UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
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ATLANTA, GEORGIA 30303-8960

APR 6 2016

Mr. Jay Zimmerman
Director
Division of Water Resources
North Carolina Department of Environment
and Natural Resources
1617 Mail Service Center
Raleigh, North Carolina 27604

Dear Mr. Zimmerman:

The United States Environmental Protection Agency has completed its review of the State of North Carolina's 2007 – 2015 Triennial Review of Water Quality Standards (WQS). All of the Triennial Review revisions were approved for adoption by the North Carolina Environmental Management Commission on November 13, 2014, and became effective for state purposes on January 1, 2015. In a letter dated May 1, 2015, the State of North Carolina Department of Justice certified that the WQS revisions, Surface Water and Wetland Standards (15A NCAC 02B .0200) had been duly adopted according to state law. On May 15, 2015, the EPA received the original signed package for review from the Division of Water Resources.

The EPA's decision on these revisions is detailed in the enclosed document, *Decision Document of the United States Environmental Protection Agency Review of North Carolina's 2007 - 2015 Triennial Review of Changes to Surface Waters and Wetlands Standards 15A NCAC 02B .0200 Under Section 303(c) of the Clean Water Act.* The approved portion of the new and revised WQS adopted by the State include upgrades to toxic criteria to meet national recommendations for arsenic, chromium III, chromium VI, copper, lead, nickel, silver and zinc and a scientifically defensible alternative for cadmium for non-trout waters. The EPA is also approving the removal of a numeric Action Level for iron and the numeric criterion for manganese (Water Supply waters only). Both parameters will be controlled through the use of a narrative WQS.

The EPA is disapproving revisions relating to biological confirmation for toxics in assessment and three revisions relating to the implementation of the hardness based equations for metals under the National Pollutant Discharge Elimination System (NPDES) permits, including the use of action levels, the use of a low end hardness cap, and the use of the median of the 8-digit hydrologic unit for determining hardness when developing NPDES permits. These revisions are inconsistent with the requirements of 40 C.F.R. Part 131 and the Clean Water Act (CWA) and therefore, are disapproved. The EPA recommends that NCDENR remove these provisions during the next rulemaking.

In addition to the EPA's review pursuant to section 303 of the CWA, section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS), to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse

modification of designated critical habitat of such species. The EPA's decision to approve the revisions contained in the enclosed decision document is subject to the results of consultation under section 7 of the ESA with the USFWS and NMFS office. The EPA will notify NCDENR of the results of the section 7 consultation upon completion of the action.

We would like to commend you and your staff on the completion of this Triennial Review and your continued efforts in environmental protection for the State of North Carolina. In particular, we would like to acknowledge the technical expertise and the hard work of Connie Brower shown during the development of these WQS.

Should you have any questions regarding the EPA's action today, please contact me at (404) 562-8357 or have a member of your staff contact Ms. Lisa Perras Gordon at gordon.lisa-perras@epa.gov or (404) 562-9317.

Sincerely,

Heather McTeer Toney
Regional Administrator

Enclosure

cc: Connie Brower
NCDWR WQS

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Decision Document of the United States Environmental Protection Agency Review of North Carolina's 2007-2015 Triennial Review of Changes to Surface Waters and Wetlands Standards 15A NCAC 02B .0200 Under Section 303(c) of the Clean Water Act

Introduction

In a letter dated May 4, 2015, from S. Jay Zimmerman, Director, Division of Water Resources (DWR), North Carolina Department of Environment and Natural Resources, to Heather McTeer Toney, Regional Administrator of the Environmental Protection Agency's (EPA's) Region 4 Office, the DWR submitted new and revised water quality standards (WQS) for review under section 303(c) of the Clean Water Act (CWA or Act). In a letter dated May 1, 2015, the State of North Carolina Department of Justice certified that the WQS revisions, Surface Water and Wetland Standards (15A NCAC 02B .0200) had been duly adopted according to State law. The revisions addressed in this decision document were approved for adoption by the North Carolina Environmental Management Commission on November 13, 2014, and became effective for state purposes on January 1, 2015. The EPA received the original signed package for review from DWR on May 15, 2015.

Clean Water Act Requirements

Section 303 of the CWA, 33 U.S.C. § 1313, requires states to establish WQS and to submit any new or revised standards to the EPA for review and approval or disapproval. The EPA's implementing regulations require states to adopt water quality criteria that protect the designated use. See 40 C.F.R. 131.11(a). Such criteria must be based on a sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. Id. For waters with multiple use designations, the criteria shall support the most sensitive use. Id. In addition, the EPA's regulations require that in establishing criteria, a state shall consider WQS of downstream waters and shall ensure that its WQS provide for the attainment and maintenance of WQS of downstream waters. See 40 C.F.R. 131.10(b). A state's submission of water quality criteria must include (1) the methods used and analyses conducted to support WQS revisions, (2) water quality criteria sufficient to protect the designated uses and (3) a certification by the State Attorney General or other appropriate legal authority within the state that the WQS were duly adopted under state law. See 40 C.F.R. 131.6.

Endangered Species Act Requirements

In addition to the EPA's review under section 303 of the CWA, section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies, in consultation with the Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS), to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species. With regard to consultation activities for section 7 of the ESA, the EPA Region 4 concluded that the WQS the Agency approved, would either have no effect or may affect, but not likely to adversely affect, threatened and endangered species or their designated critical habitat. The EPA also concluded that they had no discretion for some provisions of the approved WQS because they were derived to protect human health and the EPA has no discretion to revise an otherwise approvable human health criterion to benefit listed species.

The EPA's Decision Summary

The EPA commends the DWR for making revisions to its WQS to bring them up-to-date with long overdue changes. In particular, the State should be commended for adopting the EPA's national recommended criteria developed under CWA section 304(a) or other scientifically justified criteria for toxic metals as well as for adopting both acute and chronic values for those metals. The EPA's 304(a) recommendations provide an extensive technical basis and justification for how the recommended aquatic life criteria adequately protect aquatic life uses. The methodologies have been subject to public review, as have the individual criteria guidance documents. The methodologies have also been reviewed by EPA's Science Advisory Board (SAB) of external experts. While some of the methodologies that the EPA relied on in reaching this decision may be 20 years old, based on data and information considered over the years, EPA considers the science underpinning those recommendations to still be sound.

The goals of the CWA in section 101(a)(3) state that, "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited." In the California Toxics Rule (CTR), 65 Fed. Reg. 31,682 (page 31,683) (May 18, 2000), the EPA reaffirmed that in order to achieve the goals and objectives of the Act, toxic pollutants must be controlled. Adopting scientifically defensible water quality standards for toxics establishes water quality goals for State and EPA programs, including providing a precise basis for developing water quality-based effluent limits for National Pollutant Discharge Elimination System (NPDES) permitting under section 402 of the Act; monitoring, assessment, development of Total Maximum Daily Loads (TMDLs); protecting coastal water quality improvement; protecting aquatic ecosystems and human health; and providing endpoints for nonpoint source controls and overall ecological protection. See 65 Fed. Reg. (page 31683). In addition, these standards will be used in other applications such as the State's authority to review federal permits under section 401 of the Act and reviews under the section 404(b)(1) guidelines. North Carolina's action fulfills the statutory requirement under section 303(c)(2)(B) of the CWA.

In particular, the EPA notes that for the first time, the DWR will have scientifically defensible criteria in place for all purposes under the Act for copper, hexavalent chromium, silver and zinc. Additionally, the value for lead, previously almost twenty times higher than recommended, will be consistent with national recommendations. Similarly, the State will now have updated criteria for cadmium in trout waters and nickel consistent with national recommendations. The EPA also supports the added provision to the State's new metal criteria to use the dissolved fraction and to allow the inclusion of water effect ratios directly into the criteria for metals.

The EPA welcomed the opportunity to work with the DWR to address those areas where the State sought to tailor its WQS to conditions within the state rather than to adopt the EPA Section 304(a) national recommendations, as allowed under 40 C.F.R. 131.11. Specifically, the EPA is approving DWR's alternate chronic and acute cadmium criteria for non-trout waters, the removal of iron criteria for aquatic life protection, and the removal of manganese as an organoleptic criteria for waters designated as water supply (WS). The EPA notes that protections will remain in place for all parameters through the use of a narrative water quality standard. Each of these provisions are being approved today as detailed below.

The new and revised WQSs that EPA is approving today are now the applicable water quality standards for all purposes under the CWA, including but not limited to monitoring, assessment, and NPDES permitting. Water quality criteria are intended to protect the designated use (40 C.F.R. 131. 2 and 131.11). Further, 40 C.F.R. 131.2 clarifies that state WQS are to:

"...protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (the Act). "Serve the purposes of the Act" (as defined in section 101(a)(2) and 303(c) of the Act) means that water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife, recreation in and on the water, and agricultural, industrial, and other purposes including navigation.

Such standards serve the dual purposes of establishing the water quality goals for a specific water body and serve as the regulatory basis for the establishment of water-quality-based treatment controls and strategies beyond the technology-based levels of treatment required by sections 301(b) and 306 of the Act."

Throughout this triennial review, the EPA has repeatedly and clearly articulated to North Carolina, both verbally and in writing, the Agency's position that certain proposed WQS could not be approved if submitted to the EPA. Consistent with that position and the EPA's publicly available record, the EPA is disapproving the sections of the DWR's water quality standards allowing alternative approaches for the implementation of the newly approved toxics criteria for some purposes under the Act. Specifically, the "biological confirmation" for assessment and the "action levels" for NPDES permitting are disapproved for all purposes under the Act. The State has now adopted separate, more stringent numeric criteria that are approved for all purposes under the CWA and must be implemented in NPDES permits as required by the EPA's national permitting regulations and monitoring and assessment programs. The State's separate "biological confirmation" and "action levels" provisions are not protective of the designated uses. In addition, the EPA communicated its concern with the use of a median instream hardness when calculating hardness dependent metals criteria, another provision designed to allow an alternative approach in NPDES permitting for implementing the State's toxics criteria, because median hardness does not protect designated uses in all waters. EPA also communicated its concern that the State has not demonstrated that the low end hardness cap provision protects designated uses of waters with a hardness below the cap. Therefore, the EPA is also disapproving the median hardness and low end hardness cap WQS.

Finally, numerous changes were made to the structure and formatting of the WQS and each of those changes were reviewed. Where those did not result in substantive changes to the WQS, the EPA is approving the revisions as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of these non-substantive changes does not re-open the EPA's prior approval of the underlying substantive WQSs. Where the revisions were a substantive change to WQS, the EPA reviewed and made individual decisions regarding those changes as detailed below. Where the revisions were not considered changes to WQS, the Agency did not take action, as noted below. During this triennial, the State also provided an opportunity to accept comments on and conducted a review of the variances to water quality standards for Evergreen Paper Products, Mount Olive Pickle Company and Bay Valley Foods. The EPA continues to work with the State on the ongoing review of these water quality standards variances as noted below.

North Carolina should be extremely proud of these revisions to its WQS and the technical expertise demonstrated by its staff and management in the completion of this extended review. Each of the DWR's WQS revisions is addressed in detail below along with the EPA's analysis and decision.

15A NCAC 02B .0200 Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands

Throughout the Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands section .0200, several editorial revisions were made replacing commonly used terms with synonymous terms. For example, the word "which" was changed to "that." These revisions do not alter the meaning or intent of the previously approved corresponding provisions as they are considered editorial. A copy of the revised WQS with these changes highlighted in yellow is provided in Appendix A: Non-Substantive Word Changes. The EPA approves the non-substantive word change revisions in Appendix A as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of these non-substantive changes does not re-open the EPA's prior approval of the underlying substantive WQSs.

15A NCAC 02B .0206 Flow Design Criteria for Effluent Limitations

Subsection 15A NCAC 02B .0206(a)(3) was amended to add:

> *(3) Toxic substance standards to protect aquatic life from acute toxicity shall be protected using the 1Q10 flow.*

In the EPA's *Technical Guidance Manual for Performing Wasteload Allocation. Book IV: Design Conditions,* Chapter 1 (EPA 1986a), the EPA discusses and recommends two methods for determining design flows for calculating effluent limits, the hydrologically-based method and the biologically-based method. Those design flows should be used to calculate both the Criterion Continuous Concentration (CCC, the 4-day average concentration of a pollutant that should not be exceeded more than once every three years on the average also known as the 'chronic' toxicity) and Criterion Maximum Concentration (CMC, the one hour average concentration in ambient water that should not be exceeded more than once every three years on average, also known as the 'acute' toxicity). The EPA recommends the use of the 1Q10 flow as the hydrologically-based design flow for the CMC and the 7Q10 as the hydrologically-based design flow for the CCC. The North Carolina WQS already includes a provision for the 7Q10 design flow for chronic toxicity (15A NCAC 02B .0206 (a)(2)). This revision adds the 1Q10 flow that will now be applicable for the new acute criteria that are being adopted during this triennial. Note: in this context the flow values that are listed are solely to be used for the calculation of water quality based effluent limitations as discussed under 15A NCAC 02B .0206(a). They do not indicate or refer to in any manner setting actual instream flows.

Considering the scientific and technical information supporting the EPA's Guidance, the EPA concludes that this change to subsection 15A NCAC 02B .0206 is consistent with the CWA section 303(c), 40 C.F.R. sections 131.11 and 131.13, and the EPA's guidance on stream design flows that are protective of aquatic life. This change is protective of the designated use. Therefore, this change is approved by the EPA under CWA section 303(c).

15A NCAC 02B .0211 Fresh Surface Water Quality Standards for Class C Waters
General paragraph and Subparagraphs (1) through (10)

The following revisions were made to the General opening paragraph and subparagraphs (1) through (10) of Section 15A NCAC 02B .0211.

> *General. The water quality standards for all fresh surface waters ~~are~~ shall be the basic standards applicable to all Class C waters. ~~See Rule .0208 of this Section for standards for toxic substances and temperature.~~ Water quality standards for temperature and numerical water quality standards for the protection of human health applicable to all fresh surface waters are in Rule .0208 of this Section.*

The language regarding the reference to Rule .0208 was changed in this paragraph. The applicability of Rule .0208 to freshwaters of North Carolina has not been changed, nor has the content of Rule .0208 been changed. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

The General paragraph was also modified as follows:

> *Additional and more stringent standards applicable to other specific freshwater classifications are specified in Rules. .0212, .0214, .0215, .0216, .~~0217,~~ .0218, .0219, .0223, .0224 and .0225 of this Section.*

Subparagraph .0217 was repealed with an effective date of January 1, 1988. There are no provisions under that Rule. Therefore, reference to that Rule has been removed. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

The following sentence was added as the final sentence to the general paragraph:

> *Action levels for purposes of National Pollutant Discharge Elimination System (NPDES) permitting are specified in Item (22) of this Rule.*

The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs. For the substantive discussion of the EPA's decision regarding revisions to action levels in fresh surface waters, see page 28.

The following subparagraphs were renumbered for alphanumeric reordering only:

(1) Best Usage of Waters
(2) Conditions Related to Best Usage
(4) Chlorophyll a (corrected)
(6) Dissolved Oxygen
(8) Floating Solids, settleable solids, or sludge deposits

(10) Gases, total dissolved.

There were no other changes to these standards except for the numbering. The EPA has reviewed these changes and determined that they are non-substantive and therefore, the EPA approves these revisions as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that this approval of these non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.
Subparagraph (3) was amended as follows:

~~*(3) Quality standards applicable to all fresh surface waters:*~~

This sentence came before all of the criteria in the old format prior to the alphabetical reorganization of the WQS. The State indicated that this sentence was found to be redundant with the information in the General paragraph. The General paragraph listed just above this states that the WQS "…for all fresh surface waters are the basic standards applicable to Class C waters." 15A NCAC 02B .0101 General Procedures provides a definition for Class C waters which includes that "*Class C: freshwaters protected for secondary recreation, fishing, aquatic life including propagation and survival, and wildlife. All freshwaters shall be classified to protect these uses at a minimum.*" The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

New subparagraph (3) was created:

(3) Chlorine, total residual: 17 ug/l;

This revision moves chlorine from its previous location at Rule .0211(3)(l)(iv) without revision in order to alphabetize the criteria. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

New subparagraph (5) was created:

(5) Cyanide, total: 5.0 ug/L;

The new paragraph moves cyanide from its previous location at Rule .0211(3)(l)(vi) and retains the same numeric value. Therefore, this revision is a non-substantive change to WQSs and the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

However, the original cyanide criterion included the following language after the numeric criteria that is no longer included, "*...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.*" That language is struck out in the original location and not carried over to the new criterion's location.

States are not required to utilize the site-specific procedures, therefore the EPA concludes that this change to subsection 15A NCAC 02B .0211(11)(a)(5) is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, this change is approved by the EPA under CWA section 303(c). North Carolina notes that the site-specific criterion for cyanide has never been used since its original adoption. According to the state, Rule .0226 Exemptions from Surface Water Quality Standards, may be modified in the next triennial to include reference to the Handbook procedures that will allow the State to develop site-specific criteria. Until such time, the language allowing the use of the site-specific criteria has been removed and cannot be used for CWA purposes.

New paragraph (7) was added to move the criteria for fecal coliform into alphabetical order.

(7) Fecal coliform:

The fecal coliform criteria was previously Rule .0211(3)(e) and included the language "*Organisms of the coliform group:*" in front of the criteria. Those introductory words have been replaced with the words "*Fecal coliform:.* " No other changes were made to the criteria. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

New paragraph (9) was added to move the criterion for fluorides from Rule .0211(3)(l)(vii) in order to alphabetize the criteria, as follows:

(9) Fluorides: 1.8 mg/l;

The numeric value of the criterion did not change. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

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

A new subparagraph under 15A NCAC 02B .0211(11)(a) has been added as follows:

(11) Metals:

(a) *With the exception of mercury and selenium, freshwater aquatic life standards for metals shall be based upon measurement of the dissolved fraction of the metal. Mercury and selenium water quality standards shall be based upon measurement of the total recoverable metal.*

The DWR did not adopt updated criteria for mercury or selenium, leaving in place the previous values which are based on the total recoverable metal. Therefore, the reference to those parameters in the first sentence is a non-substantive change to standards. The EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

The EPA's most current national recommended water quality criteria for protection of aquatic life include the recommendation that fresh and salt water criteria for metals (including specifically arsenic, cadmium,

chromium III, chromium VI, copper, lead, nickel, silver and zinc) be expressed in terms of the dissolved metal in the water column (EPA 1993). The EPA further stated in this guidance that "[t]he use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal."

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA concludes that this change to subsection 15A NCAC 02B .0211(11)(a) is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, this change is approved by the EPA under CWA section 303(c).

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

A new subparagraph 11(b) was added as follows that adds and revises criteria for non-hardness dependent metals and includes the ability to conduct a water effect ratio (WER) as follows:

(11) Metals:
(b) Freshwater metals standards that are not hardness-dependent shall be as follows:
(i) Arsenic, dissolved, acute: WER· 340 ug/l;
(ii) Arsenic, dissolved, chronic: WER· 150 ug/l;
(iii) Beryllium, dissolved, acute: WER· 65 ug/l;
(iv) Beryllium, dissolved, chronic: WER· 6.5 ug/l;
(v) Chromium VI, dissolved, acute: WER· 16 ug/l;
(vi) Chromium VI, dissolved, chronic: WER· 11 ug/l;
(vii) Mercury, total recoverable, chronic: 0.012 ug/l;
(viii) Selenium, total recoverable, chronic: 5 ug/l;
(ix) Silver, dissolved, chronic: WER· 0.06 ug/l;

With the adoption of these criteria under 15A NCAC 02B .0211(11)(b), North Carolina's water quality criteria for non-hardness dependent metals, listed above, are consistent with the EPA's most current national recommended water quality criteria or derived using an EPA recommended approach as detailed below.

Arsenic

In this revision, North Carolina adopted the EPA's most recent national recommendation of 340 ug/l as an acute criterion for arsenic in freshwater. This is the first time that North Carolina has had an acute criterion for arsenic.

