll *a*, total nitrogen, and total phosphorus in subparagraphs (d)(i), (d)(iii) and (d)(viii) of Rule 391-3-6-.03(17) for Lake Allatoona and three of its major tributaries.

Please note that Enclosure 1 is a listing of the revisions to classified uses of State waters in Rules 391-3-6-.03(14) and (15) that are subject to this approval action.

Revisions to Rule 391-3-6-.03 that are not New or Revised Water Quality Standards Subject to the EPA's Approval Action

All other revisions to Rule 391-3-6-.03 are not new or revised water quality standards that are subject to the EPA's review under CWA section 303(c) authorities. Therefore, the EPA is not acting on the following provisions:

- The adoption of new and revised standards provisions created the need to renumber or re-codify certain provisions of the previous standards regulation, and several other provisions were renumbered to reflect current customary formatting practices;

- Revision of the abbreviation, "ml" to "mL" in several subparagraphs of Rule 391-3-6-.03(6) that include this term;

- A change to reflect an alphabetic listing of stream segments of primary and secondary trout streams in each county in Rule 391-3-6-.03(15), as well as minor grammatical changes and a change to correctly list the East Armuchee Creek watershed as a secondary trout stream in Walker County (which was previously incorrectly listed as being located in Whitfield County); and

- Other revisions related to renumbering and/or arrangement of the codification of various provisions in Chapter 391-3-6-.03.

These revisions are either editorial in nature or reflect corrections of inaccurate information, do not have a substantive effect on the intent or meaning of these provisions and, do not alter the effectiveness of the standards, either individually or when taken as a whole. Therefore, the EPA is not acting on these revisions under CWA 303(c) authorities.

Endangered Species Act

The EPA's action to approve the above new and revised water quality standards is subject to consultation under section 7 of the Endangered Species Act (ESA). The EPA has prepared a Biological Evaluation of the effect of the EPA's approval of these new and revised water quality standards provisions, and this Biological Evaluation has been provided to the U.S. Fish and Wildlife Service (FWS) for concurrence.

Based on review of available information, the EPA has determined that the Agency has "No Discretion" in the approval of the revisions to the water quality criterion for 2,3,7,8 TCDD in Rule 391-3-6-.03(5) under ESA section 7 based on the fact that the criterion are established for the protection of human health as an endpoint. The EPA has also determined that the Agency has "No Discretion" in the approval of revisions adopted by the State that relate to the assignment of the Drinking Water designated use, assignment of the Recreation designated use, and revisions to provisions in Rule 391-3-6-.03(6) and (16) that relate to shellfish growing areas, since the only water quality criteria that were revised due to those State actions are also based on the protection of human health as an endpoint.

With respect to ESA section 7 consultations relating to the EPA's review of revisions to aquatic life criteria for cadmium, chromium III, copper, lead, nickel, and zinc in subparagraph (e)(ii) of Rule 391-3-6-.03(5), which are equal to the EPA's nationally recommended criteria, the EPA has the option of conducting a consultation with the FWS on such revision or deferring to the national consultation between the EPA and the FWS relating to all of the EPA's criteria guidance values. In this instance, the EPA has determined it is appropriate for the consultation to be handled at the national level. Therefore, ESA section 7 consultation on these aquatic life criteria revisions are being "Deferred to the National Consultation."

The EPA has determined that revisions to the water quality criteria for Lake Allatoona adopted by the State in paragraph (d) of Rule 391-3-6-.03(17) are not likely to adversely affect listed species. Implementation of the criteria will avoid excessive concentrations of nutrients, which can lead to algal bloom conditions and invasive aquatic plants, and subsequently can result in adverse effects on the aquatic life community and resource of a water body. Although it is not possible to quantify the effect of the criteria on listed species, the EPA has determined that these revisions, when taken as a whole, are not likely to adversely affect listed species that are present in Lake Allatoona or the tributaries of the lake to which the revised criteria apply.

The EPA's approval decisions on these revisions to the State's aquatic life criteria in Rules 391-3-6-.03(5)(e)(ii) and 391-3-6-.03(17) and the revisions to water quality criteria for Lake Allatoona are fully consistent with ESA section 7(d) because these actions do not foreclose either the formulation by the FWS or the implementation by the EPA of any alternatives that, through the consultation, might be determined necessary in order to comply with ESA section 7(a)(2). By approving the standards subject to the results of completion of consultation under ESA section 7(a)(2), the EPA is expressly retaining the discretion to revise its approval decision if the consultation identifies deficiencies in the standards requiring modification by the EPA. Moreover, the application of the revised standards is not anticipated to cause any impacts of concern during the interim period, until consultation is completed.

Issues for Follow-up Action

During review of the documents submitted to the EPA in support of the 2010 – 2011 triennial review, the EPA identified other areas of Chapter 391-3-6-.03 that warrant follow-up actions by the State, as described below.

Droughts, floods, water disputes and the development of regional and state water plans have brought Georgia's water quantity and quality issues into sharp focus - including impacts of both extreme low and

high flows on habitat and aquatic life. Around the country and here in Region 4, states and trib begun to address flow through the water quality standards program. Existing water quality sta implicitly protect flow through narratives for protection of aquatic life, protection of designated uses, biological integrity, habitat protection and through antidegradation policies. As discussed at the past three State Water Director's meetings, Region 4 is encouraging all of our states and tribes to consider explicit expression of flow as a water quality standard, either through a narrative standard, (i.e. such as that used by Tennessee "...flow shall support the aquatic criteria...") or through a numeric standard (i.e. such as used by Vermont, "no more than 5% 7Q10 change from natural flow regime..."). The Region can provide you with full examples in use by other states or additional information as needed.

Also, Rule 391-3-6-.03(14) currently includes a footnote for the segment of the Chattahoochee River from Buford Dam to Atlanta (Peachtree Creek), which states:

> Specific criteria apply at all times when the river flow measured at a point immediately upstream from Peachtree Creek equals or exceeds 750 cfs (Atlanta gage flow minus Atlanta water supply withdrawal).

Based on recent discussions between our agencies, the State should evaluate the need for retaining this provision in relation to (1) the past requests by the State to reduce flows released from Buford Dam to instream flows that are less than 750 cfs, (2) the instream design flows used in the development of effluent limitations for NPDES permit discharges that enter this segment, and (3) current monitoring/reporting capabilities to ensure that a particular instream flow can be maintained on a daily basis. The possibility of installing an alternate monitoring station to accurately measure instream flow should also be considered in the State's evaluation.

Additionally, the EPA recently released for public comment revised Recreational Water Quality Criteria Recommendations, pursuant to the Agency's obligations under the CWA section 104(v) and section 304(a)(9). These revisions reflect multiple decades of scientific advances in assessing and managing recreational waters, and include guidance for predictive modeling, sanitary survey methods, site-specific criteria derivation and rapid analytical detection methods. These recommendations will serve Georgia in future triennial reviews of recreational criteria under Rule 391-3-6-.03(6) and support the EPD's stated goal in Rule 391-3-6-.03(12)(c):

> The Environmental Protection Division will continue to conduct monitoring to evaluate the use of E. coli and Enterococci as indicators of bacteriological quality in Georgia. The Environmental Protection Division will also conduct studies to determine if a better human specific indicator can be found to replace current indicator organisms.

Summary

The State's new and revised standards address all "issues for follow-up" that were identified by the EPA in the Agency's action on the State's previous triennial review of WQS. These new WQS will result in the use of defensible and protective water quality criteria that are applicable to all waters of the State, ensure protection of drinking water and recreation uses in streams and stream segments where those uses have been identified as existing uses, and will provide additional clarity and specificity to the implementation of the water quality standards regulation.

The revisions to Georgia water quality standards approved by the EPA are now effective for all purposes of the Clean Water Act. If you have any questions regarding this action by the EPA, please call me at 404-562-9470 or have your staff contact Stephen Maurano at 404-562-9044.

Sincerely,

James D. Giattina
Director
Water Management Division

Enclosure

cc: Elizabeth Booth, EPD

Appendix 1
Revisions to Classified Uses of Georgia Waters
Approved by the EPA

The Drinking Water use was added as a designated use for the segments of the following water bodies:

Chattahoochee River Basin:

Alexander Creek
Blue Creek
Camp Creek
Cedar Creek
Centralhatchee Creek
Chattahoochee River (Soque River to White Creek)
Chattahoochee River/ Lake Lanier
Chattahoochee River (Pink Creek to Harris Creek)
Chattahoochee River/West Point Lake
Flat Creek
Hazel Creek
Hillabahatchee Creek
Sandy Creek
Snake Creek
Soque River
Sweetwater Creek
Turner Creek
Upatoi Creek
Yaholla Creek

Coosa River Basin:

Beech Creek
Blackwell Creek
Chestnut Cove Creek
Coahulla Creek
Coosawattee River/Carters Lake
Dry Creek
Duck Creek
Etowah River (Headwaters to confluence with Duck Creek)
Etowah River (Lily Creek to Mill Creek)
Euharlee Creek
Holly Creek
Long Swamp Creek
Pettit Creek
Raccoon Creek
Tributary of Dakwa Lake
Woodward Creek

Flint River Basin:

Elkins Creek
Flat Creek
Flint River (Birch Creek to Red Oak Creek)
Heads Creek
Horton Creek
Keg Creek
Lazer Creek
Line Creek
Potato Creek
Pound Creek
Rush Creek
Shoal Creek
Still Branch
White Oak Creek
Whitewater Creek

Ocmulgee River Basin:

Beaverdam Creek
Big Cotton Indian Creek
Big Towaliga Creek
Brown Branch
Cornish Creek
Edie Creek
Indian Creek
Little Cotton Indian Creek
Little Towaliga River
Long Branch
Ocmulgee River (Jackson Lake Dam to Wise Creek)
Pates Creek
Rocky Creek
Tobesofkee Creek
Town Creek
Tributary to Dried Creek
Tussahaw Creek
Walnut Creek

Oconee River Basin:

Apalachee River
Barber Creek
Bear Creek
Cedar Creek (Hall County)

Curry Creek
Fort Creek
Hard Labor Creek (Headwaters to Lake Brantley Dam)
Hard Labor Creek (Lake Rutledge Dam to Mile Branch)
Jacks Creek
Lake Oconee
Lake Sinclair
Little River
Lowry Branch
Mulberry River
North Oconee River
Parks Creek
Popes Branch

Ogeechee River Basin:

Rocky Comfort Creek

Savannah River Basin:

Abercorn Creek
Beaverdam Creek
Beaverdam Creek/Lake Boline
Brier Creek
Chattooga River/Tugaloo Reservoir
Cedar Creek
Grove Creek
Little Beaverdam Creek
Mountain Creek
North Fork Broad River
Savannah River/Lake Russell and Clarks Hill Lake
Sherrills Creek
Sweetwater Creek
Tallulah River/Lake Rabun
Town Creek (Tributary to Long Creek)
Tributary to Crawford Creek
Tugaloo River/Lake Hartwell

Tallapoosa River Basin:

Astin Creek
Beach Creek
Bush Creek
Indian Creek
Little Tallapoosa River
Turkey Creek

Tennessee River Basin:

Black's Creek
Hiawassee River/Lake Chatuge
Lookout Creek
Mud Creek
Notley River/Lake Notley
South Chickamauga Creek
Toccoa River
Tributary to Crawfish Spring Lake

The Recreation use was added as a designated use for the segments of the following water bodies:

Chattahoochee River Basin:

Chattahoochee River (House Creek to North Highland Dam – including Lakes Harding, Goat Rock, Oliver, and North Highlands)

Oconee River Basin:

Lake Oconee

Savannah River Basin:

Chattooga River/Tugaloo Reservoir
Tallulah River
Tallulah River/Lake Rabun
Tallulah River/Lake Hartwell

Tennessee River Basin:

Notley River/Lake Notley
Notely River
Toccoa River

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

AUG 2 0 2010

Mr. James McIndoe
Chief, Water Division
Alabama Department of Environmental
Management
P. O. Box 301463
Montgomery, Alabama 36130-1463

Dear Mr. McIndoe,

The purpose of this letter is for the Environmental Protection Agency (EPA) to review the triennial review revisions being proposed by the Alabama Department of Environmental Management (ADEM) and provide comment and recommendations. The revisions are being conducted by the State in accordance with the requirements of Clean Water Act §303(c). ADEM's Water Quality Branch is responsible for review and revision of Water Quality Standards (WQS) program regulations at least once every three years. The revisions to water quality regulations should include refining and designating surface water uses that meet or exceed CWA §101(a) goals, revising water quality criteria and WQS protective of both near field existing uses and downstream uses, and revising Antidegradation Policy and implementation procedures as necessary.

Section 101 of the Clean Water Act identifies intended and interim goals of protection and restoration for the Nation's waters. Numerous CWA water programs depend upon WQS including monitoring, reporting, and permitting for various discharges and certification processes. In addition to criteria and uses, State policies for mixing zones, stream flow requirements, and criteria variances may also be considered WQS. In preparing revisions to WQS, ADEM appropriately holds public hearings in order to compile new information and consider requests from industry, environmental groups, and the public. ADEM reviews new data and EPA guidance applicable to WQS regulation for each triennial review. ADEM submitted to EPA their responses to comments recorded from the June 29, 2009 public hearing for the State's concomitant triennial review.

1. Revisions to Use Designations

a. Choctawhatchee River Basin Stream Use Revisions

In accordance with CWA §101(a)(2) goals and §303(c)(2)(A) requirements, EPA understands that the State is proposing to revise use designations for streams segments in the Choctawhatchee River Basin to include protection for Swimming and Other Whole

Body Water-Contact Sports. These use designations are consistent with existing uses and water quality, the protection of which is in accordance with CFR §131.10 Designation of uses, §131.11 Criteria and §131.12 Antidegradation policy. EPA is certain that ADEM will continue to progress in its endeavors to assess and refine existing water body uses as appropriate.

b. Agriculture and Industrial Use and Limited Warmwater Fishery Use Revisions

EPA anticipates the State's continued success in upgrading stream segments that meet CWA §101(a)(2) goals where information indicates a higher use is attainable. The latest upgrade of Hurtsboro Creek to the Fish and Wildlife Use is evidence of this process. The State continues to review the remaining Agriculture and Industrial and Limited Warmwater Fishery Use waters to assess upgrade opportunities.

c. Revisions for Existing Recreational Use Protection

EPA would like to request that waters classified Fish and Wildlife Use, Public Water Supply Use and Shellfish Harvesting Use where incidental primary contact recreation occurs be considered for upgrade to the Swimming and Other Whole Body Water-Contact Sports Use Designation where appropriate. In accordance with CWA §101 (a)(2) EPA believes that ADEM should continue to designate and protect existing recreational uses in and on the water and adopt appropriate recreational use criteria whenever possible. In addition to the Choctawhatchee streams segments being reclassified for primary recreational use, ADEM should also review portions of the Cahaba River, Buck Creek, Sougahatchee Creek, Hurricane Creek and other waters where primary recreational uses may exist and require additional protection.

d. Revisions for Existing Fishery Use Protection

The State should further identify and characterize the fishery use in all State streams. Refining stream uses includes sub-categories of uses such as cold water or other specialized or unique native fisheries as explained in CFR 131.10(c). There are at least five trout species that occur in many locations throughout the State including lakes, rivers and ponds. Various trout waters include Lake Weiss, Inland Lake, Sipsey Fork, North River, Black Warrior River, Tallapoosa River, Little Tallapoosa River, Coosa River, Little River and Tennessee River. The Sipsey Fork below Smith Lake Dam is advertised on the Alabama Department of Conservation and Natural Resources website as Alabama's only all year trout fishery because of the fifty to sixty-five degree water temperature year round. EPA recommends that ADEM adopt a specialized use designation and appropriate criteria for the existing trout waters in Alabama.

e. Consideration of Outstanding Alabama Use Designation

EPA recommends that all portions of Sipsey Fork of the Black Warrior River that are designated under the National Wild and Scenic Rivers Act be designated as Outstanding Alabama Waters. The National Wild and Scenic Rivers System was created

by Congress in 1968 and serves to protect designated free-flowing rivers that have "outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural and other similar values." (www.rivers.gov) The Sipsey Fork of the Black Warrior River was federally designated a Wild and Scenic River in 1988. There are 36 miles designated as Wild and 25 miles designated as Scenic. The National Park Service has rated the Black Warrior's three forks in the top 2% of United States streams for "outstandingly remarkable values." The designation is notable for safeguarding the special character of wild and scenic rivers, while also recognizing the potential for their appropriate use and development.

EPA recommends that ADEM consider the following waterbodies or portions thereof for designation as Outstanding Alabama Waters due to high water quality, recreational and ecological significance: Lake Martin, East and West Forks of the Choctawhatchee, Locust Fork. The EPA recommends that ADEM consider Outstanding Resource Designations be more inclusive of waters which are of high quality and should be recognized above the tier I level. Other factors which might be considered include unique fisheries, exceptional recreation or scenic value, national or state forest area, State or federally listed threatened, endangered or rare species, and wilderness areas.

2. Revisions to Water Quality Criteria

ADEM continues to adopt revised water quality criteria consistent with EPA published §304(a) guidance, site-specific criteria or other criteria based on scientifically-defensible methods. EPA is aware that ADEM is considering adoption of revised Ammonia and Chlorine criteria and will assist the State in moving forward with protective criteria for these pollutants.

a. Proposed Revisions for Nutrient Water Quality Criteria

ADEM continues to adopt revised water quality criteria to address potential nutrient enrichment of Alabama lakes and reservoirs by utilization of EPA published §304(a) guidance, site-specific criteria or other criteria based on scientifically-defensible methods. ADEM is proposing revisions to 335-6-10-.11 Water Quality Criteria Applicable to Specific Lakes for the Cahaba River Basin, the Coosa River Basin, the Escatawpa River Basin and the Upper Tombigbee River Basin to include numeric criteria for chlorophyll-a for specific reservoirs.

Previously, in a letter dated April 1, 2010, EPA provided comment on the State's progress in development of numeric nutrient criteria with the adoption of lake specific chlorophyll-a criteria as identified in ADEM's 2009 Nutrient Criteria Implementation Plan (Plan). That letter reiterated EPA's position that according to the National Nutrient Strategy, numeric nutrient criteria for both causal variables (nitrogen and phosphorus) and response variables (chlorophyll-a and water clarity) are necessary for all waterbody types, and also, EPA's expectation that State Plans should include the intention, approach,

and process to do so. We would like to work with ADEM to assist the State in developing these additional criteria to provide more comprehensive protection of aquatic life in all Alabama waters.

b. Revisions to Water Quality Criteria for Methylmercury

The CWA and EPA's regulations specify the requirements for adoption of water quality criteria into state or tribal WQS. ADEM must adopt water quality criteria that protect designated uses consistent with CWA §303(c)(2)(A) and 40 CFR 131.11. ADEM is required to review their WQS every three years and submit changes to EPA for approval consistent with CWA §303(c)(2)(B) including numeric criteria for §307(a) priority toxic pollutants for which EPA has published §304(a) criteria, if the discharge or presence of the pollutant can reasonably be expected to interfere with designated uses. EPA has published Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion, EPA 823-R-10-001. The April 2010 document provides guidance on how to use the new fish tissue-based criterion recommendation in developing WQS for Methylmercury and in implementing those WQS in Total Maximum Daily Loads and National Pollutant Discharge Eliminations System permits. Based on the finalization of the aforementioned implementation guidance, all of the components necessary for the State to adopt the 2001 Methylmercury water quality criterion are now in place. EPA strongly recommends that the State adopt a water quality criterion, consistent with the 2001 criterion and the 2010 implementation guidance, during the upcoming triennial review process.

c. Revisions to Water Quality Criteria for Dissolved Oxygen

EPA has reviewed the comments from ADEM's June 29, 2009, public hearing for the upcoming Triennial Review of WQS, Response to Comments. ADEM's response on page 9 is as follows:

> "The Department interprets the provisions for dissolved oxygen criteria at 335-6-10-.09 regarding hydroelectric impoundments to mean that during periods when there is no discharge from the impoundment the applicable dissolved oxygen criterion is 5.0 mg/l in waters with the Public Water Supply and Fish and Wildlife designated uses. The applicable dissolved oxygen criterion during periods when the impoundment is discharging is 4.0 mg/l. These values do not indicate an instantaneous transition from one dissolved oxygen criterion to the next after the start or stop of impoundment discharge."

The State's criterion at 335-6-10-.09 Specific Water Quality Criteria, (5) Fish and Wildlife, (e) Specific criteria, 4. Dissolved Oxygen, is as follows:

> (i) For a diversified warm water biota, including game fish, daily dissolved oxygen concentrations shall not be less than 5 mg/l at all times; except under extreme conditions due to natural causes, it may range between 5 mg/l and 4 mg/l, provided that the water quality is favorable in all other parameters. The normal seasonal and daily fluctuations shall be maintained above these levels. In no event shall the dissolved oxygen level be less than

4 mg/l due to discharges from existing hydroelectric generation impoundments. All new hydroelectric generation impoundments, including addition of new hydroelectric generation units to existing impoundments, shall be designed so that the discharge will contain at least 5 mg/l dissolved oxygen where practicable and technologically possible. The Environmental Protection Agency, in cooperation with the State of Alabama and parties responsible for impoundments, shall develop a program to improve the design of existing facilities.

The State should consider eliminating or modifying the 4 mg/l standard variance for dissolved oxygen for existing hydroelectric generation impoundment discharges. A default provision in the standard allowing dissolved oxygen to be degraded to 4 mg/l during periods of hydroelectric impoundment discharge should not be allowed if a dissolved oxygen standard of 5 mg/l can be met or if a standard higher than 4 mg/l can be met. If the 5 mg/l dissolved oxygen criteria can not be met, then the State must make a demonstration documenting the lower water quality is adequate to protect existing uses fully, in accordance with CFR 131.12(a)(2).

In addition, the standard in 335-6-10-.09(5)(e)4 could be reworded to be more explicit in the requirement for hydroelectric impoundments to operate so as to maintain the dissolved oxygen concentrations of 5 mg/l during periods of non-generation/non-discharge. Finally, EPA recommends that the State standard require any modification or addition to existing or new hydroelectric generation impoundments meet the dissolved oxygen standard of 5 mg/l.

3. Consideration of Water Quality Criteria for Flow

EPA led a discussion at the May 2010 meeting with States and Tribes in Atlanta, relating to flow (water quantity) and water quality. Drought, floods, water disputes and the development of regional and state water plans have brought water quantity/quality issues into sharp focus - including impacts of both extreme low and high flows on habitat and aquatic life. Around the country and here in Region 4, States and Tribes have begun to address flow through the WQS program. Existing WQS typically protect flow through narratives for protection of aquatic life, protection of designated uses, biological integrity, habitat protection and antidegradation policies. Region 4 EPA is encouraging all of our States and Tribes to consider explicit expression of flow as a water quality standard, either through a narrative standard, (i.e. such as used by Tennessee "...flow shall support the aquatic criteria...") or through a numeric standard (i.e. such as used by Vermont, "no more than 5% 7Q10 change from natural flow regime..."). The Region can provide you with full examples in use by other states or additional information as needed.

Conclusion

The triennial review revisions being proposed by ADEM should include adoption of WQS and criteria in accordance with the requirements of Clean Water Act §303(c). The revisions should also include refining and designating uses that meet or exceed CWA §101(a) goals. The revisions proposed thus far to State WQS and use classifications are suitable and represent ADEM's continued efforts in protecting and enhancing water quality in Alabama. EPA encourages ADEM to consider the recommendations offered in this letter and looks forward to working with you throughout the next triennial review period toward the shared goals and mission to protect and improve human health and the environment. If you have questions regarding this letter, please contact me at 404-562-9125 or have a member of your staff contact Lydia Mayo at 404-562-9247.

Sincerely,

Joanne Benante

Joanne Benante, Chief
Water Quality Planning Branch

cc: Mitch Reid, J. D.
Alabama Rivers Alliance

Judy Takats
World Wildlife Fund

Michael Mullen
Choctawhatchee Riverkeeper, Inc.

Manning, Jeff

From: Battle, Gerald <Gerald.Battle@durhamnc.gov>
Sent: Friday, August 22, 2014 2:52 PM
To: DWR_Classifications_Standards
Cc: Brower, Connie; Hicks, Reginald; Westbrook, Vicki
Subject: Comments from the City of Durham
Attachments: CofDurhamAug2014TriennialScan.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Thank you.

Gerald Tyrone Battle
Industrial Pretreatment Coordinator
Water Management, City of Durham
101 City Hall Plaza
Durham, NC 27701

(O) (919) 560-4386 x. 35556
(C) (919) 475-2520
(F) (919) 560-4418

gerald.battle@durhamnc.gov
http://www.durhamnc.gov/

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DEPARTMENT OF WATER MANAGEMENT
101 CITY HALL PLAZA • DURHAM, NC 27701
919-560-4381 • FAX 919-560-4479
www.durhamnc.gov

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Brown - 919-560-4362
Water & Sewer
Maintenance
919-560-4345

August 22, 2014

Ms. Connie Brower
N.C. Division of Water Resources – Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

RE: Comments on the Proposed Surface Water Quality Standards

Dear Ms. Brower,

The City of Durham appreciates the opportunity to provide comments on proposed Surface Water Quality Standards (WQS) which were discussed at public hearings held on July 15th and 16th. The comments below address in particular the heavy metal standards proposed by the 2009 Triennial Review and the numeric nutrient criteria.

The City's two wastewater treatment facilities – the North Durham and South Durham Water Reclamation Facilities (WRFs) - have the combined capacity to treat/reclaim 40 million gallons per day (MGD) of wastewater. The average daily flow treated by the two plants for 2013 was 17.62 MGD. For both North and South Durham, the plant effluent makes up 99 percent of the stream flow at the discharge point. Currently, the City's Industrial Pretreatment staff regulates a total of thirteen significant industrial users; 9 are tributary to the NDWRF and 4 are tributary to the SDWRF.

The City of Durham supports protecting the water quality of North Carolina's rivers and streams. Further, we understand that there is significant pressure from the United States Environmental Protection Agency (USEPA) to adopt the proposed standards for heavy metals to ensure consistency across the country. Although the standards themselves are stringent, as a municipal discharger we are more concerned with the implementation of the standards based on current policies and procedures used by the North Carolina Department of Environment and Natural Resources – Division of Water Resources (DWR). As currently practiced by both the NPDES permit section and the PERCS (Pretreatment, Emergency Response, Collection System) Unit, these policies impose multiple layers of unnecessarily conservative restrictions on wastewater treatment plants. Such constraints may create a negative environment for economic development in North Carolina by discouraging the relocation of new metals related industries. Additionally, septic tank pumpers across the state will need to find alternatives to disposal of septage; wastewater treatment plants will not likely be able to

accept the heavy metal loadings from this industry. The inability to accept these waste loads will not be based on the facility's ongoing compliance with permit limits and new

water quality standards; it will be due to the overly restrictive policies used to implement the standards. Current policies and practices assume multiple worst case scenarios occurring at the same time over an extended period of time. It is imperative that there is flexibility within the policies so that during implementation both the NPDES Permit and PERCS Unit can mitigate the impacts of the standards on the municipal wastewater treatment systems. Through this flexibility, water quality will still be protected while North Carolina communities continue to thrive economically and municipalities are still able to function in a fiscally responsible manner. Therefore the City of Durham requests the following considerations.

Sampling should be kept to the minimum necessary for scientific confidence so that more resources (money) remain available to actually do the work of cleaning the water.

There is no basis for the existing criteria for Iron and Manganese. These are ubiquitous in the environment and do not produce adverse human health or toxic environmental effects. We should allocate our resources to more pressing issues. If proposed standards for Chromium III and Chromium VI are adopted then there is no longer a need for a Total Chromium criterion and this should be eliminated.

Validation of the translator for metals eliminates the need to measure both Dissolved Metals and Total Recoverable Metals. The translator is necessary because Water Quality Standards are Toxicity –based (not technology based) and dissolved metals represent the best measurement of the toxic effects of a pollutant metal in a sample of water. It would be scientifically unsound to use the translator to extrapolate to hardness levels less than 25 mg/l. because of the unstable reproducibility of measurements in that environment.

Per 40 CFR 122.45(c) NPDES permit limits are expressed as Total Recoverable Metals in large part because this is a more controlled, reproducible, and legally defensible measurement. Measurement of dissolved metals requires extensive sample manipulation under variable, non-ideal conditions and has a greater potential to introduce sampling errors.

We request that action levels for Copper, Silver, Zinc and Chloride be continued. There is no evidence to suggest that a better environmental result will be obtained by abandoning a system that has worked well historically and replacing it with a system of limits that are of no demonstrably greater benefit.

The City is in favor of using median instream effluent hardness levels as a basis for calculating site specific NPDES permit limits. (As EPA has allowed for most states) This approach is more than conservative in these calculations and is consistent with providing a best representation of expected conditions.

The City commends DWR's use of the 95% Confidence Level and 95% Upper Boundary for Reasonable Potential Evaluations. Discarding extreme outliers allows us to truly call these evaluations "reasonable" in the generally accepted meaning of that word.

We find that the use of the 1Q10 obtained from HUC data is a valid measure that does not place an undue burden on State and municipal water resources staff. We support the League of Municipalities, NCWQA and the NC-PC recommendation to use this metric.

