APPENDIX B

ENVIRONMENTAL PROTECTION AGENCY LETTERS TO NORTH CAROLINA

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

APR 30 2009

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

Dear Mr. Clark:

The U. S. Environmental Protection Agency (EPA) received the draft revisions to *15A N.C.A.C. 2B Surface Water and Wetlands Standards,* for revised numeric water quality criteria for metals by email dated November 7, 2008. EPA appreciates the opportunity to review these criteria changes in draft and looks forward to working with you as you finalize the new criteria.

The changes are considered a significant effort to upgrade your metals criteria to reflect the latest scientific knowledge and EPA appreciates your initiative to propose these changes. EPA's comments are divided into general and parameter specific sections and are based on the latest EPA recommendations published under Section 304(a) of the Clean Water Act. To facilitate comparison of the State and EPA values, the review was done after all EPA values were converted to total metals, with hardness dependent metals calculated at 50 mg/L $CaCO_3$ to reflect North Carolina's proposed approach. The comments are enclosed for your review.

Once you and your staff have had a chance to review these comments, we would welcome a meeting, either by conference call or in person, to discuss any questions you may have. Please give me a call at (404) 562-9125 or have your staff contact Lisa Perras Gordon at (404) 562-9317 to set up a time to discuss the revisions.

Sincerely,

Joanne Benante, Chief
Water Quality Planning Branch

cc: Mark Nuhfer, Chief, EPA Municipal and Industrial NPDES Section
Tony Able, Chief, EPA Monitoring and Information Analysis Section

The draft proposed changes to North Carolina metals standards were reviewed using the most recent Environmental Protection Agency (EPA) recommendations published pursuant to Section 304(a) of the Clean Water Act (CWA). In order to facilitate comparison of North Carolina's proposed criteria, given in total values, to EPA's recommended criteria which are dissolved values, a chart was created where EPA recommended values were converted from dissolved to total concentrations. For hardness dependent metals, EPA equations were used to calculate criteria at a hardness of 50 mg/L $CaCO_3$, again to reflect North Carolina's approach. The values used for North Carolina criteria were taken from the document "Calculations Relevant to the Proposed Changes to NC Metals Standards," dated November 6, 2008. The comparison charts for both fresh water and saltwater are provided in Appendix A.

General Comments

Comment No. 1: EPA strongly supports these revisions as a means to update metals criteria to reflect the most up-to-date scientific knowledge and national recommendations.

Comment No. 2: EPA acknowledges that North Carolina Division of Water Quality (DWQ) will be removing the "not to be exceeded" language from these criteria. EPA would like to review the draft language that will be used for frequency and duration for both the chronic and the acute values.

Comment No. 3: EPA supports the addition of acute criteria.

Comment No. 4: For the hardness dependent metals, the draft states that the "default hardness will remain at 50 mg/L $CaCO_3$ with the ability to apply site-specific hardness and examination of the dissolved fraction being included in the proposed language." The national recommended criteria for cadmium, chromium, copper, lead, nickel, silver and zinc are expressed as hardness dependent equations. Many states have promulgated a calculated value at a sample mg/L $CaCO_3$, typically 25, 50 or 100. EPA's Section 304(a) recommended criteria lists calculated values at 100 mg/L $CaCO_3$. However, those values are presented as examples only. EPA and all other Region 4 states include the actual equations, either in the standards language itself, or as a footnote directly in the standards. In that way, values can be calculated based on site-specific hardness values without having to go through the process of developing site-specific criteria. This allows greater flexibility in the use of the criteria while also providing for the protection of aquatic life. EPA encourages North Carolina to promulgate the equations for the above parameters directly into the State standards, either as the standard itself or included as a footnote.