The State revised its chronic freshwater criterion for arsenic to adopt the EPA's most current recommended value of 150 ug/l replacing the previous State criterion of 50 ug/l (EPA 1995). The State noted in its adoption of this value that, "[c]urrent arsenic water quality standards designed for the protection of human health in *all* waters of the state remains at 10 ug/l, measured as total recoverable arsenic. The DWR maintains this protective standard which is equivalent to the current National Drinking Water standard." 40 C.F.R. section 131.11 states, "[f]or waters with multiple use designations, the criteria shall support the most sensitive use." In this instance, the human health value of 10 ug/l would be the criteria supporting the most sensitive use applicable to all waters of the State.

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the changes to subsections 15A NCAC 02B .0211(11)(b)(i) and (ii) protect North Carolina's aquatic life use and, therefore, are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. These changes are approved by the EPA under CWA section 303(c).

Beryllium

In this revision, North Carolina adopted an acute criterion for beryllium in freshwater of 65 ug/l. This is the first time that the State has adopted an acute value for beryllium. In 1980, the EPA concluded that an acute freshwater criterion could not be calculated due to a limited toxicity data base (EPA 1980a). Therefore, the EPA does not have an acute water quality recommendation for beryllium. The 1980 EPA report did note that acute toxicity could occur at concentrations as low as 130 ug/l. North Carolina used the acute data from the 1980 report and derived its acute freshwater criterion in a manner that is consistent with the EPA's *1985 Guidelines for Deriving Numerical National Water Quality Criteria for the Protection Of Aquatic Organisms and Their Uses* ("1985 Guidelines," EPA 1985).

North Carolina's methodology for deriving acute criteria for beryllium is scientifically defensible and results in values that protect North Carolina's aquatic life use. The EPA concludes that the change to subsection 15A NCAC 02B .0211(11)(b)(iii) is consistent with the CWA and 40 C.F.R. section 131.11. Therefore, this change is approved by the EPA under CWA section 303(c).

The State is maintaining its chronic freshwater criterion for beryllium of 6.5 ug/l. For alphabetizing purposes the chronic beryllium criterion was moved from 15A NCAC 02B .021(3)(l)(ii) to 15A NCAC 02B .0211(11)(b)(iv), which is a non-substantive change to standards and therefore the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

Chromium VI

Before these revisions, North Carolina did not have criteria for chromium III or chromium VI, instead having a single chronic value for total recoverable chromium of 50 ug/l. In this Rule, North Carolina is adopting the EPA's national recommended criteria for chromium VI of 16 ug/l (acute) and 11 ug/l (chronic) (EPA 1995).

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the changes to subsections 15A NCAC 02B .0211(11)(b)(v) and (vi) protect North Carolina's aquatic life use and, therefore, are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. These changes are approved by the EPA under CWA section 303(c).

Mercury and Selenium

The EPA notes that the numeric values for both mercury and selenium were not changed during this triennial review. The numeric criterion for mercury was moved from 15A NCAC 02B .021(3)(l)(ix) to 15A NCAC 02B .0211(11)(b)(vii) for alphabetizing purposes only. The numeric criterion for selenium was moved from 15A NCAC 02B .021(3)(l)(xiii) to 15A NCAC 02B .0211(11)(b)(viii) for alphabetizing purposes only. As the numeric value did not change for either of these criteria, the EPA determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the

EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

Silver

In this revision, North Carolina is adopting a chronic water quality criterion for silver of 0.06 ug/l in subsection 15A NCAC 02B .0211(11)(b)(ix) of this Rule. Currently, the EPA does not have a national recommended chronic criteria for silver. The State calculated this criterion using the lowest LC50 for total recoverable silver of 1.2 ug/l and multiplying it by a safety factor of 0.05. These calculations are consistent with previously approved procedures for the calculation of toxics criteria for the protection of aquatic life under subsection 15A NCAC .0208 (a)(1) Standards for Toxic Substances and Temperature.

North Carolina's methodology for deriving chronic criteria for silver is scientifically defensible and results in values that protect North Carolina's aquatic life use. The EPA concludes that the change to subsection 15A NCAC 02B .0211(11)(b)(ix) protects North Carolina's aquatic life use and, therefore, is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. This change is approved by the EPA under CWA section 303(c).

The above changes are summarized in the table below for ease of reference.

Metal (all values are dissolved)	**NCDWR's Previous Criteria (ug/l)**	**NCDWR New/Revised Criteria (ug/l)**	**EPA's Recommended Criteria (ug/l)**	**EPA's Reference for Recommended Criteria**
Arsenic (acute)	--	340	340	EPA 1995
Arsenic (chronic)	50 ug/l	150	150	
Beryllium (acute)	--	65	--	N/A
Beryllium (chronic)	6.5	6.5	--	
Chromium VI (acute)	--	16	16	EPA 1995
Chromium VI (chronic)	--	11	11	
Silver (chronic)	0.06 Action Level only	0.06	--	N/A

Water Effect Ratios

The following was added underneath the non-hardness dependent criteria in Subparagraph 11(b):

> *With the exception of mercury and selenium, acute and chronic freshwater aquatic life standards for metals listed in this Subparagraph apply to the dissolved form of the metal and apply as a function of the pollutant's water effect ratio (WER). A WER expresses the difference between the measures of the toxicity of a substance in laboratory waters and the toxicity in site water. The WER shall be assigned a value equal to one unless any person demonstrates to the Division's satisfaction in a permit proceeding that another value is developed in accordance with the "Water Quality Standards Handbook: Second Edition"*

published by the US Environmental Protection Agency (EPA-823-B-12-002), free of charge, at http://water.epa.gov/scitech/swguidance/standards/handbook, hereby incorporated by reference including any subsequent amendments. Alternative site-specific standards may also be developed when any person submits values that demonstrate to the Commissions' satisfaction that they were derived in accordance with the "Water Quality Standards Handbook: Second Edition, Recalculation Procedure or the Resident Species Procedure", hereby incorporated by reference including subsequent amendments at http://water.epa.gov/scitech/swguidance/standards/handbook/. This material is available free of charge.

This provision allows the use of a WER directly for each of the above non-hardness dependent metals (criteria x WER). The DWR provides the citation for the EPA Water Quality Standards Handbook, incorporated by reference including any amendments ("WQS Handbook," EPA 2014). Within the WQS Handbook, Appendix L, *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals* ("WER Guidance", EPA 1994a), including the transmittal memo, "Use of the Water-Effect Ratio in Water Quality Standards (EPA 1994b), provides specific details on the applicability of WERs and how to develop WERs for site-specific criteria for metals. The WER guidance notes that one of the options under 40 C.F.R. 131.11 (b)(1) allows states to establish criteria based on 304(a) Guidance modified to reflect site-specific conditions. The WER transmittal memo notes that site-specific criteria are subject to EPA review and approval/disapproval under section 303(c) of the CWA. The two options allowed for this review are:

Option 1: A state may derive and submit each individual water-effect ratio determination to EPA for review and approval.

Option 2: A State can amend its water quality standards to provide a formal procedure with includes derivation of water-effects ratios, appropriate definition of sites, and enforceable monitoring provisions to assure that designated uses are protected. Both this procedure and the resulting criteria would be subject to full public participation requirements. Public review of a site-specific criterion could be accomplished in conjunction with the public review required for permit reissuance. EPA would review and approve/disapprove this protocol as a revised standard once. For public information, we recommend that once a year the State publish a list of site-specific criteria.

By referencing the procedures in the WQS Handbook, which includes the WER Guidance and the WER transmittal memo, the DWR has chosen to proceed with Option 2, adopting the EPA's protocol and all associated procedures to conduct WERs. The requirements for public review of a WER will be incorporated through the permit process. The State has chosen to include a WER of 1 in the WQS, which the EPA considers a "rebuttable presumption until a site-specific WER is derived." National Toxics Rule (NTR), 57 Fed. Reg. (page 60,866) (December 22, 1992). The WER Transmittal memo emphasizes that ". . . although a water-effect ratio affects permit limits for individual dischargers, it is the State in all cases that determines if derivation of a site-specific criterion based on the water-effect ratio is allowed and it is the State that ensures that the calculations and data analysis are done completely and correctly." The EPA strongly recommends that the first WERs developed by the State are reviewed in the study plan phase by the EPA to ensure that WERs that are developed meet the required procedures. The EPA looks forward to working with the State to ensure a quick review of the study plans.

This section also allows for alternative site-specific standards to be developed using the Recalculation Procedure or the Resident Species Procedure in accordance with the WQS Handbook. In deriving site-specific criteria, the Recalculation Procedure (found at Appendix A of Appendix L of the WQS

Handbook) takes into account the differences in sensitivities between the species used in the national dataset in developing the national recommended criteria and the organisms at the site. The Resident Species Analysis (see Chapter 3.7 - Developing Site-Specific Criteria of the WQS Handbook) accounts for that difference as well as the difference between the toxicity of the metal in lab water versus site water similar to a WER. Chapter 3.6 - Policy on Aquatic Life Criteria for Metals was updated to also include procedures to conduct a Streamlined Water-Effects Ratio Procedure for the Discharge of Copper that may be used.

The EPA concludes that the changes to subsection 15A NCAC 02B .0211(11)(b) to add the use of a WER and to include a WER multiplier in each of the criteria is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, these changes are approved by the EPA under CWA section 303(c).

The following provision was added at the end of this subparagraph:

Hardness-dependent freshwater metals standards are located in Sub-Item (c) and (d) and in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals;

The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

15A NCAC 02B .0211 Fresh Surface Water Quality Standards for Class C Waters Subparagraph (11)(c)(i)

A new subsection 11(c)(i) was added as follows:

(11) Metals:

(c) Hardness-dependent freshwater metals standards shall be as follows:

(i) Hardness-dependent metals standards shall be derived using the equations specified in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals. If the actual instream hardness (expressed as $CaCO_3$ or Ca+Mg) is less than 25 milligrams/liter (mg/l), standards shall be calculated based upon 25 mg/l hardness. If the actual instream hardness is greater than 25 mg/l and less than 400 mg/l, standards shall be calculated based upon the actual instream hardness. If the instream hardness is greater than 400 mg/l, the maximum applicable hardness shall be 400 mg/l;

Section 15A NCAC 02B .0211(11)(c)(i) identifies the hardness value to be used in the newly adopted hardness based equations found in Table A (located after 15A NCAC 02B .0211(11)(d) Alternatives). As stated in the CTR, the EPA has found that "hardness and/or other water quality characteristics that are usually correlated to hardness can reduce or increase the toxicities of some metals. Hardness is used as a surrogate for a number of water characteristics which affect the toxicity of metals in a variety of ways." See 65 Fed. Reg. (page 31692). The relationship between hardness and toxicity is inversely proportional, that is, as the hardness increases, the toxicity is reduced. Therefore, the EPA's national recommended criteria for some metals (cadmium, chromium III, copper, lead, nickel, silver and zinc) are expressed as hardness based equations in order to most accurately reflect the site-specific toxicity of those metals.

As noted in letters[1] to the DWR, the EPA strongly supports the use of the nationally recommended hardness based equations for the derivation of criteria for hardness dependent metals. Using these equations should assure that the water quality standards are not *underprotective in low hardness waters* (setting criteria that are too high) or *overprotective in high hardness waters* (setting criteria that are too low). It is important that the correct hardness be used in those equations to ensure that the criteria are derived appropriately. This new section states in part that the hardness dependent standards shall be derived using the equations and that, "standards shall be calculated *based upon the actual instream hardness*." (Emphasis added). The EPA reads this section to state that the hardness to be used in the equation to derive the standard is based upon the actual instream hardness up to 400. This is consistent with the EPA's approach, where for instance, in the CTR, the EPA stated that the criteria should be calculated "using the actual ambient hardness of the surface water."

Low end Hardness Cap

This section also includes a provision that states "If the actual instream hardness (expressed as $CaCO_3$ or Ca+Mg) is less than 25 milligrams/liter (mg/l), standards shall be calculated based upon 25 mg/l hardness." This low end hardness "cap" for calculating criteria is not consistent with current EPA published recommendations. EPA published an update to the national recommended water quality criteria in 2002 that included the hardness dependent metals (EPA 2002). The EPA did not include a minimum hardness cutoff. Further, where the EPA has promulgated hardness based equations in the past such as in the CTR, a low end hardness cap was not included. In that rule, the EPA directly addressed this issue stating, "[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's 2015 adoption of a low end hardness cap is not consistent with EPA guidance, even with the State's application of a WER if deemed necessary for additional protection. The State did not provide adequate scientific justification to support its adoption of the cap as an alternative approach to EPA's recommendation. In its summary, the State cited EPA's 2002 Guidance stating toxicity data are somewhat limited below hardness of 25 mg/l, resulting in inconclusive data, and a hardness floor may not be fully protective. The EPA's Guidance states "Capping hardness at 25 mg/L without additional data or justification may result in criteria that provide less protection than that intended by EPA's Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. Therefore, EPA now recommends that hardness not be capped at 25 mg/L, or any other hardness on the low end." North Carolina is concerned that use of actual ambient hardness in waters where hardness is below 25 mg/l may be overly protective. However, the State has not presented additional data or justification, demonstrating that designated uses would be protected if standards are calculated based upon 25 mg/l hardness in waters with a hardness less than 25 mg/L. Without such supporting justification, North Carolina's methodology for deriving a low end hardness cap is not scientifically defensible and the EPA cannot determine whether the cap would protect designated uses. The EPA concludes that the changes to subsection 15A NCAC 02B .0211(11)(c)(i) providing a low end hardness cap are not consistent with the CWA section 303(c) and 40 C.F.R. sections 131.6 and 131.11, and cannot be approved

[1] See Appendix B, EPA letters to DWR dated April 30, 2009, August 20, 2010, and January 3, 2014 and emails to DWR on August 22, 2014 and August 25, 2014.

as a protective water quality standard. Therefore, the EPA is disapproving the low end hardness cap changes under CWA section 303(c). The approved provision reads:

(11) Metals:

(d) Hardness-dependent freshwater metals standards shall be as follows:

(i) Hardness-dependent metals standards shall be derived using the equations specified in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals. If the actual instream hardness (expressed as $CaCO_3$ or Ca+Mg) is ~~less than 25 milligrams/liter (mg/l), standards shall be calculated based upon 25 mg/l hardness. If the actual instream hardness is greater than 25 mg/l and~~ less than 400 mg/l, standards shall be calculated based upon the actual instream hardness. If the instream hardness is greater than 400 mg/l, the maximum applicable hardness shall be 400 mg/l;

The EPA recommends that the State delete the low end hardness cap language to match the approved provision above during the next triennial review.

High End Hardness Cap

This section includes the provision, "*If the instream hardness is greater than 400 mg/l, the maximum applicable hardness shall be 400 mg/l*", which is consistent with published EPA recommendations that state, "[a]t high hardness there is an indication that hardness and related inorganic water quality characteristics do not have as much of an effect on toxicity of metals as they do at lower hardnesses. Related water quality characteristics do not correlate as well at high hardnesses." The EPA recommends that for hardness over 400 mg/l as $CaCO_3$ calculation of a criterion with a default WER of 1.0 should provide the protection intended in the 1985 Guidelines. See 57 Fed. Reg. (page 60,916). The EPA does note that "capping hardness at 400 mg/l might result in a level of protection that is higher than that intended by the 1985 guidelines, but any such increase in the level of protection can be overcome by use of the WER procedure." Id. As DWR is adding in the WER procedures in this rulemaking, the state will have the ability to ensure that the proper level of protection is ensured in waters with high hardness.

The EPA concludes that the changes to subsection 15A NCAC 02B .0211(11)(c)(i) providing a high end hardness cap are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, these changes are approved by the EPA under CWA section 303(c).

15A NCAC 02B .0211 Fresh Surface Water Quality Standards for Class C Waters Subparagraph (11)(c)(ii)

A new subsection 11(c)(ii) was added as follows:

(11) Metals:

(c)(ii) Hardness-dependent metals in NPDES permitting: for NPDES permitting purposes, application of the equations in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals shall have hardness values (expressed as $CaCO_3$ or Ca+Mg) 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 (HU). The minimum applicable instream hardness shall be 25 mg/l and the maximum applicable instream hardness shall be 400

mg/l, even when the actual median instream hardness is less than 25 mg/l and greater than 400 mg/l;

As stated above, the EPA approved for all purposes under the CWA the use of the actual instream hardness for calculating the appropriate water quality criteria when using the equations in Table A, except for hardness above 400 mg/l $CaCO_3$. The newly adopted provision in this subparagraph adds an alternate method for choosing the hardness value to be used when calculating permit limits for NPDES permits under Section 402 of the CWA.

The DWR stated that this section was adopted to ensure that a set value was used for deriving permit limits that did not vary from day-to-day. Use of the median of instream hardness data collected using the 8-digit Hydrologic Unit (HU) where a facility was located was intended to provide a uniform measurement of hardness both for deriving the permit limit and for determining compliance. The DWR was concerned that the use of the actual instream hardness could also be unduly influenced by effluent which could have higher hardness than the receiving waters, resulting in a metal criterion that would not be protective of downstream waters. North Carolina's evaluation also took into account elevated instream hardness from stormwater run-off in urban centers, which they state has been found to be inconsistent with "unimpacted upstream or downstream hardness values."

However, subpart 15A NCAC 02B .0211(11)(c)(ii), in effect, creates an alternate criteria for permitting purposes from 15A NCAC 02B .0211(11)(c)(i). The EPA regulations found at 40 C.F.R. 131.2 states that water quality standards define "the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses...and serve the purposes of the Clean Water Act." Those references goals include all section 101(a)(2) goals, such as ensuring that waters are fishable/swimmable. 40 C.F.R. 131.2 states that "[s]uch standards *serve the dual purposes* of establishing the water quality goals for a specific water body and serve as the regulatory basis for the establishment of water quality based treatment controls and strategies beyond the tech-based levels of treatment required by section 301(b) and 306 of the Act" (emphasis added). Section 15A NCAC O2B .0211(11)(c)(ii) results in alternative metals effluent limitations for purposes of permitting that are inconsistent with North Carolina's newly established metals criteria and are inconsistent with the water quality standards regulations.

North Carolina has discussed the challenges associated with determining the proper instream hardness values, but has not provided a scientifically defensible justification for the use of the median hardness. Use of the median, by definition, ensures that the hardness value is too high (not protective enough) for half of the facilities and too low (needlessly overprotective) for half the facilities. The size of the 8-digit HUs is such that it could cross ecoregions or subecoregions and include a wide range of hardness values, as demonstrated by the data provided by the State. The purpose of the hardness dependent criteria is to reflect conditions in waters at or near a facility and derive criteria that protect designated uses in those waters. North Carolina has not demonstrated that use of the median hardness will protect designated uses. The EPA NPDES permitting program will work with North Carolina to ensure that the hardness procedures used for implementation will address North Carolina's concerns. For instance, the EPA recommends that hardness samples be collected in the receiving stream upstream and away from the influence of the effluent as discussed in the CTR and those recommendations could be part of the implementation procedures for permitting. The EPA notes that typically these types of provisions are considered through NPDES permitting implementation procedures and should not be included as a WQS. The EPA concludes that the changes to subsection 15A NCAC 02B .0211(11)(c)(ii) are not protective of designated uses and, therefore, are not consistent with the CWA section 303(c) or 40 C.F.R. section 131.11. Therefore, these changes are not approved by the EPA under CWA section 303(c). The EPA

notes in disapproving this section that provisions for determining hardness to use in the hardness based equations shall be conducted using the approved provisions under 15A NCAC 02B .0211(11)(c)(i). The EPA recommends that the State delete the entire provision for median hardness in NPDES permitting during the next triennial review.

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

New subparagraph (11)(d) was added as follows to allow for the use of WERs for the metals listed in Table A:

> *(d) Alternatives:*
> *Acute and chronic freshwater aquatic life standards for metals listed in Table A apply to the dissolved form of the metal and apply as a function of the pollutant's water effect ratio (WER), which is set forth in Sub-Item (b). Alternative site-specific standards may also be developed as set forth in Sub-Item (b);*

As discussed in the review of the use of WERs under subparagraph .0211(11)(b), the use of WERs is consistent with the EPA's policy and guidance. The discussion in that section's review are incorporated into the review of this section by reference. For the same reasons set out in that section, the EPA concludes that the changes to subsection 15A NCAC 02B .0211(11)(d) to add in the use of a WER and to include a x1 multiplier in each of the criteria for the criteria in Table A is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, these changes are approved by the EPA under CWA section 303(c). The EPA strongly recommends that the first WERs developed by the State are reviewed in the study plan phase by the EPA to ensure that WERs that are developed meet the required procedures. The EPA looks forward to working with the State to ensure a quick review of the study plans.