We are appreciative of the fact that many of our concerns have been addressed procedurally by DWR in discussions with NC-PC. It is likely that the majority of our remaining concerns are at the level of resolving possible ambiguities in implementation. We expect that further continued discussion with DWR will result in realistic, measurable, and achievable methods to achieve these goals.

Thank you for your time and consideration in this matter.

Sincerely,

Tyrone Battle

Tyrone Battle
Industrial Pretreatment Program Coordinator
City of Durham

Cc: Donald F. Greeley, Director, Water Management
Vicki Westbrook, Assistant Director, Water Management
Reginald Hicks, Regulatory Compliance Superintendent, Water Management
Donald O'Toole, Senior Assistant City Attorney
Michelle Woolfolk, Assistant Water Quality Manager, Durham Storm Water Services
File

Manning, Jeff

From: Jeannie <jeanniea@centurylink.net>
Sent: Friday, August 22, 2014 2:38 PM
To: DWR_Classifications_Standards
Subject: Written comments for water quality standards Triennial Review
Attachments: JA-2014 Surface Water Quality Triennial Review of Standards.pdf

Connie Brower:

Thank you for the opportunity to submit written comments.

Also, many thanks to you and others for safeguarding our precious water resource so vital to the quality of life we all enjoy in NC.

Jeannie Ambrose
Chatham County

General Comments for Surface Water Quality Triennial Review of Standards

Jeannie Ambrose | Chatham County | 2014, August 22

Water is life.

Our quality of life depends on access to clean natural resources: clean drinking water affects us all. In 2010 the United Nation General Assembly acknowledged the human right to have clean drinking water and sanitation by adopting Resolution 64/292.[1] Traditionally North Carolina has been a relatively water-rich state albeit the headwaters of our water sources are prone to low water conditions. Degradation of these important elements of our water system will continue if strong and protective water quality regulations/land use ordinances on both the state and local government levels are not put in place. We need to ensure full compliance to state and federal water quality mandates as well as to retain and strengthen current state standards—especially, for new extractive industries.

In 2013 Raleigh was reported as the fastest growing city in the United States.[2] Upward population growth brings increased land use changes and human activities that further impact our impaired water sources. These changes in land coverage directly affect water quality. And, beginning as early as mid-2015, permits for oil and gas drilling exploration may be issued in NC. This is a game-changer: protecting potable water sources will require a comprehensive review of proposed water withdrawals, wastewater disposal and management rules. Cumulative impacts due to spills, releases, or wastewater disposal of fracking chemicals will impact the water quality and aquatic biology of receiving waters. The development of energy resources in NC also means major land use changes in rural areas. This includes the clearing of land for construction of access roads, well pads, sites for chemical, water and wastewater storage as well as the expansion of midstream infrastructure (compressor stations, et al.) and interconnecting pipeline transport system.

Another factor to consider is what effect will climatic variability have on statewide drought trends. As of Aug. 19, 2014, only 14 NC counties are classified as abnormally dry. Only three years earlier, however, many more counties experienced drought conditions as follows: 38 abnormally dry; 23 moderate drought; 21 severe drought; and 4 extreme drought.[3] Drought conditions affect water levels and, therefore, have an impact on whether or not state water quality standards can be met.

Chemical Standards

- Lower the current standard for 2,4-D herbicide known to harm human health and aquatic ecosystem.
- Study the impact on our waters of all herbicides being used in conjunction with GMO crops.
- Include the EPA list of contaminants of emerging concern.[4]

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[1] United Nations Department of Economic and Social Affairs. The Human Right to Water. Retrieved Aug. 21, 2014, from: http://www.un.org/waterforlifedecade/human_right_to_water.shtml

[2] Kotkin, Joel. (2013) America's Fastest - and Slowest-Growing Cities. *Forbes,* http://www.forbes.com/sites/joelkotkin/2013/03/18/americas-fastest-and-slowest-growing-cities/

[3] US Drought Monitor of North Carolina. (2014, August 19) From: http://www.ncdrought.org/

[4] U. S. Environmental Protection Agency. Contaminants of Emerging Concern. From: http://water.epa.gov/scitech/cec/

• Review and adopt standards to regulate chemicals used in unconventional drilling operations. Start with those listed in the proposed Mining and Energy Commission rules.[5] Ana allow no discharge of fracking fluids to contaminate surface or ground water in NC.

Water Withdrawal

Water withdrawals for fracking operations use the 7Q10 state standard for flow rate.[6] This standard is too low to sustain healthy aquatic ecosystem and maintain safe water levels for drinking water and other important uses.

Water Quality Monitoring

Delaying full implementation of Falls Lake Rules and Jordan Lake Rules will only add to the high cost of cleaning up our already stressed watersheds. Mechanical mixers, such as those deployed in Jordan Lake, July 2014, may discourage algal growth but do nothing to reduce or prevent incoming pollutants.[7]

The chemical and physical analyses of water samples provide a snapshot of water quality characteristics at any given time. Biological assessment of streams show the long-term effect on aquatic communities exposed to concentrations of nutrients in sediments and identifies existing impairment conditions. New studies show why traditional laboratory toxicity tests based on short-term exposure of aquatic insects to dissolved metals alone do not reflect evidence observed in field tissue. Metal bioaccumulation in insects via dietary sources may be more physiologically active than from dissolved metal exposure.[8] Note also that it has become harder to find good (reference) designation streams to use as a standard for benthic comparison in water quality studies.

• Use data obtained from numerical nutrient criteria. Industries should not be permitted to discharge excessive amounts of toxic metals based only on biological confirmation.
• Create a reliable revenue fund to provide adequate monitoring equipment, laboratory testing and training, and to support personnel performing stream water quality sampling, biological monitoring and assessment studies.

Water Security

Efforts for full compliance to current water quality standards are long overdue. More aggressive and expensive long-term approaches need to begin now for the long-term process of reducing elevated nutrient concentrations of polluted runoffs from point sources and non-point sources. Offering some financial assistance grants or loans may incentivize municipalities and water companies to maintain, repair or upgrade their water treatment facilities and infrastructure for more resilient water services and supply. Safeguarding good water quality is essential for sustainable growth and economic development.

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[5] See 15A NCAC 05H .1803 WATER SUPPLY TESTING PROCEDURES, proposed MEC rules. (f) Table; (j); 15A NCAC 05H .2003 EXPLORATION AND PRODUCTION WASTE DISPOSAL. (a) Table

[6] See 15A NCAC 05H .1902 SURFACE WATER SOURCE DOCUMENTATION. (3); (4)

[7] Burkholder, JoAnn. (2014) Threats to Our Drinking Water and the People who depend on it, and proposed solutions. Water Quality Series, at http://www.wakeupwakecounty.org/wp-content/uploads/2014/06/Burkholder-presentation.pdf

[8] Poteat, Monica D. and D. B. Buchwalter. (2014) Four Reasons Why Traditional Metal Toxicity Testing with Aquatic Insects is Irrelevant. *Environmental Science and Technology*. 48, 887–888.

Manning, Jeff

From: Blodgett, Terry L. <Terry.Blodgett@alcoa.com>
Sent: Friday, August 22, 2014 2:34 PM
To: DWR_Classifications_Standards
Subject: Written Comments: Triennial Review
Attachments: Alcoa_Inc_Comments_on_Proposed_Amendment_to_NC_Surface_Water_Quality_Standards_of_April2014.pdf

Importance: High

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Industry or Representative

PLEASE CONFIRM RECEIPT

Attn: Connie Brower
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

RE: Written Comments: Triennial Review

Dear Ms. Brower,

Alcoa Inc. (Alcoa) respectfully submits the attached comments addressing proposed amendments to Title 15A North Carolina Administrative Code 02B. Alcoa opposes changes which would regulate cyanide on a "total cyanide" basis only. It is widely accepted and well documented that most forms of cyanide, all of which are detected in a totals analysis, do not possess the potential to cause harm to people or the environment. Conversely, it is widely accepted that it is the free forms of cyanide in toxicity studies that that have the potential to cause harm if not properly regulated. To adopt a cyanide water quality criteria based on a totals analysis for comparison to a chronic criteria based on free cyanide toxicity testing is in our opinion overly simplistic and conservative. Companies should be afforded the opportunity to develop site-specific criteria based on free cyanide limits in receiving waters.

Sincerely,

Terry L. Blodgett
Alcoa Inc., International Project Development and Asset Management
Location EHS Manager
P.O. Box 472 | 4069 Charles Martin Hall Road | Rockdale, TX 76567
W: +1 512.446.8379 M: +1 512.760.8800 F: +1 512.446.8441
terry.blodgett@alcoa.com

COMMENTS ON PROPOSED CYANIDE STANDARDS FOR FRESH SURFACE WATER QUALITY [15A NCAC 02B.0211] AND TIDAL SALT WATER QUALITY [15A NCAC 02B.0220] IN THE STATE OF NORTH CAROLINA AS PROVIDED IN PROPOSED AMENDMENTS TO TITLE 15A NCAC 02B REGULATIONS (APRIL 2014)

Prepared for:
Alcoa, Inc.

Prepared by:

Dr. David V. Nakles
The CETER Group, Inc.
4952 Oakhurst Avenue
Gibsonia, PA 15044

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1.0 Introduction

The Federal Water Pollution Control Act (otherwise known as the Clean Water Act) has delegated the authority to the State of North Carolina (NC) to establish water body classifications and applicable water quality standards to protect human health and the aquatic environment in the state. Pursuant to receiving this authority, the state adopted water quality standards (WQS), which included numeric and narrative criteria and designated use classifications, as well as antidegradation provisions, to protect all uses of the water of the state. Requirements to establish these standards is the responsibility of the Environmental Management Commission (EMC) as authorized by the NC General Statutes (NC GS §143.214.1 and 215.3(a)).

Every three years, the state of North Carolina is required to review its surface water quality standards, classifications, and applicable variances to determine if changes are needed and, if necessary, to make those changes. The most recent of these "Triennial Reviews" was concluded in March 2014 and focused on the water quality regulations of the state as presented in the following sections of the Title 15A NCAC 02B (Surface Water and Wetland Standards) regulations: Section .0100, Procedures for Assignment of Water Quality Standards (Subsections .0101 to .0110); Section .0200, Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of N.C., (Subsections .0201 to .0228, .0230, and .0231); and Section .0300, Assignment of Stream Classifications (Subsections .0301 to .0317). This Triennial Review yielded a number of recommendations for proposed amendments to these water quality standards, which were submitted to the EMC in March 2014; the proposed draft amendments are appended to this document as Attachment A.

The comments contained herein address the regulation of cyanide in surface waters (freshwater and tidal) as addressed in the proposed amendments to Title 15A NCAC 02B. More specifically, these comments are directed towards the proposed amendments to Sections 15 NCAC 02B.0211 (Fresh Surface Water Quality Standards for Class C Waters) and 15A NCAC 02B.0220 (Tidal Salt Water Quality Standards for Class SC Waters). Both technical and regulatory information is provided in support of modifying the fresh surface water and tidal salt water quality standards for cyanide by changing the basis of the standards from total cyanide, as is currently in the proposed amendments, to free cyanide.

2.0 Proposed Amendments to Water Quality Standards

The proposed amendments to the water quality standards of North Carolina, as provided in Attachment A, specify water quality criteria of 5.0 and 1.0 µg/l total cyanide for fresh surface water and tidal salt water, respectively. In contrast, for these same waters, it is proposed that the basis for the water quality criteria for eight of ten metals (i.e., arsenic, beryllium, cadmium, chromium, copper, lead, nickel and silver) be changed from the measurement of total recoverable

metals to the measurement of the dissolved fraction of the metals. The rationale for this change is attributed to the fact that "measuring dissolved metal concentrations more accurately describes how the metal affects aquatic organisms" [NCDENR, 2014]. This rationale is based on the concept of "bioavailability", which has long been recognized in the aquatic toxicology literature [Newman, et. al., 1994]. In this context, bioavailability is defined as the degree to which a chemical can be taken up by an organism, subsequently interacting with a biologically important site of action.

Based on the concept of bioavailability as defined above, combined with the history of the development of risk-based water regulations and standards for cyanide, these comments present a case for shifting the basis for the cyanide standards in Title 15A NCAC 02B, Sections .0211 and .0220, from the measurement of total cyanide to the measurement of free cyanide. The reminder of these comments: (1) provides an overview of cyanide aquatic chemistry and toxicity, emphasizing the importance of cyanide bioavailability; (2) documents the importance of free cyanide, the most bioavailable and toxic chemical form of cyanide in water, in developing Federal water quality regulations and standards; and (3) documents the evolution of EPA-approved cyanide analytical methods over the course of this regulatory development process, highlighting the desire of the U.S. Environmental Protection Agency (US EPA) to provide improved measurements of the concentration of free cyanide in water. Based on this information, it is demonstrated that the water regulations and standards for cyanide are based on free cyanide, which is the toxic form of cyanide, and that an EPA-approved analytical method now exists to accurately measure free cyanide for the purposes of assessing regulatory compliance with surface water quality standards.

3.0 Aqueous Forms of Cyanide: Chemistry and Toxicology

3.1 Cyanide Chemistry

Common aqueous forms of cyanide can be classified into two broad categories: inorganic and organic. Both categories contain the cyano group, which consists of a carbon atom triple bonded to a nitrogen atom (C≡N). Organic cyanide compounds that contain this functional group are called nitriles; inorganic cyanide compounds (also known as ionic complexes) contain one or more cyanide anions (CN^{-1}), bonded directly to a metal or an ammonium ion [ASTM, 2001].

Within the class of inorganic cyanide compounds, there are three major chemical forms of aqueous cyanide, as defined by ASTM [ASTM, 2001]: (1) Free cyanide, (2) Simple cyanide, and (3) Metal cyanide complexes. The metal cyanide complexes consist of transitional metal cyanides, i.e., compounds involving a single transition metal bonded with the cyanide anion, as well as the more complex metal-metal cyanide compounds that involve one or more transition metals bonded to an anionic cyanide complex. The sum of all of these different forms of cyanide is designated as "total cyanide" as shown in Figure 1.

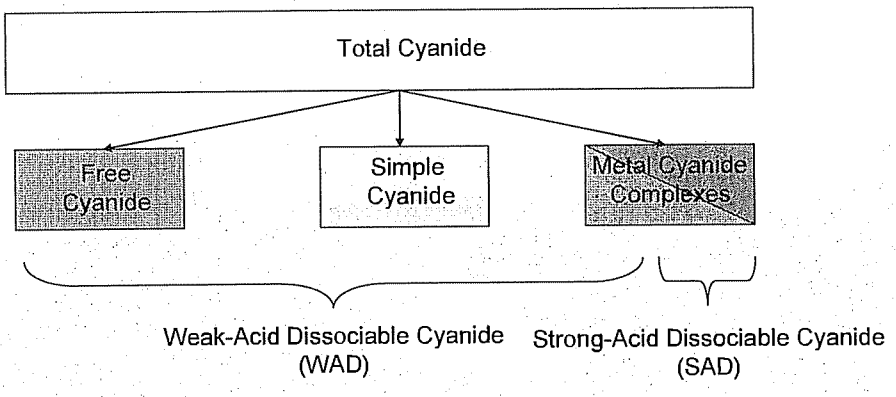

Figure 1. Inorganic Chemical Forms of Cyanide [Adapted from ASTM, 2001]

Also shown in Figure 1 are two "operational" analytical definitions that are used to characterize the cyanide compounds in an aqueous sample: weak-acid dissociable (WAD) cyanide and strong-acid dissociable (SAD) cyanide. There are direct measurement techniques for determining total and WAD cyanide; SAD cyanide is determined by taking the difference between these two measurements. It is important to note that in addition to the free and simple cyanide compounds, some, but not all, of the metal cyanide compounds are captured as part of the WAD analysis. For example, metal cyanide compounds detected by the WAD analysis are operationally defined as those compounds that undergo dissociation and liberate the cyanide anion, when refluxed under weakly acidic conditions [pH 4.5 to 6]; the remaining metal cyanide compounds are considered the SAD cyanide complexes and, consistent with their name, these metal-cyanide complexes require strong acidic conditions, i.e., pH < 2, to dissociate and release the cyanide anion[1] [Dzombak, et. al., 2006].

The chemical classes of inorganic cyanide identified in Figure 1 are formed as the cyanide anion [CN^{-1}] reacts with various groups of elements of the periodic table, resulting in different chemical and toxicological properties. The elements in the periodic table that most frequently react with cyanide are outlined in black in Figure 2. Figure 3 identifies which of those elements react to form free cyanide and simple cyanide, weak-acid dissociable cyanide and strong-acid dissociable cyanide. These specific chemical forms of cyanide are briefly discussed below.

3.1.1 Free and Simple Cyanide Compounds

Free cyanide, HCN, is formed from the combination of hydrogen with the cyanide anion. This compound readily releases the cyanide anion when in an aqueous solution, although the extent to which it does so is a strong function of the solution pH, i.e., at a pH of 7 or less, free cyanide is

[1] The existence on these two forms of metal-cyanide complexes is "qualitatively" indicated in Figure 1 by the green (WAD) and blue (SAD) shading. However, the relative quantities of each class of these compounds in a water sample will vary from site to site.

Cyanide [CN^-] Reacts with Selected Elements Forming a Range of Compounds

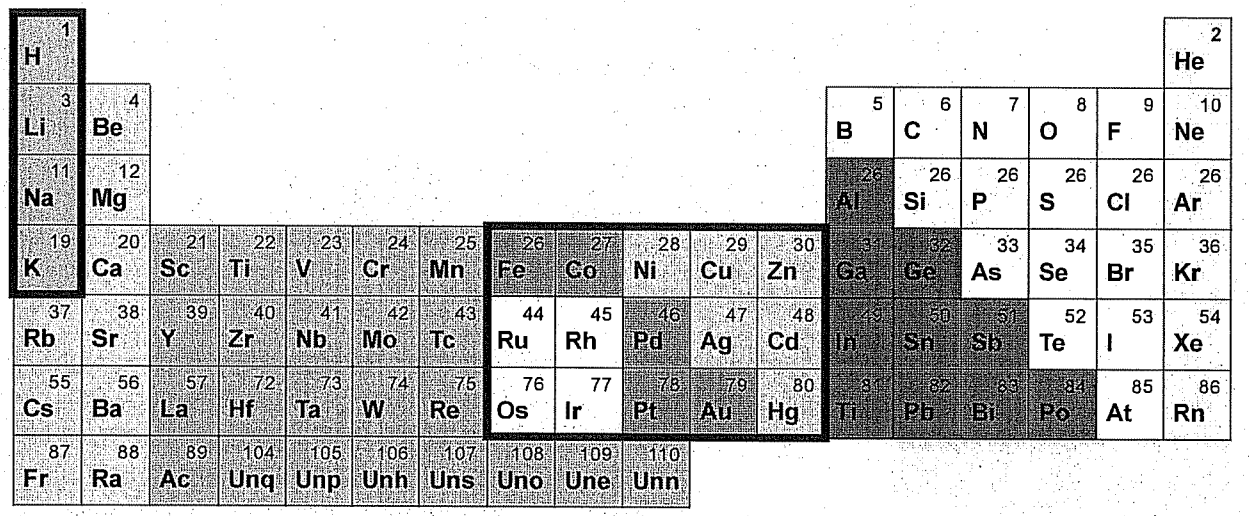

Figure 2. Elements Commonly Associated with the Cyanide Anion (CN^{-1}) as Outlined in Black [EPRI, 2010]

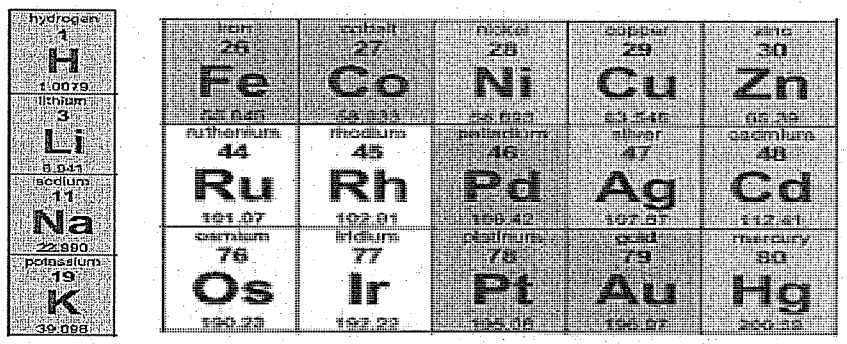

Figure 3. Elements That Form "Free and Simple Cyanide" [Shown in Red], "Weak-Acid" Dissociable (WAD) Cyanide [Shown in Green] and "Strong Acid" Dissociable (SAD) Cyanide [Shown in Blue] Compounds [EPRI, 2010]

present entirely as HCN while at a pH of 11 or greater, the opposite is true, i.e., it is entirely in the form of CN^{-1} [EPRI, 2000].

Simple cyanide compounds are formed when the cyanide anion combines with the alkali metals that are grouped with hydrogen on the periodic table, i.e., elements on the far left of the Periodic Table that are outlined in black in Figure 2 and shown in red, along with hydrogen, in Figure 3, i.e., Li, Na, and K. Due to the similarity of the chemical bonds that are formed, these chemical forms of cyanide also dissociate completely in aqueous solution to release the cyanide anion.

3.1.2 Metal Cyanide Compounds

The metal cyanide compounds are those that involve the reaction of cyanide with a select set of the transition metals on the periodic table, i.e., the elements outlined in black at the center of the Periodic Table (Figure 2). The metals are either bound directly to the cyanide anion (i.e., metal cyanide complexes) or to a negatively charged cyanide complex consisting of a transition metal and the cyanide anion (i.e., metal-metal cyanide complexes). These metal cyanide compounds bind the cyanide ion much more tightly than do the free or simple cyanide compounds, resulting in little, to essentially no, release of the cyanide anion when these compounds are in an aqueous solution. As noted later in this section, this is a critical point since the toxicity of cyanide compounds in water is directly related to their release of the cyanide anion, with increasing toxicity observed as more of the anion is released. A closer examination of these transition metals reveals a set of elements (i.e., Ni, Cu, Zn, Ag, Cd, and Hg) that form cyanide compounds which release the cyanide anion under weak acid conditions, i.e., pH of 4 to 6, and another set of elements (i.e., Fe, Co, Pd, Pt, and Au) that form cyanide compounds that will release it only under strong acid conditions, i.e., pH < 2. As previously discussed, the cyanide compounds formed by the former group of transitional metals (shown in green in Figure 3) are designated as "weak-acid dissociable", or WAD, cyanide compounds and those formed by the latter group of transitional metals (shown in blue in Figure 3), are designated as "strong-acid dissociable", or SAD, cyanide compounds.

3.2 Cyanide Toxicity

The "free cyanides" are the most toxic of the cyanide compounds and consist primarily of hydrogen cyanide, or HCN, although other simple cyanide compounds such as sodium cyanide (NaCN) or potassium cyanide (KCN) also result in toxic reactions. The free and simple cyanide compounds are toxic because they dissociate completely in aqueous solution and/or upon contact with aquatic organisms, releasing the cyanide anion, CN^{-1}, which is the active toxic agent[2]. Stated differently, these cyanide compounds are toxic because they are bioavailable. For this reason, reference to "free cyanide" in the literature, as well as throughout the remainder of these comments, includes both the free and simple cyanide compounds as discussed above. The chemical forms of cyanide that are considered essentially non-toxic are the metal cyanide compounds, which are much less bioavailable and do not release the cyanide anion when dissolved in an aqueous solution [US EPA, 2006].

It is worth noting that some metal-cyanide compounds will photodissociate in the presence of sunlight to release free cyanide (Young, et.al, 2006; Dzombak, et.al., 2006). In particular, the photodissociation of the iron-cyanide compounds has been documented in the literature over the last five decades (Ghosh, et.al., 2006b). For the most part, these literature data were generated as

[2] Since most of the organocyanide compounds are not anthropogenic, i.e., they are the natural products of the normal metabolic processes of vascular plants, and are resistant to the release of the cyanide anion, they do not play a significant role in human health or aquatic toxicity [Gensemer, et. al., 2006a; Wong-Chong, et.al,. 2006; and Ghosh, et.al., 2006a]

part of highly controlled laboratory experiments, which were required to investigate the underlying mechanisms of this decomposition reaction. Furthermore, it is known that the rate of decomposition of the iron-cyanide compounds is a function of several variables including pH, free cyanide content, sunlight intensity, temperature, turbidity and depth of the water column (Dzombak, et.al., 2006). For example, it was observed that photolysis rates declined exponentially with depth of water; the presence of natural organic matter or other photoreactive substances in water can significantly decrease the rate of photolysis; and slow or no dissociation was observed in the absence of light (Young, et. al., 2006; Ghosh, et.al., 2006b; Dzombak, et.al, 2006). Other researchers concluded that the free cyanide resulting from the photodissociation could possibly be undetectable or short-lived (Ghosh, et.al., 2006c) and that any photochemically produced free cyanide will likely be complexed with other metals in the environment (Ghosh, et. al., 2006b). For these and a number of other reasons, the complexity of natural waters makes it difficult to translate these laboratory results to field conditions. In an attempt to overcome these difficulties, direct measurements of cyanide compounds were made at a pilot-scale, constructed wetland (0.5 acres) in Alcoa, TN, which was built to treat free cyanide and iron cyanide compounds [Ebbs, et.al., 2006]. Based on a detailed cyanide material balance of the wetland, which had a hydraulic residence time of ~ 5.6 days, it was determined that 97% of the total cyanide, which was comprised of 90% iron-cyanide compounds, and 100% of the free cyanide was removed over a 21-day monitoring period. Analysis of the results suggest that photodissociation of the iron-cyanide compounds to free cyanide, followed by degradation of the free cyanide in the water column, was the principal mechanism of cyanide removal (~70%) in the wetland. Rhizosphere-mediated biodegradation of free cyanide appeared to be a secondary factor in the removal of the cyanide, accounting for ~ 30% removal of the total cyanide. These wetland field results are consistent with the comments of the ASTM Committee D19 on Water which noted that "volatilization and biodegradation of any dissociated free cyanide typically prevents its accumulation to toxic levels in the environment" [ASTM, 2001].

Based on the above discussions, it is recognized that the fate of cyanide compounds in the environment is complex and results in a dynamic condition, one in which the concentration of the various cyanide compounds, including free cyanide, can change with time. At the same time, it is also evident that an accurate assessment of the human health and environmental risk associated with the presence of cyanide at a given site requires the ability to distinguish the amount of free cyanide that is present in the surface water, regardless of its origin, from the other chemical forms of cyanide that may be present and contributing to the concentration of total cyanide [Gensemer, et. al., 2006b].

4.0 Free Cyanide – Foundation for Cyanide Regulations

Free cyanide is the class of cyanide compounds that has been used in the toxicity experiments that were conducted by the US EPA and others to develop both the health and ecological effects criteria that are embodied in the current environmental regulations. As part of these experiments,

the organisms are exposed to the chemical of choice and the toxic effects, if any, are observed and quantified. Examples of human health and aquatic criteria that have been developed based on free cyanide include:

1. Acute toxicity criterion for human ingestion of $5(10)^{-4}$ to $7(10)^{-4}$ grams per kilogram of adult body weight [Beck, et.al., 2006];
2. Subchronic/chronic toxicity criteria for human ingestion of $2(10)^{-5}$ grams per kilogram of adult body weight per day and for human inhalation of $3(10)^{-6}$ grams per cubic meter of air [Beck, et.al., 2006];
3. Maximum contaminant level goals for drinking water of 200 µg/l [ATSDR, 1997];
4. Acute and chronic effects levels for freshwater aquatic organisms of 22.4 and 5.2 µg/l, respectively [ATSDR, 1997]; and
5. Acute and chronic effects levels for marine organisms of 1.015 µg/l [ATSDR, 1997].

This information suggests that compliance with these regulations should be assessed based on the direct measurement of the concentration of free cyanide. However, the timing of these regulatory developments precluded this approach, as there was no EPA approved analytical method for free cyanide at the time that all of these regulations were established.[3] For example, as part of the Final Rule, "National Primary Drinking Water Regulations: Synthetic Organic Chemicals and Inorganic Chemicals" [US EPA, 1992], a brief discussion was provided that documented the response of EPA to public comments that addressed this specific issue with regards to the proposed MCLG (Maximum Contaminant Level Goal) for cyanide in drinking water. Specifically, commenters on the final rule stated the following:

> "…..while the proposed MCLG is based on "free cyanides", the proposed analytical methods imply that "total cyanides" will be regulated. While "free cyanides" are readily bioavailable and extremely toxic, "total cyanides" contain all cyanides, including those low-toxicity, insert species that are undissociable (to CN^{-1}) and not absorbable."

The EPA responded to these comments as follows:

> "In response to the comments concerning cyanide speciation, EPA is promulgating today an MCLG and MCL for cyanide that apply only to free cyanide. **The Agency agrees with the commenters that only free cyanides**

[3] It was possible to conduct the toxicity experiments using the EPA-approved analytical method for total cyanide since only free cyanide compounds were used in the toxicity experiments. In this case, the total cyanide method was an adequate means for determining the concentration of free cyanide. However, this situation rarely exists in most, if not all, environmental field samples.