The use of the equations can be handled in a variety of ways. Examples of how other Region 4 states have approached this are included in Appendix B, where the values for copper are presented for each of the seven states. Of particular interest is the approach used by the State of Alabama. Alabama publishes the equations as criteria with a reference table that calculates each of the metals at hardness ranging from 10 to

160 mg/L $CaCO_3$ (attached as Appendix C). This table shows there is a wide range of values that can be used for hardness dependent metals, each considered protective of aquatic life for that particular hardness. For example, the values for copper range from 1.54 ug/L at a hardness of 10 mg/L $CaCO_3$ to a value of 20.9 ug/L at a hardness of 160 mg/L $CaCO_3$. This approach has great flexibility while resulting in criteria that are not overprotective at high hardness or under-protective at low hardness. These equations may be especially useful in conducting more accurate monitoring and assessment determinations, utilizing a range of values in varying stream conditions. This may also prove useful for reducing the instances where waters are listed but may not have toxicity due to a hardness dependent parameter.

If North Carolina does list the values at a hardness of 50 mg/L in the water quality standards, there must be a provision for the calculation of a more protective criteria for those waters in the State with a hardness of less than 50 mg/L $CaCO_3$.

Region 4 states which use hardness based equations have developed methodologies for both assessment and monitoring as well as determining Reasonable Potential (RP) and compliance monitoring for National Pollutant Discharge Elimination System (NPDES) permits. EPA would be happy to provide those methodologies as well as have our monitoring/assessment and NPDES staff work directly with your staff to develop methodologies appropriate to North Carolina. Again, using the equations for calculation of hardness appropriate criteria may also provide for more flexibility in the generation of permit limits.

Comment No. 5: North Carolina's "Table 1: Proposed Changes to NC Metals Standards (DRAFT)" denotes by footnote that the values for copper, silver and zinc are "Action Level standards." As stated in 15A NCAC 02B .0211 Fresh Surface Water Quality Standards for Class C Waters, "...For purposes other than consideration of NPDES permitting of point source discharges...the Action Levels in this Rule...shall be considered as numerical ambient water quality standards." To avoid confusion regarding the proposed criteria, EPA strongly recommends that references to Action Levels be noted as applying to permitting only. For ambient monitoring, assessment, TMDLs or any other purposes under the CWA, they are considered as equivalent to water quality criteria.

Parameter Specific Comments

Comment No. 1: Cadmium. North Carolina used alternative parameters for calculating the freshwater acute and chronic criteria for cadmium. In order for EPA to complete its review of the alternative values, North Carolina must provide additional information to show how those alternative parameters were derived and to demonstrate that they are protective of aquatic life. We are receptive to reviewing the information from Chadwich Ecological Consultants, Inc., or any other information that you would like to provide.

Comment No. 2: Chromium III and Chromium VI. North Carolina calculated the fresh water chronic and acute chromium water quality standard utilizing the EPA values for chromium III. Those criteria are listed as "total chromium" rather than chromium III. EPA recommends that these criteria be listed as chromium III. EPA recommends that North Carolina adopt the EPA recommended criteria for chromium VI as a separate value due to the very different toxicity levels of the different valence states of these compounds.

North Carolina's saltwater chronic and acute criteria were calculated using the EPA values for chromium VI. These are listed as "total chromium". EPA recommends that North Carolina adopt separate numbers for chromium III and chromium VI for salt water to account for the very different toxicity of the different valence states of chromium.

Comment No. 3: Copper. EPA encourages the use of the Biotic Ligand Model.

Comment No. 4: Iron. EPA is working with DWQ staff to develop the documentation needed for a scientifically defensible rationale to demonstrate naturally occurring elevated levels of iron. That process may result in the documentation to support the removal of the iron water quality criteria.

Comment No. 5: Lead. North Carolina did not submit a revision to the chronic fresh water or chronic salt water lead criteria. The current value of 25 ug/L for fresh water (calculated as total lead at a hardness of 50 mg/L $CaCO_3$) is approximately 19 times the national recommended value (1.32 ug/L used for comparison, converted to a total value at a hardness of 50 mg/L $CaCO_3$). The current value of 25 ug/L for salt water is approximately three times the national recommended value of 8.52 ug/L. EPA recommends that North Carolina adopt the national recommended chronic values for lead.