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

A new table, Table A, was added to this section for new or revised criteria for hardness dependent metals:

> *Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals*
> *Numeric standards calculated at 25 mg/l hardness are listed below for illustrative purposes. The Water Effects Ratio (WER) is equal to one unless determined otherwise under Sub-Item (d) of this rule.*

Metal	*Equations for Hardness-Dependent Freshwater Metals (ug/l)*	*Standard at 25 mg/l hardness*
Cadmium, Acute	*WER· [{1.136672-[ln hardness](0.041838)} · e^{0.9151 [ln hardness]-3.1485}]*	*0.82*
Cadmium, Acute, Trout waters	*WER· [{1.136672-[ln hardness](0.041838)} · e^{0.9151[ln hardness]-3.6236}]*	*0.51*
Cadmium, Chronic	*WER· [1.101672-[ln hardness](0.041838)} · e^{0.7998[ln hardness]-4.4451}]*	*0.15*
Chromium III, Acute	*WER· [0.316 · e^{0.8190[ln hardness]+3.7256}]*	*180*
Chromium III, Chronic	*WER· [0.860 · e^{0.8190[ln hardness]+0.6848}]*	*24*

Copper, Acute	*WER· [0.960 · e^{0.9422[ln hardness]-1.700}]* *Or,* *Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision*	*3.6* *NA*
Copper, Chronic	*WER· [0.960 · e^{0.8545[ln hardness]-1.702}]* *Or,* *Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision* *(EPA-822-R-07-001)*	*2.7* *NA*
Lead, Acute	*WER· [{1.46203-[ln hardness](0.145712)} · e^{1.273[ln hardness]-1.460}]*	*14*
Lead, Chronic	*WER· [{1.46203-[ln hardness](0.145712)} · e^{1.273[ln hardness]-4.705}]*	*0.54*
Nickel, Acute	*WER· [0.998 · e^{0.8460[ln hardness]+2.255}]*	*140*
Nickel, Chronic	*WER· [0.997 · e^{0.8460[ln hardness]+0.0584}]*	*16*
Silver, Acute	*WER· [0.85 · e^{1.72[ln hardness]-6.59}]*	*0.30*
Zinc, Acute	*WER· [0.978 · e^{0.8473[ln hardness]+0.884}]*	*36*
Zinc, Chronic	*WER· [0.986 · e^{0.8473[ln hardness]+0.884}]*	*36*

Note: For ease of review, this evaluation will be separated into two sections: Cadmium and other metals.

Hardness based equations for all metals except cadmium

The EPA commends the DWR for adopting the hardness based equations for metals to bring them in line with the EPA's national recommended criteria. Use of the equations, rather than the previously used default number at a set hardness, aligns North Carolina's criteria with the national recommended criteria. The equations were developed to most accurately identify the biologically available fraction available for uptake by organisms and therefore most likely to cause a toxic effect to aquatic life. With the exception of cadmium, discussed in more detail below, each of the hardness based equations in Table A is consistent with the national recommended equations and the values for the metal specific variables.

Freshwater Conversion Factors and Parameters for Calculating Freshwater Dissolved Metals Criteria that Are Hardness-Dependent

Chemical	mA	bA	mC	bC	Freshwater Conversion Factor: CMC	Freshwater Conversion Factor: CCC
Cadmium	1.0166	-3.924	0.7409	-4.719	1.136672-[(*ln*hardness)(0.041838)]	1.101672-[(*ln*hardness)(0.041838)]
Chromium III	0.8190	3.7256	0.8190	0.6848	0.316	0.860
Copper	0.9422	-1.700	0.8545	-1.702	0.960	0.960
Lead	1.273	-1.460	1.273	-4.705	1.46203-[(*ln*hardness)(0.145712)]	1.46203-[(*ln*hardness)(0.145712)]
Nickel	0.8460	2.255	0.8460	0.0584	0.998	0.997
Silver	1.72	-6.59	--	--	0.85	--
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

Chromium III

Prior to these revisions, North Carolina did not have criteria for chromium III or chromium VI, instead having a single chronic value for total recoverable chromium of 50 ug/l. In this Rule, North Carolina is adopting the EPA's national recommended criteria for chromium III which are expressed as hardness based equations:

Acute: WER· [0.316 · e^{0.8190[ln hardness]+3.7256}] = 180 ug/l when calculated at 25 $CaCO_3$
Chronic: WER· [0.860 · e^{0.8190[ln hardness]+0.6848}] = 24 ug/l when calculated at 25 $CaCO_3$

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the changes to subsection 15A NCAC 02B .0211(11) Table A for acute and chronic chromium III criteria protect North Carolina's aquatic life use and, therefore, are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. These changes are approved by the EPA under CWA section 303(c).

Copper

In this triennial, North Carolina has adopted in Table A the Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision (EPA 2007) for calculating acute and chronic freshwater copper values using the Biotic Ligand Model (BLM). The BLM uses receiving water body characteristics to develop site-specific water quality criteria using the best available science to determine the bioavailability of copper. The BLM will require ten parameters to be put into the model, including temperature, pH, dissolved organic carbon, calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity rather than just the hardness required for the hardness based equation.

North Carolina determined that the BLM was not often practical to implement when resources or data were not available for the collection or use of all ten parameters and therefore caveated the adoption to note that it will be used where sufficient data are available. On February 16, 2016, the EPA made available its Draft Technical Support Document: Recommended Estimates for Missing Water Quality Parameters for Application in EPA's Biotic Ligand Model (EPA 2016). The EPA recommends North Carolina review the document and consider its use when developing site-specific copper criteria.

When sufficient data are not available, North Carolina has chosen to use the EPA's previously published hardness based equation for copper in order to ensure state wide implementation of copper criteria. These EPA equations were derived in EPA's "National Recommended Water Quality Criteria – Correction" (EPA 1999). The DWR notes that this criteria document is a modification of previously published 304(a) aquatic life that was issued in the "1995 Updates: Water Quality Criteria Document for the Protection of Aquatic Life in Ambient Water" (EPA 1995) adopted and approved by all other Region 4 state water quality standards programs. North Carolina also notes that the EPA derived these equations using Great Lakes Initiative Guidelines 60 Fed. Reg. 15,393-15,399, (March 23, 1995); also found in 40 C.F.R. 132, Appendix A. Both the BLM and the hardness based equation were derived based on the principles in the 1985 Guidelines.

The hardness based equation is as follows:

Acute: WER· [0.960 · e^{0.9422[ln hardness]-1.700}]= 3.6 ug/l calculated at 25 mg/l $CaCO_3$
Chronic: WER· [0.960 · e^{0.8545[ln hardness]-1.702}] = 2.7 ug/l calculated at 25 mg/l $CaCO_3$

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the acute and chronic copper criteria in subsection 15A NCAC 02B .0211(11) Table A protect North Carolina's aquatic life use and, therefore, are consistent with section 303(c) of the CWA and 40 C.F.R. section 131.11(b)(1)(i). These changes are approved by the EPA under CWA section 303(c) for all purposes under the CWA.

Lead

The numeric criterion for lead was moved from 15A NCAC 02B .021(3)(l)(viii) to 15A NCAC 02B .0211(11)(d) Table A for alphabetizing purposes. The criteria for lead were also significantly revised from a total recoverable chronic value of 25 ug/l to the EPA's national recommended hardness based equations as follows:

Acute: WER· [{1.46203-[ln hardness](0.145712)} · e^{1.273[ln hardness]-1.460}] = 14 at 25 mg/l $CaCO_3$
Chronic: WER· [{1.46203-[ln hardness](0.145712)} · e^{1.273[ln hardness]-4.705}] = 0.54 at 25 mg/l $CaCO_3$

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the changes to subsection 15A NCAC 02B .0211(11) Table A for acute and chronic lead criteria protect North Carolina's aquatic life use and, therefore, are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. These changes are approved by the EPA under CWA section 303(c).

Nickel

The numeric criterion for nickel was moved from 15A NCAC 02B .0211(3)(l)(x) to 15A NCAC 02B .0211(11)(d) Table A for alphabetizing purposes. The criteria for nickel were also revised from a total recoverable chronic value of 88 ug/l to the EPA's national recommended hardness based equations as follows:

Acute: WER· [0.998 · e^{0.8460[ln hardness]+2.255}] = 140 ug/l at 25 mg/l $CaCO_3$
Chronic: WER· [0.997 · e^{0.8460[ln hardness]+0.0584}] = 16 ug/l at 25 mg/l $CaCO_3$

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the changes to subsection 15A NCAC 02B .0211(11) Table A for acute and chronic nickel criteria protect North Carolina's aquatic life use and, therefore, are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. These changes are approved by the EPA under CWA section 303(c).

Silver

In this revision, North Carolina is adding an acute criterion for silver that is derived based on the EPA's national recommended hardness based equation:

Acute: WER· [0.85 · e^{1.72[ln hardness]-6.59}] = 30 ug/l at 25 mg/l $CaCO_3$

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the change to subsection 15A NCAC 02B .0211(11) Table A for acute silver criteria

protects North Carolina's aquatic life use and, therefore, is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, this change is approved by the EPA under CWA section 303(c).

Zinc

North Carolina has revised its previous water quality standard for zinc from a chronic value of 50 ug/l to the dissolved acute and chronic values expressed by the EPA's national recommended hardness dependent equations:

Acute: WER· [0.978 · e^{0.8473[ln hardness]+0.884}] = 36 ug/l calculated at 25 mg/l $CaCO_3$
Chronic: WER· [0.978 · e^{0.8473[ln hardness]+0.884}] = 36 ug/l calculated at 25 mg/l $CaCO_3$

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the zinc criteria in subsection 15A NCAC 02B .0211(11) Table A protect North Carolina's aquatic life use and, therefore, are consistent with section 303(c) of the CWA and 40 C.F.R. section 131.11(b)(1)(i). These changes are approved by the EPA under section 303(c) for all purposes under the CWA.

Using the equations above for hardness dependent metals (other than cadmium), EPA compared North Carolina's new metals criteria to the EPA's recommended criteria, calculating all values for a default hardness of 25 mg $CaCO_3$ to facilitate comparison. Each individual criteria adopted by North Carolina is at least as stringent as the EPA's national recommendations.[2]

Comparison of Table A Hardness Dependent Metals with EPA's National Recommended Criteria			
Metal (all values are dissolved)	**NCDWR's Criteria calculated at a hardness of 25 (ug/l)**	**EPA's National Recommended criteria calculated at a hardness of 25 (ug/l)**	**EPA's Most Current Published Update**
Chromium III (acute)	180	183.07	EPA 1995
Chromium III (chronic)	24	23.81	EPA 1999
Copper (acute)	3.6	3.6	EPA 2007
Copper (chronic)	2.7	2.7	EPA 1999
Lead (acute)	14	13.88	EPA 1984
Lead (chronic)	0.54	0.54	
Nickel (acute)	140	144.92	EPA 1999
Nickel (chronic)	16	16	
Silver (acute)	0.30	0.3	EPA 1980
Zinc (acute)	36	36	EPA 1999
Zinc (chronic)	36	36	

[2] The slight differences in criteria levels shown in the chart is due to how the State and the EPA rounded results of calculations.

Hardness Based Equations for Cadmium

Prior to this revision, North Carolina had a chronic value of 0.4 ug/l for total cadmium in trout waters and 2.0 ug/l for total cadmium in non-trout waters found at 15A NCAC 02B .0211(3)(l)(iii). The revised water quality criteria for acute and chronic cadmium have been moved alphabetically into 15A NCAC 02B .0211 Table A. The new criteria are hardness based equations for the calculation of acute dissolved cadmium for non-trout and trout waters and a single chronic value for all waters.
The equations that North Carolina adopted did not use the variables that are recommended in the EPA's most recent recommendations resulting in criteria that differ from the national recommended criteria as indicated in the Table below.

Comparison of Table A Hardness Dependent Metals with EPA's National Recommended Criteria for Cadmium				
Metal (all values are dissolved)	**Previous NCDWR criteria**	**NCDWR's Criteria calculated at a hardness of 25 (ug/l)**	**EPA's National Recommended criteria calculated at a hardness of 25 (ug/l)**	**Most current EPA National Recommended Value**
Cadmium (acute)	--	**0.82**	0.52	EPA 2001
Cadmium (acute, trout waters)	--	0.51	0.52	
Cadmium (chronic)	0.4 ug/l trout waters 2.0 ug/l non-trout waters.	**0.15**	0.09	

The EPA's national recommended water quality criteria for cadmium were published in 2001 using the following equations:

$$\text{CMC (dissolved)} = (\text{CF})\ \exp\{\mathbf{m_A}\ [\ln(\text{hardness})] + \mathbf{b_A}\}$$
$$\text{CCC (dissolved)} = (\text{CF})\ \exp\{\mathbf{m_C}\ [\ln(\text{hardness})] + \mathbf{b_C}\}$$

The DWR modified those equations to use different variables from the recommended hardness criteria as shown in table below:

Hardness-based Equation Variable	**m_A (acute)**	**b_A (acute)**	**m_C (chronic)**	**b_C (chronic)**
EPA Recommended Variables for calculating cadmium criteria	1.0166	-3.924	0.7409	-4.719
Variables used by NC to calculate criteria	0.9151 (non-trout) 0.9151 (trout)	-3.1485 (non-trout) 3.6236 (trout)	0.7998	-4.4451

These modifications result in the following adopted equations for cadmium with the criteria shown calculated at 25 mg/l $CaCO_3$.

Acute: WER· [{1.136672-[ln hardness](0.041838)} · e^{0.9151 [ln hardness]-3.1485}] = 0.82
Acute (trout): WER· [{1.136672-[ln hardness](0.041838)} · e^{0.9151[ln hardness]-3.6236}] = 0.51
Chronic: WER· [1.101672-[ln hardness](0.041838)} · e^{0.7998[ln hardness]-4.4451}] = 0.15

North Carolina used the option under Section 131.11(b)(ii) that allows states to establish numerical standards by modifying Section 304(a) Guidance to reflect site-specific conditions. According to the DWR's justification, the State relied upon a study by Chadwick Ecological Consultants (CEC) that calculated alternative cold and warm water acute and chronic criteria for cadmium. Those values were adopted by the State of Colorado (effective date 1/1/2007) and approved by EPA Region 8. In Region 8's approval of those criteria, Region 8 stated:

> *EPA has reviewed the technical information supporting the revised table values. The Region notes that CEC applied the "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their Uses" (EPA, 1985) in deriving the revised table values. The Region also notes that the differences between the CEC-derived table values and the CWA Section 304(a) criteria are partly attributable to CEC's use of a larger, more current database. Finally, the Region notes that the differences between the CEC-derived table values and the CWA Section 304(a) criteria are small relative to the uncertainties in both analyses. Accordingly, the Region has determined that: (I) the revised acute and chronic table value standards for cadmium were derived using scientifically-defensible methods, (2) the resulting table values generally are appropriate for the protection of Colorado's aquatic life classifications, and (3) the revisions are consistent with federal requirements at 40 C.F.R. 131.11. Accordingly, the revisions are approved today, subject to ESA consultation.*

Region 4 has determined that the CEC report relied on by the State represents the latest compilation of cadmium toxicity data available, consistent with Region 8's determination cited above. Region 4's findings are consistent with the scientific findings of Region 8 cited above and, additionally, Region 4 finds that the resulting values derived by North Carolina protect the State's aquatic life classifications. Region 4 concludes that the changes to subsection 15A NCAC 02B .0211(11)(d) to add the revised criteria in Table A for cadmium are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, these changes are approved by the EPA under CWA section 303(c) for all purposes under the Act.

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

A new subsection regarding monitoring for metals was added as follows:

> *(11) Metals:*
>
> *(e) Compliance with acute instream metals standards shall only be evaluated using an average of two or more samples collected within one hour. Compliance with chronic instream metals standards shall only be evaluated using averages of a minimum of four samples taken on 5 consecutive days, or as a 96-hour average;*

After review of this new provision, the EPA has concluded that it is not a new or revised water quality standard and is therefore taking no action on this provision. This provision does not establish or change a level of protection related to the magnitude, duration, or frequency of water quality criteria nor establish designated uses or antidegradation requirements. Rather, this provision describes the sufficiency or reliability of information necessary for the State to decide whether a water attains or does not attain a water quality standard for purposes of establishing TMDLs under section 303(d)(1)(A) of the Act. As such, this provision is not a water quality standard but is a methodology under section 303(d) of the Act. See 40 C.F.R. § 130.7(b)(6). While this provision was not reviewed by EPA as a new or revised water quality standard, it may be considered by the EPA in reviewing lists of impaired waters submitted by the State under Section 303(d) of the CWA. The decision to not review this provision in no way confers agreement with the use of the provision for making attainment decisions.

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

A new subsection relating to biological confirmation for the assessment of metals was added as follows:

> *(f) Metals criteria shall be used for proactive environmental management. An instream exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the instream aquatic community without biological confirmation and a comparison of all available monitoring data and applicable water quality standards. This weight of evidence evaluation shall take into account data quality and the overall confidence in how representative the sampling is of conditions in the waterbody segment before an assessment of aquatic life use attainment, or non-attainment, shall be made by the Division. Recognizing the synergistic and antagonistic complexities of other water quality variables on the actual toxicity of metals, with the exception of mercury and selenium, biological monitoring will be used to validate, by direct measurement, whether or not the aquatic life use is supported;*

As the EPA has advised the DWR on multiple occasions, including directly addressing this provision in writing on multiple occasions, the EPA has a long history of not supporting biological confirmation for toxics assessment.[3] The 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 as detailed further below.

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 national recommended criteria. These revisions are significant because chemical specific numeric criteria are a vital component of the CWA program for protection of the nation's waters for both assessment and permitting. The EPA has stated 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 that "Basing regulatory and management decisions on chemical assessment of water quality is an important and proven aspect of water quality assessment and protection" Water Quality Standards Regulation; Proposed Rule 63 Fed. Reg. (page 36,796) (July 7, 1998). Therefore, once

[3] See Appendix B, letters from the EPA to DWR dated August 10th, 2010, and January 3, 2014 and emails to DWR on August 22, 2014 and August 25, 2014.

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 contrast, the 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.) 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. 63 Fed. Register page 36,795.

The EPA has discussed 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" See 63 Fed. Reg. (page 36,801).

Section 101(a) of the CWA directly states the goal 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 C.F.R. 131.11 provides that criteria for toxics be established at levels that protect designated uses, that is, at levels that *prevent* impairment of waters. It is not protective to defer action until biological impairment has already occurred.

Furthermore, the EPA notes that DWR has adopted as part of this triennial review the use of the dissolved fraction of the toxics criteria, the hardness based equation for the hardness dependent metals and the BLM for copper criteria. Each of these provisions were done to more accurately derive and use criteria that are reflective of the biologically available fraction of the metals.

Finally, the US Fish and Wildlife Service (FWS) commented[4] on this provision during the public comment period. In addition to all of the EPA's stated objections, the FWS pointed out an additional flaw in this provision – the biological monitoring conducted by DWR does not include testing for those species that are most sensitive to toxic effects, including mussels, cladocerons and snails. Therefore North Carolina's biological monitoring is not representative of the impacts to all species that may be the most sensitive to the toxics subject to the new metals criteria adopted by the State during this triennial review.

The EPA has determined that the changes to subsection 15A NCAC 02B .0211(11)(f) do not protect North Carolina's aquatic life use and, therefore, are not consistent with the CWA section 303(c) or its implementing regulations found at 40 C.F.R. section 131.11. Therefore, these changes are disapproved by the EPA under CWA section 303(c). With today's disapproval of this section, the new water quality criteria for metals as approved shall be used for all purposes under the Act, including for purposes of monitoring and assessment. The EPA recommends that the State delete the entire biological confirmation provision during the next triennial review.

[4] See Appendix C. letters from the US FWS to NC DENR dated, January 3, 2014, and August 22, 2014.