> **should be regulated because these are the species of health concern due to their bioavailability and toxicity**[4]. The analytical methods issue is fully addressed in the Analytical Methods section of this rule. In summary, EPA is specifying the "cyanide amenable to chlorination" (CATC) test for determining the "free cyanide" concentrations, while the "total cyanide" analytical technique is being allowed to screen samples. If the "total cyanide" results are greater than the MCL, then the analysis for free cyanide would be required to determine whether there is an exceedance of the MCL."

The EPA made this determination in 1992 when the only EPA-approved analytical methods for cyanide were the "total cyanide" and the "cyanide amenable to chlorination" methods. However, as will be discussed in the next section, effective June 2010, there is now an EPA-approved method (SW-846 Method 9016) for the specific determination of free cyanide which can be used to directly determine the concentration of free cyanide in water for regulatory compliance purposes.

5.0 Evolution of Cyanide Analytical Methods

The disconnect between the chemical basis for the development of cyanide regulations, i.e., free cyanide, and the availability of an EPA-approved analytical method to measure free cyanide concentrations in water, has represented a regulatory conundrum for many years. Without the availability of an EPA-approved free cyanide analytical method, it was necessary to use other existing EPA-approved methods to estimate the concentration of free cyanide. Since these other analytical methods captured chemical forms of cyanide in addition to the free cyanide, this resulted in an overestimation of the free cyanide concentration, which could lead to false positives as it relates to the identification of exceedances of water quality standards and criteria. However, effective June 2010, EPA published SW-846 Method 9016 (Free cyanide in water, soils, and solid wastes by microdiffusion), which measures the cyanide that dissociates from hydrogen cyanide, simple cyanides, and weakly-bound metal cyanide complexes [US EPA, 2010]. This method is identical to the existing ASTM method D-4282-95, which has been in place since 1995 (Standard test method for determination of free cyanide in water and wastewater by microdiffusion)[5] [ASTM, 1995].

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[4] Bolding and underlining of text added.

[5] While the ASTM microdiffusion method has been available since 1995, it could not be used to assess compliance with NPDES permits, surface water regulations, or any other regulatory standards because it had not been formally approved by the US EPA.

Figure 4 emphasizes the importance of having an approved analytical method for the measurement of the free cyanide compounds. Moving left to right on the figure, the chemical forms of cyanide that are identified become less soluble in water, are less bioavailable (i.e., are less inclined to release the toxic cyanide anion), and hence, exhibit less toxicity to human health and aquatic toxicity, to the point where the compounds at the far right of figure are considered essentially non-toxic, e.g., the mercury, iron, platinum and cobalt cyanide compounds.

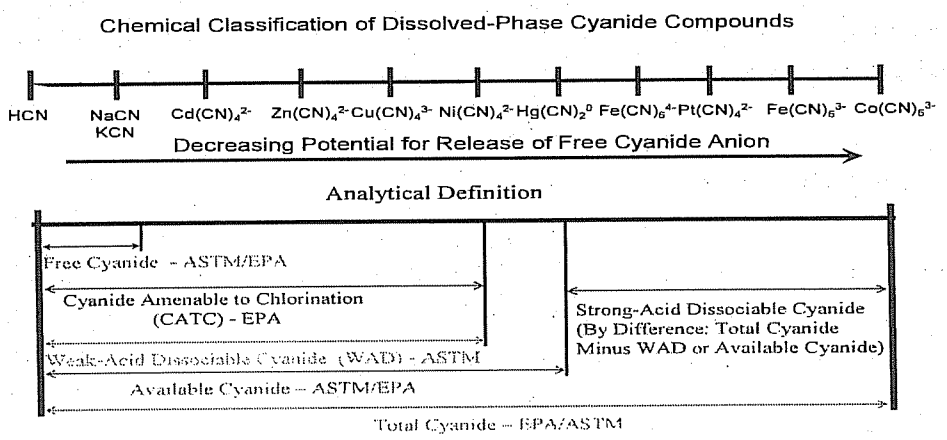

Figure 4. Chemical Forms of Cyanide Captured by EPA-Approved Analytical Methods[6]

Of the four EPA-approved analytical methods shown in Figure 4 (i.e., total cyanide, cyanide amenable to chlorination, available cyanide and free cyanide), it can be seen that only the recently approved Method 9016 accurately captures free cyanide, i.e., HCN, NaCN, and KCN (far left of the figure). All of the other analytical methods overestimate the concentration of free cyanide because they also quantify other, less toxic chemical forms of cyanide. Specifically, the analysis for "total cyanide" is the most conservative of the EPA methods for estimating the concentration of free cyanide followed by both the "available cyanide" and "cyanide amenable to chlorination (CATC)". (These latter two methods differ only in that the former measures mercury cyanide compounds while the later does not. Since mercury cyanide compounds are rarely found in surface water samples, these two methods are essentially identical in terms of the cyanide compounds that are characterized). However, it should be noted that with the EPA acceptance of the "available cyanide" method, the weaknesses regarding the precision and accuracy of the CATC method were overcome[7], making the available cyanide method the preferred method of choice for measuring free cyanide circa 1999 [US EPA, 1998; US EPA,

[6] Organocyanide compounds are generally not measured with any of the conventional analytical tests since they are resistant to the release of the cyanide anion in the total cyanide, WAD cyanide, and CATC test conditions. [Ghosh, et.al., 2006a]. Due to their lack of release of the cyanide anion, their measurement is not critical to human health or environmental toxicity assessments which explains why they were not included in the cyanide toxicity studies conducted by the US EPA.

[7] Per [US EPA 1998], Page 36812: "..in many instances, the measured level (by CATC) exceeds the concentration of total cyanide, potentially providing a more controversial result in some regulatory contexts."

1999]. Lastly, the WAD analytical method, which is equivalent to CATC in terms of the cyanide compounds that are captured in the analysis, is an ASTM-approved method that was never approved by the US EPA.

The progression of these analytical developments for cyanide, i.e., total cyanide to CATC to available cyanide, reflected the desire of EPA to achieve an improved, more accurate quantification of the free cyanide concentration. With this in mind, the EPA approval of Method 9016 in 2010 has finally bridged the gap between the analytical capabilities to measure free cyanide concentrations in water and the chemical basis for the existing regulatory and health effects standards and criteria.

6.0 Recommendations

Based on the information provided in these comments, it is recommended that the proposed amendments of the NCDENR to Title 15A NCAC 02B include a revision of the cyanide water quality standards that replaces 5.0 and 1.0 µg/l of "total cyanide" with 5.0 and 1.0 µg/l of "free cyanide", as measured by the EPA-approved analytical method, Method 9016. In doing so, the State of North Carolina will institute surface water regulations that properly harmonize the regulatory criteria and the analysis of cyanide in surface water samples. This harmonization will ensure the protection of human health and the environment while avoiding false positive determinations of exceedances in water quality criteria and the unwarranted allocation of human and monetary resources associated with addressing them.

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ATTACHMENT A

PROPOSED DRAFT AMENDMENTS TO TITLE 15A NCAC 02B (SURFACE WATER AND WETLAND STANDARDS) [APRIL 2014)

Manning, Jeff

From: Gordon, Lisa Perras <Gordon.Lisa-Perras@epa.gov>
Sent: Friday, August 22, 2014 1:21 PM
To: Brower, Connie; Manning, Jeff
Cc: Wetherington, Michele; Petter, Lauren
Subject: Comments on NC's Proposed Triennial Review
Attachments: 2014 Feb 4 EPA Rec Crit and Ammonia Letter to NC.pdf; 2014 Jan 3 EPA to NC Triennial Review Comments with Attachments.pdf; 2010 Aug NC Triennial Cmts Chart.pdf; 2010 Aug NC Triennial Cmts Letter.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Federal Agency

Connie,

Please accept these comments from the U.S. Environmental Protection Agency on the current North Carolina Triennial Review.

The EPA has provided earlier comments dated January 3, 2014 and August 20th, 2010, for this triennial review. We resubmit those comments in their entirety for your consideration for this triennial review as many of the revisions and comments remain the same. In particular, please note the comments in these letters that specifically address the proposed changes to the metals criteria, the low end hardness cap, the biological 'trump' and the action levels, as well as the request to ensure that the State submit the methods and analyses conducted to support the revised WQS as required by 40 CFR 131.6. This is important for all revisions but especially important for those areas that are not adopting federally recommended criteria (40 CFR 131.11(b)). We are also including as part of our comments EPA's February 4th, 2014, letter encouraging the State to consider adoption of the EPA's most recent ammonia and bacteria criteria. For those changes in our letters that NC does not intend to address in this triennial, we urge NC to fully evaluate in the next triennial.

In addition to those previous comments, we add the following:

1. Since the date of our January 3rd, 2014 letter, the EPA and NC Division of Water Resources have entered into a mutually agreed plan to develop numeric nutrient criteria. The work in that plan has already begun and the EPA looks forward to continuing to work with the State on that process so that numeric nutrient criteria can be adopted into the State WQS in a future triennial review as outlined in the milestone section of that plan.
2. The EPA attended the public hearings in both Raleigh and Statesville, NC on July 15th and 16th. During those hearings, numerous suggestions were made to modify the proposed metals criteria by including a multiplier of "x 1 WER" to allow for the use of a Water Effects Ratio. The EPA supports the use of this multiplier. Appendix L of the U.S. Environmental Protection Agency Water Quality Standards Handbook, entitled, *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals,* (EPA-823-B-94-001, February 1994) and *Streamlined Water-Effect Ratio Procedure for Discharge of Copper* (EPA-822-R-01-005, March 2001) provide detailed information on how to properly conduct a WER and those sections may be directly referenced in the state

WQS. The EPA welcomes the opportunity to assist North Carolina with any questions regarding the use or applicability of WERs.

3. Since the date of the original proposal reviewed for the January 3, 2014 comments, the section regarding the derivation of the hardness for the use with the hardness based metals (Section 15 NCAC 02B .0211 (11)(c)(i)) was revised. EPA notes that the actual instream hardness will be used when calculating the metals criteria and supports that revision. For permitting purposes, the updated revision (Section 15 NCAC 02B .0211 (11)(c)(ii))states that the hardness shall be established using the "median of instream hardness data collected within the local US Geological Survey (USGS) and Natural Resources Conservation Service (NRCS) 8-digit Hydrologic Unit." EPA notes that 8 digit HUCs can be hundreds of miles in size and include multiple eco-regions with varying physical conditions. The use of so large of an area may result in hardness that are either over-protective (hardness lower than in the receiving water) or under-protective (hardness higher than in the actual receiving water.) The EPA recommends that NC consider using hardness values that more closely reflect the hardness in the actual receiving stream for the NPDES permittee. The EPA welcomes the opportunity to continue to evaluate this section with NC DWR in the coming weeks.

The EPA wants to be able to quickly review and respond to these changes once they are submitted to us. Therefore, please let us know at your earliest convenience of any changes that will be made to these proposed revisions so that we can begin our evaluation. Your incredible persistence and diligence in moving this triennial ahead is greatly appreciated.

Thank you,

Lisa Perras Gordon
Water Quality Standards
NC Coordinator
U.S. Environmental Protection Agency
Atlanta, Georgia
(404) 562-9317

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

FEB 04 2014

Tom Reeder
Director
Division of Water Resources
North Carolina Department of Environment
and Natural Resources
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Dear Mr. Reeder:

I would like to take this opportunity to highlight for you the Environmental Protection Agency's recent publication of final ammonia and recreational water quality criteria recommendations and urge you to consider adoption of these criteria into your water quality standards. These recently published criteria documents reflect once again the Agency's commitment to improving and updating the science regarding protection of our Nation's water resources. As you know, the EPA's water quality standards regulations at 40 CFR 131.11(a)(1) require states to adopt protective criteria that are based on sound scientific rationale. The publication of the EPA recommendations under Clean Water Act section 304(a) provides an excellent opportunity for you and your stakeholders to review existing water quality criteria and determine whether those existing criteria are still, in fact, protective and based on sound scientific rationale. I encourage you to consider adoption of these criteria and to use your triennial public hearings (required by 40 CFR 131.20(a)) to provide a venue for public feedback on the need to adopt new or modify existing water quality standards to reflect the latest science.

The EPA's CWA section 304(a) criteria recommendations provide scientific recommendations to states and authorized tribes in developing new or revised water quality standards. States and authorized tribes have the discretion to adopt the EPA's criteria recommendations, the EPA's recommendations modified to reflect site-specific conditions or criteria based on other scientifically defensible methods.

The EPA last issued final ambient water quality criteria recommendations for recreational waters in 1986 and for ammonia in 1999. The new water quality criteria reflect the significant research that has taken place between then and now on these pollutants and the levels that are protective of designated uses.

Recreational Water Quality Criteria

The recreational water quality criteria were developed based on a review of historic studies and more recent scientific information including the National Epidemiological and the Environmental Assessment of Recreational Water studies at U.S. beaches in 2003, 2004, 2005, 2007 and 2009. Those studies enrolled 54,250 participants, encompassed nine locations and collected and analyzed numerous samples from a combination of fresh, marine, tropical and temperate waters. The resulting criteria have numerous improvements over the 1986 criteria:

- The criteria consist of both a geometric mean and statistical threshold value.
- The criteria now comprise a magnitude, duration and frequency.

- States may choose from two different sets of recommended criteria values to protect primary contact recreation waters.
- The criteria recommendations for fresh and marine waters are based on the same illness rate.
- The criteria no longer refer to different use intensities.
- States may take advantage of newly-developed rapid test (qPCR) methods in adopting water quality standards.
- States may now use Beach Action Values in their beach notification programs.

As you know, as a BEACH Act state, you have specific requirements regarding recreational water criteria. Section 303(i)(1)(B) of the Clean Water Act (as amended by the BEACH Act of 2000) directs each state with coastal recreational waters to adopt and submit to the EPA new or revised water quality standards for all pathogens and pathogen indicators for those waters to which the new or revised water quality criteria are applicable. The deadline for state adoption and submittal to the EPA of revised water quality standards is three years from the EPA publication of new recommendations. Since the EPA published final recreational water quality criteria recommendations in December 2012, states should complete this action by December 2015. The Agency's 2012 recommendations apply to all waters designated for primary contact recreation.

You can find more information on the 2012 recreational water quality criteria on the EPA's website, at http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/.

Ammonia Criteria

In updating the 1999 ammonia criteria, the EPA conducted an extensive literature review that incorporates new toxicity data from 69 studies, including new data on freshwater mussels and gill-bearing snails, which are both sensitive to ammonia toxicity. In particular, the freshwater mussels are more sensitive to ammonia than the organisms included in the 1999 criteria dataset. You can find more information on the 2013 ammonia water quality criteria on the EPA's website, at http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/ammonia/.

Because both these newly published criteria rely on the latest research and science, I encourage you, when re-examining your water quality standards during the next triennial review, to consider adoption of these criteria into your water quality standards. If, after you review your existing water quality standards, you conclude that the EPA's latest publication of final ammonia and recreational water quality criteria are not necessary to protect the designated uses, I encourage you to submit in your triennial review, your rationale for not making a change.

I hope these new criteria provide you with the information you need to move forward as you consider changes to your water quality standards in the near future. I appreciate your commitment to protecting water quality and look forward to continuing to work collaboratively towards our mutual goals.

If you should have any additional questions, please feel free to contact me at (404) 562-9345 or Mr. Joel Hansel at (404) 562-9274 and Ms. Lydia Mayo at (404) 562-9247, respectively, for more information on the recreational water quality criteria and ammonia criteria.

Sincerely,

James D. Giattina
Director
Water Protection Division

Comparison of EPA and Proposed NC Metals Criteria:
All values listed are dissolved. Hardness dependent metals calculated at 25 mg/l $CaCO_3$.
(All values are ug/l.)

FRESHWATER

Metal	EPA's 304(a) CMC (Acute)	NC's Proposed CMC (Acute)	EPA's 304(a) CCC (Chronic)	NC's Proposed CCC (Chronic)	Priority Pollutant?	Hardness Dependent?
Arsenic	340	340	150	150	Y	N
Barium	none	none	none	none	N	N
Beryllium	none	65	none	6.5	Y	N
Cadmium	0.52	0.52/0.51 (trout)	0.09	0.15*	Y	Y
Chromium III	183.07	180	23.81	24	Y	Y
Chromium VI	16	16	11	11	Y	N
Copper	3.6	3.6	2.7	2.7	Y	Y
Iron	none	none	1000	none**	N	N
Lead	13.88	14	0.54	0.54	Y	Y
Manganese	none	none	none	none	N	N
Nickel	144.92	140	16	16	Y	Y
Silver	0.3	0.3	none	0.06	Y	Y
Zinc	36	36	36	36	Y	Y

** additional data submitted.*

Comparison of EPA and Proposed NC Metals Criteria: All Values Listed are Dissolved
(All values are ug/l.)

SALTWATER

Metal	EPA's 304(a) CMC (Acute)	NC's Proposed CMC (Acute)	EPA's 304(a) CCC (Chronic)	NC's Proposed CCC (Chronic)	Priority Pollutant?
Arsenic	69	69	36	36	Y
Barium	none	none	none	none	N
Beryllium	none	none	none	none	Y
Cadmium	40	40	8.8	8.8	Y
Chromium III	none	none	none	none	Y
Chromium VI	1100	1100	50	50	Y
Copper	4.8	4.8	3.1	3.1	Y
Iron	none	none	none	none	N
Lead	210	210	8.1	8.1	Y
Manganese	none	none	none	none	N
Nickel	74	74	8.2	8.2	Y
Silver	1.9	1.9	None	0.1	Y
Zinc	90	90	81	81	Y

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REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JAN 0 3 2014

Tom Reeder
Director, Division of Water Resources
North Carolina Department of Environmental and Natural Resources
Division of Water Resources
Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Dear Mr. Reeder,

North Carolina Division of Water Resources (DWR), on behalf of the Environmental Management Commission (EMC), has initiated a triennial review of water quality standards (WQS) regulations in Title 15A NCAC 02B .0100-.0110, .0201-.0228, .0230-.0231 and .0300-.0317. Under the public input provisions of this triennial review, North Carolina DWR held a public hearing on November 19, 2013 and announced that it will consider written comments, data or relevant information received by Friday, January 3, 2014.

The Environmental Protection Agency applauds DWR's scheduling of the recently held triennial review public hearing, which had been significantly overdue. Section 303(c)(1) of the Clean Water Act (CWA) requires that a State or Tribe shall, from time to time, but at least once every three (3) years, hold public hearings to review its water quality standards and, as appropriate, modify and adopt those standards. The North Carolina DWR last held a triennial review public hearing for purposes of amending the State WQS in July 2006. Completing the triennial review public hearing and moving forward to make any necessary revisions to the State WQS to ensure the standards are consistent with the requirements of 40 CFR 131 Subpart A is necessary for the State to conform to and implement federal law.

The last revisions to the State WQS were made in May 2007. Due to the significant delay since the WQS were last updated, we urge DWR to move ahead expeditiously with the activities necessary for the completion of the triennial review, including the following steps:

a. *The State shall conduct a comprehensive review of all water quality standards, including toxic and conventional pollutant criteria to be consistent with EPA recommendations or other scientifically defensible methods and analysis.* The EPA sent comments to the State in August 2010 and September 2010 which are incorporated here by reference. Enclosed please find updated recommendations for your consideration. The EPA would like to acknowledge that the North Carolina DWR Classification and Standards Unit staff performs outstanding technical work in keeping abreast of the latest scientific revisions issued by the EPA, toxicological updates and Federal Register notices for all applicable and relevant information under the CWA. North Carolina's staff demonstrates considerable knowledge in technical issues relating to WQS and should be commended for their diligence in this program area. Due to this diligence, the time for this review should not be extensive. The staff completed a thorough

review in 2010 and would only need to update that review with the newly recommended criteria. Therefore, this step should not cause any undue delay in the completion of the WQS triennial review.

b. *The State shall propose revisions based on that review, including adoption of numeric criteria for toxic pollutants listed in Section 307(a)(1), where the discharge of the toxic pollutants could interfere with the designated use.* In order to ensure that those revised WQS are reviewed and approved as quickly as possible once submitted to the EPA, I urge DWR to work collaboratively with us throughout this process, particularly in those areas where North Carolina may choose to adopt WQS that may not meet the minimum federal requirements. With particular regard to North Carolina's toxic metals criteria, as we have expressed in our previous comments, we are concerned that continued use of screening levels and the use of biological confirmation approaches may not be protective of the State's designated uses.

c. *Submit the results of the review to EPA, within 30 days of the final State action, or if no revisions are made, within 30 days of the completion of the review.* For any revisions submitted to the EPA, the State should include methods used and analyses conducted to support WQS revisions as required by 40 CFR 131.6. If, after North Carolina reviews its WQS, the State concludes that any of the enclosed recommendations are not necessary to protect the designated uses of the waters of the State, the EPA requests that you provide in your submission to the EPA the rationale for not making the recommended changes.

Finally, the EPA notes that my staff attended the November 19, 2013, public hearing and acknowledges the enormous public interest that has been demonstrated both by the large attendance at the hearing and in the volume of comments received to date by both the State and the EPA. This makes it all the more important to complete the triennial review to bring the State WQS into alignment with minimum federal recommendations under the Clean Water Act. We truly appreciate your willingness to review and expedite the schedule and to work with us as you complete these actions.

Sincerely,

James D. Giattina
Director, Water Protection Division

Enclosure

EPA Recommendations on the 2007 – 2014 NC Triennial Review

Ammonia and Recreation Criteria

In 2012, the EPA finalized Recreational Water Quality Criteria recommendations for protecting human health in all coastal and non-coastal waters designated for primary contact recreation use. In 2013, the EPA published national recommended ambient water quality criteria for the protection of aquatic life from the toxic effects of ammonia, a constituent of nitrogen pollution. The EPA encourages North Carolina to consider the adoption of these new criteria during this current triennial review. The EPA will be forwarding North Carolina more information on these new criteria under separate cover. That letter is considered part of the recommendations for this triennial review.

Nutrients

Currently, North Carolina is the only Region 4 state that does not have a mutually-agreed upon Nutrient Criteria Development Plan. Due to significant delays in this triennial review, the EPA has recommended that the State complete the triennial review as quickly as possible. The timeframe of this triennial makes it unlikely that North Carolina would have the time to develop and submit scientifically defensible water quality criteria under ***Fresh Surface Water Quality Standards (WQS) for Class C Waters 15A NCAC 02B .0211*** for nutrients. On May 23, 2013, Joanne Benante, EPA, sent a letter to Chuck Wakild, North Carolina Division of Water Quality, encouraging the development of a draft NCDP that would result in scientifically sound criteria and that addresses all waterbodies as well as both causal and response variables. The EPA urges North Carolina to submit a new draft NCDP so that North Carolina can adopt scientifically defensible criteria in the next triennial review.

Flow Design Criteria

In January 2010, North Carolina had proposed revisions to ***Flow Design Criteria for Effluent Limitations 15A NCAC 02B .0206*** to include addition of the provision that states "Toxic substance standards to protect aquatic life from acute toxicity will be protected using the 1Q10 flow." EPA supports including this revision in this triennial review.

2, 4 D (chlorophenoxy herbicide)

In January 2010, North Carolina had proposed revising its criteria for 2,4 D from 100 ug/l to 70 ug/l under ***Fresh Surface Water Quality Standards for Class WS-1, Class WS-II, Class WS-III, Class WS-IV and Class WS-V Waters 15A NCAC 02B .0212, 0214, .0215, .0216 and 0218.*** EPA supports this revision.

Metals: General Comments

In January 2010, North Carolina proposed multiple revisions to ***Fresh Surface Water Quality Standards for Class C Waters 15A NCAC 02B .0211(11) Metals.*** EPA supports the proposed revisions including the addition of up-to-date criteria for metals, including the adoption of acute metals criteria, updated chronic criteria, the use of dissolved fraction criteria and the use of the hardness-based equations. However, in January 2010, North Carolina also proposed to add in a biological qualifier

and retain action levels for some metals. The EPA is concerned that the biological qualifier for assessment purposes or action levels when considering the need for National Pollutant Discharge Elimination System (NPDES) permit limits may negate implementation of these criteria when needed to protect the designated uses of North Carolina waters. The EPA therefore recommends that these provisions not be included in the State WQS. Details for this position are outlined below. In addition, the EPA includes a review of the January 2010 proposed revisions below with recommendations on what to include in this triennial review.

Background: EPA's development of water quality standards for toxic criteria, including metals, evolved during the late 1980's and early 1990's, and resulted in significant updates to EPA's CWA Section 304(a) criteria guidance for metals at that time. EPA's updates, based on numerous scientific studies, expert panel reviews and recommendations from the Science Advisory Board, included recommendations and criteria which would most accurately identify the biologically available fraction available for uptake by organisms that would most likely cause a toxic effect.

In the early 1990's, EPA recognized the challenges involved with the transition to the new criteria and, at that time, held numerous workshops and conferences and issued guidance to assist the states in the adoption and implementation of these updated criteria. The guidance to the states during that time period included procedures, such as the EPA-approved Water Effects Ratio, or WER, which further take into account site-specific conditions affecting metals toxicity. By the early 1990's, most of the states in the country adopted the new criteria, including the Region 4 states except for North Carolina. In the ensuing years, the other Region 4 states phased these metals criteria into expiring permits, often using compliance schedules, to allow facilities time to come into compliance with the new limits. North Carolina is the only Region 4 State which has not adopted the nationally recommended criteria and has not used these values for permitting or assessment under the Clean Water Act.

EPA commends the State for proposing the nationally recommended metals criteria in January 2010 and recommends that North Carolina includes those changes in this triennial so the water quality criteria for metals are in-line with the national recommended criteria. The addition of the criteria (listed below) and the inclusion of the equations allowing for development of alternative standards for hardness dependent metals is an important revision to North Carolina's standards program. North Carolina's January 2010 proposed criteria also include the important addition of acute criteria for metals and the use of the dissolved fraction for measurement for metals (other than selenium and mercury). The EPA recommends adoption of these additional provisions.

However, EPA has substantial concerns that, although the State has added the updated metals criteria, it is simultaneously considering retaining and adding other provisions which may negate the use of the new criteria, specifically the 'biological trump' and 'action levels.' The EPA is concerned that North Carolina's new provision to allow biological 'trumping' of the new metals criteria for assessment purposes may result in inadequate or underreporting of impaired waters. The EPA is also concerned that the use of action levels in lieu of the reasonable potential (RP) analysis required for NPDES permitting for copper or zinc may preclude implementation of appropriate effluent limits needed to protect designated uses. We believe the updated metals criteria should stand on their own to be used for all CWA purposes, including assessment and permitting, as is done in the surrounding states.

There is a good deal of experience in the surrounding states and in the Region's permitting staff regarding implementation of these criteria. Please let us know how we can use that experience to assist North Carolina's permitting staff in developing compliance schedules, recommending appropriate

testing techniques and, if necessary, developing WERs and other mechanisms which will allow sound and proven methods for appropriate implementation of the metals criteria.

Metals: Specific Comments

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (a)

"With the exception of mercury and selenium, water quality standards for metals in surface waters shall be based upon measurement of the dissolved fraction of the metal. Mercury and Selenium must be based upon measurement of the total recoverable metal. Alternative site-specific dissolved standards require studies designed according to the "Water Quality Standards Handbook Second Edition" published by the U.S. Environmental Protection Agency (EPA 823-B-94-005a) hereby incorporated by reference including any subsequent amendments;"

This January 2010 proposed revision would bring North Carolina in line with other Region 4 states and with EPA's national recommendations. EPA supports this revision.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (b)

"Hardness dependent metals standards listed in Subsection (e) of this Rule are established at 25 mg/l hardness. Alternative standards shall be derived using the equations specified in Table A – Dissolved Freshwater Standards for Hardness Dependent Metals. For NPDES permitting purposes, application of the equations requires hardness values established using the tenth percentile of hardness data within the local U.S. Geological Survey (USGS) and Natural Resources Conservation Services (NRCS) 8-digit Hydrologic Unit (HU). The equations are applicable for instream hardness ranges from 25 mg/l to 400 mg/l expressed as $CaCO_3$ or Ca+Mg;"

This January 2010 proposed revision would bring North Carolina in line with other Region 4 states and with EPA's national recommendations. EPA supports this revision in this triennial review with the following recommendations.

As stated in the EPA's April 30, 2009, letter to North Carolina regarding metals, EPA's national recommended criteria for cadmium, chromium, copper, lead, nickel, silver and zinc are expressed as hardness dependent equations. (The EPA and all other Region 4 states include calculated values for example purposes only, and adopted the equations as the actual criteria.) EPA reads North Carolina's January 2010 revisions to have default criteria set state-wide at 25 mg/l $CaCO_3$ with the ability to calculate alternative criteria using the equations where hardness is found to be above 25 mg/l $CaCO_3$. The EPA is very encouraged that the State has revised its default values from 50 mg/l $CaCO_3$ to the newly revised language. However, the EPA strongly supports the inclusion and use of the nationally recommended equations for the derivation of criteria where the hardness is other than (higher or lower) 25 mg/l $CaCO_3$. Use of the equations to derive criteria in these waters will ensure that the State is neither *under protective in low hardness waters* or *overprotective in high hardness waters*, as discussed further below.