APPENDIX A: Comparison of NC and EPA Metals Criteria

Comparison of NC and EPA Metals Criteria: EPA values converted to Total Metals.
Hardness dependent metals all calculated at
50 mg/L CaCO3.

FRESHWATER

Metal	EPA's 304(a) FW CMC (Acute)	NC's Proposed FW CMC (Acute)	EPA's 304(a) FW CCC (Chronic)	NC's 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	1.05439	1.54	0.16193	0.27	Y	Y
Chromium III	1022.03	1022.03	48.85	48.85	Y	Y
Chromium VI	16	none	11	none	Y	N
Copper	7.29	7.29	5.16	5.16	Y	Y
Iron	none	none	1000	none	N	N
Lead	33.78	33.78	1.32	25	Y	Y
Manganese	none	none	none	none	N	N
Nickel	261.01	261.01	29.05	29.02	Y	Y
Silver	1.15	1.15	none	0.06	Y	Y
Zinc	66.6	66.6	66.06	66.6	Y	Y

Comparison of NC and EPA Metals Criteria: EPA Values Converted to Total Metals

SALTWATER

Metal	EPA's 304(a) SW CMC (Acute)	NC's Proposed SW CMC (Acute)	EPA's 304(a) SW CCC (Chronic)	NC's 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	40.24	40.24	8.85	8.85	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	220.82	220.82	8.52	25	Y
Manganese	none	none	none	none	N
Nickel	74.75	74.75	8.28	8.28	Y
Silver	2.24	2.24	none	0.1	Y
Zinc	95.14	96.19	85.62	85.62	Y

APPENDIX B: Fresh Water Copper Criteria Example

Fresh Water Copper

Examples of How Other Region 4 States Express Hardness Dependent Criteria In Published Water Quality Standards

State /EPA	Freshwater CMC (ug/L)	Freshwater CCC (ug/L)	Dissolved/ Total	Hardness (mg/L CaCO3)	Equation Provided?
EPA	13 is listed as the value calculated at 100 mg/L CaCO3 using CMC dissolved = exp (0.9422(ln(hardness))-1.700(CF))	9 is listed as the value calculated at 100 mg/L CaCO3 using CCC dissolved = exp (0.8545(ln(hardness))-1.702)(CF))	Dissolved	Calculated Example 100	Equation is provided in a footnote. "Criteria values for other hardness may be calculated from the following (equation)."
AL	conc. (ug/l) = exp (0.9422(ln(hardness))-1.7(CF))	conc. (ug/l) = exp (0.8545(ln(hardness))1.702)(CF)	Dissolved	Calculated Examples from 10 - 160	Equation is provided as standard.
FL		Cu < or = exp(0.8545[lnH]-1.702)	Total	Based on Actual Hardness. No examples provided.	Equation provided as standard with the footnote: "the hardness shall be set at 25 mg/L if actual hardness is < 25 mg/L and set at 400 mg/L if actual hardness is >400 mg/L."
GA	7.0 is listed as the value calculated at 50 mg/L CaCO3 using the equation of CMC dissolved = exp(0.9422 [(ln hardness)]-1.700(0.96)]	5.0 is used as the value calculated at 50 mg/L CaCO3 using the equation of CCC dissolved = exp(0.8545 [(ln hardness)-1.702(0.96)]	Dissolved	Calculated Example 50	Equation is provided in a footnote, "For other hardness values, the following equations from the EPA document - National Recommended Water Quality Criteria EPA 2006 should be used..." Equations to be used listed below footnote.
KY	Total CMC = exp (0.9422(ln(hardness))-1.700)	Total CCC = exp (0.8545(ln(hardness))-1.702)	Total	Based on Actual Hardness. No examples provided.	Equation is provided as standard.