15A NCAC 02B .0211 Fresh Surface Water Quality Standards for Class C Waters
Subparagraph 13 - 20

The following parameters were moved in order to alphabetize the state water quality criteria:

(13) Pesticides:
- *(a) Aldrin: 0.002 ug/l;*
- *(b) Chlordane: 0.004 ug/l;*
- *(c) DDT: 0.001 ug/l;*
- *(d) Demeton: 0.1 ug/l;*
- *(e) Dieldrin: 0.002 ug/l;*
- *(f) Endosulfan: 0.05 ug/l;*
- *(g) Endrin: 0.002 ug/l;*
- *(h) Guthion: 0.01 ug/l;*
- *(i) Heptachlor: 0.004 ug/l;*
- *(j) Lindane: 0.01 ug/l;*
- *(k) Methoxychlor: 0.03 ug/l;*
- *(l) Mirex: 0.001 ug/l;*
- *(m) Parathion: 0.013 [~~ug/l;~~] ug/l; and*
- *(n) Toxaphene: 0.0002 ug/l;*

~~(g)~~(14) pH: shall be normal for the waters in the area, which ~~generally shall~~ range between 6.0 and 9.0 except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions;

~~(h)~~(15) Phenolic compounds: only such levels as shall not result in fishflesh- tainting or impairment of other best usage;

(16) Polychlorinated biphenyls (total of all PCBs and congeners identified): 0.001 ug/l;

~~(i)~~(17) Radioactive substances:
- *~~(i)~~(a) Combined radium-226 and radium-228: the ~~maximum~~ average annual activity level (based on at least one sample collected per quarter)~~four samples collected quarterly)~~ for combined radium226 and radium228 shall not exceed five -picoCuries- per liter;*
- *~~(ii)~~(b) Alpha Emitters: the average annual gross alpha particle activity (including radium226, but excluding radon and uranium) shall not exceed 15 picoCuries- per liter;*
- *~~(iii)~~(c) Beta Emitters: the ~~maximum~~ average annual activity level (based on at least one sample collected per quarter) ~~four samples, collected quarterly)~~ for strontium90 shall not exceed eight picoCuries- per liter; nor shall the average annual gross beta particle activity (excluding potassium-40 and other naturally occurring ~~radio-nuclides)~~ radionuclides) exceed 50 picoCuries per liter; nor shall the ~~maximum~~ average annual activity level for tritium exceed 20,000 picoCuries per liter;*

~~(j)~~(18) Temperature: not to exceed 2.8 degrees C (5.04 degrees F) above the natural water temperature, and in no case to exceed 29 degrees C (84.2 degrees F) for mountain and upper piedmont waters and 32 degrees C (89.6 degrees F) for lower piedmont and coastal plain Waters; the temperature for trout waters shall not be increased by more than 0.5 degrees C (0.9 degrees F) due to the discharge of heated liquids, but in no case to exceed 20 degrees C (68 degrees F);

(19) Toluene: 11 ug/l or 0.36 ug/l in trout classified waters;

(20) Trialkyltin compounds: 0.07 ug/l expressed as tributyltin;

~~(k)~~(21) *Turbidity: the turbidity in the receiving water shall not exceed 50 Nephelometric Turbidity Units (NTU) in streams not designated as trout waters and 10 NTU in streams,* ~~*lakes*~~ *lakes, or reservoirs designated as trout waters; for lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTU; if turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased. Compliance with this turbidity standard can be met when land management activities employ Best Management Practices (BMPs) [as defined by Rule .0202 of this Section] recommended by the Designated Nonpoint Source Agency [as defined by Rule .0202 of this Section]. BMPs* ~~*must*~~ *shall be in full compliance with all specifications governing the proper design, installation,* ~~*operation*~~ *operation, and maintenance of such BMPs;*

The EPA has reviewed the revision and since the numeric values of the above listed criteria did not change, they are non-substantive. Therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

15A NCAC 02B .0211 Fresh Surface Water Quality Standards for Class C Waters
Subparagraph (l)

The following language was removed from previously existing 15A NCAC 02B .0211(3)(l) where it had served as the introductory language to all metals criteria as well as criteria for other toxics (chlorine, cyanide flourides, pesticides, polychlorinated biphenyls, toluene and trialkyltin compounds). After alphabetizing the criteria, the metals and toxics criteria are no longer together in one section, therefore, the State removed the following introductory language.

~~*(l) Toxic substances: numerical water quality standards (maximum permissible levels) for the protection of human health applicable to all fresh surface waters are in Rule .0208 of this Section. Numerical water quality standards (maximum permissible levels) to protect aquatic life applicable to all fresh surface waters:*~~

The "General" paragraph listed at the beginning of 15A NCAC 02B .0211 now serves as the introductory paragraph to this section which applies to all metals and toxics criteria. The "General" paragraph states that the WQS "…for all fresh surface waters are the basic standards applicable to Class C waters." 15A NCAC 02B .0101 General Procedures provides a definition for Class C waters which includes that Class C waters are "*freshwaters protected for secondary recreation, fishing, aquatic life including propagation and survival, and wildlife. All freshwaters shall be classified to protect these uses at a minimum.*" EPA has reviewed this change and determined that it is non-substantive. The EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

The following sections were removed from this subparagraph as follows:

~~*(i) Arsenic: 50 ug/l;*~~
~~*(ii) Beryllium: 6.5 ug/l;*~~
~~*(iii) Cadmium: 0.4 ug/l for trout waters and 2.0 ug/l for nontrout waters; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable*~~

~~*metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;*~~

~~*(iv) Chlorine, total residual: 17 ug/l;*~~

~~*(v) Chromium, total recoverable: 50 ug/l;*~~

~~*(vi) Cyanide, 5.0 ug/l, unless site-specific criteria are developed based upon the aquatic life at the site utilizing The Recalculation Procedure in Appendix B of Appendix L in the Environmental Protection Agency's Water Quality Standards Handbook hereby incorporated by reference including any subsequent amendments;*~~

~~*(vii) Fluorides: 1.8 mg/l;*~~

~~*(viii) Lead, total recoverable: 25 ug/l, collection of data on sources, transport and fate of lead shall be required as part of the toxicity reduction evaluation for dischargers who are out of compliance with whole effluent toxicity testing requirements and the concentration of lead in the effluent is concomitantly determined to exceed an instream level of 3.1 ug/l from the discharge;*~~

~~*(ix) Mercury: 0.012 ug/l;*~~

~~*(x) Nickel: 88 ug/l, attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;*~~

~~*(xi) Pesticides:*~~

~~*(A) Aldrin: 0.002 ug/l;*~~

~~*(B) Chlordane: 0.004 ug/l;*~~

~~*(C) DDT: 0.001 ug/l;*~~

~~*(D) Demeton: 0.1 ug/l;*~~

~~*(E) Dieldrin: 0.002 ug/l;*~~

~~*(F) Endosulfan: 0.05 ug/l;*~~

~~*(G) Endrin: 0.002 ug/l;*~~

~~*(H) Guthion: 0.01 ug/l;*~~

~~*(I) Heptachlor: 0.004 ug/l;*~~

~~*(J) Lindane: 0.01 ug/l;*~~

~~*(K) Methoxychlor: 0.03 ug/l;*~~

~~*(L) Mirex: 0.001 ug/l;*~~
~~*(M) Parathion: 0.013 ug/l;*~~
~~*(N) Toxaphene: 0.0002 ug/l;*~~
~~*(xii) Polychlorinated biphenyls: (total of all PCBs and congeners identified) 0.001 ug/l;*~~
~~*(xiii) Selenium: 5 ug/l;*~~
~~*(xiv) Toluene: 11 ug/l or 0.36 ug/l in trout waters;*~~
~~*(xv) Trialkyltin compounds: 0.07 ug/l expressed as tributyltin;*~~

The struck provisions for arsenic, beryllium, cadmium, chromium, lead and nickel have been replaced by new criteria as noted above. The remaining numeric values in this section were moved to other sections as previously noted. As the criteria are not changed, the EPA determined that these changes are non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

15A NCAC 02B .0211(22) Fresh Surface Water Quality Standards for Class C Waters

North Carolina has had a provision in place to allow the use of action levels for copper, iron, silver, zinc and chloride rather than using water quality criteria for all purposes under the CWA. Under North Carolina's WQS, action levels are numerical water quality standards except for NPDES permitting. For NPDES permitting purposes, a facility would need reasonable potential to exceed a water quality criteria (or in this case, the action level), and must fail a Whole Effluent Toxicity (WET) test prior to receiving a limit in its NPDES permit. If a facility had reasonable potential for a parameter, such as copper or zinc, but passed a WET test, the facility would not be required to limit or control the parameter in its permit. Therefore, a facility may cause or contribute to an exceedance of an action level parameter and pass a WET test thereby not controlling for the action level parameters in its permit.

A subsection relating to action levels was revised to change the values for copper, silver and zinc, remove iron and remove the language that states that action levels are considered water quality standards. Each of the revisions are addressed individually below:

~~(4)~~(22) Action Levels for Toxic ~~Substances:~~ Substances Applicable to NPDES Permits:
(a) ~~Copper: 7 ug/l;~~Copper, dissolved, chronic: 2.7 ug/l;
~~(b) Iron: 1.0 mg/l;~~
(c) ~~Silver:~~Silver, dissolved, chronic: 0.06 ug/l;
(d) ~~Zinc:~~Zinc, dissolved, chronic: ~~50 ug/l;~~36 [~~ug/l;~~] ug/l; and
(e) Chloride: 230 mg/l;
The hardness-dependent freshwater action levels for ~~Copper and Zinc,~~ copper and zinc, provided here for illustrative purposes, corresponds to a hardness of 25 mg/l. Copper and [~~Zinc~~] zinc action level values for other instream hardness values shall be calculated per the chronic equations specified in Item (11) of this Rule and in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals. If the ~~Action Levels~~ action levels for any of the substances listed in this ~~Subparagraph~~Item (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 specified ~~low flow~~ 7Q10 criterion for toxic ~~substances (Rule .0206 in this Section),~~ 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~~ action levels are listed in this ~~Subparagraph~~Item shall be limited as appropriate in the NPDES permit ~~based on the Action Levels listed in this Subparagraph~~ if sufficient information (to be determined for metals by measurements of that portion of the dissolved instream concentration of the ~~Action Levels~~ action levels 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. ~~NPDES permit limits may be based on translation of the toxic form to total recoverable metals. Studies used to determine the toxic form or translators must be designed according to "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators.~~

~~For purposes other than consideration of NPDES permitting of point source discharges as described in this Subparagraph, the Action Levels in this Rule, as measured by an appropriate analytical technique, per 15A NCAC 02B .0103(a), shall be considered as numerical instream water quality standards.~~

Removal of the Action Level for Iron

North Carolina has removed the action level for iron and has not replaced that value with a new or revised numeric water quality criterion. DWR proposed this revision and worked with the EPA in the scientific review and development of a justification that demonstrates that iron occurs at naturally high levels in some areas of the state, often above the value of 1 mg/l that is being removed. The EPA Region 4 conducted an independent evaluation of the State's findings and supports the removal of the iron criterion because iron occurs at naturally high levels. DWR has agreed that in order to protect the designated use for any potential impairment determined to be caused by iron (for instance, from mining operations or increased iron in the tailwaters below dams), the State will rely upon the existing narrative WQS at 15A NCAC .0211(12), "[o]ils, deleterious substances, colored, or other wastes: only such amounts as shall not render the waters injurious to public health, secondary recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses."

The EPA has determined that the change to subsection 15A NCAC 02B .0211(22) to remove the iron criterion protects North Carolina's aquatic life use and, therefore, is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. The change is approved by the EPA under CWA section 303(c) for all purposes under the Act.

Revision to Copper, Silver and Zinc as an Action Level

As the EPA has advised the DWR on multiple occasions, the EPA does not support North Carolina's continued use of action levels, and directly addressed this provision in multiple letters to DWR.[5] The EPA reiterates its previous comments. The EPA's section 304(a) criteria were developed to take into account site specific factors such as solubility and chemical form in determining the biologically available fraction

[5] See Appendix B. EPA letters to DWR dated April 30, 2009, August 20, 2010, and January 3, 2014 and emails to DWR on August 22, 2014 and August 25, 2014.

available for uptake by biological organisms and, therefore, the fraction most likely to cause a toxic effect. The use of the dissolved fraction and 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. See 65 Fed. Reg. (page 31,692). North Carolina's adoption of the hardness dependent equations negates the need for the continued use of action levels as the criteria equations address issues related to protection of downstream waters and brings North Carolina in-line with the criteria used in surrounding states. 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, such as WERs, under 15A NCAC 02B .0211(11)(b).

North Carolina's action level requirements, set forth above, provide that NPDES limits shall 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 C.F.R. 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 if it could *contribute* to a water quality standards excursion. This requirement is significant because there may often be multiple sources of pollutants in receiving waters, from non-point source run-off, from point sources and from storm water. No one facility or source may be the sole cause of the impairment, but rather multiple discharges contribute to the toxicity and excursion of water quality standards. That is, a facility could contribute to an impairment while also passing a WET test. Therefore, when a point source discharges zinc levels with a reasonable potential to cause or contribute to exceedance of the State's zinc criteria, the permit must include effluent limitations as stringent as necessary to achieve the WQS.

The Region recognizes that North Carolina has a strong WET testing program. 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. See 63 Fed. Reg. (page 36,768). 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 EPA has explained that states can reconcile biological data, such as WET, with 'reasonable potential' analysis and concludes "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." See 63 Fed. Reg. (page 36,802). If needed, an effort should be made to refine the applicable criteria, through WERs and other tools, to ensure that appropriate criteria be developed for each facility. It is not protective, however, and is not consistent with EPA's permitting regulations, to defer permit limitations once there is reasonable potential to exceed a water quality criteria.

The State now has approved copper, silver and zinc criteria applicable for all purposes under the CWA in 15A NCAC 02B .0211(11) in place of the action levels, which were applicable only for NPDES permitting. The EPA concludes that the changes to subsection 15A NCAC 02B .0211(22) do not protect North Carolina's aquatic life use and, therefore, are not consistent with the CWA section 303(c) or its implementing regulations found at 40 C.F.R. section 131.11. The changes to (22)(a), (c), and (d) and the added language to the narrative following (22)(e) are disapproved by the EPA under CWA section 303(c). The deletions of the narrative language below (22)(e) at the end of the provision are approved by the EPA under CWA section 303(c) as consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. The EPA notes in disapproving this section that no new standards are required to be promulgated in its place

and the new water quality criteria for metals as approved in 15A NCAC 02B .0211(11) shall be used for all purposes under the Act.

The EPA's disapproval of the revisions to the action level provision means that the previously approved action levels are applicable WQS under the CWA, per the Alaska Rule.[6] However, the State's newly adopted and approved metals criteria are also applicable WQS under the CWA and, therefore, must also be implemented in all CWA programs, including the NPDES permitting program. The EPA's permitting regulations at 40 C.F.R. 122.44(d)(1)(vii)(A) require that effluent limitations be derived from and comply with all applicable water quality standards. Where the State has two applicable water quality standards addressing the same or similar parameters, permit limitations based on those WQS must protect the more stringent criteria. Based on EPA's understanding of the permitting provisions in North Carolina's action level section, effluent limitations derived to comply with the new metals criteria in 15A NCAC 02B .0211(11) will likely be more stringent than limitations derived to comply with the action level provision. The EPA recommends that the State delete the entire action level section during the next triennial review.

Action Level for Chloride

Chloride remains the only parameter in the action levels provision for which there is not an associated criterion in Table A or elsewhere in the State water quality standards. Prior to this revision, the following language applied to the action levels,

> *"For purposes other than consideration of NPDES permitting of point source discharges as described in this Subparagraph, the Action Levels in this Rule, as measured by an appropriate analytical technique, per 15A NCAC 02B .0103(a), shall be considered as numerical instream water quality standards."*

This language, which was removed from the revised action level provision, was previously added by the State to clarify that the State intended the action level values to be standards for all other CWA purposes besides permitting. In this triennial review, the State adopted numeric water quality criteria for all purposes under the CWA, as water quality standards. The adoption of numeric criteria for all other action level parameters clarifies their use as WQS. The numeric value for chloride still remains and the EPA anticipates that the State will continue using the chloride action level as a WQS for all other purposes under the CWA. The EPA's position is that the chloride action level is still a WQS for all other purposes than permitting even with the sentence above deleted. The EPA notes that with this section 303(c) decision, the only remaining action level is chloride. Therefore, the EPA strongly recommends that North Carolina adopt chloride as a numeric water quality criterion for all purposes under the CWA and remove the Action Level section from the water quality standards.

[6] The Alaska Rule states that water quality standards adopted by states and authorized tribes on or after May 30, 2000 must be approved by the EPA before they can be used as the basis for actions, such as establishing water quality-based effluent limitations or TMDLs, under the CWA.

15A NCAC 02B .0212 Fresh Surface Water Quality Standards for Class WS-I Waters
15A NCAC 02B .0214 Fresh Surface Water Quality Standards for Class WS-II Waters
15A NCAC 02B .0215 Fresh Surface Water Quality Standards for Class WS-III Waters
15A NCAC 02B .0216 Fresh Surface Water Quality Standards for Class WS-IV Waters
15A NCAC 02B .0218 Fresh Surface Water Quality Standards for Class WS-V Waters

Section (h) of each of the five WS designated use classifications was revised as follows:

(h) Toxic and other deleterious substances:
(i) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for noncarcinogens- in Class WS-V waters:
(A) Barium: 1.0 mg/l;
(B) Chloride: 250 mg/l;
~~(C) Manganese: 200 ug/l;~~
~~(D)~~(C) Nickel: 25 ug/l;
~~(E)~~(D) Nitrate nitrogen: 10 mg/l;
~~(F)~~(E) 2,4-D: ~~100 ug/l;~~70 ug/l;

Manganese

The DWR conducted a review of the effects of manganese on human health and taste and odor (organoleptic effects) in WS waters. As part of that evaluation, the State reviewed stream and groundwater data on how often manganese occurs in State waters. The DWR initiated this review because the State's monitoring data often showed levels of manganese that were higher than the State's criterion of 200 ug/l. The results of the review found studies that show high concentrations of naturally occurring manganese in both state surface water and groundwater. For example, a United States Geological Survey (USGS 1992) study indicated concentrations of manganese ranged from "less than 10 to 380 ug/l…" and that "…many mean concentrations of total manganese in stream water exceeded recommended limits…" A second USGS paper found a range of 30-640 ug/l manganese in the French Broad River and noted that the "geology of the region is the primary cause for these high…manganese concentrations." (USGS 1982)

In considering whether or not to remove the ambient water quality criterion for manganese from WS waters, the State reviewed the EPA recommendations both under the CWA and the Safe Drinking Water Act (SDWA). The EPA's currently recommended criterion for manganese under the CWA in freshwater is 50 ug/L. This value is not based on toxic effects, but rather is intended to minimize objectionable quality such as laundry stains and objectionable tastes in beverages (EPA 1986a). North Carolina's WS designated waters are considered safe for drinking, culinary, and food-processing purposes "following treatment required by the Division of Environmental Health" and "shall meet the Maximum Contaminant Level concentrations…which are specified in the national drinking water regulations and in the North Carolina Rules Governing Public Water Supplies, 15A NCAC 18C .1500." There is currently no recommended Maximum Contaminant Level (MCL) for manganese in treated drinking water under the SDWA, however, there is a Secondary MCL of 50 ug/L, established as a guideline for public water systems in managing drinking water systems for taste and odor. The DWR's review concluded that the Secondary MCL, "could be used by water suppliers, if ever warranted, to protect users from objectionable taste and/or staining of laundry." The EPA notes that a health advisory was published for manganese in drinking water of 50 mg/L, as well, which should also be evaluated by North Carolina (EPA 2004). The EPA has noted that it may update the currently recommended ambient water quality criterion for

freshwater manganese at some time in the future. NC has stated that they will review and consider the new recommendations once published.