Low-end Hardness Cap On May 25, 2005, the EPA published a compilation of national recommended water quality criteria in a summary table, including the hardness dependent metals. (See http://www.epa.gov/waterscience/criteria/wqctable/). The freshwater aquatic life criteria for these parameters published by EPA do not include a minimum hardness cutoff. In the California Toxics Rule (CTR, May 18, 2000. Pg. 31692), EPA states, "[I]n the past, the EPA generally recommended that 25 mg/l as $CaCO_3$ be used as a default hardness value in deriving freshwater aquatic life criteria for metals when the ambient (or actual) hardness value is below 25 mg/l as $CaCO_3$. However, use of the approach results in criteria that may not be fully protective. Therefore, for waters with a hardness of less than 25 mg/l as $CaCO_3$, criteria should be calculated using the actual ambient hardness of the surface water." North Carolina has a significant number of State waters with hardness below 25 mg/l $CaCO_3$. EPA strongly recommends that the State revise the criteria for these metals to delete the minimum hardness cutoff from the criteria equations so as to not be under protective of North Carolina's many waters with low hardness. At a minimum, the EPA recommends that North Carolina allow the equations to be used to calculate criteria to a hardness of 20 mg/l $CaCO_3$, consistent with several other states.

Overprotection in High Hardness Waters On the other end of that spectrum, the EPA supports the use of the January 2010 provision which allows that, "*Alternative standards shall be derived using the equations specified in Table A.*" The use of the equations are encouraged where the hardness is above 25 mg/l $CaCO_3$, so that the State does not have criteria that are *overprotective* at higher hardness values, which may have happened in the past when the State's criteria were set at 50 mg/l $CaCO_3$. In fact, the use of the equations should provide a sound scientific approach for evaluating waters for the CWA Section 303(d) list using hardness measured in surface waters, which more accurately assesses the potential for impairment and does not incorrectly add waters for which there may not be a threat to impairment. For example, when assessing copper in waters with high hardness, i.e. 150 mg/l $CaCO_3$, copper would not be considered to have exceeded the acute value at 19.7 ug/l or the chronic value at 12.7 ug/l. This is a significant change from the State's current value of 7 ug/l copper, which was calculated at a hardness of 50 mg/l $CaCO_3$. The use of the equations may expedite the process to review the Section 303(d) list in future cycles and may result in fewer waters listed for hardness dependent metals.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (c); and,
Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0211(11) Metals (b)

"Acute metals standards shall be evaluated using an average of two or more samples collected within one hour. Chronic metals standards shall be evaluated using averages of a minimum of four samples taken on consecutive days, or as a 96-hour average. Samples collected within a one hour time frame shall not be used to determine compliance with the chronic standards;"

This language was proposed in January 2010. EPA has concerns with this language as several states which have adopted similar provisions around the country have not been able to successfully carry out the strategy of monitoring on four consecutive days and can, therefore, never assess compliance with the water quality standard. Should the new proposed criteria include this revision, North Carolina must submit information indicating how North Carolina's monitoring program will address this issue. It was not clear if this sampling requirement also applied to NPDES permittees.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (d)

"With the exception of mercury and selenium, demonstrated attainment of the applicable aquatic life use in a waterbody will take precedence over the application of the aquatic life criteria established for metals associated with these uses. An instream exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the instream aquatic community if biological monitoring has demonstrated attainment of biological integrity;"

and,

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0211(11) Metals (c)

"With the exception of mercury and selenium, demonstrated attainment of the applicable aquatic life use in a waterbody will take precedence over the application of the aquatic life criteria established for metals associated with these uses. An exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the in situ aquatic community if biological monitoring has demonstrated attainment of biological integrity;"

As stated, earlier, EPA does not recommend that North Carolina include this as a change to WQS as provisions allowing for "biological trumping" are potentially inconsistent with the CWA and the EPA's interpretation of 40 CFR Part 131.

North Carolina's narrative for biological integrity and its field monitoring and assessment program have been regarded as a model for the nation for more than a decade. (*Water Quality Standards Advanced Notice of Public Rulemaking, ANPRM, 63 FR 36771*, July 7, 1998.) However, EPA views biological criteria as one component of a comprehensive water quality standards program that works in concert with – *not in place of* – the use of water quality criteria for toxics.

Chemical parameters v. Biological As stated above, the EPA encourages North Carolina to adopt criteria for metals which will bring its water quality standards program in line with other Region 4 states and EPA's nationally recommended criteria. These chemical specific numeric criteria are considered a vital component of the CWA program for protection of the nation's waters for both assessment and permitting. The 1998 ANPRM states that "chemical specific assessments are ideal for predicting the likelihood of ecological impacts where they may not yet have occurred because…critical exposure conditions have not yet been experienced by the aquatic community." It further states "Basing regulatory and management decisions on chemical assessment of water quality is an important and proven aspect of water quality assessment and protection." (ANPRM, pg. 36796).

Once criteria are established, assessment for purposes of listing under section 303(d) of the CWA and for permitting under the NPDES program must be based on all applicable water quality criteria in order to *prevent* impacts to the State's designated uses. (ANPRM, pg. 36798.)

On the other hand, biological assessments are considered more restorative in nature, rather than preventive. EPA has stated that, "…while biological assessments can provide information in determining the cumulative effect of past or current impacts from multiple stressors, these assessments may be limited in their ability to predict, and therefore *prevent*, impacts" (emphasis added. ANPRM,

pg. 36795.) In fact, once biological impairment has been found, by definition, that impact was not prevented and costs for determining the cause and source and needed restoration can be prohibitive.

Reconciling differences. The ANPRM (pg. 36801) further discusses how results of different tools should be reconciled should they indicate different outcomes, such as passing a biological assessment, while exceeding a chemical criteria. "Where biological impact is not detected using biological assessment methods, it is possible that impairment that is projected and plausible, may simply have not yet occurred....EPA's view is that it would be inappropriate to ignore projected impairment simply because the impairment has not yet been observed in the environment." One of the goals stated in Section 101 of the CWA is that the biological integrity of the Nation's waters be maintained, specifically stating the national policy that the discharge of toxic pollutants in toxic amounts be prohibited in order to maintain biological integrity. To meet that goal, 40 CFR 131.11 provides that criteria for toxics be established, including the use of recommended Section 304(a) criteria intended for the *prevention* of impairment of waters. It is unacceptable to not act until biological impairment has already occurred.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (e)

(i) Arsenic, acute: 340 ug/l;
(ii) Arsenic, chronic: 150 ug/l;
(iii) Beryllium, acute: 65 ug/l;
(iv) Beryllium, chronic: 6.5 ug/l;
(v) Cadmium, acute: 0.82 ug/l;
(vi) Cadmium for trout waters, acute: 0.51 ug/l;
(vii) Cadmium, chronic; 0.15 ug/l;
(viii) Chromium III, acute: 180 ug/l;
(ix) Chromium III, chronic: 24 ug/l;
(x) Chromium VI, acute: 16 ug/l;
(xi) Chromium VI, chronic: 11 ug/l;
(xii) Copper, acute: 3.6 ug/l, or an alternative criterion derived in accordance with the US. EPA aquatic life criteria document titled, "Aquatic Life Ambient Freshwater Quality Criteria – Copper 2007 Revision" (EPA-822-R-07-001);
(xiii) Copper, chronic: 2.7 ug/l, or an alternative criterion derived in accordance with the US EPA aquatic life criteria document titled, "Aquatic Life Ambient Freshwater Quality Criteria— Copper 2007 Revision" (EPA-822-R-)&-001);
(xiv) Lead, acute: 14 ug/l;
(xv) Lead, chronic: 0.54 ug/l;
(xvi) Mercury, total recoverable, chronic: 0.012 ug/l;
(xvii) Nickel, acute: 140 ug/l;
(xviii) Nickel, chronic:16 ug/l;
(xix) Selenium, total recoverable, chronic: 5 ug/l;
(xx) Silver, acute: 0.30 ug/l;
(xxi) Silver, chronic: 0.06 ug/l;
(xxii) Zinc, acute: 36 ug/l;
(xxiii) Zinc, chronic: 36 ug/l;

These revisions, as proposed in January 2010, would bring North Carolina in line with other Region 4 states and with EPA's national recommendations. EPA strongly supports including this revision in this triennial. A comparison of the North Carolina criteria and national recommended criteria is enclosed.

Note: In the January 2010 revisions, North Carolina proposed to revise cadmium using a recalculation used by Chadwick Ecological Consultants, Inc. In October, 2009, DWQ provided all of the relevant documentation to EPA to support their use of the alternative criteria.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (e)
Table A: Dissolved Freshwater Standards for Hardness Dependent Metals.

Table A includes the hardness based equations for cadmium, chromium III, copper, lead, nickel, silver and zinc.

This revision, as proposed in January 2010, would bring North Carolina in line with other Region 4 states and with the EPA national recommendations. EPA strongly supports this revision to include the equations for hardness based metals.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(22) Action Levels for Toxic Substances Applicable to NPDES permits:

(a) Copper: 2.7 ug/l
(b) Silver; 0.06 ug/l;
(c) Zinc; 36 ug/l;
(e) Chloride; 230 mg/l.

If the Action Levels for any of the substances listed in this Subparagraph (which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream characteristics or associated waste characteristics) are determined by the waste load allocation to be exceeded in a receiving water by a discharge under the 7Q10 flow criterion for toxic substances, the discharger shall monitor the chemical or biological effects of the discharge; efforts shall be made by all dischargers to reduce or eliminate these substances from their effluents. Those substances for which Action Levels are listed in this Subparagraph shall be limited as appropriate in the NPDES permit if sufficient information (to be determined for metals by measurements of that portion of the bioavailable instream concentration of the Action Level parameter attributable to a specific NPDES permitted discharge) exists to indicate that any of those substances may be a causative factor resulting in toxicity of the effluent.

For purposes other than consideration of NPDES permitting of point source discharges as described in this Subparagraph, the Action Levels in this Rule shall be considered as numerical ambient water quality standards.

And,

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0220 (20)

(a) Copper: 3.1 ug/l
(b) Silver; 0.1 ug/l;
(c) Zinc; 81 ug/l;

EPA is concerned with the January 2010 proposed revision of the North Carolina water quality standards which retained provisions relating to action levels for metals. We believe these provisions are inconsistent with 40 CFR 122.44(d)(1)(i), the CWA and EPA CWA Section 304(a) national recommendations. The EPA's Section 304(a) criteria were developed to take into account the factors listed above, such as solubility and chemical form, in determining the fraction biologically available for uptake by aquatic organisms and therefore most likely to cause a toxic effect. The use of the hardness-based equations for hardness dependent metals, such as copper and zinc, further addressed variability caused by stream characteristics. Hardness is used as a surrogate for a number of water quality characteristics which affect the toxicity of metals in a variety of ways. (California Toxics Rule, pg. 31692). North Carolina's adoption of the hardness dependent equations negates the need for the continued use of action levels. This is particularly true as North Carolina is adopting the procedures for the use of the Biotic Ligand Model for copper as well as including a reference for EPA approved site-specific criteria development under 15A NCAC 02B .0211(11)(a).

North Carolina's action level requirements, stated above, indicate that NPDES limits must be set for metals if information exists to indicate that a particular substance may be a *causative* factor resulting in the toxicity of the effluent. 40 CFR 122.44(d)(1)(i) states that limits must be put in place to control pollutants which may be discharged at a level "which will cause, have the reasonable potential to cause or contribute to an excursion above any State water quality standard." This regulation does not indicate that the effluent must be the sole cause of toxicity before the parameter should be limited.

This is significant in that there may often be multiple sources of pollutants in receiving waters, from non-point source run-off, point sources and storm water. Single facilities or sources are often not the sole cause of an impairment, but rather multiple discharges contribute to the toxicity and excursion of water quality standards. Therefore, when a point source discharges zinc levels with a reasonable potential to cause or contribute to an exceedence of water quality standards, it must be limited.

North Carolina has one of the strongest programs for whole effluent toxicity (WET) testing, recognized as such by both the Region and EPA Headquarters. WET testing can be "effective for controlling discharges containing multiple pollutants. It can also provide a method for addressing synergistic and antagonistic effects on aquatic life" from multiple pollutants. (ANPRM, 63 FR 36768, July 7, 1998). However, where criteria exist to directly control toxic pollutants, those criteria should be used to limit the discharge of pollutants. WET should be used to address those instances where criteria may not be available to limit toxicity. The ANPRM's extensive discussion of reconciling biological data, such as WET, with 'reasonable potential' analysis concludes that "EPA would not support a radical shift away from chemical criteria and limits or toxicity criteria and limits. Those tools are simply too important as proven tools for assessing potential impact to surface waters and improving water quality." If needed, an effort should be made to refine the applicable criteria, through WERs and other tools, to ensure that appropriate criteria are developed for each facility.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(22) Action Levels for Toxic Substances Applicable to NPDES permits.

In January 2010, North Carolina proposed removal of the action level for iron. Iron is the one action level which is not being replaced with a criteria value in an alternative section of the water quality standards. North Carolina is removing iron after a review of data indicated that iron may occur naturally at high levels in the State. EPA does not oppose this revision.

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0220(9) Metals (d)

(i) Arsenic, acute: 69 ug/l;
(ii) Arsenic, chronic: 36 ug/l;
(iii) Cadmium, acute: 0.40 ug/l;
(iv) Cadmium, chronic; 8.8 ug/l;
(v) Chromium VI, acute: 1100 ug/l;
(vi) Chromium VI, chronic: 50 ug/l;
(vii) Copper, acute: 4.8 ug/l;
(viii) Copper, chronic: 3.1 ug/l;
(ix) Lead, acute: 210 ug/l;
(x) Lead, chronic: 8.1 ug/l;
(xi) Mercury, total recoverable, chronic: 0.025 ug/l;
(xii) Nickel, acute: 74 ug/l;
(xiii) Nickel, chronic: 8.2 ug/l;
(xiv) Selenium, total recoverable, chronic: 71 ug/l;
(xv) Silver, acute: 1.9 ug/l;
(xvi) Silver, chronic: 0.1 ug/l;
(xvii) Zinc, acute: 90 ug/l;
(xviii) Zinc, chronic: 81 ug/l;

This revision, as proposed in January 2010, would bring North Carolina in line with other Region 4 states and with the EPA national recommendations. EPA strongly supports this revision. A comparison of the proposed North Carolina criteria and national recommended criteria is enclosed. (Note: the metals listed above are listed in consecutive Roman numeral order; however, the proposed regulations do not have the numbers listed consecutively.)

Flow

For the past four years, the EPA Region 4 has led numerous discussions at both meetings with states and tribal program staff as well as at the State Water Director's meetings in Atlanta, Georgia relating to flow (water quantity) and water quality. Drought, floods, the development of regional and state water plans and numerous new requests for reservoir development and new surface water intakes have brought water quantity/quality issues into sharp focus - including impacts of both extreme low and high flows on habitat and aquatic life. Around the country and here in Region 4, states and tribes have begun to address flow through their water quality standards program. Existing water quality standards implicitly protect flow through narratives for protection of aquatic life, protection of designated uses, biological integrity, habitat protection and antidegradation policies. Region 4 is encouraging all of our states and tribes to consider explicit expression of flow as a water quality standard, either through a

narrative standard, (i.e. such as used by Tennessee "...flow shall support the aquatic criteria...") or through a numeric standard (i.e. such as used by Vermont, "no more than 5% 7Q10 change from natural flow regime..."). The Region recommends that North Carolina consider the adoption of narrative or numeric water quality criteria for flow to protect aquatic life and other designated uses.

Methylmercury

Section 303(c)(2)(B) of the Clean Water Act requires states and authorized tribes to adopt numeric criteria for §307(a) priority toxic pollutants for which the Agency has published §304(a) criteria, if the discharge or presence of the pollutant can reasonably be expected to interfere with designated uses. EPA has published Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion, EPA 823-R-10-001. The April 2010 document provides guidance for states, territories and authorized tribes on how to use the new fish tissue-based criterion recommendation in developing water quality standards for methylmercury and in implementing those standards in Total Maximum Daily Loads and NPDES permits. Based on the finalization of the aforementioned implementation guidance, all of the components necessary for North Carolina to adopt the 2001 methylmercury water quality criterion are now in place. EPA strongly recommends that the State adopt a water quality criterion, consistent with the 2001 criterion and the 2010 implementation guidance.

Trout Waters

Currently, North Carolina's water quality standards include definitions for Trout waters and High Quality Waters as follows:

15A NCAC 02B .0101 General Procedures

(e)(1) Trout waters (TR): freshwaters protected for natural trout propagation and survival of stocked trout.

(e)(5) High Quality Waters (HQW): waters which are rated as excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, native and special native trout waters (and their tributaries) designated by the Wildlife Resources Commission....

Suggestion 1: From past submissions for Trout water reclassifications, it appears that some, but not all, Trout waters are also HQWs. EPA asks North Carolina to clarify when a Trout water is or is not a HQW.

Suggestion 2: EPA recommends that North Carolina clarify how to define and identify what information is used to determine how and when a water meets the definition of "native and special native trout waters...designated by the Wildlife Resource Commission" (WRC). EPA has not been able to consistently find reference to 'native and special native trout waters' on the WRC's webpage.

15A NCAC 02B .0202, Definitions

(65) "Trout waters are those waters which have conditions which shall sustain and allow for trout propagation and survival of stocked trout on a year-round basis."

Suggestion 3: This definition differs slightly from the definition at *15A NCAC 02B .0101(e)(1) General Procedures*. The EPA recommends that DWR revise one or both of the two definitions to be the same or to clarify the distinction between the two.

15A NCAC 02B .0211, Fresh Surface Water Quality Standards for Class C Waters

Suggestion 4: This section includes criteria applicable to Trout waters which are interspersed with other criteria not applicable to trout waters. Trout waters are the only supplemental classification without its own section. DWR has mentioned the possibility of grouping the criteria in a separate section for Trout waters, including the applicable numeric criteria, as follows:

a. Chlorophyll a,
b. Dissolved oxygen,
c. Temperature,
d. Turbidity,
e. Cadmium, and
f. Toluene.

EPA agrees that revision would provide more consistency with the organizational structure of the other criteria and make it easier to know what is applicable to Trout waters and recommends that North Carolina make this revision during this triennial review.

<u>High Quality Waters (HQW)</u>

Suggestion 5: In ***15A NCAC 02B .0101(e)(5), General Procedures***, it states that HQWs include WS-I, WS-II and SA waters. It would be helpful to cross reference that statement by including a reference to HQWs under the sections for WS-I, WS-II and SA. For instance, for SA waters it currently reads, "Water quality standards applicable to Class SC and SB waters…also apply." Could that be amended to say, "…Class SC, SB *and HQWs* also apply"?

Suggestion 6: The section on HQWs found at ***15A NCAC 02B .0101(e)(5), General Procedures*** does not list Outstanding Resource Waters (ORW) as being HQW. The DWR webpage indicates that ORWs are a subset of HWQs. The only statement regarding the connection between the two types of waters in the Water Quality Standards is the Antidegradation Policy *(Antidegradation Policy 15A NCAC 02B 0.201(e))*, which states, *"Outstanding Resource Waters (ORW) are a special subset of High Quality Waters with unique and special characteristics as described in Rule .0225 of this Section."* EPA recommends explicitly defining the relationship between the two water classifications under the ORW and/or HQW sections in General Procedures and/or under the ORW and HWQ sections found at 15A 02B .0225 and .0224.

<u>General References to Other Applicable Requirements</u>

Suggestion 7: For many of the supplemental classifications, there are rules which apply that are found under other DWR regulations or even regulations outside of DWR. In most cases, they are mentioned, but there are some that are not. For all of the supplemental classifications it would be helpful to mention all the other applicable standards both within and outside of the Water Quality Standards. For instance,

a. If Trout waters were to be placed in its own section, it could list the other requirements which also apply, such as the Department of Land Resources (DLR) requirements for 25-foot minimum width buffers *(15A NCAC 4B .0125)* and, as applicable, the Buffer requirements at *NCGS 113A-57 (Mandatory Standards for Land Disturbing Activity)*.

b. The ORW section lists references to *15A NCAC 2H .1007 (Stormwater Requirements for ORWs)*. Packages sent to EPA have also included references to *15A NCAC 04B .0124 (Design Standards in Sensitive Waters)* and *15A NCAC 02N .0301 (Performance Standards for New UST Systems)*, which are not mentioned in the ORW section.

c. The HQW section lists references to 15A NCAC 2H .1006 (Stormwater practices applicable to HQW). There may also be other requirements that apply in HQWs, such as buffer requirements that could be referenced as applicable.

Comparison of NC's 2010 Proposed Metals Criteria and EPA Metals Criteria.
(All values listed are dissolved.
Hardness dependent metals all calculated at
25 mg/L CaCO3.)

FRESHWATER

Metal	EPA's 304(a) FW CMC (Acute)	NC's 2010 Proposed FW CMC (Acute)	EPA's 304(a) FW CCC (Chronic)	NC's 2010 Proposed FW CCC (Chronic)	Priority Pollutant?	Hardness Dependent?
Arsenic	340	340	150	150	Y	N
Barium	none	none	none	none	N	N
Beryllium	none	65	none	6.5	Y	N
Cadmium	0.52	0.82*/0.51 (trout)	0.09	0.15*	Y	Y
Chromium III	183.07	180	23.81	24	Y	Y
Chromium VI	16	16	11	11	Y	N
Copper	3.6	3.6	2.7	2.7	Y	Y
Iron	none	none	1000	none	N	N
Lead	13.88	14	0.54	0.54	Y	Y
Manganese	none	none	none	none	N	N
Nickel	144.92	140	16	16	Y	Y
Silver	0.3	0.3	none	0.06	Y	Y
Zinc	36	36	36	36	Y	Y

*Additional data submitted by NC

Comparison of NC's 2010 Proposed Metals Criteria and EPA Metals Criteria.
(EPA Values Converted to Total Metals)

SALTWATER

Metal	EPA's 304(a) SW CMC (Acute)	NC's 2010 Proposed SW CMC (Acute)	EPA's 304(a) SW CCC (Chronic)	NC's 2010 Proposed SW CCC (Chronic)	Priority Pollutant?
Arsenic	69	69	36	36	Y
Barium	none	none	none	none	N
Beryllium	none	none	none	none	Y
Cadmium	40	40	8.8	8.8	Y
Chromium III	none	none	none	none	Y
Chromium VI	1107.75	1107.75	50.35	50.35	Y
Copper	5.78	5.78	3.73	3.73	Y
Iron	none	none	none	none	N
Lead	210	210	8.1	8.1	Y
Manganese	none	none	none	none	N
Nickel	74	74	8.2	8.2	Y
Silver	1.9	1.9	None	0.1	Y
Zinc	90	90	81	81	Y

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

AUG 20 2010

Alan Clark, Chief
Planning Section
Division of Water Quality
North Carolina Department of
Environment and Natural Resources
1617 Mail Service Center
Raleigh, NC 27699-1617

Dear Mr. Clark:

Section 303(c)(1) of the Clean Water Act (CWA), requires that a State or Tribe shall, from time to time, but at least once every three (3) years, hold public hearings to review its water quality standards and, as appropriate, modify and adopt those standards. Based on this requirement, North Carolina has been in the process of evaluating the State's current water quality standards found in *Surface Waters and Wetlands Standards, NC Administrative Code 15A NCAC 02B .0100, .0200 & .0300 (amended effective: May 1, 2007)*, and developing draft revisions and proposing changes to these standards.

North Carolina Division of Water Quality's (DWQ's) Classification and Standards Unit staff does an outstanding job of keeping up with U.S. Environmental Protection Agency (EPA) websites, toxicological updates and Federal Register notices for all applicable and relevant information under the CWA. North Carolina's staff demonstrates considerable knowledge in technical issues relating to water quality standards and should be commended for their diligence in this program area.

On numerous occasions, North Carolina and EPA have met and discussed the State's proposed changes for this triennial period. In January 2010, North Carolina sent a draft rule package to EPA for review. Since that time, Connie Brower of your staff has sent frequent updates regarding the rules revision, which are informative and appreciated. One of those updates, an email dated April 21, 2010, indicated that State staff made a presentation to the Environmental Management Commission (EMC) on March 11, 2010. The minutes of that meeting, which included background information on the development of the proposed changes to standards became available on-line on May 13, 2010. EPA has reviewed the proposed changes posted on the webpage along with the additional information that DWQ provided to the EMC, which DWQ also made available on-line in May. EPA's comments to these proposed changes are attached. EPA is also including some additional comments on other sections of the regulations for your consideration during the 2011 – 2014 triennial review.

Based on a recent revision to the triennial schedule posted on the web, it is EPA's understanding that the dates for the public hearings on these proposed standards revisions have not yet been set. The State has indicated that in order to follow its Administrative Procedures Act, it may not hold public hearings until after the Office of State Budget Management approves the Division's financial review (commonly referred to as a "Fiscal Note"). The State anticipates that the public hearings will take place late in this calendar year or early in 2011. Given the length of time that has passed since the State last held a public hearing relating to review of the State's water quality standards, EPA urges the State to hold the hearings as soon as practicable.

The State anticipates that, if adopted, the proposed standards revisions would not be adopted and submitted to EPA for approval until 2011. In consideration of CWA time constraints for EPA action on any new standards, EPA is committed to working with the State in an effort to address and resolve any outstanding issues and concerns EPA may have prior to adoption and submission of a final standards revisions package by the State. EPA looks forward to attending the public hearings and continuing to work with North Carolina on this triennial. Please do not hesitate to contact me at 404-562-9967, or have your staff contact Lisa Perras Gordon at 404-562-9317 to discuss the comments.

Sincerely,

Annie M. Godfrey

Annie M. Godfrey, Chief
Water Quality Standards Section

Enclosures (2)

EPA Comments and Recommendations
North Carolina 2008 – 2010 Triennial Review of Water Quality Standards

The U.S. Environmental Protection Agency's (EPA's) review covers various revisions that North Carolina is considering and/or has already proposed to *Surface Waters and Wetlands Standards, NC Administrative Code 15A NCAC 02B .0100, .0200 & .0300 (amended effective: May 1, 2007)*, as reflected in the draft (marked-up) version of these regulations that was linked to the North Carolina Division of Water Quality (NC DWQ) webpage available as of May 15, 2010. (Enclosure 1, for reference).

Flow Design Criteria

Revisions proposed to ***Flow Design Criteria for Effluent Limitations 15A NCAC 02B .0206*** includes addition of "Toxic substance standards to protect aquatic life from acute toxicity will be protected using the 1Q10 flow."

EPA supports this revision.

Nutrients

Revisions proposed to ***Fresh Surface Water Quality Standards (WQS) for Class C Waters 15A NCAC 02B .0211(4) Chlorophyll a.***

EPA is participating in on-going discussions with DWQ staff and management regarding the development of numeric nutrient criteria. These discussions are in conjunction with revisions to the North Carolina Nutrient Criteria Implementation Plan. EPA will provide separate comments on these revisions to North Carolina.

Cyanide

Revisions proposed to ***Fresh Surface Water Quality Standards for Class C Waters 15A NCAC 02B .0211(5) Cyanide, total: 5.0 ug/l.***

Although not listed as a change, the current water quality standards (WQS) include the following language after the numeric criteria for cyanide, "... unless site-specific criteria are developed based upon the aquatic life at the site utilizing The Recalculation Procedure in Appendix B of Appendix L in the Environmental Protection Agency's Water Quality Standards Handbook hereby incorporated by reference including any subsequent amendments."

This language has been removed in the updated revisions. North Carolina may want to consider retaining the original language for ease of developing site-specific criteria for cyanide in the future.

2, 4 D (chlorophenoxy herbicide)

Revisions proposed to ***Fresh Surface Water Quality Standards for Class WS-1, Class WS-II, Class WS-III, Class WS-IV and Class WS-V Waters 15A NCAC 02B .0212, 0214, .0215, .0216 and 0218.*** North Carolina has proposed a revision from 100 ug/l to 70 ug/l for 2, 4 D.

EPA supports this revision.

Metals: General Comments

Revisions proposed to ***Fresh Surface Water Quality Standards for Class C Waters 15A NCAC 02B .0211(11) Metals***

EPA supports the addition of up-to-date criteria for metals, including the adoption of acute metals criteria, the use of dissolved fraction criteria and the use of the hardness-based equations. EPA does not support the biological qualifier for assessment or action levels used for permitting. Details for this position are outlined below.

Background: EPA's development of water quality standards for toxic criteria, including metals, evolved during the late 1980's and early 1990's, and resulted in significant updates to EPA's CWA Section 304(a) criteria guidance for metals at that time. EPA's updates, based on numerous scientific studies, expert panel reviews and recommendations from the Science Advisory Board, included recommendations and criteria which would most accurately identify the biologically available fraction available for uptake by organisms and therefore most likely to cause a toxic effect.

Since the early 1990's, EPA recognized the challenges involved with the transition to the new criteria and, at that time, held numerous workshops and conferences and issued guidance to assist the states in the adoption and implementation of these updated criteria. The guidance to the states during that time period included procedures, such as the EPA-approved Water Effects Ratio, or WER, which further take into account site-specific conditions affecting metals toxicity. By the early 1990's, most of the states in the country adopted the new criteria, including the seven other Region 4 states except for North Carolina. In the ensuing years, the other Region 4 states phased these metals criteria into expiring permits, often using compliance schedules, to allow facilities time to come into compliance with the new limits. North Carolina is the only Region 4 state which has not adopted the nationally recommended criteria and has not used these values for permitting or assessment under the Clean Water Act.