Fresh Water Copper

Examples of How Other Region 4 States Express Hardness Dependent Criteria in Published Water Quality Standards

State /EPA	Freshwater CMC (ug/L)	Freshwater CCC (ug/L)	Dissolved/ Total	Hardness (mg/L CaCO3)	Equation Provided?
MS	Total Dissolved value of 7 calculated at a hardness of 50 mg/L CaCO3.	Total Dissolved value of 5 calculated at a hardness of 50 mg/L CaCO3.	Total	Calculated Example 50	Equation is referenced in a footnote: "All criteria are as indicated at hardness of 50 mg/L as CaCO3..the equation is applicable for instream hardness ranges from 25 mg/L to 400 mg/L...If instream hardness is less than 25 mg/L, then a hardness value of 25 mg/L should be used."
SC	3.8	2.9	Total	25	Equation provided as a footnote. "Criteria values for other hardness may be calculated from the following (equation)."
TN	13 is listed as the value calculated at 100 mg/L CaCO3 using CMC dissolved = exp (0.9422(ln(hardness))-1.700(CF))	9 is listed as the value calculated at 100 mg/L CaCO3 using CCC dissolved = exp (0.8545(ln(hardness))-1.702)(CF))	Dissolved	100	Equation is provided as a footnote. "Hardness dependent metals criteria may be calculated from the following (equation)..."

APPENDIX C: Alabama Criteria Calculations

Aquatic Life Criteria (ug/L)

(calculated for selected hardness and pH values using equations 1-15 from Rule 335-6-10-.07, effective 1-14-05)

ACUTE

Hardness (mg/L as CaCO3)

Pollutant	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
Cadmium - dissolved	0.214	0.420	0.624	0.826	1.026	1.225	1.423	1.621	1.818	2.014	2.209	2.404	2.599	2.793	2.986	3.180
Chromium[+3] (dissolved)	86.4	152	213	269	323	375	425	475	523	570	616	662	706	751	794	837
Copper - dissolved	1.54	2.95	4.32	5.67	6.99	8.31	9.60	10.9	12.2	13.4	14.7	16.0	17.2	18.5	19.7	20.9
Lead - dissolved	4.91	10.8	17.0	23.5	30.1	36.9	43.7	50.6	57.6	64.6	71.6	78.7	85.8	93.0	100.1	107.3
Nickel - dissolved	66.8	120	169	216	260	304	346	388	428	468	508	546	585	622	660	697
Silver - dissolved	0.061	0.202	0.406	0.665	0.976	1.34	1.74	2.19	2.68	3.22	3.79	4.40	5.05	5.74	6.46	7.22
Zinc - dissolved	16.7	30.0	42.2	53.9	65.1	76.0	86.6	97.0	107	117	127	137	146	156	165	175

pH (Standard Units)

Pollutant	6	6.2	6.4	6.6	6.8	7	7.2	7.4	7.6	7.8	8	8.2	8.4	8.6	8.8	9
Pentachlorophenol	3.19	3.90	4.77	5.84	7.13	8.72	10.7	13.0	15.9	19.5	23.8	29.1	35.6	43.6	53.3	65.1

CHRONIC

Hardness (mg/L as CaCO3)

Pollutant	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
Cadmium - dissolved	0.049	0.080	0.106	0.130	0.152	0.172	0.192	0.211	0.229	0.246	0.263	0.279	0.295	0.311	0.326	0.341
Chromium[+3] (dissolved)	11.2	19.8	27.6	35.0	42.0	48.8	55.3	61.7	68.0	74.1	80.1	86.1	91.9	97.6	103.3	108.9
Copper - dissolved	1.25	2.26	3.20	4.09	4.95	5.79	6.60	7.40	8.18	8.96	9.72	10.5	11.2	11.9	12.7	13.4
Lead - dissolved	0.19	0.42	0.66	0.92	1.17	1.44	1.70	1.97	2.24	2.52	2.79	3.07	3.34	3.62	3.90	4.18
Nickel - dissolved	7.41	13.3	18.8	24.0	28.9	33.8	38.5	43.1	47.6	52.0	56.4	60.7	64.9	69.1	73.3	77.4
Silver - dissolved								No Chronic Criterion for Silver								
Zinc - dissolved	16.8	30.2	42.6	54.4	65.7	76.6	87.3	97.8	108	118	128	138	148	157	167	176

pH (Standard Units)