After reviewing the EPA's recommendations under the CWA and the SDWA and its own data on manganese, the State concluded that there was "no evidence to conclude that discharges of manganese will impact any designed uses of NC's waters." In addition, the DWR has indicated that existing narrative criteria will be used to protect water supplies from any deleterious effects from manganese. The applicable criterion at 15A NCAC 02B .0211(12) states,

> "Oils, deleterious substances, colored, or other wastes: only such amounts as shall not render the waters injurious to public health, secondary recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality or impair the water for any designated uses..."

The EPA has determined that North Carolina's WS uses will continue to be protected considering the changes to subsection 15A NCAC 02B .0212(h), 15A NCAC 02B .0214(h), 15A NCAC 02B .0215(h), 15A NCAC 02B .0216(h) and 15A NCAC 02B .0218(h) to remove the numeric criteria for manganese, since the State has committed to use the narrative criterion at 15A NCAC 02B .0211(12) as needed to address deleterious impacts of manganese. Therefore, these changes are consistent with the CWA section 303(c) and the implementing regulations at 40 C.F.R. section 131.11 and are approved by the EPA under CWA section 303(c).

2, 4 Dichlorophenoxyacetic acid (2, 4 D)

The DWR revised its 2, 4 D criterion for WS uses to update it with the most recently published reference dose information from the EPA's Integrated Risk Information System. This resulted in a revision of the criterion from 100 ug/l to 70 ug/l.

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that the changes to subsection 15A NCAC 02B .0212(h), 15A NCAC 02B .0214(h), 15A NCAC 02B .0215(h), 15A NCAC 02B .0216(h) and 15A NCAC 02B .0218(h) to update the criterion for 2, 4 D will protect North Carolina's WS uses and, therefore, are consistent with the CWA section 303(c) and the implementing regulations at 40 C.F.R. section 131.11. These changes are approved by the EPA under CWA section 303(c).

Many portions of this section were also modified for clarification, grammar, and reorganization. The EPA has reviewed these revisions and determined that they are non-substantive and, therefore, the EPA approves the revisions as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of these non-substantive changes does not re-open the EPA's prior approval of the underlying substantive WQSs.

15A NCAC 02B .0220 Tidal Salt Water Quality Standards for Class SC Waters
General paragraph and Subparagraphs (1) through (6)

The following revisions were made to the General opening paragraph and Sections (1) through (9) of *Section 15A NCAC 02B .0220.*

> *General. The water quality standards for all tidal salt waters shall be the basic standards applicable to Class SC waters. Additional and more stringent standards applicable to other specific tidal salt water classifications are specified in Rules .0221 and .0222 of this Section.*

Action Levels, for purposes of National Pollutant Discharge Elimination System (NPDES) permitting, are specified in Item (20) of this Rule.

The new sentence added as the final sentence to the general paragraph references the use of action levels. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs. For the substantive discussion of the EPA's decision regarding revisions to action levels in tidal salt waters, see page 42.

The following subparagraphs were renumbered for alphanumeric reordering only:

(3) Chlorophyll a
(5) Dissolved oxygen
(7) Floating solids, settleable solids or sludge deposits
(8) Gases, total dissolved
(12) pH
(13) Phenolic compounds
(15) Radioactive substances
(16) Salinity
(17) Temperature

The EPA has reviewed these changes and determined that they are non-substantive and therefore, the EPA approves these revisions as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that this approval of these non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

The following sentence came before all of the criteria in the old format prior to the alphabetical reorganization of the WQS.

~~*(3) Quality standards applicable to all tidal salt waters:*~~

The State indicated that this sentence was found to be redundant with the information in the General paragraph of this rule. The General paragraph listed just above this states that "*The water quality standards for all tidal salt waters shall be the basic standards applicable to Class SC waters.*" 15A NCAC 02B .0101 General Procedures provides a definition for Class SC waters which includes that "*Class SC: saltwaters protected for secondary recreation, fishing, aquatic life including propagation and survival, and wildlife. All saltwaters shall be classified to protect these uses at a minimum.*" The removal of this sentence does not change or revise the state WQS. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

New subparagraph (4) was created:

(4) Cyanide: 1 ug/l;

The new paragraph moves cyanide from its previous location at Rule .0220(m)(iv) and retains the same numeric value. Therefore, this revision is a non-substantive change to WQSs and the EPA approves the

revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

New subparagraph (6) was created to move the bacteria criteria into alphabetical order. This section also includes the strike-out as noted below. The state indicated that this language was found to be redundant and not needed. The EPA concurs that all provisions in these Rules are in accordance with the Federal Water Pollution Control Act and that the specific reference in this paragraph is not a substantive change to the criteria. The EPA has reviewed this change and determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

(6) *Enterococcus, including Enterococcus faecalis, Enterococcus faecium, Enterococcus avium and Enterococcus gallinarium: not to exceed a geometric mean of 35 enterococci per 100 ml based upon a minimum of five samples within any consecutive 30 days. [~~In accordance with 33 U.S.C. 1313 (Federal Water Pollution Control Act) for~~]For purposes of beach monitoring and notification, "Coastal Recreational Waters Monitoring, Evaluation and Notification" regulations (15A NCAC 18A .3400), available free of charge at: http://www.ncoah.com/ , are hereby incorporated by reference including any subsequent amendments;*

~~(e) Enterococcus, including Enterococcus faecalis, Enterococcus faecium, Enterococcus avium and Enterococcus gallinarium: not to exceed a geometric mean of 35 enterococci per 100 ml based upon a minimum of five samples within any consecutive 30 days. In accordance with 33 U.S.C. 1313 (Federal Water Pollution Control Act) for purposes of beach monitoring and notification, "Coastal Recreational Waters Monitoring, Evaluation and Notification" regulations (15A NCAC 18A .3400) are hereby incorporated by reference including any subsequent amendments;~~

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

(9) *Metals:*

(a) *With the exception of mercury and selenium, tidal salt water quality standards for metals shall be based upon measurement of the dissolved fraction of the metals. Mercury and selenium shall be based upon measurement of the total recoverable metal;*

The EPA's most current national recommended water quality criteria for protection of aquatic life includes the recommendation that fresh and salt water criteria for metals (including specifically arsenic, cadmium, chromium III, chromium VI, copper, lead, nickel, silver and zinc) be expressed in terms of the dissolved metal in the water column. In 1993, the EPA provided additional guidance on the use of the dissolved fraction of metals stating that, "[t]he use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal" (EPA 1993).

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that this change to subsection 15A NCAC 02B .0220(9)(a) protects North Carolina's aquatic

life use and, therefore, is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. This change is approved by the EPA under CWA section 303(c).

The DWR is not currently adopting updated salt water criteria for mercury or selenium, leaving in place the previous values which are based on the total recoverable metal in the second sentence of paragraph (a). Therefore, the reference to those parameters is a non-substantive change to standards and the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

The following new provision was added in subparagraph (9)(b):

> *(b) Compliance with acute instream metals standards shall only be evaluated using an average of two or more samples collected within one hour. 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;*

After review of this new provision, the EPA has concluded that it is not a new or revised water quality standard and is therefore taking no action on this provision. This provision does not establish or change a level of protection related to the magnitude, duration, or frequency of water quality criteria nor establish designated uses. Rather, this provision describes the sufficiency or reliability of information necessary for the State to decide whether a water attains or does not attain a water quality standard for purposes of establishing TMDLs under section 303(d)(1)(A) of the Act. As such, this provision is not a water quality standard but is a methodology under section 303(d) of the Act. See 40 C.F.R. § 130.7(b)(6). While the provision was not reviewed by EPA as a new or revised water quality standard, it may be considered by EPA in reviewing lists of impaired waters submitted by the State under Section 303(d) of the CWA. The decision to not review this provision in no way confers agreement with the use of the provision for making attainment decisions.

The following new subparagraph was added under (9)(c).

> *(c) Metals criteria shall be used for proactive environmental management. An instream exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the aquatic community without biological confirmation and a comparison of all available monitoring data and applicable water quality standards. This weight of evidence evaluation shall take into account data quality and the overall confidence in how representative the sampling is of conditions in the waterbody segment before an assessment of aquatic life use attainment, or non-attainment, is made by the Division. Recognizing the synergistic and antagonistic complexities of other water quality variables on the actual toxicity of metals, with the exception of mercury and selenium, biological monitoring shall be used to validate, by direct measurement, whether or not the aquatic life use is supported.*

As detailed more fully under the disapproval of similar language for freshwater under 15A NCAC .02B .0211(f), the EPA has advised the DWR on multiple occasions, including directly addressing this provision in writing on multiple occasions that the EPA does not support biological confirmation for

toxics assessment.[7] The 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 as detailed further below. The EPA incorporates by reference all of the discussion in the disapproval under 15A NCAC .02B .0211(f).

The EPA has determined that the changes to subsection 15A NCAC 02B .0220 (9)(c) do not protect North Carolina's aquatic life use and, therefore, are not consistent with the CWA section 303(c) or its implementing regulations found at 40 C.F.R. section 131.11. Therefore, these changes are disapproved by the EPA under CWA section 303(c). With today's disapproval of this section, the new water quality criteria for metals in salt water as approved shall be used for all purposes under the Act. The EPA recommends that the State delete the biological confirmation provision during the next triennial review.

North Carolina adopted updated acute and chronic metals values under 15A NCAC 02B .0220 (9)(d) for salt water as follows:

> *(d) Acute and chronic tidal salt water quality metals standards are as follows:*
> *(i) Arsenic, acute: WER· 69 ug/l;*
> *(ii) Arsenic, chronic: WER· 36 ug/l;*
> *(iii) Cadmium, acute: WER· 40 ug/l;*
> *(iv) Cadmium, chronic: WER· 8.8 ug/l;*
> *(v) Chromium VI, acute: WER· 1100 ug/l;*
> *(vi) Chromium VI, chronic: WER· 50 ug/l;*
> *(vii) Copper, acute: WER· 4.8 ug/l;*
> *(viii) Copper, chronic: WER· 3.1 ug/l;*
> *(ix) Lead, acute: WER· 210 ug/l;*
> *(x) Lead, chronic: WER· 8.1 ug/l;*
> *(xi) Mercury, total recoverable, chronic: 0.025 ug/l;*
> *(xii) Nickel, acute: WER· 74 ug/l;*
> *(xiii) Nickel, chronic: WER· 8.2 ug/l;*
> *(xiv) Selenium, total recoverable, chronic: 71 ug/l;*
> *(xv) Silver, acute: WER· 1.9 ug/l;*
> *(xvi) Silver, chronic: WER· 0.1 ug/l;*
> *(xvii) Zinc, acute: WER· 90 [ug/l;]ug/l; and*
> *(xviii) Zinc, chronic: WER· 81 ug/l;*
>
> *With the exception of mercury and selenium, acute and chronic tidal saltwater quality aquatic life standards for metals listed above apply to the dissolved form of the metal and apply as a function of the pollutant's water effect ratio (WER). A WER expresses the difference between the measures of the toxicity of a substance in laboratory waters and the toxicity in site water. The WER [~~is~~]shall be assigned a value equal to one unless any person demonstrates to the Division's satisfaction in a permit proceeding that another value is developed in accordance with the Water Quality Standards Handbook: Second Edition'published by the US Environmental Protection Agency (EPA-823-B-12-002), free of charge, at http://water.epa.gov/scitech/swguidance/standards/handbook/, hereby incorporated*

[7] See Appendix B. EPA letters to DWR dated April 30, 2009, August 10th, 2010, and January 3, 2014 and emails to DWR on August 22, 2014 and August 25, 2014.

by reference including any subsequent amendments. Alternative site-specific standards may also be developed when any person submits values that demonstrate to the Commissions' satisfaction that they were derived in accordance with the Water Quality Standards Handbook: Second Edition, Recalculation Procedure or the Resident Species Procedure", hereby incorporated by reference including subsequent amendments at http://water.epa.gov/scitech/swguidance/standards/handbook/. This material is available free of charge;

The EPA notes that the DWR is not currently adopting updated criteria for mercury or selenium, leaving in place the previous values which are based on the total recoverable metal. Those metals have been reordered for alphabetizing purposes only. As the numeric value did not change for either of these criteria, the EPA determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that its approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

For comparison purposes, all other salt water metals are listed in the chart below alongside the EPA's current national recommended criteria.

Metal (all values are dissolved)	**NCDWR's Criteria** (all values ug/l)	**EPA's National Recommended criteria** (all values ug/l)
Arsenic (acute)	69	69
Arsenic (chronic)	36	36
Cadmium (acute)	40	40
Cadmium (chronic)	8.8	8.8
Chromium VI (acute)	1100	1100
Chromium VI (chronic)	50	50
Copper (acute)	4.8	4.8
Copper (chronic)	3.1	3.1
Lead (acute)	210	210
Lead (chronic)	8.1	8.1
Nickel (acute)	74	74
Nickel (chronic)	8.2	8.2
Silver (acute)	1.9	1.9
Silver (chronic)	0.1	--
Zinc (acute)	90	90
Zinc (chronic)	81	81

With the exception of the chronic value for silver, the DWR is directly adopting the EPA's national recommended values for saltwater acute and chronic criteria for metals in saltwater.

The EPA initially published a national recommended criteria for silver in 1980 (EPA 1980). In that document, the EPA recommended that the total recoverable acute silver criteria should not exceed 2.3 ug/ at any time. However, data were not available to develop chronic criteria for salt water. In 1990, the EPA published draft chronic criteria for silver, but after public comment determined that more research was

needed. In a 1992 memo, the EPA addressed how to review chronic silver salt water criteria from states (EPA 1992b). That memo noted that, "States which choose, of their own accord, to take an approach which generates chronic standards, either from data in the 1980 final document, the 1990 draft or other sources, are taking an approach more stringent than EPA criteria, and these standards are approvable." In order to develop its chronic silver criterion, the DWR stated that it they applied a safety factor of 0.05 to the 2.3 ug/l acute criterion from EPA's 1980 publication generating a chronic value of 0.1 ug/l.

As discussed in the approval of the freshwater metals criteria, the EPA's most current national recommended water quality criteria for protection of aquatic life includes the recommendation that fresh and salt water criteria for metals (including specifically arsenic, cadmium, chromium III, chromium VI, copper, lead, nickel, silver and zinc) be expressed in terms of the dissolved metal in the water column. In 1993, the EPA provided additional guidance on the use of the dissolved fraction of metals stating that, "[t]he use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal" (EPA 1993).

As discussed in the review of the use of WERs under subparagraph .0211(11)(b), the use of WERs is consistent with the EPA's policy and guidance. The discussion in that section's review are incorporated into the review of this section by reference. The EPA concludes that the changes to subsection 15A NCAC 02B .0220(9)(d) to add in the use of a WER and to include a x1 multiplier in each of the criteria for the criteria in Table A is consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. Therefore, these changes are approved by the EPA under CWA section 303(c).The EPA strongly recommends that the first WERs developed by the State are reviewed in the study plan phase by the EPA to ensure that WERs that are developed meet the required procedures. The EPA looks forward to working with the State to ensure a quick review of the study plans so that the WERs may be used for CWA purposes once completed.

This section also allows for alternative site-specific standards to be developed using the Recalculation Procedure or the Resident Species Procedure in accordance with the *Water Quality Standards Handbook: Second Edition,* referenced as http://water.epa.gov/scitech/swguidance/standards/handbook/. In deriving site-specific criteria, the Recalculation Procedure (found at Appendix A of Appendix L of the WQS Handbook) takes into account the differences between the sensitivity of the species used in the national dataset in developing the national recommended criteria, and the organisms at the site. The Resident Species Analysis (see Chapter 3.7 - Developing Site-Specific Criteria of the WQS Handbook) accounts for that difference as well as the difference between the toxicity of the metal in lab water versus site water similar to a WER. Chapter 3.6 - Policy on Aquatic Life Criteria for Metals was updated to also include procedures to conduct a Streamlined Water-Effects Ratio Procedure for the Discharge of Copper that may also be used.

Considering the scientific and technical information supporting the 304(a) recommendations, the EPA has determined that all of the changes to subsection 15A NCAC 02B .0220(9)(d) protect North Carolina's aquatic life use and, therefore, are consistent with the CWA section 303(c) and 40 C.F.R. section 131.11. These changes are approved by the EPA under CWA section 303(c) for all purposes under the Act.

15A NCAC 02B .0220 Tidal Salt Water Quality Standards for Class SC Waters
Subparagraphs (10) through (19)

~~(f)~~(10) Oils, deleterious substances, colored, or other wastes: only such amounts as shall not render the waters injurious to public health, secondary-recreation, aquatic life, and wildlife or

adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses. For the purpose of implementing this Rule, oils, deleterious substances, colored, or other wastes shall include substances that cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines under 40 C.F.R. 110.3;

(11) Pesticides:

(a) Aldrin: 0.003 ug/l;

(b) Chlordane: 0.004 ug/l;

(c) DDT: 0.001 ug/l;

(d) Demeton: 0.1 ug/l;

(e) Dieldrin: 0.002 ug/l;

(f) Endosulfan: 0.009 ug/l;

(g) Endrin: 0.002 ug/l;

(h) Guthion: 0.01 ug/l;

(i) Heptachlor: 0.004 ug/l;

(j) Lindane: 0.004 ug/l;

(k) Methoxychlor: 0.03 ug/l;

(l) Mirex: 0.001 ug/l;

(m) Parathion: 0.178 [ug/l;]ug/l; and

(n) Toxaphene: 0.0002 ug/l;

~~*(g)*~~*(12) pH: shall be normal for the waters in the area, which* ~~*generally shall*~~ *range between 6.8 and* ~~*8.5*~~ *8.5, except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions;*

~~*(h)*~~*(13) Phenolic compounds: only such levels as shall not result in fishflesh- tainting or impairment of other best usage;*

(14) Polychlorinated biphenyls: (total of all PCBs and congeners identified) 0.001 ug/l;

~~*(i)*~~*(15) Radioactive substances:*

~~*(i)*~~*(a) Combined radium-226 and radium-228: The* ~~*maximum*~~ *average annual activity level (based on at least one sample collected per quarter)*~~*four samples collected quarterly)*~~ *for combined radium226, and radium228 shall not exceed five -picoCuries- per liter;*

~~*(ii)*~~*(b) Alpha Emitters. The average annual gross alpha particle activity (including radium226, but excluding radon and uranium) shall not exceed 15 picoCuries- per liter;*

~~*(iii)*~~*(c) Beta Emitters. The* ~~*maximum*~~ *average annual activity level (based on at least one sample collected per quarter)*~~*four samples collected quarterly)*~~ *for strontium90 shall not exceed eight picoCuries- per liter; nor shall the average annual gross beta particle activity (excluding potassium-40 and other naturally occurring* ~~*radio-nuclides)*~~ *radionuclides exceed 50 picoCuries per liter; nor shall the* ~~*maximum*~~ *average annual activity level for tritium exceed 20,000 picoCuries per liter;*

~~*(j)*~~*(16) Salinity: changes in salinity due to hydrological modifications shall not result in removal of the functions of a PNA. Projects that are determined by the Director to result in modifications of salinity such that functions of a PNA are impaired* ~~*will*~~ *shall be required to employ water management practices to mitigate salinity impacts;*

~~*(k)*~~*(17) Temperature: shall not be increased above the natural water temperature by more than 0.8 degrees C (1.44 degrees F) during the months of June, July, and August nor more than 2.2 degrees C (3.96 degrees F) during other months and in no cases to exceed 32 degrees C (89.6 degrees F) due to the discharge of heated liquids;*

(18) Trialkyltin compounds: 0.007 ug/l expressed as tributyltin;

~~(l)~~(19) Turbidity: the turbidity in the receiving water shall not exceed 25 Nephelometric Turbidity Units (NTU); ~~NTU;~~ if turbidity exceeds this level due to natural background conditions, the existing turbidity level shall not be increased. Compliance with this turbidity standard can be met when land management activities employ Best Management Practices (BMPs) [as defined by Rule .0202 of this Section] recommended by the Designated Nonpoint Source Agency (as defined by Rule .0202 of this Section). BMPs ~~must~~ shall be in full compliance with all specifications governing the proper design, installation, ~~operation~~ operation, and maintenance of such BMPs;

~~(m) Toxic substances: numerical water quality standards (maximum permissible levels) to protect aquatic life applicable to all tidal saltwaters:~~

~~(i) Arsenic, total recoverable: 50 ug/l;~~

~~(ii) Cadmium: 5.0 ug/l; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;~~

~~(iii) Chromium, total: 20 ug/l;~~

~~(iv) Cyanide: 1.0 ug/l;~~

~~(v) Mercury: 0.025 ug/l;~~

~~(vi) Lead, total recoverable: 25 ug/l; collection of data on sources, transport and fate of lead shall be required as part of the toxicity reduction evaluation for dischargers that are out of compliance with whole effluent toxicity testing requirements and the concentration of lead in the effluent is concomitantly determined to exceed an instream level of 3.1 ug/l from the discharge;~~

~~(vii) Nickel: 8.3 ug/l; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;~~

~~(viii) Pesticides:~~

~~(A) Aldrin: 0.003 ug/l;~~

~~(B) Chlordane: 0.004 ug/l;~~

~~(C) DDT: 0.001 ug/l;~~

~~(D) Demeton: 0.1 ug/l;~~

~~(E) Dieldrin: 0.002 ug/l;~~

~~(F) Endosulfan: 0.009 ug/l;~~

~~(G) Endrin: 0.002 ug/l;~~

~~(H) Guthion: 0.01 ug/l;~~

~~(I) Heptachlor: 0.004 ug/l;~~

~~(J) Lindane: 0.004 ug/l;~~

~~(K) Methoxychlor: 0.03 ug/l;~~

~~(L) Mirex: 0.001 ug/l;~~

~~(M) Parathion: 0.178 ug/l;~~

~~(N) Toxaphene: 0.0002 ug/l;~~

~~(ix) Polychlorinated biphenyls: (total of all PCBs and congeners identified) 0.001 ug/l;~~

~~(x) Selenium: 71 ug/l;~~

~~(xi) Trialkyltin compounds: 0.007 ug/l expressed as tributyltin.~~

The struck provisions for arsenic, cadmium, chromium, lead and nickel are replaced by new criteria as described in detail above. The criteria for the remaining criteria were moved into alphabetical order. As the numeric value did not change for these criteria, the EPA determined that it is non-substantive and therefore, the EPA approves the revision as being consistent with the CWA and the EPA's implementing regulations. The EPA notes, however, that is approval of this non-substantive change does not re-open the EPA's prior approval of the underlying substantive WQSs.