North Carolina's revisions would bring its water quality criteria for metals in-line with the national recommended criteria, and EPA commends the State for taking this necessary step. The addition of the criteria (listed below) and the inclusion of the equations allowing for development of alternative standards for hardness dependent metals is a significant revision to North Carolina's standards program. North Carolina's current proposed criteria also include the important addition of acute criteria for metals

and the use of the dissolved fraction for measurement for metals (other than selenium and mercury.)

However, EPA has substantial concerns that, although the State has added the updated metals criteria, it is simultaneously considering retaining and adding other provisions which may negate the use of the new criteria, specifically the 'biological trump' and 'action levels.' EPA does not support North Carolina's new provision to allow biological 'trumping' of the new metals criteria for assessment purposes. EPA also no longer supports the use of action levels in lieu of the reasonable potential (RP) analysis for NPDES permitting for copper or zinc. The updated metals criteria should stand on their own to be used for all CWA purposes, including assessment and permitting, as is done in the surrounding states. The new metals criteria should be used in a manner consistent with federal recommendations and the CWA. Details on EPA's concerns are discussed in the sections below.

North Carolina has indicated that there is significant concern within the regulated community regarding the costs associated with the revisions. EPA acknowledges the very real concerns facing DWQ as it prepares its State-required fiscal review of the proposed rule. Many of the Region 4 states raised similar issues almost twenty years ago as they sought to adopt these same requirements. However, after adoption, the costs and the effect were, in many cases, not as significant as feared.

As stated, North Carolina has not had the same metals criteria as surrounding states. This difference between states was considered in May 2000, when EPA promulgated toxic criteria for the State of California (California Toxics Rule, May 18, 2000, 65 FR 31682), which included the promulgation of metals criteria. In that determination, the preamble explained that "(t)oday's action will help restore equity among states," and the water quality standards should be implemented "in a manner that provides for a level playing field." It further stated that implementing numeric water quality standards for toxics in California "would not impose an undue or inappropriate burden on the State of California or its dischargers. It merely puts in place numeric criteria for toxic pollutants that are already used in other States in implementing CWA programs." That rule, in 2000, put in place for California most of the values which North Carolina is now adopting in 2010.

There is a good deal of experience in the surrounding states and in the Region's permitting staff in implementation of these criteria. Please let us know how we can use that experience to assist North Carolina's permitting staff in developing compliance schedules, recommending appropriate testing techniques and, if necessary, developing WERs and other mechanisms which will allow sound and proven methods for appropriate implementation of the metals criteria.

Metals: Specific Comments

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (a)

"With the exception of mercury and selenium, water quality standards for metals in surface waters shall be based upon measurement of the dissolved fraction of the metal. Mercury and Selenium must be based upon measurement of the total recoverable metal. Alternative site-specific dissolved standards require studies designed according to the "Water Quality Standards Handbook Second Edition" published by the U.S. Environmental Protection Agency (EPA 823-B-94-005a) hereby incorporated by reference including any subsequent amendments;"

This revision brings North Carolina in-line with other Region 4 states and with EPA's national recommendations. EPA supports this revision.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (b)

"Hardness dependent metals standards listed in Subsection (e) of this Rule are established at 25 mg/l hardness. Alternative standards shall be derived using the equations specified in Table A – Dissolved Freshwater Standards for Hardness Dependent Metals. For NPDES permitting purposes, application of the equations requires hardness values established using the tenth percentile of hardness data within the local U.S. Geological Survey (USGS) and Natural Resources Conservation Services (NRCS) 8-digit Hydrologic Unit (HU). The equations are applicable for instream hardness ranges from 25 mg/l to 400 mg/l expressed as $CaCO_3$ or Ca+Mg;"

This revision brings North Carolina in-line with other Region 4 states and with EPA's national recommendations. EPA supports this revision with the following recommendations listed in the paragraphs below.

As stated in EPA's April 30, 2009, letter to North Carolina regarding metals, EPA's national recommended criteria for cadmium, chromium, copper, lead, nickel, silver and zinc are expressed as hardness dependent equations. (EPA and all other Region 4 states include a calculated value for example purposes only, and adopted the equations as the actual criteria.) EPA reads North Carolina's draft revisions to have default criteria set state-wide at 25 mg/l $CaCO_3$ with the ability to calculate alternative criteria using the equations where hardness is found to be above 25 mg/l $CaCO_3$. EPA is very encouraged that the State has revised its default values from 50 mg/l $CaCO_3$ to the newly revised language. However, EPA strongly supports the inclusion and use of the nationally recommended equations for the derivation of criteria where the hardness is other than (higher or lower) 25 mg/l $CaCO_3$. Use of the equations to derive criteria in these waters will ensure that the State is neither *under protective in low hardness waters* or *overprotective in high hardness waters*, as discussed further below.

Low-end Hardness Cap On May 25, 2005, EPA published a compilation of national recommended water quality criteria in a summary table, including the hardness dependent metals. (See http://www.epa.gov/waterscience/criteria/wqctable/). The freshwater aquatic life criteria for these parameters published by EPA do not include a minimum hardness cutoff. In the California Toxics Rule (CTR, May 18, 2000. Pg. 31692), EPA states, "[I]n the past, EPA generally recommended that 25 mg/l as $CaCO_3$ be used as a default hardness value in deriving freshwater aquatic life criteria for metals when the ambient (or actual) hardness value is below 25 mg/l as $CaCO_3$. However, use of the approach results in criteria that may not be fully protective. Therefore, for waters with a hardness of less than 25 mg/l as $CaCO_3$, criteria should be calculated using the actual ambient hardness of the surface water." North Carolina has a significant number of state waters with hardness below 25 mg/l $CaCO_3$. EPA strongly recommends that the State revise the criteria for these metals to delete the minimum hardness cutoff from the criteria equations so as to not be under protective of North Carolina's many waters with low hardness. At a minimum, EPA recommends that North Carolina allow the equations to be used to calculate criteria to a hardness of 20 mg/l $CaCO_3$, consistent with several other states.

Overprotection in High Hardness Waters On the other end of that spectrum, EPA supports the use of the new provision which allows that, "*Alternative standards shall be derived using the equations specified in Table A.*" The use of the equations are encouraged where the hardness is above 25 mg/l $CaCO_3$, so that the State does not have criteria that are *overprotective* at higher hardness values, which may have happened in the past when the State's criteria were set at 50 mg/l $CaCO_3$. In fact, the use of the equations should provide a sound scientific approach for evaluating waters for the CWA Section 303(d) list using hardness measured in surface waters, which more accurately assesses the potential for impairment and does not incorrectly add waters for which there may not be a threat to impairment. For example, when assessing copper in waters with high hardness, i.e. 150 mg/l $CaCO_3$, copper would not be considered to have exceeded the acute value at 19.7 ug/l or the chronic value at 12.7 ug/l. This is a significant change from the State's current value of 7 ug/l copper, which was calculated at a hardness of 50 mg/l $CaCO_3$. The use of the equations may expedite the process to review the Section 303(d) list in future cycles and may result in fewer waters listed for hardness dependent metals.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (c); and,
Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0211(11) Metals (b)

"Acute metals standards shall be evaluated using an average of two or more samples collected within one hour. Chronic metals standards shall be evaluated using averages of a minimum of four samples taken on consecutive days, or as a 96-hour average. Samples collected within a one hour time frame shall not be used to determine compliance with the chronic standards;"

This language has been forwarded to EPA Region 4's monitoring staff for review. EPA has concerns with this language as several states which have adopted similar provisions around the country have not been able to successfully carry out the strategy of monitoring on four consecutive days and can, therefore, never assess compliance with the water quality standard. North Carolina may want to submit information indicating if the monitoring program will face similar challenges or how they will be addressed. It was not clear if this sampling requirement also applied to NPDES permittees.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (d)

"With the exception of mercury and selenium, demonstrated attainment of the applicable aquatic life use in a waterbody will take precedence over the application of the aquatic life criteria established for metals associated with these uses. An instream exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the instream aquatic community if biological monitoring has demonstrated attainment of biological integrity;"

and,

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0211(11) Metals (c)

"With the exception of mercury and selenium, demonstrated attainment of the applicable aquatic life use in a waterbody will take precedence over the application of the aquatic life criteria established for metals associated with these uses. An exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the in situ aquatic community if biological monitoring has demonstrated attainment of biological integrity;"

EPA does not support the inclusion of these revisions. These draft provisions allowing for "biological trumping" should not be adopted into the State's water quality standards regulations based on their potential inconsistency with the CWA and EPA's interpretation of 40 CFR Part 131.

North Carolina's narrative for biological integrity and its field monitoring and assessment program have been regarded as a model for the nation for more than a decade. (*Water Quality Standards Advanced Notice of Public Rulemaking, ANPRM, 63 FR 36771*, July 7, 1998.) However, EPA views biological criteria as one component of a comprehensive water quality standards program that works in concert with – *not in place of* – the use of water quality criteria for toxics.

Chemical parameters v. Biological As stated above, North Carolina is adopting criteria for metals which will bring its water quality standards program in-line with other Region 4 states and EPA's nationally recommended criteria. This is significant in that

chemical specific numeric criteria are considered a vital component of the CWA program for protection of the nation's waters for both assessment and permitting. The 1998 ANPRM states that "chemical specific assessments are ideal for predicting the likelihood of ecological impacts where they may not yet have occurred because...critical exposure conditions have not yet been experienced by the aquatic community." It further states "Basing regulatory and management decisions on chemical assessment of water quality is an important and proven aspect of water quality assessment and protection." (ANPRM, pg. 36796).

Once criteria are established, assessment for purposes of listing under section 303(d) of the CWA and for permitting under the National Pollutant Discharge Elimination System (NPDES) program must be based on all applicable water quality criteria. (ANPRM, pg. 36798.) This approach is considered preventive.

On the other hand, biological assessments are considered more restorative in nature, rather than preventive. EPA has stated that, "...while biological assessments can provide information in determining the cumulative effect of past or current impacts from multiple stressors, these assessments may be limited in their ability to predict, and therefore *prevent*, impacts" (emphasis added. ANPRM, pg. 36795.) And, in fact, once biological impairment has been found, by definition, that impact was not prevented and costs for determining the cause and source and needed restoration can be prohibitive.

Reconciling differences. The ANPRM (pg. 36801) further discusses how results of different tools should be reconciled should they indicate different outcomes, such as passing a biological assessment, while exceeding a chemical criteria. "Where biological impact is not detected using biological assessment methods, it is possible that impairment that is projected and plausible, may simply have not yet occurred....EPA's view is that it would be inappropriate to ignore projected impairment simply because the impairment has not yet been observed in the environment."

One of the goals stated in Section 101 of the CWA is that the biological integrity of the Nation's waters be maintained, specifically stating the national policy that the discharge of toxic pollutants in toxic amounts be prohibited in order to maintain biological integrity. To meet that goal, 40 CFR 131.11 provides that criteria for toxics be established, including the use of recommended Section 304(a) criteria intended for the *prevention* of impairment of waters. It is unacceptable to not act until biological impairment has already occurred.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (e)

(i) ***Arsenic, acute: 340 ug/l;***
(ii) ***Arsenic, chronic: 150 ug/l;***
(iii) ***Beryllium, acute: 65 ug/l;***
(iv) ***Beryllium, chronic: 6.5 ug/l;***
(v) ***Cadmium, acute: 0.82 ug/l;***

(vi) ***Cadmium for trout waters, acute: 0.51 ug/l;***
(vii) ***Cadmium, chronic; 0.15 ug/l;***
(viii) ***Chromium III, acute: 180 ug/l;***
(ix) ***Chromium III, chronic: 24 ug/l;***
(x) ***Chromium VI, acute: 16 ug/l;***
(xi) ***Chromium VI, chronic: 11 ug/l;***
(xii) ***Copper, acute: 3.6 ug/l, or an alternative criterion derived in accordance with the US. EPA aquatic life criteria document titled, "Aquatic Life Ambient Freshwater Quality Criteria – Copper 2007 Revision" (EPA-822-R-07-001);***
(xiii) ***Copper, chronic: 2.7 ug/l, or an alternative criterion derived in accordance with the US EPA aquatic life criteria document titled, "Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision" (EPA-822-R-)&-001);***
(xiv) ***Lead, acute: 14 ug/l;***
(xv) ***Lead, chronic: 0.54 ug/l;***
(xvi) ***Mercury, total recoverable, chronic: 0.012 ug/l;***
(xvii) ***Nickel, acute: 140 ug/l;***
(xviii) ***Nickel, chronic:16 ug/l;***
(xix) ***Selenium, total recoverable, chronic: 5 ug/l;***
(xx) ***Silver, acute: 0.30 ug/l;***
(xxi) ***Silver, chronic: 0.06 ug/l;***
(xxii) ***Zinc, acute: 36 ug/l;***
(xxiii) ***Zinc, chronic: 36 ug/l;***

This revision brings North Carolina in-line with other Region 4 states and with EPA's national recommendations. EPA strongly supports this revision. A comparison of the North Carolina criteria and national recommended criteria is enclosed.

Note: North Carolina has chosen to revise cadmium using a recalculation used by Chadwick Ecological Consultants, Inc. In October, 2009, DWQ provided all of the relevant documentation to EPA to support their use of the alternative criteria.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(11) Metals (e)
Table A: Dissolved Freshwater Standards for Hardness Dependent Metals.

Table A includes the hardness based equations for cadmium, chromium III, copper, lead, nickel, silver and zinc.

This revision brings North Carolina in-line with other Region 4 states and with the EPA national recommendations. EPA strongly supports this revision to include the equations for hardness based metals.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(22) Action Levels for Toxic Substances Applicable to NPDES permits:

(a) Copper: 2.7 ug/l
(b) Silver; 0.06 ug/l;
(c) Zinc; 36 ug/l;
(e) Chloride; 230 mg/l.

If the Action Levels for any of the substances listed in this Subparagraph (which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream characteristics or associated waste characteristics) are determined by the waste load allocation to be exceeded in a receiving water by a discharge under the 7Q10 flow criterion for toxic substances, the discharger shall monitor the chemical or biological effects of the discharge; efforts shall be made by all dischargers to reduce or eliminate these substances from their effluents. Those substances for which Action Levels are listed in this Subparagraph shall be limited as appropriate in the NPDES permit if sufficient information (to be determined for metals by measurements of that portion of the bioavailable instream concentration of the Action Level parameter attributable to a specific NPDES permitted discharge) exists to indicate that any of those substances may be a causative factor resulting in toxicity of the effluent.

For purposes other than consideration of NPDES permitting of point source discharges as described in this Subparagraph, the Action Levels in this Rule shall be considered as numerical ambient water quality standards.

And,

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0220 (20)

(a) Copper: 3.1 ug/l
(b) Silver; 0.1 ug/l;
(c) Zinc; 81 ug/l;

EPA does not support this proposed revision of the North Carolina water quality standards or retention of any provisions relating to action levels for metals. The State should not adopt and/or retain these provisions given their inconsistency with 40 CFR 122.44(d)(1)(i), the CWA and EPA national recommendations.

EPA's Section 304(a) criteria were developed to take into account the factors listed above, such as solubility and chemical form, in determining the fraction biologically for uptake by aquatic organisms and therefore most likely to cause a toxic effect. The use of the hardness-based equations for hardness dependent metals, such as copper and zinc, further addressed variability caused by stream characteristics. Hardness

is used as a surrogate for a number of water quality characteristics which affect the toxicity of metals in a variety of ways. (California Toxics Rule, pg. 31692). North Carolina's adoption of the hardness dependent equations negates the need for the continued use of action levels. This is particularly true as North Carolina is adopting the procedures for the use of the Biotic Ligand Model for copper as well as including a reference for EPA approved site-specific criteria development under 15A NCAC 02B .0211(11)(a).

North Carolina's action level requirements, stated above, indicate that NPDES limits must be set for metals if information exists to indicate that a particular substance may be a *causative* factor resulting in the toxicity of the effluent. 40 CFR 122.44(d)(1)(i) states that limits must be put in place to control pollutants which may be discharged at a level "which will cause, have the reasonable potential to cause or contribute to an excursion above any State water quality standard." This regulation does not indicate that the effluent must be the sole cause of toxicity before the parameter should be limited. The provision states that the pollutant should be limited under NPDES if it could cause or even if it could *contribute* to a water quality standards excursion.

This is significant in that there may often be multiple sources of pollutants in receiving waters, from non-point source run-off, point sources and storm water. Single facilities or sources are often not the sole cause of an impairment, but rather multiple discharges contribute to the toxicity and excursion of water quality standards. Therefore, when a point source discharges zinc levels with a reasonable potential to cause or contribute to an exceedence of water quality standards, it must be limited. Surrounding states have limited zinc and copper in permits where there is reasonable potential to cause or contribute to the excursion of a water quality standard.

North Carolina has one of the strongest programs for whole effluent toxicity (WET) testing, recognized as such by both the Region and EPA Headquarters. WET testing can be "effective for controlling discharges containing multiple pollutants. It can also provide a method for addressing synergistic and antagonistic effects on aquatic life" from multiple pollutants. (ANPRM, 63 FR 36768, July 7, 1998). However, where criteria exist to directly control toxic pollutants, those criteria should be used to limit the discharge of pollutants. WET should be used to address those instances where criteria may not be available to limit toxicity. The ANPRM's extensive discussion of reconciling biological data, such as WET, with 'reasonable potential' analysis concludes that "EPA would not support a radical shift away from chemical criteria and limits or toxicity criteria and limits. Those tools are simply too important as proven tools for assessing potential impact to surface waters and improving water quality." If needed, an effort should be made to refine the applicable criteria, through WERs and other tools, to ensure that appropriate criteria are developed for each facility.

Fresh Surface Water Quality Standards for Class C Waters
15A NCAC 02B .0211(22) Action Levels for Toxic Substances Applicable to NPDES permits.

North Carolina has proposed removal of the action level for iron. Iron is the one action level which is not being replaced with a criteria value in an alternative section of the water quality standards. North Carolina is removing iron after a review of data indicated that iron may occur naturally at high levels in the State.

EPA does not oppose this revision.

Tidal Salt Water Quality Standards for Class SC Waters
15A NCAC 02B .0220(9) Metals (d)

(i) Arsenic, acute: 69 ug/l;
(ii) Arsenic, chronic: 36 ug/l;
(iii) Cadmium, acute: 0.40 ug/l;
(iv) Cadmium, chronic; 8.8 ug/l;
(v) Chromium VI, acute: 1100 ug/l;
(vi) Chromium VI, chronic: 50 ug/l;
(vii) Copper, acute: 4.8 ug/l;
(viii) Copper, chronic: 3.1 ug/l;
(ix) Lead, acute: 210 ug/l;
(x) Lead, chronic: 8.1 ug/l;
(xi) Mercury, total recoverable, chronic: 0.025 ug/l;
(xii) Nickel, acute: 74 ug/l;
(xiii) Nickel, chronic: 8.2 ug/l;
(xiv) Selenium, total recoverable, chronic: 71 ug/l;
(xv) Silver, acute: 1.9 ug/l;
(xvi) Silver, chronic: 0.1 ug/l;
(xvii) Zinc, acute: 90 ug/l;
(xviii) Zinc, chronic: 81 ug/l;

This revision brings North Carolina in-line with other Region 4 states and with the EPA national recommendations. EPA strongly supports this revision. A comparison of the proposed North Carolina criteria and national recommended criteria is enclosed. (Note: the metals listed above are listed in consecutive Roman numeral order, however, the proposed regulations do not have the numbers listed consecutively.)

Additional comments

The following section addresses areas not currently proposed for revision. North Carolina is asked to consider including these suggestions in this revision, if possible, or during the 2011-2014 triennial.

Flow

EPA led a discussion at the May 2010 meeting with States and Tribes in Atlanta, Georgia relating to flow (water quantity) and water quality. Drought, floods, water disputes and the development of regional and state water plans have brought water quantity/quality issues into sharp focus - including impacts of both extreme low and high flows on habitat and aquatic life. Around the country and here in Region 4, states and tribes have begun to address flow through the water quality standards program. Existing water quality standards implicitly protect flow through narratives for protection of aquatic life, protection of designated uses, biological integrity, habitat protection and antidegradation policies. Region 4 is encouraging all of our states and tribes to consider explicit expression of flow as a water quality standard, either through a narrative standard, (i.e. such as used by Tennessee "...flow shall support the aquatic criteria...") or through a numeric standard (i.e. such as used by Vermont, "no more than 5% 7Q10 change from natural flow regime..."). The Region can provide you with full examples in use by other states or additional information as needed.

Methylmercury

Section 303(c)(2)(B) of the Clean Water Act requires states and authorized tribes to adopt numeric criteria for §307(a) priority toxic pollutants for which the Agency has published §304(a) criteria, if the discharge or presence of the pollutant can reasonably be expected to interfere with designated uses. EPA has published Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion, EPA 823-R-10-001. The April 2010 document provides guidance for states, territories and authorized tribes on how to use the new fish tissue-based criterion recommendation in developing water quality standards for methylmercury and in implementing those standards in Total Maximum Daily Loads and NPDES permits. Based on the finalization of the aforementioned implementation guidance, all of the components necessary for North Carolina to adopt the 2001 methylmercury water quality criterion are now in place. EPA strongly recommends that the State adopt a water quality criterion, consistent with the 2001 criterion and the 2010 implementation guidance.

Trout Waters

Currently, North Carolina's water quality standards include definitions for Trout waters and High Quality Waters as follows:

15A NCAC 02B .0101 General Procedures

(e)(1) Trout waters (TR): freshwaters protected for natural trout propagation and survival of stocked trout.

(e)(5) High Quality Waters (HQW): waters which are rated as excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, native and special native trout waters (and their tributaries) designated by the Wildlife Resources Commission....

Suggestion 1: From past submissions for Trout water reclassifications, it appears that some, but not all, Trout waters are also HQWs. It would be helpful to clarify when a Trout water is or is not a HQW.

Suggestion 2: It would be helpful to clarify how to define and identify what information is used to determine how and when a water meets the definition of "native and special native trout waters...designated by the Wildlife Resource Commission" (WRC). EPA has not been able to consistently find reference to 'native and special native trout waters' on the WRC's webpage.

15A NCAC 02B .0202, Definitions

(65) "Trout waters are those waters which have conditions which shall sustain and allow for trout propagation and survival of stocked trout on a year-round basis."

Suggestion 3: This definition differs slightly from the definition at *15A NCAC 02B .0101(e)(1) General Procedures.* DWQ may want to consider revision of one or both of the two definitions to be the same or to clarify the distinction between the two.

15A NCAC 02B .0211, Fresh Surface Water Quality Standards for Class C Waters

Suggestion 4: This section includes criteria applicable to Trout waters which are interspersed with other criteria not applicable to trout waters. Trout waters are the only supplemental classification without its own section. DWQ has mentioned the possibility of grouping the criteria in a separate section for Trout waters, including the applicable numeric criteria, as follows:

a. Chlorophyll a,
b. Dissolved oxygen,
c. Temperature,
d. Turbidity,
e. Cadmium, and
f. Toluene.

EPA strongly agrees that revision would provide more consistency with the organizational structure of the other criteria and make it easier to know what is applicable to Trout waters.

<u>High Quality Waters (HQW)</u>

Suggestion 5: In ***15A NCAC 02B .0101(e)(5), General Procedures***, it states that HQW's include WS-I, WS-II and SA waters. It would be helpful to cross reference that statement by including a reference to HQWs under the sections for WS-I, WS-II and SA. For instance, for SA waters it currently reads, "Water quality standards applicable to Class SC and SB waters...also apply." Could that be amended to say, "...Class SC, SB *and HQWs* also apply"?

Suggestion 6: The section on HQW found at ***15A NCAC 02B .0101(e)(5), General Procedures*** does not list Outstanding Resource Waters (ORW) as being a HQW. The DWQ webpage indicates that ORWs are a subset of HWQs. The only statement regarding the connection between the two types of waters in the Water Quality Standards is the Antidegradation Policy *(Antidegration Policy 15A NCAC 02B 0.201(e))*, which states, *"Outstanding Resource Waters (ORW) are a special subset of High Quality Waters with unique and special characteristics as described in Rule .0225 of this Section."* EPA recommends explicitly defining the relationship between the two water classifications under the ORW and/or HQW sections in General Procedures and/or under the ORW and HWQ sections found at 15A 02B .0225 and .0224.

General References to Other Applicable Requirements

Suggestion 7: For many of the supplemental classifications, there are rules which apply that are found under other DWQ regulations or even regulations outside of DWQ. In most cases, they are mentioned, but there are some that are not. It would be helpful for all of the supplemental classifications to mention all the other applicable standards both within and outside of the Water Quality Standards. For instance,

a. If Trout waters were to be placed in its own section, it could list the other requirements which also apply, such as the Department of Land Resources (DLR) requirements for 25-foot minimum width buffers *(15A NCAC 4B .0125)* and, as applicable, the Buffer requirements at *NCGS 113A-57 (Mandatory Standards for Land Disturbing Activity)*.

b. The ORW section lists references to *15A NCAC 2H .1007 (Stormwater Requirements for ORWs)*. Packages sent to EPA have also included references to *15A NCAC 04B .0124 (Design Standards in Sensitive Waters)* and *15A NCAC 02N .0301 (Performance Standards for New UST Systems)*, which are not mentioned in the ORW section.

c. The HQW section lists references to 15A NCAC 2H .1006 (Stormwater practices applicable to HQW). There may also be other requirements that apply in HQWs, such as buffer requirements that could be referenced as applicable.

Manning, Jeff

From: Peter Raabe <praabe@americanrivers.org>
Sent: Friday, August 22, 2014 11:25 AM
To: DWR_Classifications_Standards
Cc: Grady McCallie (grady@ncconservationnetwork.org)
Subject: Triennial Review Comments from NC Conservation Network and American Rivers
Attachments: AR - NCCN triennial review comments.docx

Follow Up Flag: Follow up
Flag Status: Completed

Categories: NGOs

Please find attached the comments submitted on behalf of NC Conservation Network and American Rivers.

Thank you for your time and efforts on this package of protections for water quality.

Peter

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Peter Raabe | NC Conservation Director
331 West Main Street |Suite 304 | Durham, NC 27701
Office: 919-682-3500 |Cell: 202-441-6174 | praabe@americanrivers.org

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American Rivers • NC Conservation Network

August 22, 2014

Connie Brower
DWR Water Planning Section,
1611 Mail Service Center,
Raleigh, NC 27699-1611

Dear Ms. Brower,

Thank you for the opportunity to offer comments on the NC Environmental Management's proposed changes to North Carolina's surface water quality standards (triennial review). American Rivers protects wild rivers, restores damaged rivers, and conserves clean water for people and nature. The NC Conservation Network works in partnership with 90 affiliate organizations and over 80,000 supporters to protect public health and the environment across North Carolina. We share a deep commitment to implementation of the vision of the Clean Water Act in this state: that all waters should be fishable and swimmable, and should support their designated uses. The current proposal is a modest but important step in that direction.

The Commission should adopt the proposed changes to tighten metal standards to protect aquatic life.

North Carolina the only state in the southeast that has not adopted toxic metals criteria recommended by EPA two decades ago. The current proposal would upgrade our water quality standards for metals – cadmium, chromium III, copper, lead, nickel, silver, and zinc - to match EPA's national recommendations and protect aquatic life and human health. We support the adoption of these long-overdue revisions. We also strongly urge the commission to retain the proposed chronic standard for silver which is protective of aquatic life.

That said, the toxicity of metals depends on the 'hardness' of water. The state has proposed to assume a value of 25 mg//l $CaCO_3$ even though actual hardness in streams, particularly in the mountains, can drop much lower, making metals more toxic. We urge the Commission to apply a lower hardness (thus regulating metals more strictly) in streams that have a lower actual hardness.

Also, while the state has proposed to tighten the numeric standards for toxic metals, it has proposed to allow dischargers to routinely violate the standards as long as in-stream monitoring does not identify loss of aquatic life. This 'biological trump' violates the Clean Water Act, as it only identifies damage *after* pollution has gone too far, rather than protecting designated uses from degradation. We recommend that the Commission exclude the biological trump from the final rule.

The Commission should neither eliminate nor relax the standard for manganese.

We urge the Commission to retain the current water quality standard for manganese, 200 µg/L, in all waters classified for use as sources of drinking water (WS-I through WS-V). While manganese is a vital nutrient in small quantities, its harmful impacts at higher concentrations are well documented. A 2011 study in Canada found a 6.2 point difference in IQ scores between children in the lowest quintile of exposure to manganese in

tap water (median: 1 µg/L) versus those in the highest (median: 216 µg/L).[1] Strikingly, tap water concentrations of manganese correlated much more closely with impacts to intelligence than levels of manganese in diet. More generally, research has found exposure to manganese in drinking water correlate inversely with children's intellectual capacity.[2]

Moreover, failure to control manganese discharges could contribute to a significant environmental justice problem. Children who are exposed to lead in the environment suffer far worse impacts if they are also exposed to relatively high concentrations of manganese.[3] Unfortunately, children of color and children living in poverty are disproportionately likely to already be suffering from high blood lead levels.[4] That makes them unusually susceptible to the combined cumulative harms of also being exposed to manganese in drinking water. Interference with brain development strikes at the heart of these children's ability to compete and succeed in the world. The Commission should keep the current water quality standard for manganese.