Pollutant	6	6.2	6.4	6.6	6.8	7	7.2	7.4	7.6	7.8	8	8.2	8.4	8.6	8.8	9
Pentachlorophenol	2.45	3.00	3.66	4.48	5.47	6.69	8.18	10.00	12.23	14.95	18.28	22.35	27.33	33.41	40.85	49.95

Conversion Factors

Hardness (mg/L as CaCO3)

ACUTE

	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
Cadmium - dissolved	1.000	1.000	0.994	0.982	0.973	0.965	0.959	0.953	0.948	0.944	0.940	0.936	0.933	0.930	0.927	0.924
Chromium[+3] (dissolved)	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316	0.316
Copper - dissolved	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960
Lead - dissolved	1.000	1.000	0.966	0.925	0.892	0.865	0.843	0.824	0.806	0.791	0.777	0.764	0.753	0.742	0.732	0.723
Nickel - dissolved	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Silver - dissolved	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850
Zinc - dissolved	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978

CHRONIC

Cadmium - dissolved	1.000	0.976	0.959	0.947	0.938	0.930	0.924	0.918	0.913	0.909	0.905	0.901	0.898	0.895	0.892	0.889
Chromium[+3] (dissolved)	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860	0.860
Copper - dissolved	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960	0.960
Lead - dissolved	1.000	1.000	0.966	0.925	0.892	0.865	0.843	0.824	0.806	0.791	0.777	0.764	0.753	0.742	0.732	0.723
Nickel - dissolved	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
Silver - dissolved								No Chronic Criterion for Silver								
Zinc - dissolved	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986

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AUG 2 0 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.

Enclosure 1: NC Division of Water Quality Proposed Revisions to *Surface Waters and Wetlands Standards*

North Carolina 2008 – 2010 Triennial Review of Standards
August 2010

Enclosure 2: Comparison of EPA and Proposed NC Metals Criteria
Freshwater and Saltwater

North Carolina 2008 – 2010 Triennial Review of Standards
August 2010

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	0.82*/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.*

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

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

JAN 0 8 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-I, 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.

High Quality Waters (HQW)

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.

General References to Other Applicable Requirements

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

Gordon, Lisa Perras

rom: Gordon, Lisa Perras
Sent: Friday, August 22, 2014 1:21 PM
To: Connie Brower; 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

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. or 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

Gordon, Lisa Perras

:om: Gordon, Lisa Perras
Sent: Monday, August 25, 2014 9:12 AM
To: Connie Brower; Manning, Jeff
Cc: Godfrey, Annie; Petter, Lauren; Wetherington, Michele
Subject: RE: Comments on NC's Proposed Triennial Review

Connie,

With apologies, I realized that I inadvertently left off the following comment, which I've included now under No. 4 below. While we have discussed this in earlier communications and on the phone, I would like it to be included with our official comments.

Hope you fared well last Friday!

Thanks so much,

Lisa Gordon

From: Gordon, Lisa Perras
Sent: Friday, August 22, 2014 1:21 PM
To: Connie Brower; 'Manning, Jeff'
Cc: Wetherington, Michele; Petter, Lauren
Subject: Comments on NC's Proposed Triennial Review

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4. As noted, NC DWR has proposed metals criteria to include updated chronic criteria for arsenic, beryllium, cadmium, chromium III, chromium VI, copper, lead, nickel, silver and zinc. NC has also proposed to add in a section at 15A NCAC 02B .0211 (11)(d) which states that, "Compliance with chronic 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." It is EPA's understanding that NC's monitoring program does not currently monitor over four consecutive days. Please provide information on how monitoring will be done to assess against these new criteria once adopted.

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
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