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

~~(4)~~(20) Action Levels for Toxic ~~Substances:~~Substances Applicable to NPDES Permits:

(a) ~~Copper:~~Copper, dissolved, chronic: ~~3 ug/l;~~3.1 ug/l;

(b) ~~Silver:~~Silver, dissolved, chronic: 0.1 ug/l;

(c) ~~Zinc:~~Zinc, dissolved, chronic: ~~86 ug/l;~~81 ug/l

If the [~~chronic~~] ~~Action Levels~~ action levels for any of the substances listed in this ~~Subparagraph~~Item (which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream ~~characteristics~~ characteristics, or associated waste characteristics) ~~are~~ shall be determined by the waste load allocation to be exceeded in a receiving water by a discharge under the ~~specified low~~7Q10 flow criterion for toxic ~~substances (Rule .0206 in this Section),~~substances, the discharger shall ~~be required to~~ 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~~ action levels are listed in this ~~Subparagraph~~Item ~~may~~shall be limited as appropriate in the NPDES permit if sufficient information (to be determined for metals by measurements of that portion of the dissolved instream concentration of the ~~Action Level~~ 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. ~~NPDES permit limits may be based on translation of the toxic form to total recoverable metals. Studies used to determine the~~

~~*toxic form or translators must be designed according to: "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators.*~~

Revision to Copper, Silver and Zinc as an Action Level

As the EPA has advised the DWR on multiple occasions, including directly addressing this provision in multiple letters,[8] the EPA does not support the maintenance of action levels. The EPA reiterates its previous comments. The EPA's Section 304(a) criteria were developed to take into account specific factors such as solubility and chemical form in determining the biologically available fraction available for uptake by biological organisms and, therefore, the fraction most likely to cause a toxic effect.

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 C.F.R. 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 requirement is significant because there may often be multiple sources of pollutants in receiving waters, from non-point source run-off, from point sources and from storm water. No one facility or source may be the sole cause of the 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 exceedence of water quality standards, that discharge 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.

The Region recognizes that North Carolina has a strong WET testing program. 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. See 63 Fed. Reg. (page 36,768). 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 EPA's discussion of reconciling biological data, such as WET, with 'reasonable potential' analysis concludes "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 be developed for each facility. It is not protective, however, and is not consistent with EPA's permitting regulations, to defer permit limitations once there is reasonable potential to exceed the water

[8] See Appendix B. EPA letters to DWR dated April 30, 2009, August 20, 2010, and January 3, 2014 and emails to DWR on August 22, 2014 and August 25, 2014.

quality criteria for toxics.

The EPA has determined that the changes to subsection 15A NCAC 02B .0211(20) do not protect North Carolina's aquatic life use and, therefore, are not consistent with the CWA section 303(c) or its implementing regulations found at 40 C.F.R. section 131.11. These changes are disapproved by the EPA under CWA section 303(c). With today's disapproval of this section, the new water quality criteria for metals as approved shall be used for all purposes under the Act. For more discussion on the implications of the EPA's disapproval, see pages 30-31.

Review of Water Quality Standards Variances

Under 40 C.F.R. section 131.20, each state is required, at least once every three years, to re-examine any water body segment with water quality standards which do not include the uses specified in section 101(a)(2) of the CWA to determine if any new information has become available to indicate the uses are now attainable. North Carolina has three variances from water quality standards in the State, which are subject to this triennial evaluation requirement. During the triennial, the State provided a notice of an opportunity to comment on and conducted a review of each of the variances to water quality standards.

Evergreen Packaging (formerly Blue Ridge Paper Products, NPDES Permit No. NC0000272) has a water quality standards variance for color. The most recent permit reissuance and variance renewal was issued by the State on July 21, 2010. The EPA reviewed and approved the variance on December 21, 2010. A comprehensive review and evaluation of the status of the variance is ongoing concurrent with the facility's permit reissuance process, which will include public hearings and opportunity for comments. Comments received by the State during the triennial will be considered during the permit and variance review as well.

Both Mount Olive Pickle Company (NPDES Permit No. NC0001074) and Bay Valley Foods (formerly Dean Pickle Products, NPDES Permit No. NC0001970) have excess sodium chloride from pickle processing. Limited technology exists for removal of sodium chloride from the waste stream. New variances were issued by the State on March 29, 2011. The EPA approved those variances on September 27, 2011. The information collected during this triennial review will be used for the next scheduled permit and variance review.

APR 6 2016

Date

Heather McTeer Toney
Regional Administrator

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APPENDIX A

NON-SUBSTANTIVE EDITORIAL REVISIONS

15A NCAC 02B .0206 is amended as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0206 FLOW DESIGN CRITERIA FOR EFFLUENT LIMITATIONS

(a) Water quality based effluent limitations ~~are~~ shall be developed to allow appropriate frequency and duration of deviations from water quality standards so that the designated uses of receiving waters are protected. There are water quality standards for a number of categories of pollutants and to protect a range of water uses. For this reason, the appropriate frequency and duration of deviations from water quality standards ~~is not~~ shall not be the same for all categories of standards. A flow design criterion ~~is~~ shall be used in the development of water quality based effluent limitations as a simplified means of estimating the acceptable frequency and duration of deviations. More complex modeling techniques ~~can~~ may also be used to set effluent limitations directly based on frequency and duration criteria published by the U.S. Environmental Protection Agency available free of charge ~~pursuant to Section 304(a) of the Federal Clean Water Act as amended.~~ at http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm are hereby incorporated by reference including any subsequent amendments. Use of more complex modeling techniques to set water quality based effluent limitations ~~will~~ shall be approved by the Commission or its designee on a case-by-case basis. Flow design criteria to calculate water quality based effluent limitations for categories of water quality standards ~~are listed as follows:~~ shall be the following:

(1) All standards except toxic substances and aesthetics ~~will~~ shall be protected using the minimum average flow for a period of seven consecutive days that has an average recurrence of once in ten years (7Q10 flow). Other governing flow ~~strategies~~ strategies, such as varying discharges with the receiving waters ability to assimilate ~~wastes~~wastes, may be designated by the Commission or its designee on a case-by-case basis if the discharger or permit applicant ~~provide~~ provides evidence ~~which~~ that establishes to the satisfaction of the Director that the alternative flow strategies will give equal or better protection for the water quality standards. ~~Better~~ "Better protection for the water quality ~~standards~~ standards" means that deviations from the standard would be expected less frequently than provided by using the 7Q10 flow.

(2) Toxic substance standards to protect aquatic life from chronic toxicity ~~will~~ shall be protected using the 7Q10 flow.

(3) Toxic substance standards to protect aquatic life from acute toxicity [~~will~~] shall be protected using the 1Q10 flow.

~~(3)~~(4) Toxic substance standards to protect human health ~~will be:~~ shall be the following:

(A) The 7Q10 flow for standards to protect human health through the consumption of water, ~~fish~~ fish, and shellfish from ~~noncarcinogens;~~ noncarcinogens; and

(B) The mean annual flow to protect human health from carcinogens through the consumption of water, ~~fish~~ fish, and shellfish unless site specific fish contamination concerns necessitate the use of an alternative design flow;

~~(4)~~(5) Aesthetic quality ~~will~~ shall be protected using the minimum average flow for a period of 30 consecutive days that has an average recurrence of once in two years (30Q2 flow).

(b) In cases where the stream flow is regulated, a minimum daily low flow may be used as a substitute for the 7Q10 ~~flow~~ flow, except in cases where there are acute toxicity concerns for aquatic life. In the cases where there are acute toxicity concerns, an alternative low ~~flow~~ flow, such as the instantaneous minimum ~~release~~ release, shall be approved by the Director ~~may be used~~ on a case-by-case ~~basis.~~basis so that the designated uses of receiving waters are protected.

(c) Flow design criteria ~~are~~ shall be used to develop water quality based effluent limitations and for the design of wastewater treatment facilities. Deviations from a specific water quality standard resulting from discharges ~~which~~ that are affirmatively demonstrated to be in compliance with water quality based effluent limitations for that standard ~~will~~ shall not be a violation pursuant to G.S. 143-215.6 when the actual flow is significantly less than the design flow.

(d) In cases where the 7Q10 flow of the receiving stream is estimated to be zero, water quality based effluent limitations ~~will~~ shall be assigned as follows:

(1) Where the 30Q2 flow is estimated to be greater than zero, effluent limitations for new or expanded (additional) discharges of oxygen consuming waste ~~will~~ shall be set at BOD_5= 5 mg/l, NH_3-N = 2 mg/l and DO = 6 mg/l, unless it is determined by the Director that these limitations will not protect water quality standards. Requirements for existing discharges ~~will~~ shall be determined on a case-by-case basis by the Director. More stringent limits ~~will~~ shall be applied in cases where violations of water quality standards are predicted to occur for a new or expanded discharge with the limits set pursuant to this Rule, or where existing limits are determined to be inadequate to protect water quality standards.

(2) If the 30Q2 and 7Q10 flows are both estimated to be zero, no new or expanded (additional) discharge of oxygen consuming waste ~~will~~ shall be allowed. Requirements for existing discharges to streams where the 30Q2 and 7Q10 flows are both estimated to be zero ~~will~~ shall be determined on a case-by-case basis.

(3) Other water quality standards ~~will~~shall be protected by requiring the discharge to meet the standards unless the Director determines that alternative limitations ~~are determined by the Director to~~ protect the classified water uses.

(e) Receiving water flow statistics ~~will~~ shall be estimated through consultation with the U.S. Geological Survey. Estimates for any given location may be based on actual flow data, modeling analyses, or other methods determined to be appropriate by the Commission or its designee.

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. February 1, 1976;
Amended Eff. January 1, 2015; February 1, 1993; October 1, 1989; August 1, 1985; January 1, 1985.

15A NCAC 02B .0211 is amended with changes as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0211 FRESH SURFACE WATER QUALITY STANDARDS FOR CLASS C WATERS

General. The water quality standards for all fresh surface waters ~~are~~ shall be the basic standards applicable to Class C waters. ~~See Rule .0208 of this Section for standards for toxic substances and temperature.~~ Water quality standards for temperature and numerical water quality standards for the protection of human health applicable to all fresh surface waters are in Rule .0208 of this Section. Additional and more stringent standards applicable to other specific freshwater classifications are specified in Rules .0212, .0214, .0215, .0216, ~~.0217,~~ .0218, .0219, .0223, .0224 and .0225 of this Section. Action Levels for purposes of National Pollutant Discharge Elimination System (NPDES) [~~NPDES~~] permitting are specified in Item (22) of this Rule.

(1) Best Usage of Waters: aquatic life propagation and maintenance of biological integrity (including fishing and fish), wildlife, secondary recreation, ~~agriculture~~ agriculture, and any other usage except for primary recreation or as a source of water supply for drinking, ~~culinary~~ culinary, or food processing purposes;

(2) Conditions Related to Best Usage: the waters shall be suitable for aquatic life propagation and maintenance of biological integrity, wildlife, secondary recreation, and agriculture. Sources of water pollution ~~which~~ that precludes any of these uses on either a short-term or long-term basis shall be considered to be violating a water quality standard;

~~(3) Quality standards applicable to all fresh surface waters:~~

(3) Chlorine, total residual: 17 ug/l;

(4)~~(a)~~ Chlorophyll a (corrected): not greater than 40 ug/l for lakes, reservoirs, and other waters subject to growths of macroscopic or microscopic vegetation not designated as trout waters, and not greater than 15 ug/l for lakes, reservoirs, and other waters subject to growths of macroscopic or microscopic vegetation designated as trout waters (not applicable to lakes or reservoirs less than 10 acres in surface area). The Commission or its designee may prohibit or limit any discharge of waste into surface waters ~~if, in the opinion of the Director,~~ if the surface waters experience or the discharge would result in growths of microscopic or macroscopic vegetation such that the standards established pursuant to this Rule would be violated or the intended best usage of the waters would be impaired;

(5) Cyanide, total: 5.0 ug/L;

(6)~~(b)~~ Dissolved oxygen: not less than 6.0 mg/l for trout waters; for non-trout waters, not less than a daily average of 5.0 mg/l with a minimum instantaneous value of not less than 4.0 mg/l; swamp waters, lake ~~coves~~ coves, or backwaters, and lake bottom waters may have lower values if caused by natural conditions;

(7) Fecal coliform: shall not exceed a geometric mean of 200/100ml (MF count) based upon at least five consecutive samples examined during any 30 day period, nor exceed 400/100ml in more than 20 percent of the samples examined during such period. Violations of the fecal coliform standard

are expected during rainfall events and, in some cases, this violation is expected to be caused by uncontrollable nonpoint source pollution. All coliform concentrations [~~are to~~]shall be analyzed using the membrane filter [~~technique~~] technique, unless high turbidity or other adverse conditions necessitate the tube dilution[~~method;~~] method. [~~in~~]In case of controversy over results, the MPN 5-tube dilution technique shall be used as the reference method;

(8)~~(c)~~ Floating solids, settleable solids, or sludge deposits: only such amounts attributable to sewage, industrial ~~wastes~~ wastes, or other wastes as shall not make the water unsafe or unsuitable for aquatic life and wildlife or impair the waters for any designated uses;

(9) Fluorides: 1.8 mg/l;

(10)~~(d)~~ Gases, total dissolved: not greater than 110 percent of saturation;

~~(e) Organisms of the coliform group: fecal coliforms shall not exceed a geometric mean of 200/100ml (MF count) based upon at least five consecutive samples examined during any 30 day period, nor exceed 400/100ml in more than 20 percent of the samples examined during such period. Violations of the fecal coliform standard are expected during rainfall events and, in some cases, this violation is expected to be caused by uncontrollable nonpoint source pollution. All coliform concentrations are to be analyzed using the membrane filter technique unless high turbidity or other adverse conditions necessitate the tube dilution method; in case of controversy over results, the MPN 5-tube dilution technique shall be used as the reference method;~~

(11) Metals:

(a) With the exception of mercury and selenium, freshwater aquatic life standards for metals shall be based upon measurement of the dissolved fraction of the metal. Mercury and [~~Selenium~~] selenium water quality standards [~~must~~] shall be based upon measurement of the total recoverable ~~metal.~~metal; ~~[Alternative site-specific metals standards can be developed where studies are designed in accordance with the "Water Quality Standards Handbook: Second Edition" published by the US Environmental Protection Agency (EPA 823-B-94-005a) hereby incorporated by reference including any subsequent amendments;]~~

(b) Freshwater metals standards that are not hardness-dependent [~~are~~] shall be as follows:

(i) Arsenic, dissolved, acute: WER· 340 ug/l;

(ii) Arsenic, dissolved, chronic: WER· 150 ug/l;

(iii) Beryllium, dissolved, acute: WER· 65 ug/l;

(iv) Beryllium, dissolved, chronic: WER· 6.5 ug/l;

(v) Chromium VI, dissolved, acute: WER· 16 ug/l;

(vi) Chromium VI, dissolved, chronic: WER· 11 ug/l;

(vii) Mercury, total recoverable, chronic: 0.012 ug/l;

(viii) Selenium, total recoverable, chronic: 5 ug/l;

(ix) Silver, dissolved, chronic: WER· 0.06 ug/l;

With the exception of mercury and selenium, acute and chronic freshwater aquatic life standards for metals listed [~~above~~] in this Subparagraph apply to the dissolved form of the metal and apply as a function of the pollutant's water effect ratio (WER). A WER [~~is a factor that~~] expresses the difference between the measures of the toxicity of a substance in laboratory waters and the toxicity in site water. The WER [~~is~~]shall be assigned a value equal to one [~~(1)~~]unless any person demonstrates to the [~~Department's~~]Division's satisfaction in a permit proceeding that another value is [~~appropriately~~] developed in accordance with the "Water Quality Standards Handbook: Second Edition" published by the US Environmental Protection Agency (EPA-823-B-12-002), free of charge, at http://water.epa.gov/scitech/swguidance/standards/handbook/, hereby incorporated by reference including any subsequent amendments. Alternative site-specific standards [~~can~~] may also be developed when any person submits values that demonstrate to the Commissions' satisfaction that they were derived in accordance with the "Water Quality Standards Handbook: Second Edition, Recalculation Procedure or the Resident Species [~~Procedure".~~]Procedure", hereby incorporated by reference including subsequent amendments at http://water.epa.gov/scitech/swguidance/standards/handbook/.
This material is available free of charge.

Hardness-dependent freshwater metals standards are located in Sub-Item (c) and (d) and in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals;

(c) Hardness-dependent freshwater metals standards [~~are~~] shall be as follows:

(i) Hardness-dependent metals standards shall be derived using the equations specified in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals. If the actual instream hardness (expressed as $CaCO_3$ or Ca+Mg) is less than 25 milligrams/liter (mg/l), standards shall be calculated based upon 25 mg/l hardness. If the actual instream hardness is greater than 25 mg/l and less than 400 mg/l, standards [~~will~~] shall be calculated based upon the actual instream hardness. If the instream hardness is greater than 400 mg/l, the maximum applicable hardness shall be 400 mg/l;

(ii) Hardness-dependent metals [~~standards~~] in NPDES permitting: for NPDES permitting purposes, application of the equations in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals [~~requires~~] shall have hardness values (expressed as $CaCO_3$ or Ca+Mg) 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 (HU). The minimum applicable instream hardness shall be 25 mg/l and the maximum applicable instream hardness shall be 400 mg/l, even when the actual median instream hardness is less than 25 mg/l and greater than 400 mg/l;

(d) Alternatives:

Acute and chronic freshwater aquatic life standards for metals listed in Table A apply to the dissolved form of the metal and apply as a function of the pollutant's water effect ratio[~~(WER).~~](WER), which is set forth in Sub-Item (b). [~~A WER is a factor that expresses the difference between the measures of the toxicity of a substance in laboratory waters and the toxicity in site water. The WER is assigned a value equal to one (1) unless any person demonstrates to the Department's satisfaction in a permit proceeding that another value is appropriately developed in accordance with the "Water Quality Standards Handbook: Second Edition" published by the US Environmental Protection Agency (EPA-823-B-12-002) hereby incorporated by reference including any subsequent amendments.~~ Alternative site-specific standards [~~ean~~] may also be developed as set forth in Sub-Item (b); [~~when any person submits values that demonstrate to the Commissions' satisfaction that they were derived in accordance with the "Water Quality Standards Handbook: Second Edition, Recalculation Procedure or the Resident Species Procedure";~~]

Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals

Numeric standards[~~listed below are~~]calculated at 25 mg/l hardness are listed below for illustrative purposes. The Water Effects Ratio (WER) is equal to one [~~(1)~~] unless determined otherwise under [~~15A NCAC 02B .0211 (d).~~] Sub-Item (d) of this rule.