The EMC should adopt the proposed standard of 70 µg/l for 2,4-D in drinking waters.

The herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) is widely used and shows clear associations with non-Hodgkins' lymphoma and changes in the endocrine system (thyroid function, hormone levels emitted by testicular cells), and interference with neurotransmitters in the brain.[5] A 2004 EPA risk assessment suggested that land application could, rarely, result in 60-day average concentrations of 2,4-D downslope from pastures or apple orchards of between 40 to 45 µg/l.[6] On the other hand, 2,4-D is also applied directly to water for control of aquatic weeds, and the same EPA risk assessment found that concentration in a North Carolina pond at 29 days after application could still be at 860 µg/L.[7] Because 2,4-D can break down rapidly in water, it would be wise for the EMC to consider whether standards are also needed for its (toxic) breakdown products, or to make it clear that the proposed state standard covers those as well.

The EMC's proposal to tighten the water quality standard for 2,4-D is timely. While North Carolina has been fortunate not to find high levels of the herbicide in state waters recently, 2,4-D use has increased in North Carolina in recent years, particularly in the coastal plain.[8] Moreover, exposures are likely to become more common. Dow Chemical has sought permission from EPA to market an herbicide, Enlist, containing 2,4-D and glyphosate for use on crops genetically engineered for resistance to 2,4-D.[9] That comment period closed June

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[1] Maryse Bouchard, et al, "Intellectual Impairment in School-Age Children Exposed to Manganese from Drinking Water", *Environmental Health Perspectives*, 119:1 (2011), 138 – 143.

[2] David Bellinger, "Prenatal Exposures to Environmental Chemicals and Children's Neurodevelopment: An Update," *Safety and Health at Work*, 4 (2013), 1 – 11.

[3] Bridget Claus Henn, et al, "Associations of early childhood manganese and lead coexposure with neurodevelopment," *Environmental Health Perspectives* 120:1 (2012), 126-31 (one to three year old children); Yeni Kim, et al, "Co-exposure to environmental lead and manganese affects the intelligence of school-aged children," *Neurotoxicology*, 30:4 (2009), 564-71 (school-aged children).

[4] Leo Morales, "Demographic and socioeconomic factors associated with blood lead levels among Mexican-American children and adolescents in the United States," *Public Health Rep*. 120:4 (2005), 448–454; Robert Jones, "Trends in Blood Lead Levels and Blood Lead Testing Among US Children Aged 1 to 5 Years, 1988–2004," *Pediatrics*, 123:3 (2009), e376.

[5] *See, Comments from Beyond Pesticides et al*, August 23, 2004, docket EPA-HQ-OPP-2004-0167-0072 (appendix includes a detailed review of studies showing health effects of 2,4-D exposures).

[6] US EPA, *Environmental Fate and Effects Division's Risk Assessment for the Reregistration Eligibility Document for 2,4-Dichlorophenoxyacetic Acid (2,4-D)*, May 20, 2004, docket EPA-HQ-OPP-2004-0167-0003, at 58.

[7] *Ibid*, at 63.

[8] The US Geological Survey, Pesticide National Synthesis Project, has an impressive set of maps that estimate applications of many different pesticides from 1992 through 2011. The map for 2,4-D use in 2011 is here (http://water.usgs.gov/nawqa/pnsp/usage/maps/show_map.php?year=2011&map=24D&hilo=L).

[9] See, US EPA, EPA Seeks Comment on Proposed Decision to Register Enlist, visited August 16, 2014.

30, 2014, and a decision is expected this fall. The US Department of Agriculture has estimated that approval of Enlist will increase application of 2,4-D by a factor of two to six.[10]

Significantly, the exposure pathway for 2,4-D is not limited to drinking water. A 2008 study found that 83% of randomly selected homes of preschoolers in six counties in North Carolina tested positive for 2,4-D in house dust, and the compound was detected in more than 85% of the urine samples of children and their caregiving adults in the study. Researchers concluded that a major pathway of exposure is spraying on athletic fields and playgrounds, with adults and children then tracking 2,4-D laden dust into their homes, where young children are particularly exposed to it (because they are close to the ground, are constantly putting things from the floor into their mouths, and spend sizeable chunks of time at home).[11] Significant numbers of North Carolinians – especially children – may already be exposed to this pollutant through this pathway. That makes it particularly important for the EMC to set a water quality standard that minimizes cumulative risk to children from exposure to contaminated water.

The recommended level 70 µg/L standard for 2,4-D is wise. The US EPA has set a maximum contaminant level (MCL) for drinking water – the application of the proposed state standard – of 70 µg/L to protect human health,[12] and the World Health Organization (WHO) has recommended a standard of 30 µg/L.[13]

The EMC should adopt water quality standards to address fracking wastewater contamination.

The enactment this summer of SL2014-4 (S786) has placed the state is on track to begin issuing permits in the summer of 2015 for extraction of natural gas via fracking. The fracking process generates massive volumes of contaminated wastewater, both flowback and produced water. That wastewater can contain hundreds of different contaminants.[14] North Carolina lacks water quality standards for most; without such standards, the state has few ways to limit concentrations of those pollutants in wastewater discharged to surface waters.

We encourage the Commission to take these steps to address this complex challenge:

- For fracking contaminants that have federal human health or aquatic life criteria but no current state surface water quality standard (shaded in yellow on Table 1), adopt the federal criteria;

- For fracking contaminants that lack federal criteria and NC water quality standards but have been assigned surface water quality standards in at least two other states, adopt the most stringent of those standards (see Appendix 1);

- For fracking contaminants that lack federal criteria and have not had standards assigned by another state – this is by far the majority of chemicals identified by US EPA in fracking wastewater – assign them a 'non-detection' limit. If this seems too sweeping, the non-detection limit could be assigned only to those chemicals that are (1) listed as suspected carcinogens, teratogens, or endocrine disruptors; (2) are precursors of chemicals regulated as disinfection byproducts under the federal Safe

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[10] APHIS. 2013. *Draft Environmental Impact Statement*. Dow AgroSciences Petitions (09-233-01p, 09-349-01p, and 11-234-01p) for Determinations of Nonregulated Status for 2,4-D Resistant Corn and Soybean Varieties, at ix.

[11] M.K. Morgan et al, "Adult and children's exposure to 2,4-D from multiple sources and pathways," *J Expo Sci Environ Epidemiol*, 185 (2008), 486-94.

[12] 40 CFR §141.61(c), *see also*, US EPA, "Basic Information About 2,4-D in Drinking Water", visited Aug. 15, 2014.

[13] World Health Organization, *Guidelines for Drinking Water Quality*, 4th edition (2011), at 347.

[14] See, US EPA, *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Progress Report*, December 2012, Appendix A: Chemicals Identified in Hydraulic Fracturing Fluids and Wastewater, Table A-3.

Drinking Water Act (SDWA); or (3) are expected to bioaccumulate based on their structure and other known properties.

- As scientific information is developed that supports numeric standards that will protect aquatic life and human health, those values can be adopted by rule and should replace the non-detection limit for those pollutants.

The Commission should adopt numeric nitrogen and phosphorus criteria.

Over the last two years, we have sent multiple letters and comments urging the state to promptly adopt numeric criteria for nitrogen and phosphorus to address excessive nutrients in North Carolina's streams, rivers, lakes, and estuaries. We adopt those prior comments here.

Now that North Carolina and EPA Region IV have reached an agreement on the state's Nutrient Criteria Development Plan, we realize that the Commission is unlikely to move quickly to adopt numeric criteria. Nonetheless, such a step is what the Clean Water Act requires, and it would benefit North Carolina to take it sooner than later. The current chlorophyll-a standard – indeed, any standard keyed to a response and not a causal variable – will not provide proactive protection. In the meantime, excess nitrogen and phosphorous continues to enter state waters, causing eutrophication and fish kills. The approach proposed by some stakeholders – develop only site-specific criteria, one waterbody at a time – amounts to a strategy of endless delay. Instead, the Commission should set statewide default criteria for nitrogen (0.35 mg/l) and phosphorous (0.05 mg/l), allowing those to be displaced with site-specific criteria based on local data.[15] Such an approach would bring forward site-specific proposals much more rapidly than they are likely to be developed under the approved NCDP.

The Commission should adopt numeric criteria for concentrations of nutrients in benthic sediments.

Beyond criteria that apply to the water column, the Commission should adopt criteria for nutrients in benthic sediments.

Most of North Carolina's waters have accumulations of sediment on the bottom. These sediments are washed down from uplands, or abraded from banks and bottoms upstream during heavy rains or floods. In relatively pristine streams and rivers, these benthic sediments play important ecological roles. More commonly – since relatively few waters of the state are still pristine – the benthic sediments reflect the impacts of erosion and excessive runoff. The sediments also collect contaminants, including nitrogen and phosphorus. Depending on how firmly pollutants are attached to the sediments – either adsorbed on particles or in solution in the pore spaces between particles – they can flux in and out of the water column more or less readily.

Studies have suggested that nutrients do not easily accumulate in fast-flowing streams, but do build up in lakes and estuaries. Scientists studying the Neuse and Pamlico estuaries, and such inland waterbodies as Jordan and Falls Lakes, have found substantial fluxes of nutrients from benthic sediments into the water column.[16] When the State tackles impairment, these nutrients are called 'legacy nutrients', and they can have a significant

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[15] These numbers are based on an analysis by former USGS hydrogeologist Tim Spruill that found such a standard who have roughly a 95% chance of not generating an exceedance of the current 40 µg/L chlorophyll-a standard. See, Letter, Tim Spruill, Hydrologist, to Dianne Reid, Division of Water Quality, January 18, 2013; Letter, Tim Spruill, Hydrologist, to Nikki Schmizzi, Division of Water Quality, May 24, 2013.

[16] See, e.g., D.R. Corbett, "Resuspension and estuarine nutrient cycling: insights from the Neuse River Estuary," *Biogeosciences*, 7, 3289–3300, 2010

impact on the dynamics of recovery.[17] The State has assumed that, once the ongoing excess contribution of nutrients is removed, the lake or estuary will eventually rebound, though it may take several decades.[18]

In the great majority of watersheds in North Carolina – all those not under an active nutrient management plan –those 'legacy' sediments are not simply a historical artifact.[19] They are still accumulating, and state standard setting cannot prevent future degradation without taking them into account. We recommend that the Commission address this by:

- Setting a narrative water quality standard that year over year nutrient concentrations in benthic sediments in a given waterbody should not show a net increase. From day to day, nutrients may flux in and out of the water column, driven by flows, temperature, and seasonal patterns. But, if average annual the nitrogen or phosphorus concentrations are increasing over time, even if the water isn't showing violations of response variables, the water body is on borrowed time, threatened with inevitable impairment unless management measures are adopted.

- Setting a numeric standard for the maximum allowed nutrient concentration in benthic sediment. This numeric level is an important complement to the narrative standard, since the narrative standard alone will fail in situations where the sediment has become hypersaturated with nutrients and simply cannot absorb any more.

The Commission should adopt EPA's recommended acute and chronic standards for ammonia.

Ammonia, often released by wastewater treatment plants and other dischargers, is sharply toxic to aquatic life, including endangered mussels. US EPA has addressed North Carolina's lack of a water quality standard, and has encouraged the Commission to adopt a standard.[20] The science to support a water quality standard is abundant and readily available, and on this issue, we endorse and support the recommendations of the Pamlico-Tar River Foundation (PTRF).

The Commission should adopt a standard for methylmercury of 0.3 mg/kg of fish tissue.

Especially in the form of methylmercury, mercury is highly toxic to humans, interfering with fetal, infant, and childhood development, and placing adults at risk, too.[21] However, North Carolina does not directly regulate methylmercury, although that is the form in which mercury accumulates in fish and most directly threatens wildlife and people who eat the fish. We encourage the Commission to adopt a methylmercury criterion that meets or exceeds the national recommendation of 0.3 mg/kg of fish tissue to protect human health, while retaining the current standard for inorganic mercury.

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[17] *See, e.g.*, L.M. Malecki et al, "Nitrogen and phosphorus flux rates from sediment in the lower St. Johns River estuary," *J Environ Qual.* 2004 Jul-Aug; 33(4):1545-55 ("the internal flux from sediments may be a significant portion of the total load" to an impaired waterbody).

[18] *But see* Stephen Carpenter, "Eutrophication of Aquatic Ecosystems: Bistability and Soil Phosphorus," *PNAS*, 102, 10002-10005, 2005 (suggesting with modelling that some lakes may take hundreds of years to recover naturally from phosphorus-driven eutrophication, or require special soil management measures. This poses a challenge for fixing impaired waters; it also highlights the importance of preventing waters from sliding into phosphorus-driven impairment).

[19] The key question is whether the nutrient loading reduction measures are in effect. So, for example, even in the Jordan Lake watershed, where new development rules have been adopted but delayed for three years, the existing nutrient loading is not in fact a 'legacy', but a burden that continues to grow over time.

[20] Letter, James Giattina, US EPA Region IV, to Tom Reeder, NC DENR, February 4, 2014, at 2.

[21] Margaret Karagas, "Evidence on the Human Health Effects of Low-Level Methylmercury Exposure," *Environmental Health Perspectives*, 120:6 (2012), 799 – 806.

The Commission should develop narrative and numeric standards for stream flow that fully protect the waters of the State.

Sufficient stream flow is essential to protecting many designated uses, and the physical, chemical, and biological quality of the waters of the State. Aquatic life, primary and secondary recreation, drinking water, industrial and agricultural water use, and other designated uses depend on adequate flow in streams and rivers. These uses warrant protections through the development and adoption of narrative and numeric flow standards.

Flow is fundamental to achieving the goals of the Clean Water Act to protect and restore the chemical, physical and biological quality of the state's waters. The tendency of some state agencies implementing the Clean Water Act to focus disproportionately on the chemical integrity of waterways and less so on the biological and physical integrity, has created a need for explicit recognition of the authority and responsibility to address water quantity to achieve these goals. Dynamic instream flows are essential for sustaining healthy waters. Flow protections should be addressed through the Clean Water Act's water quality standards program.

EPA Region 4 has recommended through letters and meetings with State directors that State agencies develop flow standards as part of the Triennial Review process and has provided State agencies with guidance. In the Southeast, Kentucky, Virginia, and Tennessee have already adopted flow protections in their water quality standards, allowing for the protection of flows for aquatic life and recreation. We agree with EPA's recommendations.

The objective of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." *33 U.S.C. § 1251(a)*. The goal is to achieve, "wherever attainable," "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water." *Id. at § 1251(a)(2)*. The water quality components of the Clean Water Act are aimed at protecting the full scope of benefits that clean and abundant water provide to society at large. The parameters for success of this goal are water quality standards that protect existing and classified designated uses. The Clean Water Act does not allow the impairment of existing and classified designated uses of streams and rivers in favor of off-stream uses.

State water quality standards are made up of beneficial uses, narrative and numeric criteria, and the anti-degradation policy. Federal courts have been clear that water quality standards can be affected by water flow and that regulation of flow as necessary to protect a designated use contained in a water quality standard, such as propagation of fish and wildlife, falls under the authority of the Clean Water Act. See, *e.g., PUD No. 1 of Jefferson County v. Washington Dept. of Ecology, 511 U.S. 700, 723 (1994)*.

Explicit standards recognizing water flow as essential to supporting existing and classified designated uses are crucial to meeting the goals of the Clean Water Act. While water flows are implicitly protected, in practice when a state agency charged with implementing the Clean Water Act focus on the chemical component of the water quality and provide only cursory review of how their decisions will affect physical and biological integrity. The results can be paradoxical decisions where a waterway is deemed "suitable for primary and secondary recreational contact" because it meets chemical standards, but there is not enough water volume in the stream to swim or boat, or the timing and delivery of the water prevents aquatic life from completing key lifestages. When only chemical integrity is considered a waterway could be considered "suitable for recreation" when in reality, most conceivable forms of recreation are impossible because of insufficient water flow or high flows that threaten public safety. This is just one example of the problems that arise when

implementation of the Clean Water Act focuses too narrowly on only one or two of the three inter-related components of chemical, physical, and biological integrity necessary to achieve water quality.

Developing flow based water quality standards will work to support the designated uses of the waters of the state. For example, a key component of water based recreation is water quantity. Swimming and boating take a certain amount of water to be possible, while sudden large increases in water flow can make both of those activities unsafe for the public. A focus solely on the chemical composition of the water (e.g. fecal coliform concentrations) without considering the physical and biological integrity, can fail to protect primary and secondary recreational uses. Another example where a flow standard would support designated use is within a water supply watershed, clean drinking water is critical to our economy and society and is given paramount priority in the Clean Water Act. Water quantity is critical to drinking water uses because without enough water to assimilate nutrients and pollutants, the water can become unfit for consumption or industrial processes. Likewise, stormwater flows can impair water quality for off-stream uses. The state must ensure sufficient water quantity to protect drinking water uses in addition to that required for fishing and recreation uses.

Standards should be developed using techniques that adequately allows for flow variability based on a "natural flow paradigm." The importance of seasonal, intra-annual and inter-annual variable flow patterns needed to sustain natural riverine characteristics that support recreation and downstream uses should also be recognized in the standards. One method that is useful when site-specific flow data is lacking is the "presumptive standard." The presumptive standard "explicitly recognizes the importance of natural flow variability and sets protection standards by using allowable departures from natural conditions, expressed as percent alternation."

As flow standards are developed the Commission should not adopt 7Q10 or other similarly low flows as a default flow; such low flows mimic drought conditions and are not adequate to protect aquatic life or other uses. Such low flows are relevant only for designating the lowest discharge into which a pollutant discharge can be allowed [and] should not be approved as the instream flow for any other stream management purpose. As a minimum flow standard to sustain aquatic life, 7Q10 lacks any scientific or common sense foundations and can be expected to result in severe degradation of riverine biota and processes" by effectively imposing a "permanent drought.

The Commission must take into account the economic benefits of clean water when evaluating the need to increase regulatory protections.

Clean, abundant water is essential for both the environment and the economy. A 2012 report by the Outdoor Industry Association [22]clearly made the connection between a healthy environment, the outdoor recreation economy and job creation. According to the report, outdoor recreation nationally supports $646 billion in direct spending each year with $121 billion spent on fishing and water sports. For North Carolina, the association estimates $19.2 billion in direct spending on outdoor recreation and 192,000 jobs in outdoor-related industries. A January 2013 report by the American Sportfishing Association[23] found that freshwater fishing in North Carolina annually results in an $1.2 billion overall benefit to the State economy with $80.7 million generated for state and local government revenues. Spending on freshwater fishing supports 11,193

[22] The Outdoor Recreation Economy- North Carolina. http://outdoorindustry.org/images/ore_reports/NC-northcarolina-outdoorrecreationeconomy-oia.pdf visited Aug. 21, 2014

[23] American Sportsfishing Association "Sport Fishing in America, An Economic Force for Conservation" http://asafishing.org/uploads/2011_ASASportfishing_in_America_Report_January_2013.pdf visited Aug. 21, 2014

jobs and $400 million in wages and salaries. These reports clearly demonstrate that a healthy environment and healthy economy go hand in hand.

Conclusion

Thank you for your consideration of these comments. It is critical that the state move forward with strong protections for our clean water supplies to ensure that both people and nature are protected. This triennial review took far longer than it needed to and the commission must act with expedience to address these concerns and provide adequate protections that use the latest science and technology. We look forward to working with the Commission and The Department of Environment and Natural Resources on the Triennial Review process. Please do not hesitate to contact us if you have any questions.

Sincerely,

Grady McCallie
Policy Director
NC Conservation Network

Peter Raabe
NC Conservation Director
American Rivers

Table 1. Pollutants in fracking wastewater and existing standards. All units in $\mu g/L$.

Pollutant	NCWQS Class C	NCWQS WS	EPA HHC	EPA ALC acute	EPA ALC chronic
Acrolein	--	--	6	3	3
Alcrylonitrile	--	--	0.051	--	--
Aldrin	0.002	0.00005	0.000049	3	--
Alpha-Endosulfan (Endosulfan I)	0.05	--	62	0.22	0.056
Benzene	--	1.19	2.2	--	--
Benzo(a) Athracene	--	PAH: 0.0028	0.0038	--	--
Benzo(a) Pyrene	--	PAH: 0.0028	0.0038	--	--
Benzo(b) Fluroanthene	--	PAH: 0.0028	0.0038	--	--
Benzo(k) Fluroanthene	--	PAH: 0.0028	0.0038	--	--
Beta-BHC (beta-1,2,3,4,5,6-Hexachlorocyclohexane)	--	--	0.0091	--	--
Beta-Endosulfan (Endosulfan II)	--	--	62	--	--
Bis(2-Chloroethyl) Ether	--	--	0.030	--	--
Bis(2-Ethylhexyl) Phtalate (Di(2-Ethylhexyl) Phtalate)	--	--	1.2	--	--
Bromoform	--	--	4.3	--	--
Chlorodibromomethane (Dibromochloromethane)	--	--	0.40	--	--
Chloroform	--	--	5.7	--	--
Cyanide	5	--	140	22	5.2
Dibenzo(a,h) Anthracene	--	PAH: 0.0028	0.0038	--	--
Dichlorobromomethane (Bromodichloromethane)	--	--	0.55	--	--
Dieldrin	0.002	0.00005	0.000052	0.24	0.056
Diethyl Phtalate	--	--	17,000	--	--
Di-n-butyl Phtalate (Dibutyl Phtalate)	--	--	2,000	--	--
Endrin Aldehyde	--	--	0.29	--	--
Ethylbenzene	--	--	530	--	--
Fluoranthene	--	PAH: 0.0028	130	--	--
Fluorene	--	PAH: 0.0028	1,100	--	--
Gamma-BHC (Lindane)	0.01	--	0.98	0.95	--
Heptachlor	0.004	0.00008	0.000079	0.52	0.0038
Heptachlor Epoxide	--	--	0.000039	0.52	0.0038
Ideno(1,2,3-cd) Pyrene (Indeno(1,2,3-cd) Pyrene)	--	PAH: 0.0028	0.0038	--	--
Methyl Bromide	--	--	47	--	--
Methylene Chloride (Dichloromethane)	--	--	4.6	--	--
Phenol	--	--	10,000	--	--
Pyrene	--	PAH: 0.0028	830	--	--
Tetrachloroethylene	--	--	0.69	--	--
Toluene	11	--	1,300	--	--
1,2,4-Trichlorobenzene	--	--	35	--	--
2,4-Dimethylphenol	--	--	380	--	--
4,4'-DDE (p,p'-DDE)	--	--	0.00022	--	--

Source for first column: US EPA, Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Progress Report, December 2012, App. A, Tables A-1, A-3.

Appendix 1. Other state water quality standards for contaminants found in fracking wastewater.

This appendix describes the regulations applied to fracking wastewater in other states; Table 2 then identifies which states have surface water quality standards for pollutants identified by EPA in fracking wastewater (the table omits metals, since North Carolina already has provisions for those). If fact, the EPA list in conservative; other investigations have found much longer lists of contaminants. But this is a start.

Arkansas. As of 2012, there were no known discharges of hydraulic fracturing wastewater to surface waters in Arkansas.[1] However, as of 2012 three centralized wastewater treatment plants (CWTs) had received NPDES permits and were awaiting construction. They would treat the wastewater by reverse osmosis or distillation. Whenever possible, Arkansas promotes disposal of hydraulic fracturing wastewater through underground injection wells.[2] Arkansas has water quality criteria for only a handful of contaminants, so we have not included them in Table 2.[3]

Colorado. In Colorado, flowback from hydraulic fracturing is disposed of through injection wells or is treated by an Exploration & Production (E&P) waste disposal facility.[4] Colorado does not have testing regulations specific to hydraulic fracturing for these E&P waste disposal facilities.[5] Colorado's rules on hydraulic fracturing do not mention how wastewater should be disposed.[6] Colorado's surface water quality standards criteria apply depending on the designation of the specific waterbody.

Illinois. A proposed regulation in Illinois requires hydraulic fracturing flowback to be tested for volatile organic chemicals, semi-volatile organic chemicals, inorganic chemicals, heavy metals, and naturally occurring radioactive material before removal from the well site.[7] Flowback may only be disposed of by permitted underground injection or treated and recycled for reuse in hydraulic fracturing fluid.[8] Produced water under the proposed regulation similarly may only be disposed of through permitted underground injection or treated and recycled for reuse in hydraulic fracturing fluid.[9]

While surface water quality standards should thus become irrelevant if the proposed framework is adopted, Illinois has water quality standards for a long list of pollutants. All of the criteria listed in Table2 apply in 'general use' waters, the state equivalent of 'Class C' waters; some pollutants have different standards in Lake Michigan.[10]

North Dakota. In North Dakota, the produced water from hydraulic fracturing must be disposed of in an authorized facility and is governed by the normal NPDES requirements.[11] Treating plants must apply for a permit for construction that details the location, type, capacity of the plant, method of processing proposed, and the plan of operation for all plant waste.[12]

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[1] STRONGER, *Arkansas Hydraulic Fracturing State Review*, February 2012.
[2] Arkansas Pollution Control and Ecology Commission, *Regulation No.1.8*.
[3] Arkansas Pollution Control and Ecology Commission, Arkansas Regulation 2.501.
[4] ALS Global, *State Fracking Regulations*.
[5] *Id.*
[6] *See* COGCC Hydraulic Fracturing Rules.
[7] 62 Ill. Adm. Code 245.850.
[8] *Id.*
[9] 62 Ill. Adm. Code 245.940.
[10] Illinois EPA, *Derived Water Quality Criteria List*.
[11] ALS Global, *State Fracking Regulations*; NDAC 43-02-03-19.2.
[12] NDAC 43-02-03-41.