Metal	Equations for Hardness-Dependent Freshwater Metals (ug/l)	Standard at 25 mg/l hardness (ug/l)
Cadmium, Acute	WER· [{1.136672-[*ln* hardness](0.041838)} · *e*^{0.9151 [*ln* hardness]-3.1485}]	0.82
Cadmium, Acute, Trout waters	WER· [{1.136672-[*ln* hardness](0.041838)} · *e*^{0.9151[*ln* hardness]-3.6236}]	0.51
Cadmium, Chronic	WER· [{1.101672-[*ln* hardness](0.041838)} · *e*^{0.7998[*ln* hardness]-4.4451}]	0.15
Chromium III, Acute	WER· [0.316 · *e*^{0.8190[*ln* hardness]+3.7256}]	180
Chromium III, Chronic	WER· [0.860 · *e*^{0.8190[*ln* hardness]+0.6848}]	24
Copper, Acute	WER· [0.960 · *e*^{0.9422[*ln* hardness]-1.700}] Or, Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision	3.6 NA

	(EPA-822-R-07-001)	
Copper, Chronic	WER· [0.960 · *e*^{0.8545[*ln* hardness]-1.702}] Or, Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision (EPA-822-R-07-001)	2.7 NA
Lead, Acute	WER· [{1.46203-[*ln* hardness](0.145712)} · *e*^{1.273[*ln* hardness]-1.460}]	14
Lead, Chronic	WER· [{1.46203-[*ln* hardness](0.145712)} · *e*^{1.273[*ln* hardness]-4.705}]	0.54
Nickel, Acute	WER· [0.998 · *e*^{0.8460[*ln* hardness]+2.255}]	140
Nickel, Chronic	WER· [0.997 · *e*^{0.8460[*ln* hardness]+0.0584}]	16
Silver, Acute	WER· [0.85 · *e*^{1.72[*ln* hardness]-6.59}]	0.30
Zinc, Acute	WER· [0.978 · *e*^{0.8473[*ln* hardness]+0.884}]	36
Zinc, Chronic	WER· [0.986 · *e*^{0.8473[*ln* hardness]+0.884}]	36

[~~(d)~~](e) Compliance with acute instream metals standards shall only be evaluated using an average of two or more samples collected within one hour. 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;

[~~(e) 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.~~]

(f) Metals criteria [~~will~~] shall be used for proactive environmental management. An instream exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the instream aquatic community without biological confirmation and a comparison of all available monitoring data and applicable water quality standards. This weight of evidence evaluation [~~will~~]shall take into account data quality and the overall confidence in how representative the sampling is of conditions in the waterbody segment before an assessment of aquatic life use attainment, or non-attainment, [~~is~~] shall be made by the Division. Recognizing the synergistic and antagonistic complexities of other water quality variables on the actual toxicity of metals, with the exception of mercury and selenium, biological monitoring will be used to validate, by direct measurement, whether or not the aquatic life use is supported;

~~(f)~~(12) Oils, deleterious substances, ~~colored~~ colored, or other wastes: only such amounts as shall not render the waters injurious to public health, secondary ~~recreation~~ recreation, or to aquatic life and ~~wildlife~~

wildlife, or adversely affect the palatability of fish, aesthetic ~~quality~~ quality, or impair the waters for any designated uses. For the purpose of implementing this Rule, oils, deleterious substances, ~~colored~~ colored, or other wastes shall include ~~but not be limited to~~ substances that cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines pursuant to 40 CFR 110.3(a)-(b) which are hereby incorporated by reference including any subsequent amendments and additions. This material is ~~available~~available, free of charge, at: http://www.ecfr.gov/; ~~for inspection at the Department of Environment and Natural Resources, Division of Water Quality, [Water Resources,] 512 North Salisbury Street, Raleigh, North Carolina.[Carolina;] Copies may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402-9325 at a cost of forty-five dollars ($45.00);D.C.;~~

(13) Pesticides:

(a) Aldrin: 0.002 ug/l;

(b) Chlordane: 0.004 ug/l;

(c) DDT: 0.001 ug/l;

(d) Demeton: 0.1 ug/l;

(e) Dieldrin: 0.002 ug/l;

(f) Endosulfan: 0.05 ug/l;

(g) Endrin: 0.002 ug/l;

(h) Guthion: 0.01 ug/l;

(i) Heptachlor: 0.004 ug/l;

(j) Lindane: 0.01 ug/l;

(k) Methoxychlor: 0.03 ug/l;

(l) Mirex: 0.001 ug/l;

(m) Parathion: 0.013 [~~ug/l;~~] ug/l; and

(n) Toxaphene: 0.0002 ug/l;

~~(g)~~(14) pH: shall be normal for the waters in the area, which ~~generally shall~~ range between 6.0 and 9.0 except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions;

~~(h)~~(15) Phenolic compounds: only such levels as shall not result in fish-flesh tainting or impairment of other best usage;

(16) Polychlorinated biphenyls (total of all PCBs and congeners identified): 0.001 ug/l;

~~(i)~~(17) Radioactive substances:

~~(i)~~(a) Combined radium-226 and radium-228: the ~~maximum~~ average annual activity level (based on at least one sample collected per quarter)~~four samples collected quarterly)~~ for combined radium-226 and radium-228 shall not exceed five picoCuries per liter;

~~(ii)~~(b) Alpha Emitters: the average annual gross alpha particle activity (including radium-226, but excluding radon and uranium) shall not exceed 15 picoCuries per liter;

~~(iii)~~(c) Beta Emitters: the ~~maximum~~ average annual activity level (based on at least one sample collected per quarter) ~~four samples, collected quarterly)~~ for strontium-90 shall not exceed eight picoCuries per liter; nor shall the average annual gross beta particle activity (excluding potassium-40 and other naturally occurring ~~radio-nuclides)~~radionuclides) exceed 50 picoCuries per liter; nor shall the ~~maximum~~ average annual activity level for tritium exceed 20,000 picoCuries per liter;

~~(j)~~(18) Temperature: not to exceed 2.8 degrees C (5.04 degrees F) above the natural water temperature, and in no case to exceed 29 degrees C (84.2 degrees F) for mountain and upper piedmont waters and 32 degrees C (89.6 degrees F) for lower piedmont and coastal plain Waters; the temperature for trout waters shall not be increased by more than 0.5 degrees C (0.9 degrees F) due to the discharge of heated liquids, but in no case to exceed 20 degrees C (68 degrees F);

(19) Toluene: 11 ug/l or 0.36 ug/l in trout classified waters;

(20) Trialkyltin compounds: 0.07 ug/l expressed as tributyltin;

~~(k)~~(21) Turbidity: the turbidity in the receiving water shall not exceed 50 Nephelometric Turbidity Units (NTU) in streams not designated as trout waters and 10 NTU in streams, ~~lakes~~ lakes, or reservoirs designated as trout waters; for lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTU; if turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased. Compliance with this turbidity standard can be met when land management activities employ Best Management Practices (BMPs) [as defined by Rule .0202 of this Section] recommended by the Designated Nonpoint Source Agency [as defined by Rule .0202 of this Section]. BMPs ~~must~~ shall be in full compliance with all specifications governing the proper design, installation, ~~operation~~ operation, and maintenance of such BMPs;

~~(l) Toxic substances: numerical water quality standards (maximum permissible levels) for the protection of human health applicable to all fresh surface waters are in Rule .0208 of this Section. Numerical water quality standards (maximum permissible levels) to protect aquatic life applicable to all fresh surface waters:~~

~~(i) Arsenic: 50 ug/l;~~

~~(ii) Beryllium: 6.5 ug/l;~~

~~(iii) Cadmium: 0.4 ug/l for trout waters and 2.0 ug/l for non-trout waters; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which~~

~~are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;~~

~~(iv) Chlorine, total residual: 17 ug/l;~~

~~(v) Chromium, total recoverable: 50 ug/l;~~

~~(vi) Cyanide, 5.0 ug/l, unless site-specific criteria are developed based upon the aquatic life at the site utilizing The Recalculation Procedure in Appendix B of Appendix L in the Environmental Protection Agency's Water Quality Standards Handbook hereby incorporated by reference including any subsequent amendments;~~

~~(vii) Fluorides: 1.8 mg/l;~~

~~(viii) Lead, total recoverable: 25 ug/l, collection of data on sources, transport and fate of lead shall be required as part of the toxicity reduction evaluation for dischargers who are out of compliance with whole effluent toxicity testing requirements and the concentration of lead in the effluent is concomitantly determined to exceed an instream level of 3.1 ug/l from the discharge;~~

~~(ix) Mercury: 0.012 ug/l;~~

~~(x) Nickel: 88 ug/l, attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;~~

~~(xi) Pesticides:~~

~~(A) Aldrin: 0.002 ug/l;~~

~~(B) Chlordane: 0.004 ug/l;~~

~~(C) DDT: 0.001 ug/l;~~

~~(D) Demeton: 0.1 ug/l;~~

~~(E) Dieldrin: 0.002 ug/l;~~

~~(F) Endosulfan: 0.05 ug/l;~~

~~(G) Endrin: 0.002 ug/l;~~

~~(H) Guthion: 0.01 ug/l;~~

~~(I) Heptachlor: 0.004 ug/l;~~

~~(J) Lindane: 0.01 ug/l;~~

~~(K) Methoxychlor: 0.03 ug/l;~~

~~(L) Mirex: 0.001 ug/l;~~

~~(M) Parathion: 0.013 ug/l;~~

~~(N) Toxaphene: 0.0002 ug/l;~~

~~(xii) Polychlorinated biphenyls: (total of all PCBs and congeners identified) 0.001 ug/l;~~

~~(xiii) Selenium: 5 ug/l;~~

~~(xiv) Toluene: 11 ug/l or 0.36 ug/l in trout waters;~~

~~(xv) Trialkyltin compounds: 0.07 ug/l expressed as tributyltin;~~

~~(4)~~(22) Action Levels for Toxic ~~Substances:~~ Substances Applicable to NPDES Permits:

(a) ~~Copper: 7 ug/l;~~Copper, dissolved, chronic: 2.7 ug/l;

~~(b) Iron: 1.0 mg/l;~~

(c) ~~Silver:~~Silver, dissolved, chronic: 0.06 ug/l;

(d) ~~Zinc:~~Zinc, dissolved, chronic: ~~50 ug/l;~~36 [~~ug/l;~~] ug/l; and

(e) Chloride: 230 mg/l;

The hardness-dependent freshwater action levels for ~~Copper and Zinc,~~ copper and zinc, provided here for illustrative purposes, corresponds to a hardness of 25 mg/l. Copper and [~~Zinc~~] zinc action level values for other instream hardness values shall be calculated per the chronic equations specified in Item (11) of this Rule and in Table A: Dissolved Freshwater Standards for Hardness-Dependent Metals. If the ~~Action Levels~~ action levels for any of the substances listed in this ~~Subparagraph~~Item (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 specified ~~low flow~~ 7Q10 criterion for toxic ~~substances (Rule .0206 in this Section),~~ 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~~ action levels are listed in this ~~Subparagraph~~Item shall be limited as appropriate in the NPDES permit ~~based on the Action Levels listed in this Subparagraph~~ if sufficient information (to be determined for metals by measurements of that portion of the dissolved instream concentration of the ~~Action Levels~~ action levels 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. ~~NPDES permit limits may be based on translation of the toxic form to total recoverable metals. Studies used to determine the toxic form or translators must be~~

~~designed according to "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators.~~

~~For purposes other than consideration of NPDES permitting of point source discharges as described in this Subparagraph, the Action Levels in this Rule, as measured by an appropriate analytical technique, per 15A NCAC 02B .0103(a), shall be considered as numerical instream water quality standards.~~

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. February 1, 1976;
Amended Eff. January 1, 2015; May 1, 2007; April 1, 2003; August 1, 2000; October 1, 1995; August 1, 1995; April 1, 1994; February 1, 1993.

15A NCAC 02B .0212 is amended with changes as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0212 FRESH SURFACE WATER QUALITY STANDARDS FOR CLASS WS-I WATERS

The following water quality standards apply to surface waters within water supply watersheds ~~that are~~ classified as WS-I. Water quality standards applicable to Class C waters as described in Rule .0211 of this Section shall also apply to Class WS-I waters.

(1) The best usage of WS-I waters ~~are~~ shall be as follows: a source of water supply for drinking, culinary, or food-processing purposes for those users desiring maximum protection of their water supplies; waters located on land in public ownership; and any best usage specified for Class C waters;

(2) The conditions related to the best usage ~~are~~ shall be as follows: waters of this class are protected water supplies within essentially natural and undeveloped watersheds in public ownership with no permitted point source dischargers except those specified in Rule .0104 of this Subchapter; waters within this class ~~must~~ shall be relatively unimpacted by nonpoint sources of pollution; land use management programs are required to protect waters from nonpoint source pollution; the waters, following treatment required by the ~~Division of Environmental Health,~~Division, shall meet the Maximum Contaminant Level concentrations considered safe for drinking, culinary, and food-processing purposes ~~which~~ that are specified in the national drinking water regulations and in the North Carolina Rules Governing Public Water Supplies, 15A NCAC 18C .1500. Sources of water pollution ~~which~~ that preclude any of these uses on either a short-term or long-term basis shall be considered to be violating a water quality standard. The Class WS-I classification may be used to protect portions of Class WS-II, ~~WS-III~~ WS-III, and WS-IV water supplies. For reclassifications occurring after the July 1, 1992 statewide reclassification, the more protective classification requested by local governments shall be considered by the Commission when all local governments having jurisdiction in the affected area(s) have adopted a resolution and the appropriate ordinances to protect the watershed or the Commission acts to protect a watershed when one or more local governments has failed to adopt necessary protection measures;

(3) Quality standards applicable to Class WS-I Waters ~~are~~ shall be as follows:

(a) MBAS (Methylene-Blue Active Substances): not greater than 0.5 mg/l to protect the aesthetic qualities of water supplies and to prevent foaming;

(b) Nonpoint Source Pollution: none shall be allowed that would adversely impact the waters for use as a water supply or any other designated use;

(c) Organisms of coliform group: total coliforms not to exceed 50/100 ml (MF count) as a monthly geometric mean value in watersheds serving as unfiltered water supplies;

(d) Chlorinated phenolic compounds: not greater than 1.0 ug/l to protect water supplies from taste and odor problems from chlorinated phenols;

(e) Sewage, industrial wastes: none shall be allowed except those specified in ~~Subparagraph~~Item~~(2)~~ Item (2) of this ~~Paragraph~~Rule or Rule .0104 of this Subchapter;

(f) Solids, total dissolved: not greater than 500 mg/l;

(g) Total hardness: not greater than 100 mg/l as calcium ~~carbonate;~~carbonate ($CaCO_3$ or Ca + Mg);

(h) Toxic and other deleterious substances:

(i) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for non-carcinogens in Class WS-I waters:

(A) Barium: 1.0 mg/l;

(B) Chloride: 250 mg/l;

~~(C) Manganese: 200 ug/l;~~

~~(D)~~(C) Nickel: 25 ug/l;

~~(E)~~(D) Nitrate nitrogen: 10.0 mg/l;

~~(F)~~(E) 2,4-D: ~~100 ug/l;~~70 ug/l;

~~(G)~~(F) 2,4,5-TP (Silvex): 10 ~~ug/l;~~ ug/l; and

~~(H)~~(G) Sulfates: 250 mg/l;

(ii) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for carcinogens in Class WS-I waters:

(A) Aldrin: 0.05 ng/1;

(B) Arsenic: 10 ug/l;

(C) Benzene: 1.19 ug/1;

(D) Carbon tetrachloride: 0.254 ug/l;

(E) Chlordane: 0.8 ng/1;

(F) Chlorinated benzenes: 488 ug/l;

(G) DDT: 0.2 ng/1;

(H) Dieldrin: 0.05 ng/1;

(I) Dioxin: 0.000005 ng/l;

(J) Heptachlor: 0.08 ng/1;

(K) Hexachlorobutadiene: 0.44 ug/l;

(L) Polynuclear aromatic hydrocarbons (total of all PAHs): 2.8 ng/l;

(M) Tetrachloroethane (1,1,2,2): 0.17 ug/l;

(N) Tetrachloroethylene: 0.7 ug/l;

(O) Trichloroethylene: 2.5 ~~ug/l;~~ ug/l; and

(P) Vinyl Chloride: 0.025 ug/l.

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. February 1, 1976;
Amended Eff. January 1, 2015; May 1, 2007; April 1, 2003; October 1, 1995; February 1, 1993;
March 1, 1991; October 1, 1989.

15A NCAC 02B .0214 is amended with changes as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0214 FRESH SURFACE WATER QUALITY STANDARDS FOR CLASS WS-II WATERS

The following water quality standards apply to surface waters within water supply watersheds ~~that are~~ classified as WS-II. Water quality standards applicable to Class C waters as described in Rule .0211 of this Section shall also apply to Class WS-II waters.