Ohio. Ohio requires that produced water from hydraulic fracturing is sent to an ODNR-permitted underground injection well.[13] Direct discharge of wastewater into surface water is prohibited, as is disposal at wastewater treatment plants.[14]

Pennsylvania. Wastewater from hydraulic fracturing must be recycled, treated by an authorized facility, or disposed of at a authorized treatment facility.[15] Pennsylvania requires a waste handling plan that details how the liquid waste will be handled for operators of hydraulic fracturing sites, and requires wastewater analysis testing for a variety of metals and organic compounds.[16] Pennsylvania will only authorize new and expanding wastewater discharges associated with hydraulic fracturing from centralized waste treatment facilities (CWTs), and not from publicly owned treatment works unless the wastewater has been pretreated by a CWT.[17] Pennsylvania also has standards for total dissolved solids, total chlorides, total barium, and total strontium for hydraulic fracturing wastewater discharges.[18] Wastewater must be treated to meet the safe drinking water standard for total dissolved solids.[19]

Pennsylvania has a number of standard water quality criteria,[20] and also special metals standards.[21] The state also has human health and aquatic life criteria applicable to fracking contaminants as indicated in Table 2.[22]

Texas. Hydraulic fracturing flowback fluid handling is governed by the standard state and Clean Water Act requirements, with not additional testing regulations specific to hydraulic fracturing operations.[23] There are special requirements for oil and gas NORM waste.[24] Texas has aquatic life criteria and human health criteria as reflected in Table 2.[25]

West Virginia. Flowback fluid in West Virginia may be disposed of through underground injection, recycling, and disposals at centralized treatment centers such as publicly owned treatment works.[26] West Virginia instructs hydraulic fracturing operators that underground injection of wastewater may be the best option, but disposal at a centralized treatment facility remains an option.[27] If wastewater is sent to publicly owned treatment works, state authorities must be notified and will ensure that the waste will be properly treated by the facility. Additionally, if the facility does not already have a pretreatment permit covering hydraulic fracturing wastewater there will be an NPDES permit modification evaluation. West Virginia has water quality criteria as indicated in Table 2.[28]

Wyoming. Wyoming has no testing regulations that specifically address hydraulic fracturing.[29] Wyoming's water quality standards distinguish between priority pollutants and nonpriority pollutants; both have criteria as indicated in Table 2.[30]

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13 ALS Global, *State Fracking Regulations.*
14 Ohio EPA, *Guide for Operators Drilling in the Marcellus and Utica Shales*, March 2012.
15 Pennsylvania DEP, *Marcellus Shale Development Fact Sheet.*
16 ALS Global, *State Fracking Regulations.*
17 P.A. Code § 95.10(b)(3).
18 *Id.*
19 Pennsylvania DEP, *Marcellus Shale: Tough Regulations, Greater Enforcement.*
20 P.A. Code §93.7.
21 P.A. Code §93.8b.
22 P.A. Code §93.8c.
23 ALS Global, *State Fracking Regulations.*
24 *See* TAC 16-1-4-F-4.614
25 30 TAC 307.6(c)(1); 30 TAC 307.6(d)(1).
26 ALS Global, *State Fracking Regulations.*
27 West Virginia DEP, *Industry Guidance, Gas Well Drilling/Completion, Large Water Volume Fracture Treatments*, January 8, 2010.
28 West Virginia DEP, *Water Quality Standards Tables.*
29 ALS Global, *State Fracking Regulations.*
30 Wyoming DEQ, *Water Quality Rules Chapter 1.*

Table 2. State standards for some contaminants in fracking wastewater as identified by US EPA.[i]

Pollutant	IL	CO	ND	PA	TX	WV	WY
acetone	X	X	--	X	--	--	--
acetonitrile	X	--	--	--	X	--	--
acrolein	X	X	X	X	--	--	P
acrylamide	X	X	--	X	--	--	--
2-propenamide	X	--	--	--	--	--	--
acrylonitrile	X	X	X	X	--	X	P
aldrin	X	X	X	X	X	X	P
anthracene	X	X	X	X	X	X	P
benzene	X	X	X	X	X	X	P
benzo (a) anthracene	X	X	X	X	X	X	P
benzo (a) pyrene	X	X	X	X	X	X	P
benzo (b) fluoranthene	X	X	X	X	--	X	P
benzo (k) fluoranthene	X	X	X	X	--	X	P
benzyl alcohol	X	--	--	--	--	--	--
BHC *[hexachlorocyclohexane]*	X	--	--	X	--	X	P
bis (2-chloro-1-methylethyl) ether	X	X	--	X	X	--	S
bis (2-ethylhexyl) phthalate	X	--	X	X	X	--	--
bromodichloromethane	X	X	X	X	X	X	P
bromoform	X	X	X	X	X	X	P
n-butylbenzene	X	--	--	--	--	--	--
chlorodibromomethane	X	X	X	X	X	--	P
chloroform	X	X	X	X	X	X	P
chloromethane	X	--	--	--	--	--	--
dibenz[a,h]anthracene	X	X	X	X	--	X	P
dichloromethane	--	X	--	--	X	--	--
dieldrin	X	X	X	X	X	X	P
diethyl phthalate	X	X	X	X	--	--	P
2,4-dimethylphenol	X	X	X	--	X	X	P
dioxane	X	X	--	--	--	--	--
α-endosulfan	X	X	X	X	X	--	P
β-endosulfan	X	X	X	X	X	--	P
endrin aldehyde	--	X	X	X	--	--	P
ethylbenzene	--	X	X	X	X	X	P
ethylene glycol	X	--	--	--	--	--	--
fluoranthene	X	X	X	X	--	X	P
fluorine	X	X	X	X	--	X	P
fluoride	--	--	X	--	X	X	S
heptachlor	X	X	X	X	X	X	P
heptachlor epoxide	X	X	X	X	X	--	P
heptane *	X	--	--	--	--	--	--

Pollutant	IL	CO	ND	PA	TX	WV	WY
hexachloroethane, n-hexane*	X	X	X	X	X	--	P
indeno [1,2,3-cd] pyrene	X	X	X	X	--	X	P
lindane	X	--	--	X	X	--	--
methanol	X	--	--	--	--	--	--
methyl bromide	--	X	X	X	--	X	P
methylene chloride**	X	X	X	X	--	X	P
methyl ethyl ketone	X	--	--	X	X	--	--
methyl naphthalene	X	--	--	--	--	--	--
4-methylphenol	X	--	--	--	--	--	--
3-methyl phenol	X	--	--	--	--	--	--
2-methylphenol	X	--	--	--	--	--	--
2-methyl-1-propanol	X	--	--	--	--	--	--
naphthalene	X	X	--	X	--	--	--
nitroso- amines (several)	--	X	X	X	X	--	P
pentane*	X	--	--	--	--	--	--
phenanthrene	X	--	--	X	X	--	--
p-phenyl phenol	X	X	--	X	--	X	--
o-phenyl phenol	X	X	--	--	--	X	--
n-propylbenzene	X	--	--	--	--	--	--
pyridine	--	--	--	--	X	--	--
pyrene	X	X	X	X	--	X	P
tetrachloroethylene	X	X	X	X	X	X	P
toluene	--	X	X	X	X	X	P
1,2,3-trichlorobenzene	X	--	--	--	--	--	--
1,2,4-trichlorobenzene	X	X	X	X	--	--	P
1,3,5-trimethyl benzene	X	--	--	X	--	--	--
1,2,4-trimethyl benzene	X	--	--	X	--	--	--
xylene	--	X	X	X	--	--	S

* occurs in wastewater as acid.
** not found by EPA in wastewater but ubiquitous on drilling sites and potentially in runoff.
Note: Wyoming distinguishes between priority (P) and secondary (S) pollutants.

---

[i] US EPA, *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Progress Report*, December 2012, Appendix A: Chemicals Identified in Hydraulic Fracturing Fluids and Wastewater, Table A-3.

Manning, Jeff

From: george <george@riverguardfdn.org>
Sent: Thursday, August 21, 2014 10:26 PM
To: DWR_Classifications_Standards
Subject: Triennial Review Comments
Attachments: Triennial Review Water Quality Standards Revision Comments 2014.doc

Follow Up Flag: Follow up
Flag Status: Completed

Categories: NGOs

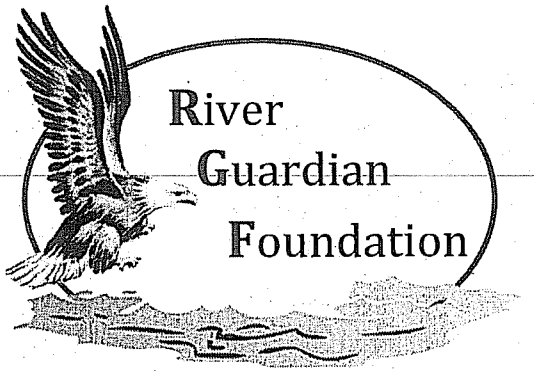
Ms. Brower:

Please find attached recommendations related to the draft triennial review water quality standards.

We appreciate the opportunity to comment and look forward to the EMC's action on this important issue that is vital to protecting North Carolina's citizens and the environment.

Best regards,
George

George Matthis, President
River Guardian Foundation
http://www.riverguardfdn.org
https://www.facebook.com/RiverGuardianFoundation/
https://twitter.com/RiverGuardianFd



August 21, 2014

Ms. Connie Brower
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

RE: Comments on Triennial Review of Surface Water Quality Standards

Dear Ms. Brower:

I am writing to comment on the proposed triennial review changes to North Carolina's water quality standards. We support many of the changes but have concerns about the level of limits or lack of standards for some parameters as well as some other items. Specific comments and concerns are below.

North Carolina is the only state in the southeast that has not adopted the toxic metals criteria as recommended by EPA two decades ago. The current proposal would upgrade our water quality standards for metals cadmium, chromium III, copper, lead, nickel, silver, and zinc - to match national recommendations and protect wildlife and human health. The proposed upgrade is a step in the right direction, but in many cases may not be strong enough to adequately protect human health and the environment. As an example, in the mountain region of North Carolina, water hardness can be low, making metals more toxic, but the proposal does not address these conditions. We recommend that the state tighten the metals standards as proposed, but should also tighten them further than proposed in vulnerable mountain streams with an especially low hardness.

While the state has proposed to tighten and improve the standards for toxic metals, it has also proposed to let polluting industries routinely violate the standards as long as stream life appears to survive. This violates the Clean Water Act, as it only identifies damage after pollution has gone too far. We recommend that polluters be held accountable in every instance when they violate water quality standards.

The herbicide 2,4-D (chlorophenoxy) is already widely applied, and genetic engineering of crops is predicted to significantly expand its use. When consumed by humans, 2,4-D can damage the liver, kidney, and adrenal glands. We recommend that the state, as proposed, tighten its standard for 2,4-D in waters used as sources for drinking water and food-processing purposes and that change should be adopted into the final set of water quality standards.

In addition to the existing draft rule set, there are several items missing items. As a result of recent legislation, the state is on track to begin issuing permits for extraction of natural gas via fracking in 2015. The fracking process generates massive volumes of contaminated wastewater. North Carolina lacks water quality standards for hundreds of contaminants that can be in fracking wastewater. Without such standards, the state has no effective way to limit pollutants in fracking wastewater discharged to rivers, lakes, and streams. The triennial review would be the ideal tool to use for adopting such standards, but the state has not proposed any standards for fracking contaminants.
We recommend that the Environmental Management Commission prohibit discharges of fracking contaminants for which safe levels have not yet been scientifically determined.

PO Box 97003 Raleigh, NC 27624 (919) 602-8682
info@riverguardfdn.org www.riverguardfdn.org

Excess nutrients (nitrogen and phosphorous) cause algal blooms and fish kills. EPA recently approved a multi-year state plan to study whether to adopt limits on nitrogen and phosphorus, but this process will not yield a limit for most of the state's water bodies for more than a decade, if at all. North Carolina needs to address nutrient pollution now, at the source, by adopting statewide nitrogen and phosphorus limits.

Ammonia is sharply toxic to aquatic life, especially mussels and is released by wastewater plants and other polluters. North Carolina has no water quality standard for ammonia, and the current package does not propose one. The state should adopt EPA's nationally recommended standards for ammonia - formulas that rely on local temperature and water acidity (pH) to protect life in North Carolina's streams, rivers and lakes.

Mercury is highly toxic to humans, especially in the form of methylmercury, interfering with fetal, infant, and childhood development, and placing adults at risk, too. However, North Carolina does not directly regulate methylmercury, although that is the form in which mercury accumulates in fish and most directly threatens wildlife and people who eat the fish. North Carolina should adopt a methylmercury limit that meets or exceeds the national recommendation of 0.3 mg/kg of fish tissue to protect human health, while retaining its standard for inorganic mercury.

If withdrawals leave too little water in a river or lake, that water body will not sustain healthy fish and wildlife. Worse, pollution discharged into a depleted river remains more concentrated, increasing the risks to people who use it downstream. Currently, North Carolina lacks explicit protections for flow in its water quality standards, and the state uses a weak method to set permit limits. North Carolina should adopt strong protections for water flow.

When the state reviews its water quality standards, it must also review variances. These include two chloride variances for pickle companies, Mt. Olive Pickle Company in Wayne County and Bay Valley Foods in Duplin County; a color variance for Evergreen Paper Products in Haywood County; and thermal variances for the cooling systems at a long list of electric power generating plants. DENR should insist on all possible progress being made toward meeting water quality standards as a condition to granting continued variances.

Overall, as has been frequently mentioned in the media and by concerned organizations and citizens, it is past time for North Carolina to upgrade our water quality standards to better protect its citizens and the environment. We appreciate the efforts to move forward with metals standards, but the package is painfully limited. The state should take the next step and product additional and more stringent standards.

Thank you for accepting my comments regarding the draft triennial review rule revisions. Protection of North Carolina's watersheds is of prime concern to the River Guardian Foundation and we stand ready to assist the State of North Carolina in every possible manner to ensure that together we are achieving this goal.

Sincerely,

George C. Matthis, Jr.

George C. Matthis, Jr., President
River Guardian Foundation, Inc.

Manning, Jeff

From: Wrenne Kapornyai <wkapornyai@franklincountync.us>
Sent: Thursday, August 21, 2014 2:28 PM
To: DWR_Classifications_Standards
Subject: Triennial Review of Stds Response
Attachments: Triennial Review 2014 Response 08212014.docx

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Good morning Ms. Brower:

Attached please find my response.

Thank you for all you do.

Wrenne

Mrs. Wrenne Kapornyai
Lab Supervisor
Pretreatment Coordinator
Franklin County
North Carolina
Member NC-PC
(919) 494-5850
wkapornyai@franklincountync.us

August 21, 2014

Ms. Connie Brower
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Re: Surface Water Quality Triennial Review of Standards

Dear Ms. Brower:

Please accept the following comments on the Surface Water Triennial Review of Water Quality Standards. The North Carolina Pretreatment Consortium, Incorporated (NC-PC) is a non-profit organization representing over 140 pretreatment professionals from municipalities throughout the State of North Carolina. Since its inception in 1997, the NC-PC has grown to represent most of the state's 110 pretreatment programs. North Carolina's pretreatment programs cover 133 municipal wastewater treatment plants with a combined NPDES permitted flow of over 1060 MGD; more than 90% of all municipal NPDES permitted flow in the state.

We appreciate the Division of Water Resources' (DWR) efforts in updating the water quality criteria. The NC-PC believes that proposed changes under this review will allow the regulated community to remain fully protective of water quality while eliminating nonproductive costs and compliance burdens Our specific comments follow.

No amount of money spent on sampling produces a single drop of cleaner water.

Sampling should be kept to the minimum necessary for scientific confidence so that more resources (money) remain available to actually do the work of cleaning the water. We are committed to that task.

The following items are a reasonable compromise on ways to achieve the major goals of what this Triennial Review has proposed while remaining fiscally responsible.

The NC-PC asserts that there is no basis for the existing criteria for Iron and Manganese. These are ubiquitous in the environment and do not produce adverse human health or toxic environmental effects. We should allocate our resources to more pressing issues. If proposed standards for Chromium III and Chromium VI are adopted then there is no longer a need for a Total Chromium criterion and this should be eliminated.

Validation of the translator for metals eliminates the need to measure both Dissolved Metals and Total Recoverable Metals. The translator is necessary because Water Quality Standards are Toxicity –based (not technology based) and dissolved metals represent the best measurement of the toxic effects of a pollutant metal in a sample of water. It would be scientifically unsound to use the translator to extrapolate to hardness levels less than 25 mg/l. because of the unstable reproducibility of measurements in that environment.

Per 40 CFR 122.45(c) NPDES permit limits are expressed as Total Recoverable Metals in large part because this is a more controlled, reproducible, and legally defensible measurement.

Measurement of dissolved metals requires extensive sample manipulation under variable, non-ideal conditions and has a greater potential to introduce sampling errors.

We request that action levels for Copper, Silver, Zinc and Chloride be continued. There is no evidence to suggest that a better environmental result will be obtained by abandoning a system that has worked well historically and replacing it with a system of limits that are of no demonstrably greater benefit.

The NC-PC has long been in favor of using median in stream effluent hardness levels as a basis for calculating site specific NPDES permit limits. (As EPA has allowed for most states.) This approach is more than conservative in these calculations and is consistent with providing a best representation of expected conditions.

Likewise, NC-PC commends DWR's use of the 95% Confidence Level and 95% Upper Boundary for Reasonable Potential Evaluations. Discarding extreme outliers allows us to truly call these evaluations "reasonable" in the generally accepted meaning of that word.

We find that the use of the 1Q10 obtained from HUC data is a valid measure that does not place an undue burden on State and municipal water resources staff. We support the League of Municipalities and NCWQA recommendation to use this metric.

We do appreciate the fact that many of our concerns have been addressed procedurally by DWR in discussions with NC-PC. It is likely that the majority of our remaining concerns are at the level of resolving possible ambiguities in implementation. We expect that further continued discussion with DWR will result in realistic, measurable, and achievable methods to achieve these goals.

The NC-PC hereby incorporates by reference the comments provided by the NC Water Quality Association.

Thank you for your kind consideration of these points.

Sincerely,

D. Wrenne Kapornyai
Pretreatment Coordinator
Franklin County, NC
Member NC-PC
wkapornyai@franklincountync.us
(919) 494-5850

By Email (DWR-Classifications-Standards@ncdenr.gov)

Manning, Jeff

From: Gondek, John <jgondek@geiconsultants.com>
Sent: Thursday, August 21, 2014 2:04 PM
To: DWR_Classifications_Standards
Cc: Joseph Gorsuch (joseph.gorsuch@copperalliance.us); Gensemer, Bob; Canton, Steven; DavidD@windwardenv.com; evangenderen@zinc.org
Subject: GEI Comments on NC Triennial Review -- Copper BLM
Attachments: GEI_BLMProposal_NC.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Industry or Representative

Ms. Brower,

Attached is a comment letter from Robert Gensemer on behalf of the Copper Development Association discussing an issue we would like your staff to consider in North Carolina's triennial review of standards.

Please let us know if you need any additional information – we are here to help if you have any questions. We look forward to speaking with you soon.

Thank you,
John

John Gondek
Ecotoxicologist
GEI Consultants
Consulting Engineers & Scientists
GEI Consultants, Inc.
455 Winding Brook Drive, Suite 201 | Glastonbury, CT 06033
T: 860.368.5382 | **M:** 845.323.6424
www.geiconsultants.com | vCard | map | LinkedIn | Twitter | Facebook

GEI Consultants

August 21th, 2014

Connie Brower
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Geotechnical
Environmental
Water Resources
Ecological

Re: Proposal to Support the Use of Biotic Ligand Model for Copper Aquatic Life Criteria in North Carolina

Dear Ms. Brower,

We would like to submit these comments to the North Carolina Department of Environment and Natural Resources, Division of Water Resources (DWR) as part of the Triennial Review of surface water quality standards on behalf of our client, the Copper Development Association (CDA). CDA played a significant role in sponsoring scientific research used in development of the freshwater Biotic Ligand Model (BLM) for copper, which was adopted by the United States Environmental Protection Agency (EPA) in its latest national ambient water quality criteria (EPA 2007). CDA is now interested in encouraging efforts by states and tribes to incorporate these latest recommended EPA national criteria for copper into their water quality standards programs.

The DWR is conducting its Triennial Review of water quality standards and is currently accepting stakeholder comments until August 22th, 2014. We understand that the DWR is considering updating its copper criteria to allow use of the BLM. Thus, the purpose of this letter is to support the DWR in its consideration of using the BLM to calculate aquatic life criteria for copper, as currently recommended by EPA.

North Carolina's current aquatic life criteria used to derive copper standards, like most states' criteria, only take into account hardness as a factor that modifies toxicity. Using only hardness as a modifying factor for metals criteria is an outdated approach that excludes a substantial body of peer-reviewed scientific literature demonstrating that additional modifying factors can and should be incorporated into regulatory benchmarks or standards, while providing the same levels of aquatic life protection required under the Clean Water Act (EPA 1985, 1994, 2001, 2007). Like most metals, copper toxicity is a function of its bioavailability, which in addition to being controlled by hardness, is also strongly related to other important factors such as dissolved organic carbon (DOC), alkalinity, pH, and temperature. The key strength of the BLM is that it accounts for multiple factors—in addition to hardness—that mitigate or exacerbate copper's toxic effect on aquatic life.

We would also recommend the BLM be allowed to be used for determining copper action levels related to NPDES permits, as the proposed standards only refer the

www.geiconsultants.com

GEI Consultants, Inc.
4601 DTC Boulevard, Suite 900, Denver, CO 80237
303.662.0100 fax: 303.662.8757

hardness-based equations for determining these levels. This would allow any stakeholder with sufficient water quality data to use BLM-based copper criteria in development or revision of their NPDES permit rather than the existing hardness-based criteria. This approach is currently in place in South Carolina, and is currently under consideration by the Virginia Water Control Board.

With respect to changes to the proposed standards, we suggest the following addition:

- Add a new subparagraph under 15A NCAC 02B .0211, Subsection (22) that would state: "(a) Alternate Copper Criteria in Freshwater: The freshwater action level for copper can also be calculated using the EPA 2007 Biotic Ligand Model. If an individual permittee wants to use the BLM to calculate criteria for copper applicable to the receiving stream, the permittee will be responsible for generating the needed data for the ten water parameters needed to run the BLM model. Without the needed data for these ten parameters, the current hardness-based criteria in Table A for copper will continue to be applicable."

Similar to copper, BLMs have been developed and validated and are available for regulatory use for several other metals, including zinc, lead, nickel, and cadmium. While EPA has yet to develop formal recommended national ambient water quality criteria using BLMs for these other metals, the models are widely available and are being applied in regulatory programs in several European countries and Canada. CDA fully supports and shares their desire to move towards bioavailability models such as the BLM as being the current state of both scientific and regulatory practice.

There also are practical advantages for using the BLM; it is a cost-effective regulatory tool compared to other site-specific toxicity test procedures (e.g., water-effect ratios), and the BLM software is publicly available, sanctioned by EPA, and requires only brief training to generate rapid and useable output. While the model is widely considered to be useful for derivation of site-specific water quality criteria, we suggest its best application is on a state-wide basis for any discharger with sufficient water quality data to run the BLM. This would enable individual permit writers and permittees to collaborate directly to use the BLM to derive permit limits, thereby minimizing or eliminating the need to go through a lengthy and expensive rulemaking process. BLM-based criteria provide a practical means of deriving demonstrably more accurate levels of aquatic life protection across a broad range of water quality conditions, and with sufficient flexibility to support most any regulatory application framework.

Please let us know how we can assist the DWR in its consideration of the BLM during this review. GEI or CDA could help in a variety of ways, including preparation of written or oral testimony supporting the technical basis of the BLM, or providing guidance on application of the BLM to water quality criteria and what type

of implementation approach would best fit your available datasets. GEI would also be glad to review datasets, if provided by the DWR, to evaluate potential BLM-based criteria for North Carolina waters. CDA has also sponsored BLM training sessions over the past several years, and they have been well-attended by both regulators and the regulated community. If desired, it may be possible to provide this course or related education materials if you would find that helpful as a means of helping inform the public and stakeholders as to the basis and application of the BLM.

We appreciate the opportunity to provide you with this prospective proposal. Please let us know if you have any questions. We look forward to discussing this with you further.

Sincerely,

GEI CONSULTANTS, INC.

Robert W. Gensemer, Ph.D.
Senior Ecotoxicologist
RWG

cc: Joe Gorsuch, CDA
Steven Canton, GEI
John Gondek, GEI
David DeForest, Windward Environmental
Eric Van Genderen, International Zinc Association

References

U.S. Environmental Protection Agency (EPA). 1985. Guidelines for deriving numerical national water quality criteria for the protection of the aquatic organisms and their uses. PB85-227049, U.S. Environmental Protection Agency, Washington, DC.

U.S. Environmental Protection Agency (EPA). 1994. Interim guidance on determination and use of water-effect ratios for metals. EPA-823-B-94-001, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2001. Streamlined water-effect ratio procedure for discharges of copper. EPA-822-R001-005, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2007. Aquatic Life Ambient Freshwater Quality Criteria – Copper. EPA-822-R-07-001. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2012. Calculation of BLM Fixed Monitoring Benchmarks for Copper at Selected Monitoring Sites in Colorado. EPA -820-R-12-009. United States Environmental Protection Agency, Washington, D.C.

Manning, Jeff

From: Katie Hicks <katie@cwfnc.org>
Sent: Thursday, August 21, 2014 10:48 AM
To: DWR_Classifications_Standards
Cc: Hope Taylor
Subject: Comments of Clean Water for NC - 2014 Triennial Review
Attachments: NC Triennial Review 2014 - written comments of CWFNC.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: NGOs

Ms. Brower,

Please find attached the written comments of Clean Water for North Carolina regarding the April 2014 proposed draft amendments to NC's water quality standards.

Respectfully,

Katie Hicks
Assistant Director
Clean Water for North Carolina
828-251-1291 / 1-800-929-4480
katie@cwfnc.org
www.cwfnc.org
Connect on Twitter - Follow on Facebook - Join CWFNC

Clean Water for North Carolina
29 ½ Page Ave.
Asheville, NC 28801

August 21, 2014

Connie Brower
DWR Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Comments of Clean Water for North Carolina on the Triennial Review of North Carolina Water Quality Standards

Ms. Brower:

I am writing to offer the official written comments of Clean Water for North Carolina (CWFNC) regarding the Division's proposed draft amendments to North Carolina's water quality standards. CWFNC is a statewide environmental justice organization with almost 500 diverse members who are advocates for healthy surface and groundwater in North Carolina and the people who depend on them, especially the state's most vulnerable communities. These comments are a supplement to the oral comments Clean Water for North Carolina presented in Statesville on July 16, 2014.

We are deeply concerned by the evident disregard for protection of NC's waters that the four year delay in the Triennial Review indicates. Because of the Division's long delay and the very modest scope of its proposals for this review, we call on the Division to complete this review process within 4 months and to initiate the next Triennial Review process, including public "scoping" comments for proposals within a year.

Below are our specific comments on the 2014 review:

Chemicals associated with wastewater streams from shale gas extraction

With the potential for hydraulic fracturing to come to some regions of our state as early as 2015, the Division must identify chemicals most likely to be used in frack fluids or other gas development activities and wastes, including a wide array of contaminants previously not seen in NC, and therefore not included in water quality criteria. Many of these contaminants will threaten water quality, human health and aquatic life. Wastewater associated with shale gas extraction could contain high levels of salts (total dissolved solids), fracturing fluid additives and toxic organic constituents from shale formations, heavy metals, and naturally occurring radioactive materials. To protect surface waters, aquatic life and downstream communities depending on receiving waters for drinking water or source waters for agricultural or other uses, the Environmental Management Commission should set a default water quality standard of zero – non-detect with high sensitivity EPA approved analytical methods – for the hundreds of contaminants found in fracking wastewater and other gas development wastes in other states, until safe levels (if any) are scientifically determined. In other words, any discharge of all compounds for which a level safe for aquatic life or drinking water have not been determined should be strictly forbidden.

Nutrients

Since the Triennial Review of 2001-2, Clean Water for NC has been calling for the implementation of the long-ago proposed national ecosystem nutrient criteria for phosphorus and nitrogen. The continuing failure to do so has been a major contributor to eutrophication and other water quality degradation in NC waters. We have been given the excuse for over a decade that nutrient standards have to be set for individual water bodies to be appropriately protective. It's quite obvious that's merely a delaying tactic, as it's manifestly unfeasible to carry out the studies that would be needed to set standards for individual waters and DWR never intends to do so. Instead, use of the general characteristics of the surface waters included in each ecosystem region has been the scientific basis for the proposed standards. They should be implemented immediately to serve as a "floor" for protection of water quality while other more locally specific standards, if any, are developed.

North Carolina should adopt a water quality standard for ammonia. Unlike other components of nitrogen pollution which over-enrich lakes and rivers, leading to indirect impacts on aquatic organisms, ammonia is directly toxic to aquatic life. In the previous Triennial Review, the Division claimed to be waiting until EPA issued new recommendations for freshwater ammonia criteria to adopt an ammonia standard. Those recommendations were published in 2013, and there is now no reason to wait any longer to protect aquatic life by adopting the nationally recommended acute and chronic standards.

In addition, the presence of re-mobilizable nutrients in the sediments in lakes and slow-moving rivers represents an ongoing liability for the future health of these water bodies. Current nutrient levels in sediments and sediment depth must be determined for all such cases and nutrient levels, or depth of nutrient-enriched sediments, should not be allowed to increase over time.

Variances

When the state reviews its water quality standards, it must also review variances –permissions given to specific facilities to violate the standards under limited conditions. In other words, a variance is an acknowledgement of a failure to meet a water quality standard and should never be granted in perpetuity. In addition to variances for chloride at pickle production facilities and thermal variances for almost all of the state's electric generating stations, Blue Ridge Paper Products (dba Evergreen Packaging) has variances both for color and excess temperature, with which Clean Water for NC has extensive experience.

All of these variances were granted without credible biological evidence that they did not adversely impact the aquatic life dependent on the receiving waters, and without a credible economic analysis or updated review indicating that there is no feasible alternative or that meeting the standard would cause significant economic hardship to the community. Due to this lack of analysis, and the resulting lack of continuing review and updating of permit conditions to require progress toward meeting standards, these variances have been essentially granted "forever." Even the EPA's Inspector General commented that NC's management of thermal variances was inadequate to protect the state's waters. Specifically for the Blue Ridge Paper variances, EPA has called for application of rigorous methods of biological evaluation for thermal variances, and has agreed with advocates seeking to reduce downstream temperature and color impacts that the company's "color perception" study is so badly flawed that it cannot justify removal of the color variance.

Variances should only be granted for a limited time period with a clear and enforceable schedule for achieving compliance within 2 permit periods, rather than granting them uncritically and in perpetuity. The EMC must take steps to restore its credibility to review all variances by showing that

it can critique ones given with provisions that do NOT meet required criteria of federal statutes and provide conditions to be incorporated into permits immediately. The schedule for renewal of variances is to correspond with the Triennial Review and NOT wait until the next permit renewal or to avoid review altogether.

"Biological trump"

In no case should there be an allowance for discharge of toxic metals simply because downstream life appears to be surviving. Use of numeric criteria for toxic metals must be strictly implemented in permits and strictly monitored and enforced as the legal and most cost-effective way to protect the public's waters and aquatic life. We have seen too many "hired gun" studies by industries on biological parameters used to justify exemptions or variances to state water quality standards based on unsupportable conclusions from data and analysis provided by interested parties. This is a clear violation of the Clean Water Act and grounds for citizen initiated action against such a policy or any given instance of its implementation, against the polluter and regulatory agency.

Toxic Metals

We support the Division of Water Resources' proposed updates to water quality standards for metals including arsenic, beryllium, chromium, mercury, selenium, and silver, bringing NC's out-of-date standards to a level at or more protective than the EPA-recommended standards already adopted by other states in the southeastern US. (For silver, a hardness based standard should also be included.)However, we are very concerned that below a threshold of 25 milligrams per liter of hardness, metals standards will be not be calculated for the actual instream value but instead will use 25 mg/L in calculating the standard, because the same metals concentrations could be far more toxic in mountain streams with very low hardness. Monitoring requirements must be incorporated for permits to discharge to such waters with notice to permittees in advance of renewal schedules so that they can begin planning for implementation. Instead of "action levels" for these metals, NC must strictly apply numeric criteria, with a "reasonable potential analysis", as required by regulation, and with the understanding that each of them has the potential to contribute to chronic or acute toxicity in aquatic life.

NC must also adopt a specific methylmercury standard that meets or exceeds EPA's recommended 0.3 mg/kg of fish tissue, to better protect the vulnerable populations that depend most extensively on fishing from NC's streams, rivers and lakes.

The recent coal ash spill on the Dan River points to the need to include total recoverable metals analysis and not just dissolved metals in ambient stream monitoring requirements. The potential for mobilizing metals or bioaccumulative toxins from suspended solids or sediment downstream of similar occurrences, or post-flood conditions, as occurred in western NC in 2004, makes clear the need to monitor all forms of these contaminants in the water body.

2,4-D

We also thank the Division for proposing to tighten the standard for the widely used herbicide 2,4-D from 100 µg/l to 70 µg/l. A component of Agent Orange, the substance is a toxin to the liver, kidneys and adrenal glands. It's widely used on genetically modified crops, so its use is expected to increase, and this updated standard is an important step in protecting NC residents' health.

Flow

Excessive withdrawals by permitted facilities can impact downstream wildlife and other users, and lower volumes of water lead to higher concentrations of contaminants downstream. North Carolina

does not explicitly address flow in its water quality standards, and does not use the most protective calculations to set limits in polluter permits. The Division should add explicit minimum protections for instream flow to the water quality standards. Permitted facilities should have limits based on a more protective level of flow, the 1Q10 flow (the lowest one day of flow expected in ten years), rather than the 7Q10 flow (the lowest seven-day average flow in ten years).

Thank you for this opportunity to submit comments!

Respectfully,

Katie Hicks
Assistant Director

Hope Taylor
Executive Director

Manning, Jeff

From: Botic, Katie <kbotic@ci.charlotte.nc.us>
Sent: Wednesday, August 20, 2014 4:37 PM
To: DWR_Classifications_Standards
Subject: NC-PC Response to Triennial Review of Standards
Attachments: Triennial Review of Standards Response.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Please see the attached response. Thank you.

Katie Botic

Environmental Compliance Specialist
Charlotte Mecklenburg Utilities
4222 Westmont Drive
Charlotte, NC 28217
704-336-4582

Please consider the environment before printing this e-mail.

August 20, 2014

By Email (DWR-Classifications-Standards@ncdenr.gov)
Connie Brower
DENR/Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Re: Surface Water Quality Triennial Review of Standards

Dear Ms. Brower:

Please accept the following comments on the Surface Water Triennial Review of Water Quality Standards. The North Carolina Pretreatment Consortium, Incorporated (NC-PC) is a non-profit organization representing over 140 pretreatment professionals from municipalities throughout the State of North Carolina. Since its inception in 1997, the NC-PC has grown to represent most of the state's 110 pretreatment programs. North Carolina's pretreatment programs cover 133 municipal wastewater treatment plants with a combined NPDES permitted flow of over 1060 MGD, more than 90% of all municipal NPDES permitted flow in the state.

We appreciate the Division of Water Resources' (DWR) efforts in updating the water quality criteria. The NC-PC believes that proposed changes under this review will allow the regulated community to remain fully protective of water quality while eliminating nonproductive costs and compliance burdens Our specific comments follow.

No amount of money spent on sampling produces a single drop of cleaner water.
Sampling should be kept to the minimum necessary for scientific confidence so that more resources (money) remain available to actually do the work of cleaning the water. We are committed to that task.

The following items are a reasonable compromise on ways to achieve the major goals of what this Triennial Review has proposed while remaining fiscally responsible.

The NC-PC asserts that there is no basis for the existing criteria for Iron and Manganese. These are ubiquitous in the environment and do not produce adverse human health or toxic environmental effects. We should allocate our resources to more pressing issues. If proposed standards for Chromium III and Chromium VI are adopted then there is no longer a need for a Total Chromium criterion and this should be eliminated.

Validation of the translator for metals eliminates the need to measure both Dissolved Metals and Total Recoverable Metals. The translator is necessary because Water Quality Standards are Toxicity –based (not technology based) and dissolved metals represent the best measurement of the toxic effects of a pollutant metal in a sample of water. It would be scientifically unsound to use the translator to extrapolate to hardness levels less than 25 mg/l. because of the unstable reproducibility of measurements in that environment.

Per 40 CFR 122.45(c) NPDES permit limits are expressed as Total Recoverable Metals in large part because this is a more controlled, reproducible, and legally defensible measurement. Measurement of dissolved metals requires extensive sample manipulation under variable, non-ideal conditions and has a greater potential to introduce sampling errors.

We request that action levels for Copper, Silver, Zinc and Chloride be continued. There is no evidence to suggest that a better environmental result will be obtained by abandoning a system that has worked well historically and replacing it with a system of limits that are of no demonstrably greater benefit.

The NC-PC has long been in favor of using median instream effluent hardness levels as a basis for calculating site specific NPDES permit limits. (As EPA has allowed for most states.) This approach is more than conservative in these calculations and is consistent with providing a best representation of expected conditions.

Likewise, NC-PC commends DWR's use of the 95% Confidence Level and 95% Upper Boundary for Reasonable Potential Evaluations. Discarding extreme outliers allows us to truly call these evaluations "reasonable" in the generally accepted meaning of that word.

We find that the use of the 1Q10 obtained from HUC data is a valid measure that does not place an undue burden on State and municipal water resources staff. We support the League of Municipalities and NCWQA recommendation to use this metric.

We are appreciative of the fact that many of our concerns have been addressed procedurally by DWR in discussions with NC-PC. It is likely that the majority of our remaining concerns are at the level of resolving possible ambiguities in implementation. We expect that further continued discussion with DWR will result in realistic, measurable, and achievable methods to achieve these goals.

The NC-PC hereby incorporates by reference the comments provided by the NC Water Quality Association.

Respectfully,
Frank Skee and the North Carolina Pretreatment Consortium

Manning, Jeff

From: jo ellen gay <jgay@wilsonnc.org>
Sent: Tuesday, August 19, 2014 8:20 AM
To: DWR_Classifications_Standards
Cc: Reeder, Tom; Skvarla, John
Subject: Wilson's Comment on Revised Water Quality Standards
Attachments: EMC Triennial Review Comment 8-12-14.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Please find attached our comments on the Revised Water Quality Standards. We appreciate the opportunity to submit comments on this very important proposal.

JoEllen Gay
Water Reclamation Compliance Coordinator
City of Wilson
PO Box 10 Wilson, NC 27894-0010
(p) 252-399-2499 (c) 252-230-8318
jgay@wilsonnc.org
Mon.- Fri. 7:30 am -4 pm

Pursuant to North Carolina General Statutes, Chapter 132,et.seq., this electronic mail message and any attachment hereto, as well as any electronic mail message(s) that may be sent in response to it may be considered public record and as such are subject to requests for review.

CITY OF WILSON
INCORPORATED 1849

WILSON
NORTH CAROLINA

OFFICE OF THE CITY MANAGER

August 12, 2014

Ms. Connie Brower
N.C. Division of Water Resources - Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

RE: City of Wilson Comment – Proposed Revised Water Quality Standards

Dear Ms. Brower,

The City of Wilson (Wilson) is hereby submitting a comment to be included with comments from the public hearing held July 15, 2014 and July 16, 2014 for proposed revised Water Quality Standards (WQS) with regards to the Triennial Review for heavy metals.

Wilson currently operates a 14 MGD Advanced Wastewater Treatment Facility with 15 Significant Industrial Users, 3 of which are Categorical Metal Finishers. Wilson is also a member of the Neuse River Compliance Association (NRCA) which has reduced Nitrogen loading to the Neuse River by more than 70% since 1995.

Wilson is in support of protecting water quality and concurs that adopting the WQS would indeed move NC in a positive manner in protecting our water bodies. Our concern is not based on the standards themselves; instead we are concerned with the Division's implementation policies combined with the standards. These restrictive policies have a layering effect on each utility by imposing multiple safety factors much beyond the already stringent safety factors which in our opinion are already built into the EPA standards. These "policies" are at the heart of the problem and are over-burdensome. They also assume multiple worst case scenarios which are extremely unlikely to occur all at the same time and over an extended period of time, if ever.

DWR has expressed their willingness to allow flexibility within the policies of implementation in the NPDES Permit Section and Pretreatment Section. Through this flexibility, water quality can continue to be protected while the permitted community can avoid unnecessary upgrades which would have little to no environmental benefit.

P.O. BOX 10 | WILSON, NORTH CAROLINA 27894-0010 | TELEPHONE 252-296-3398 | FACSIMILE 252-291-0267

Our comments are as follows:

I. Supported Proposed Revisions

Dissolved Metals Criteria

We support DWR's adoption of dissolved metals criteria as it more closely approximates the bioavailable fraction of metal in the water column than total recoverable metal.

Retain Action Levels for Copper, Zinc, Silver, and Chloride

We strongly support the decision to retain the action levels for Copper, Zinc, Silver, and Chloride. Experience has shown the existing action levels for these substances are reasonable and fully protective of aquatic life. The action level approach avoids the need for multiple site-specific standards revisions that otherwise would be necessary. The action level parameters are naturally occurring and always present in surface waters in highly varying ambient levels. We strongly urge DWR to retain the action levels, until DWR and permittees gain experience implementing the pending dissolved metals criteria.

Adopt Recalculated Cadmium Criteria

Wilson supports the proposal to retain reasonable cadmium criteria based on DENR's careful recalculation. The Genus Mean Acute Values used by EPA were based on a limited and selective data set and produced criteria that are lower than necessary to be fully protective of aquatic life. While we believe more recent work by USGS may warrant a further update, it is reasonable to defer such an update for consideration until the next triennial review cycle.

Delete Existing Iron, Manganese, and Total Chromium Criteria

The existing criteria for non-priority pollutants Iron and Manganese are unnecessary. Moreover, the existing criterion for Total Chromium also is unnecessary in light of the proposed Chromium III and Chromium IV standards. We support the deletion of these criteria.

Biological Integrity versus Ambient Standards

We support the proposal to allow careful evaluation of aquatic life biological integrity to take precedence over ambient pollutant levels in making impaired waters determinations. This leads to a more accurate assessment of designated use attainment and is appropriate in light of DWR's aggressive whole effluent toxicity program.

Chlorophyll-α Standards

We support the proposal to retain existing Chlorophyll-α standards in their existing form until the criteria are either replaced or updated through the Nutrient Criteria Development Plan process.

Permit Limits Using Median Instream Hardness Values

We support the proposal to base permit limits on median instream and effluent hardness levels. This approach is technically correct and appropriate and is also used in most states with EPA approval.

Acknowledgment that Exceedances of Fecal Coliform Standard during Rain Events Are Often Not Caused by Point Sources

The proposal includes the following statement: "Violations of fecal coliform standard are expected during rainfall events and, in some cases, this violation is expected to be caused by uncontrollable nonpoint source pollution." This statement is an important acknowledgment of the fact that sources of fecal coliform pollution outside the control of regulated point sources, including unregulated stormwater and wildlife, often contribute to exceedances of this standard. It is important to recognize that, in some cases, the reduction or elimination of regulated fecal coliform sources will not prevent occasional exceedances during rain events. The proposal provides an appropriate public warning that instream bacteria levels are highly variable – often due to natural sources, especially when streams are materially influenced by runoff from the land during wet weather events.

Reasonable Potential Analysis (RPA)

We support retaining the 95% Confidence level and the 95th Upper Boundary for RPA evaluations of discharge data. These levels are more than adequate for the reasonable potential determination, especially in light of the other conservative approaches employed (e.g., drought stream flow coupled with assuming maximum discharge flows- two conditions which are mutually inconsistent for POTWs). Given these and other conservative assumptions used in the RPA, we support DWR's approach.

II. Suggestions for Revision or Clarification of the Proposal

Application of Non-Detect Data

Treat "less than" values as being present at the practical quantification limit (PQL) to decrease the variability of the data and thus decrease the maximum predicted effluent concentration. The alternate approach- assigning a "zero" to such data- will skew the data by artificially and

wrongly increasing the coefficient of variation of the effluent data set. This would be a simple policy change and should not have a negative environmental impact. In cases of data sets with varying PQLs, the data set would need to reflect a consistent PQL (one that represents the effluent characteristics reasonably) to avoid a false increase in the coefficient of variation. We support the assignment of the PQL to non-quantified effluent data for the purpose of calculating the coefficient of variability of the data for reasonable potential purposes.

Treatment of "Less Than" Detection Values in the Headworks Analysis

Current policy states a value ½ the detection limit is to be used for "less than" results in the Headworks Analysis. Assuming these metals are present at half the detection level creates what amounts to a fictitious domestic load, thus reducing the quantity available for allocation to non-domestic users.

With a body of collection system data suggesting no presence of specific metals, we should be able to conclude the metals are indeed absent from the collection system, freeing up loading that can be made available to permitted industries.

We encourage DWR to Change policy to allow "less than" values to be reported as zero in the calculations for HWA. This should not impact the environment negatively. This is also more consistent with other current reporting practices on DMRs.

Consider Site-Specific Permit Limits Using Water Effects Ratios

We encourage DWR to consider unambiguously approving the use of the water effects ratio (WER) to develop site-specific permit limits in lieu of site specific water quality criteria. An increasing number of states are utilizing the WER approach, with the full approval of EPA. Permittees should be given the opportunity to develop site-specific permit limits through the use of scientifically justifiable WERs, especially with the adoption of EPA's dissolved metals criteria.

The regulations should specifically allow site-specific limits to be determined during the permitting process without requiring a cumbersome site-specific modification to the standards. The regulations should expressly incorporate the WER formula—water quality standard X WER. The default WER should be "1" unless the permit applicant (or DWR) elects to complete an appropriate WER study. Site-specific limits are a much more efficient regulatory approach that still provides the full public safeguard of a public notice and comment opportunity as well as the right to appeal any such site-specific limit.

For site-specific copper limits, the regulations should give applicants the choice of using the hardness-based equation or either a WER procedure or EPA's biotic ligand model (BLM).

Change Methodology for Determining Chronic Wasteload Allocations

For reasonable potential evaluations, it is reasonable to use the highest sample value for small data sets with regard to acute criteria. However, that approach does not make sense for chronic wasteload allocations (WLAs). Chronic WLAs should be 4-day averages but EPA's reasonable potential tables focus on single (instantaneous rather than 4-day average) values. If, for example, there is a data set with copper values of 4, 6, 6 and 18 ug/l, it is not reasonable to conclude that the highest 4-day *average* chronic value is "18." Accordingly, we urge DWR to be more reasonable and discard the highest individual value for chronic WLA purposes.

Delete Chronic Silver Standard

We recommend that DWR withdraw the proposed chronic silver water quality standard because there is no corresponding EPA standard. Absent an individual technical justification, NC should withdraw this unnecessary chronic silver criterion.

Adopting these alternatives to current policies would not require additional involvement from the EMC or legislature. These are internal policies within the Division that could simply be made with written notification to affected parties. Should the Division agree to the suggested alternatives, it would significantly decrease those affected by the adoption of the proposed WQS and the standards would be adopted with ease. Wilson is urging the Division to consider these policy changes which would simplify adopting currently proposed WQS and as well as standards which may be proposed in the future.

We appreciate DWR's extensive public outreach on the triennial review and efforts to assist stakeholders to understand the adoption and implementation of EPA's national dissolved metals criteria.

Respectfully,

Grant W. Goings
City Manager

C: Dathan C. Shows, Chief Operations Officer
Barry Parks, Director of Water Resources
Jimmy Pridgen, Water Reclamation Manager
JoEllen Gay, Water Reclamation Compliance Coordinator
NC EMC Members
Tom Reeder- NC DENR
John Sklavara- NCDENR- Secretary
Paul Calamita- NC Water Quality Association
NC Pretreatment Consortium

Manning, Jeff

From: Mick Noland <mick.noland@faypwc.com>
Sent: Tuesday, July 29, 2014 10:39 AM
To: 'Steve Tedder'; DWR_Classifications_Standards
Cc: Chad Ham
Subject: FW: Letter to Connie Brower - Comments on Proposed Amendments - Triennial Review of Water Quality Standards
Attachments: Comments on Proposed Amendments Triennial Review of Water Quality Standards.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Fayetteville Public Works Commission comments on Proposed Amendments Triennial Review of Water Quality Standards.

Mick Noland, PE
Chief Operations Officer
Water Resources Division
Public Works Commission of the
City of Fayetteville
955 Old Wilmington Road
P O Box 1089
Fayetteville, NC 28302
(W) 910-223-4733
(F) 910-829-0207
mick.noland@faypwc.com

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STEVEN K. BLANCHARD, CEO/GENERAL MANAGER

PUBLIC WORKS COMMISSION
OF THE CITY OF FAYETTEVILLE
ELECTRIC & WATER UTILITIES

955 OLD WILMINGTON RD
P.O. BOX 1089
FAYETTEVILLE, NORTH CAROLINA 28302-1089
TELEPHONE (910) 483-1401
WWW.FAYPWC.COM

July 29, 2014

Ms. Connie Brower
Division of Water Resources
1611 Mail Service Center
Raleigh, NC 27699-1611

Subject: **Comments on Proposed Amendments**
Triennial Review of Water Quality Standards

My name is Mick Noland and I am a licensed Professional Engineer and Chief Operating Officer for the Water Resources Division, of the Public Works Commission of the City of Fayetteville. I want to thank the Environmental Management Commission and the Department of Environment and Natural Resources for the opportunity to comment on these rules.

We have reviewed the EMC's proposed changes to 15A NCAC Subchapter 2B and offer the following comments:

- PWC strongly supports the retention of Action Levels for copper, zinc, and chloride. The Action Level approach, augmented by toxicity testing, has shown to be fully protective of aquatic life in North Carolina for decades and should be continued.

- PWC supports the proposed consideration of in-stream biological integrity for evaluating compliance with the dissolved metals standards. This is an excellent example of balancing environmental protection with minimization of regulatory burden.

- PWC supports retaining the current chlorophyll criteria until the criteria are either replaced or updated through the Nutrient Criteria Development Plan process. North Carolina has implemented nationally leading nutrient control programs and should continue these programs while a statewide approach to addressing nutrient enrichment is developed.

- PWC supports the removal of the manganese, iron and total chromium criteria. These criteria have either been withdrawn by USEPA or have no ongoing scientific basis.

- PWC supports the proposed change for dissolved water quality criteria for metals, incorporating acute and chronic criteria, based on the 25 – 400 mg/l range of hardness used by EPA to develop the criteria. This change is consistent with EPA guidance.

- PWC recommends that the Division consider adopting the dissolved metals criteria as a multiplier of the Water Effects Ratio with the Water Effects Ratio set at a default of "1" unless DWR has approved an actual value. This will allow DWR to develop site-specific permit limits rather than more cumbersome site-specific water quality criteria. Site-specific permit limits are a much more efficient regulatory approach that still provides the safeguard of a public notice and opportunity for appeal on site-specific limits through the NPDES Permitting process.

- PWC supports the proposed change to protect aquatic life from acute toxicity based on the 1Q10 low flow. This is a reasonable change and is in accordance with approaches used in many other States.

- Overall, PWC finds the proposal to be fully protective of water quality, and we support the proposed rules if paired with reasonable implementation procedures.

This completes our comments at this public hearing. We may issue additional written comments during the comment period.

Very truly yours,

PUBLIC WORKS COMMISSION

Mick Noland

Mick Noland, P E
Chief Operations Officer
Water Resources Department

MN/ek

Manning, Jeff

From: Waldroup, Kenneth <Kenneth.Waldroup@raleighnc.gov>
Sent: Wednesday, July 16, 2014 9:36 AM
To: DWR_Classifications_Standards
Cc: McLawhorn, Dan; Lynch, TJ
Subject: City of Raleigh verbal comments at the triennial review public hearing 7-15-14
Attachments: COR Speakers Comments on WQS Rules w TJL edits.pdf; ATT00001.c; ATT00002.htm

Follow Up Flag: Follow up
Flag Status: Completed

Categories: muni or representative

Connie,

Here is a copy of the comments we shared at the public hearing yesterday. We will also be providing written comments before the August deadline. Thank you for your good work on this issue.

-Kenny

Kenneth R. Waldroup, PE
Assistant Public Utilities Director
City of Raleigh Public Utilities
Post Office Box 590
Raleigh, North Carolina 27602
Direct Phone (919) 996-3489
Cell Phone (919) 369-3240
Direct Fax (919) 996-7967
Please consider the environment before printing this e-mail.

"The first responsibility of a leader is to define reality. The last is to say thank you. In between, the leader is a servant." —Max DePree

City of Raleigh Verbal Comments on the Triennial Review of Water Quality Standards

My name is Kenneth Waldroup and I am here representing the City of Raleigh and its water resource protection programs. The City provides stormwater services to over 410,000 people within the City itself and provides potable water and wastewater treatment services to 515,000 people in the combined service area of Raleigh, Garner, Rolesville, Wake Forest, Knightdale, Wendell and Zebulon. I would like to provide comments on the Environmental Management Commission's proposed changes to rules in 15A NCAC Subchapter 2B which represent the Water Quality Standard Regulations for North Carolina.

Our Council's guidance in these matters calls for a continuing emphasis on establishing environmental priorities based on sound science and not individually as an issue receives public attention. This is the fundamental basis of the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). To accomplish this goal, City Council supports policies that:

- Target resources at reducing the highest demonstrated risks to human health,
- Develop solutions to environmental problems using an integrated approach, examining all sources of a contaminant,
- Emphasize pollution prevention as a program priority,
- Work to improve public understanding of environmental and health risks and the costs for their correction,
- Develop improved analytical methods,
- Improve scientific understanding of environmental health impacts including the health protection of children and other potentially sensitive populations,
- Continue to provide for stakeholder involvement in the development of solutions to environmental problems, and
- Consider sustainability of our environment and resources.

Evaluating the proposed changes through this guidance, the City generally supports the draft standards as proposed by Division staff and believe they represent an appropriate balance between the twin goals of environmental protection and minimizing unnecessary and burdensome costs on the regulated community. North Carolina has long been known for having a strong, comprehensive

program to protect water quality that is supported by specific language in the water quality standards rules and by various approaches to water quality protection that often lead the nation in scope and concept. The proposed rules have been developed consistent with this strong, traditional approach of the water quality program and we applaud the efforts of the Division of Water Resources in developing these recommendations and the efforts of you, the hearing officer, to fit them within the context of fair and balanced rulemaking; we want to extend the thanks of our Citizens and Rate Payers for the work you are doing.

The following are some specific comments on several of the proposed changes:

For the record, the City supports the full comments of the North Carolina Water Quality Association, of which it is a member. The City also supports the full comments of the North Carolina League of Municipalities, of which it is also a member.

Within the body of that work, there are several points of particular concern to the City that we emphasize here.

- First, the City strongly supports the continuation of the action level approach for copper, silver, zinc, and chloride as augmented by contemporaneous toxicity testing. This approach has been demonstrated to be fully protective of aquatic life in North Carolina for decades and should be continued. In addition to be fully protective against in-stream toxicity for these (and all other) metals, the action level approach avoids the need for dozens and dozens of site-specific standards revisions that otherwise would be necessary.
- The City supports the application of the dissolved criteria over the full range of hardness used by USEPA to develop the criteria - 25 mg/L to 400 mg/L. Because the dissolved metals criteria are not linear, based upon the hardness values used, they are only applicable over the range that US EPA used in deriving the criteria. In developing permit requirements based on hardness, it is important to use receiving stream specific and effluent specific hardness data for development of limits. Hardness may vary significantly with hydrological units particularly when comparing small streams with large rivers. Accordingly, we support DWR's proposal to apply the criteria across the entire hardness range (25-400 mg/L).
- The City strongly recommends that the Division adopt the dissolved metals criteria as being a multiple of a water effects ratio (criteria X WER) with the WER set at a default of "1"

unless DWR has approved an actual value. This will allow the Division to develop site-specific permit limits rather than the more cumbersome site-specific water quality criteria changes. Site-specific limits are a much more efficient regulatory approach that still provides the full public safeguard of a public notice on any site-specific limit and an opportunity for any interested member of the public to appeal such limits.

- The City supports retaining the current Chlorophyll criteria until the criteria are either replaced or updated through the Nutrient Criteria Development Plan process. North Carolina has implemented nationally leading nutrient control programs. The City actively participates in two of those programs, the Falls Lake Nutrient Management Strategy and the Neuse Estuary Nutrient Management Strategy, and we believe these programs should continue, uninterrupted, while a statewide approach to addressing nutrient control is developed.

- Finally, we respectfully request that the US EPA defer to the State's approach to protecting water quality through these proposed rule changes, at least until we obtain several triennial cycles of experience in implementing these new criteria. We recommend this particular comment be shared with US EPA when seeking concurrence with that entity for the final changes to rules in 15A NCAC Subchapter 2B.

In closing, the City supports the proposed rules paired with the reasonable implementation procedures as we believe they are protective of the environment without putting unnecessary costs on the regulated community. We will also likely prepare additional written comments before the end of the comment period.

Thank you!

Manning, Jeff

From: Brianna Van Stekelenburg <vanstekelenburg.sierraclub@gmail.com>
Sent: Tuesday, July 15, 2014 4:16 PM
To: DWR_Classifications_Standards
Subject: Triennial Review Comments
Attachments: TriennialReviewComments-Methylmercury-2.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: NGOs

Hi Connie Brower,

My name is Brianna Van Stekelenburg. I am a Policy Analyst Intern with the NC Chapter of the Sierra Club. I gave comments at the Triennial Review public hearing in Raleigh, but I wanted to submit a written copy of them. I have attached them to this email.

Thank you,
Brianna Van Stekelenburg

NC Chapter Sierra Club - Public Comment at Triennial Review Hearing - July 15, 2014

Hello, my name is Brianna Van Stekelenburg. I am a Policy Analyst Intern with the NC Chapter of the Sierra Club. The NC Chapter has over 61,000 members and supporters in North Carolina, who are concerned about water quality.

Thank you for this opportunity to comment.

We are appreciative that North Carolina will be upgrading our water quality standards for toxic metals to the nationally recommended criteria. This is a step in the right direction but we ask that the Division go further.

While North Carolina has a mercury standard, it currently does not regulate methylmercury. When Mercury is deposited into water or onto land, microorganisms found in soils and sediments convert it to methylmercury, which is a highly toxic form. In this form, it is consumed by aquatic plants and animals. Fish that eat these plants and animals build up methylmercury in their bodies.

People in North Carolina are typically exposed to methylmercury by eating fish and shellfish like trout, catfish and carp. In 2011, 1.5 million people 16 years and older spent a combined total of 23.5 million days fishing and 1.5 billion dollars on fishing in North Carolina. The highest concentrations of methylmercury are usually found in large fish that eat other fish. In North Carolina, the highest concentrations are found in largemouth bass and bowfin.

Mercury, especially in the form of methylmercury, is highly toxic to humans. It can interfere with fetal, infant, and childhood brain development, and cause health problems for adults as well. North Carolina does not currently regulate methylmercury, although that is the form that mercury takes in fish and therefore directly threatens the wildlife and the people who eat the fish. We recommend that DENR adopt a methylmercury limit that meets or exceeds the national recommendation of 0.3 milligrams per kilogram of fish tissue to better protect human health.

Again, it is good that the state is moving forward with adopting metals standards, but the public is counting on the state to appropriately regulate a wide range of toxic substances in our waters - such as methylmercury - in order to protect public health.

Thank you.

Manning, Jeff

From: MARTHA W GIROLAMI <mgirolami@me.com>
Sent: Tuesday, July 15, 2014 1:06 PM
To: DWR_Classifications_Standards
Subject: Triennial Reveiw.
Attachments: Triennial Reveiw..pdf

Sent from my iPad

To: EMC
From: Martha Girolami, 473 Mount Pisgah Church Rd, Apex, NC 27523
Subject: Triennial Review of NC Water Quality Standards.

I have lived about a half mile from Lake Jordan for the past 20 years. I drive over it almost every day, take hikes along the Lake trails and shores and count Bald Eagles for the Army Corps four times a year. Over this time, the Lake Jordan water quality has really suffered in the part north of highway 64, that I am familiar with. Over time my dogs got skin rashes when they swam in the Lake even after baths. We had to give up swimming in the Lake. The incredible amount of mud from construction run off in the Northeast Creek and Indian Creek is staggering.

Now Solar Bees are going to "fix" the Lake. DENR is rapidly losing its reputation as a non political science based organization that will protect the environment.

North Carolina need's true reduction in nitrogen and phosphorous and sediment in our lakes and rivers. I am asking the EMC to act for the environment and recommend meaningful statewide limits on nitrogen, phosphorous and pH. Please do this now. Cyanobacteria feeding on Lake excess nutrients are also a public health danger that needs to be addressed by reduction of nutrients. This was discussed by Dr. JoAnn Burkholder at the recent 2014 Water Quality Series presented by Wake Up Wake on June 18, 2014. Her presentation maybe found at this address.
http://www.wakeupwakecounty.org/wp-content/uploads/2014/06/Burkholder-presentation.pdf

Fracking may be permitted in NC in 2015. This type of extreme energy extraction uses hundred's of toxic chemicals. Each well requires from 8 to 40 thousand gallons of chemicals and 4 to 6 million gallons of water. Contaminated waste water called flowback will be stored in large pits. Please do not allow any of this toxic waste water to be released from the frack pad, the pits or any other industrial equipment. This material should not be treated by a POTW, since the waste composition will be unknown and variable. Biocides,

radionucleotids and chemicals released from the shale for example, benzene and toluene, are present in the waste water as well as acrylonitrile, acrylamides and ethylene glycol. Many of these and hundreds of other fracking chemicals have never been released to the environment or waterways of NC before and must be contained. Please prohibit discharge of fracking chemicals for which safe levels have not yet been scientifically determined.