(1) The best usage of WS-II waters ~~are~~ shall be as follows: a source of water supply for drinking, culinary, or food-processing purposes for those users desiring maximum protection for their water supplies where a WS-I classification is not feasible and any best usage specified for Class C waters;

(2) The conditions related to the best usage ~~are~~ shall be as follows: waters of this class are protected as water supplies ~~which~~ that are in predominantly undeveloped watersheds and meet average watershed development density levels as specified in Sub-Items (3)(b)(i)(A), (3)(b)(i)(B), (3)(b)(ii)(A) and (3)(b)(ii)(B) of this Rule; discharges ~~which~~ that qualify for a General Permit pursuant to 15A NCAC 2H .0127, trout farm discharges, recycle (closed loop) systems that only discharge in response to 10-year storm events and other stormwater discharges ~~are~~ shall be allowed in the entire watershed; new domestic and industrial discharges of treated wastewater ~~are not~~ shall not be allowed in the entire watershed; the waters, following treatment required by the ~~Division of Environmental Health,~~Division, shall meet the Maximum Contaminant Level concentrations considered safe for drinking, culinary, and food-processing purposes ~~which~~ that are specified in the national drinking water regulations and in the North Carolina Rules Governing Public Water Supplies, 15A NCAC 18C .1500. Sources of water pollution ~~which~~ that preclude any of these uses on either a short-term or long-term basis shall be considered to be violating a water quality standard. The Class WS-II classification may be used to protect portions of Class WS-III and WS-IV water supplies. For reclassifications of these portions of Class WS-III and WS-IV water supplies occurring after the July 1, 1992 statewide reclassification, the more protective classification requested by local governments shall be considered by the Commission when all local governments having jurisdiction in the affected area(s) have adopted a resolution and the appropriate ordinances to protect the watershed or the Commission acts to protect a watershed when one or more local governments has failed to adopt necessary protection measures;

(3) Quality standards applicable to Class WS-II Waters ~~are~~ shall be as follows:

(a) Sewage, industrial wastes, non-process industrial wastes, or other wastes: none shall be allowed except for those specified in either Item (2) of this Rule and Rule .0104 of this Subchapter; none shall be allowed that have an adverse effect on human health or that are not ~~effectively~~ treated to the satisfaction of the Commission and in accordance with the requirements of the ~~Division of Environmental Health, North Carolina Department of~~

~~Environment and Natural Resources.~~Division. Any discharger ~~may~~ shall be required upon request by the Commission to disclose all chemical constituents present or potentially present in their wastes and chemicals ~~which~~ that could be spilled or be present in runoff from their facility ~~which~~ that may have an adverse impact on downstream water quality. These facilities may be required to have spill and treatment failure control plans as well as perform special monitoring for toxic substances;

(b) Nonpoint Source and Stormwater Pollution: none that would adversely impact the waters for use as a water supply or any other designated use;

(i) Nonpoint Source and Stormwater Pollution Control Criteria for Entire Watershed:

(A) Low Density Option: development density ~~must~~shall be limited to either no more than one dwelling unit per acre of single family detached residential development (or 40,000 square foot lot excluding roadway ~~right-of-way)~~ right-of-way), or 12 percent built-upon area for all other residential and non-residential development in the watershed outside of the critical area; stormwater runoff from the development shall be transported by vegetated conveyances to the maximum extent practicable;

(B) High Density Option: if new development exceeds the low density option requirements as stated in Sub-Item (3)(b)(i)(A) of this Rule, then engineered stormwater controls ~~must~~ shall be used to control runoff from the first inch of rainfall; new residential and non-residential development shall not exceed 30 percent built-upon area;

(C) Land within the watershed shall be deemed compliant with the density requirements if the following condition is met: the density of all existing development at the time of reclassification does not exceed the density requirement when densities are averaged throughout the entire watershed area at the time of classification;

(D) Cluster development ~~is~~ shall be allowed on a project-by-project basis as follows:

(I) overall density of the project meets associated density or stormwater control requirements of this Rule;

(II) buffers meet the minimum statewide water supply watershed protection requirements;

(III) built-upon areas ~~are~~ shall be designed and located to minimize stormwater runoff impact to the receiving waters, minimize concentrated stormwater flow, maximize the use of

sheet flow through vegetated areas, and maximize the flow length through vegetated areas;

(IV) areas of concentrated development ~~are~~ shall be located in upland areas and away, to the maximum extent practicable, from surface waters and drainageways;

(V) remainder of tract to remain in vegetated or natural state;

(VI) area in the vegetated or natural state may be conveyed to a property owners association, a local government for preservation as a park or greenway, a conservation organization, or placed in a permanent conservation or farmland preservation easement;

(VII) a maintenance agreement for the vegetated or natural area shall be filed with the Register of Deeds; and

(VIII) cluster development that meets the applicable low density option requirements shall transport stormwater runoff from the development by vegetated conveyances to the maximum extent practicable;

(E) A maximum of 10 percent of each jurisdiction's portion of the watershed outside of the critical area as delineated on July 1, 1993 may be developed with new development projects and expansions of existing development of up to 70 percent built-upon surface area (the "10/70 option") in addition to the new development approved in compliance with the appropriate requirements of Sub-Item (3)(b)(i)(A) or Sub-Item (3)(b)(i)(B) of this Rule. For expansions to existing development, the existing built-upon surface area ~~is not~~shall not be counted toward the allowed 70 percent built-upon surface area. A local government having jurisdiction within the watershed may transfer, in whole or in part, its right to the ~~10 percent/70 percent~~ 10/70 option land area to another local government within the watershed upon submittal of a joint resolution and review by the Commission. When the water supply watershed is composed of public lands, such as National Forest land, local governments may count the public land acreage within the watershed outside of the critical area in calculating the acreage allowed under this provision. For local governments that do not choose to use the high density option in that WS-II watershed, each project ~~must,~~ shall, to the maximum extent practicable, minimize built-upon surface area, direct stormwater runoff away from surface ~~waters~~waters, and

incorporate best management ~~practices~~practices, as defined in Rule .0202 of this Section, to minimize water quality impacts. If the local government selects the high density development option within that WS-II watershed, then engineered stormwater controls ~~must~~ shall be employed for the new development;

(F) If local governments choose the high density development option ~~which~~that requires stormwater controls, then they shall assume ultimate responsibility for operation and maintenance of the required controls as outlined in Rule .0104 of this Subchapter;

(G) ~~Minimum~~ A minimum 100 foot vegetative buffer ~~is~~ shall be required for all new development activities that exceed the low density option requirements as specified in Sub-Items (3)(b)(i)(A) and Sub-Item (3)(b)(ii)(A) of this Rule, otherwise a minimum 30 foot vegetative buffer for development activities ~~is~~ shall be required along all perennial waters indicated on the most recent versions of U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps or as determined by local government studies. Nothing in this Rule shall stand as a bar to artificial streambank or shoreline stabilization;

(H) No new development ~~is~~ shall be allowed in the buffer; water dependent structures, or other structures such as flag poles, ~~signs~~ signs, and security lights, which result in only de minimus increases in impervious area and public projects such as road crossings and greenways may be allowed where no practicable alternative exists. These activities shall minimize built-upon ~~surface area, direct runoff away from the surface waters and maximize the utilization of BMPs;~~surface area and avoid channelizing stormwater;

(I) No National Pollutant Discharge Elimination System(NPDES) ~~NPDES~~ permits shall be issued for landfills that discharge treated leachate;

(ii) Critical Area Nonpoint Source and Stormwater Pollution Control Criteria:

(A) Low Density Option: new development ~~is~~ shall be limited to either no more than one dwelling unit of single family detached residential development per two acres (or 80,000 square foot lot excluding roadway ~~right-of-way)~~right-of-way), or six percent built-upon area for all other residential and non-residential development; stormwater runoff from the development shall be transported by vegetated conveyances to the maximum extent practicable;

(B) High Density Option: if new development density exceeds the low density requirements specified in Sub-Item (3)(b)(ii)(A) of this Rule, then engineered stormwater controls ~~must~~ shall be used to control runoff from the first inch of rainfall; new residential and non-residential development density ~~not to~~ shall not exceed 24 percent built-upon area;

(C) No new permitted sites for land application of residuals or petroleum contaminated soils ~~are~~ shall be allowed;

(D) No new landfills ~~are~~ shall be allowed;

(c) MBAS (Methylene-Blue Active Substances): not greater than 0.5 mg/l to protect the aesthetic qualities of water supplies and to prevent foaming;

(d) Odor producing substances contained in sewage or other wastes: only such amounts, whether alone or in combination with other substances or wastes, as shall not cause taste and odor difficulties in water supplies ~~which~~that cannot be corrected by treatment, impair the palatability of fish, or have a deleterious effect upon any best usage established for waters of this class;

(e) Chlorinated phenolic compounds: not greater than 1.0 ug/l to protect water supplies from taste and odor problems from chlorinated phenols;

(f) Total hardness: not greater than 100 mg/l as calcium ~~carbonate;~~carbonate ($CaCO_3$ or Ca + Mg);

(g) Total dissolved solids: not greater than 500 mg/l;

(h) Toxic and other deleterious substances:

(i) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for non-carcinogens in Class WS-II waters:

(A) Barium: 1.0 mg/l;

(B) Chloride: 250 mg/l;

~~(C) Manganese: 200 ug/l;~~

~~(D)~~(C) Nickel: 25 ug/l;

~~(E)~~(D) Nitrate nitrogen: 10 mg/l;

~~(F)~~(E) 2,4-D: ~~100 ug/l;~~70 ug/l;

~~(G)~~(F) 2,4,5-TP (Silvex): 10 ~~ug/l;~~ ug/l; and

~~(H)~~(G) Sulfates: 250 mg/l;

(ii) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for carcinogens in Class WS-II waters:

(A) Aldrin: 0.05 ng/l;

(B) Arsenic: 10 ug/l;

(C) Benzene: 1.19 ug/l;

(D) Carbon tetrachloride: 0.254 ug/l;

(E) Chlordane: 0.8 ng/l;

(F) Chlorinated benzenes: 488 ug/l;

(G) DDT: 0.2 ng/l;

(H) Dieldrin: 0.05 ng/l;

(I) Dioxin: 0.000005 ng/l;

(J) Heptachlor: 0.08 ng/l;

(K) Hexachlorobutadiene: 0.44 ug/l;

(L) Polynuclear aromatic hydrocarbons (total of all PAHs): 2.8 ng/l;

(M) Tetrachloroethane (1,1,2,2): 0.17 ug/l;

(N) Tetrachloroethylene: 0.7 ug/l;

(O) Trichloroethylene: 2.5 ~~ug/l;~~ ug/l; and

(P) Vinyl Chloride: 0.025 ug/l.

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. May 10, 1979;
Amended Eff. January 1, 2015; May 1, 2007; April 1, 2003; January 1, 1996; October 1, 1995.

15A NCAC 02B .0215 is amended with changes as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0215 FRESH SURFACE WATER QUALITY STANDARDS FOR CLASS WS-III WATERS

The following water quality standards apply to surface waters within water supply ~~waters~~ watersheds ~~that are~~ classified as WS-III. Water quality standards applicable to Class C waters as described in Rule .0211 of this Section shall also apply to Class WS-III waters.

(1) The best usage of WS-III waters ~~are~~ shall be as follows: a source of water supply for drinking, culinary, or food-processing purposes for those users where a more protective WS-I or WS-II classification is not feasible and any other best usage specified for Class C waters;

(2) The conditions related to the best usage ~~are~~ shall be as follows: waters of this class are protected as water supplies ~~which~~ that are ~~generally~~ in low to moderately developed watersheds and meet average watershed development density levels as specified in Sub-Items (3)(b)(i)(A), (3)(b)(i)(B), (3)(b)(ii)(A) and (3)(b)(ii)(B) of this Rule; discharges that qualify for a General Permit pursuant to 15A NCAC 2H .0127, trout farm discharges, recycle (closed loop) systems that only discharge in response to 10-year storm events, and other stormwater discharges ~~are~~ shall be allowed in the entire watershed; treated domestic wastewater discharges ~~are~~ shall be allowed in the entire watershed but no new domestic wastewater discharges ~~are~~ shall be allowed in the critical area; no new industrial wastewater discharges except non-process industrial discharges ~~are~~ shall be allowed in the entire watershed; the waters, following treatment required by the ~~Division of Environmental Health,~~Division, shall meet the Maximum Contaminant Level concentrations considered safe for drinking, culinary, or food-processing purposes ~~which~~ that are specified in the national drinking water regulations and in the North Carolina Rules Governing Public Water Supplies, 15A NCAC 18C .1500. Sources of water pollution ~~which~~ that preclude any of these uses on either a short-term or long-term basis shall be considered to be violating a water quality standard. The Class WS-III classification may be used to protect portions of Class WS-IV water supplies. For reclassifications of these portions of WS-IV water supplies occurring after the July 1, 1992 statewide reclassification, the more protective classification requested by local governments shall be considered by the Commission when all local governments having jurisdiction in the affected area(s) have adopted a resolution and the appropriate ordinances to protect the watershed or the Commission acts to protect a watershed when one or more local governments has failed to adopt necessary protection measures;

(3) Quality standards applicable to Class WS-III Waters ~~are~~ shall be as follows:

(a) Sewage, industrial wastes, non-process industrial wastes, or other wastes: none shall be allowed except for those specified in Item (2) of this Rule and Rule .0104 of this Subchapter; none shall be allowed that have an adverse effect on human health or that are not ~~effectively~~ treated to the satisfaction of the Commission and in accordance with the

requirements of the ~~Division of Environmental Health, North Carolina Department of Environment and Natural Resources.~~Division. Any discharger may be required by the Commission to disclose all chemical constituents present or potentially present in their wastes and chemicals ~~which~~ that could be spilled or be present in runoff from their facility ~~which~~ that may have an adverse impact on downstream water quality. These facilities may be required to have spill and treatment failure control plans as well as perform special monitoring for toxic substances;

(b) Nonpoint Source and Stormwater Pollution: none that would adversely impact the waters for use as water supply or any other designated use;

(i) Nonpoint Source and Stormwater Pollution Control Criteria For Entire Watershed:

(A) Low Density Option: development density ~~must~~ shall be limited to either no more than two dwelling units of single family detached residential development per acre (or 20,000 square foot lot excluding roadway ~~right-of-way)~~ right-of-way), or 24 percent built-upon area for all other residential and non-residential development in watershed outside of the critical area; stormwater runoff from the development shall be transported by vegetated conveyances to the maximum extent practicable;

(B) High Density Option: if new development density exceeds the low density option requirements specified in Sub-Item (3)(b)(i)(A) of this Rule then development ~~must~~ shall control runoff from the first inch of rainfall; new residential and non-residential development shall not exceed 50 percent built-upon area;

(C) Land within the watershed shall be deemed compliant with the density requirements if the following condition is met: the density of all existing development at the time of reclassification does not exceed the density requirement when densities are averaged throughout the entire watershed area;

(D) Cluster development ~~is~~ shall be allowed on a project-by-project basis as follows:

(I) overall density of the project meets associated density or stormwater control requirements of this Rule;

(II) buffers meet the minimum statewide water supply watershed protection requirements;

(III) built-upon areas ~~are~~ shall be designed and located to minimize stormwater runoff impact to the receiving waters, minimize

concentrated stormwater flow, maximize the use of sheet flow through vegetated areas, and maximize the flow length through vegetated areas;

(IV) areas of concentrated development ~~are~~ shall be located in upland areas and away, to the maximum extent practicable, from surface waters and drainageways;

(V) remainder of tract to remain in vegetated or natural state;

(VI) area in the vegetated or natural state may be conveyed to a property owners association, a local government for preservation as a park or greenway, a conservation ~~organization~~ organization, or placed in a permanent conservation or farmland preservation easement;

(VII) a maintenance agreement for the vegetated or natural area shall be filed with the Register of Deeds; and

(VIII) cluster development that meets the applicable low density option requirements shall transport stormwater runoff from the development by vegetated conveyances to the maximum extent practicable;

(E) A maximum of 10 percent of each jurisdiction's portion of the watershed outside of the critical area as delineated on July 1, 1993 may be developed with new development projects and expansions of existing development of up to 70 percent built-upon surface area (the "10/70 option") in addition to the new development approved in compliance with the appropriate requirements of Sub-Item (3)(b)(i)(A) or Sub-Item (3)(b)(i)(B) of this Rule. For expansions to existing development, the existing built-upon surface area ~~is not~~shall not be counted toward the allowed 70 percent built-upon surface area. A local government having jurisdiction within the watershed may transfer, in whole or in part, its right to the ~~10 percent/70 percent~~10/70 option land area to another local government within the watershed upon submittal of a joint resolution and review by the Commission. When the water supply watershed is composed of public lands, such as National Forest land, local governments may count the public land acreage within the watershed outside of the critical area in figuring the acreage allowed under this provision. For local governments that do not choose to use the high density option in that WS-III watershed, each project ~~must,~~ shall, to the maximum extent practicable, minimize built-upon surface

area, direct stormwater runoff away from surface waters, and incorporate best management ~~practices~~ practices, as defined in Rule .0202 of this Section, to minimize water quality impacts. If the local government selects the high density development option within that WS-III watershed, then engineered stormwater controls ~~must~~ shall be employed for the new development;

(F) If local governments choose the high density development option ~~which~~ that requires engineered stormwater controls, then they shall assume ultimate responsibility for operation and maintenance of the required controls as outlined in Rule .0104 of this Subchapter;

(G) ~~Minimum~~ A minimum 100 foot vegetative buffer ~~is~~ shall be required for all new development activities that exceed the low density requirements as specified in Sub-Item (3)(b)(i)(A) and Sub-Item (3)(b)(ii)(A) of this Rule, otherwise a minimum 30 foot vegetative buffer for development ~~is~~ shall be required along all perennial waters indicated on the most recent versions of U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps or as determined by local government studies. Nothing in this Rule shall stand as a bar to artificial streambank or shoreline stabilization;

(H) No new development ~~is~~ shall be allowed in the buffer; water dependent structures, or other structures such as flag poles, ~~signs~~ signs, and security lights, which result in only de minimus increases in impervious area and public projects such as road crossings and greenways may be allowed where no practicable alternative exists. These activities shall minimize built-upon ~~surface area, direct runoff away from surface waters and maximize the utilization of BMPs;~~ surface area and avoid channelizing stormwater;

(I) No National Pollutant Discharge Elimination System (NPDES) ~~NPDES~~ permits shall be issued for landfills that discharge treated leachate;

(ii) Critical Area Nonpoint Source and Stormwater Pollution Control Criteria:

(A) Low Density Option: new development shall be limited to either no more than one dwelling unit of single family detached residential development per acre (or 40,000 square foot lot excluding roadway ~~right-of-way)~~ right-of-way), or 12 percent built-upon area for all other residential and non-residential development; stormwater runoff from the development shall be transported by vegetated conveyances to the maximum extent practicable;

(B) High Density Option: if new development exceeds the low density requirements specified in Sub-Item (3)(b)(ii)(A) of this Rule, then engineered stormwater controls ~~must~~ shall be used to control runoff from the first inch of rainfall; development shall not exceed 30 percent built-upon area;

(C) No new permitted sites for land application of residuals or petroleum contaminated soils ~~are~~ shall be allowed;

(D) No new landfills ~~are~~ shall be allowed;

(c) MBAS (Methylene-Blue Active Substances): not greater than 0.5 mg/l to protect the aesthetic qualities of water supplies and to prevent foaming;

(d) Odor producing substances contained in sewage, industrial wastes, or other wastes: only such amounts, whether alone or in combination with other substances or wastes, as shall not cause taste and odor difficulties in water supplies ~~which~~ that cannot be corrected by treatment, impair the palatability of fish, or have a deleterious effect upon any best usage established for waters of this class;

(e) Chlorinated phenolic compounds: not greater than 1.0 ug/l to protect water supplies from taste and odor problems from chlorinated phenols;

(f) Total hardness: not greater than 100 mg/l as calcium ~~carbonate;~~carbonate ($CaCO_3$ or Ca + Mg);

(g) Total dissolved solids: not greater than 500 mg/l;

(h) Toxic and other deleterious substances:

(i) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for non-carcinogens in Class WS-III waters:

(A) Barium: 1.0 mg/l;

(B) Chloride: 250 mg/l;

~~(C) Manganese: 200 ug/l;~~

~~(D)~~(C) Nickel: 25 ug/l;

~~(E)~~(D) Nitrate nitrogen: 10 mg/l;

~~(F)~~(E) 2,4-D: ~~100 ug/l;~~70 ug/l;

~~(G)~~(F) 2,4,5-TP (Silvex): 10 ~~ug/l;~~ ug/l; and

~~(H)~~(G) Sulfates: 250 mg/l;

(ii) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for carcinogens in Class WS-III waters:

(A) Aldrin: 0.05 ng/l;

(B) Arsenic: 10 ug/l;

(C) Benzene: 1.19 ug/l;

(D) Carbon tetrachloride: 0.254 ug/l;

(E) Chlordane: 0.8 ng/l;

(F) Chlorinated benzenes: 488 ug/l;

(G) DDT: 0.2 ng/l;

(H) Dieldrin: 0.05 ng/l;

(I) Dioxin: 0.000005 ng/l;

(J) Heptachlor: 0.08 ng/l;

(K) Hexachlorobutadiene: 0.44 ug/l;

(L) Polynuclear aromatic hydrocarbons (total of all PAHs): 2.8 ng/l;

(M) Tetrachloroethane (1,1,2,2): 0.17 ug/l;

(N) Tetrachloroethylene: 0.7 ug/l;

(O) Trichloroethylene: 2.5 ~~ug/l;~~ ug/l; and

(P) Vinyl Chloride: 0.025 ug/l.

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. September 9, 1979;
Amended Eff. January 1, 2015; May 1, 2007; April 1, 2003; January 1, 1996; October 1, 1995; October 1, 1989.

15A NCAC 02B .0216 is amended with changes as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0216 FRESH SURFACE WATER QUALITY STANDARDS FOR WS-IV WATERS

The following water quality standards apply to surface waters within water supply ~~waters that are~~ watersheds classified as WS-IV. Water quality standards applicable to Class C waters as described in Rule .0211 of this Section shall also apply to Class WS-IV waters.

(1) The best usage of WS-IV waters ~~are~~ shall be as follows: a source of water supply for drinking, culinary, or food-processing purposes for those users where a more protective WS-I, WS-II or WS-III classification is not feasible and any other best usage specified for Class C waters;

(2) The conditions related to the best usage ~~are~~ shall be as follows: waters of this class are protected as water supplies ~~which~~ that are ~~generally~~ in moderately to highly developed watersheds or protected areas and meet average watershed development density levels as specified in Sub-Items (3)(b)(i)(A), (3)(b)(i)(B), (3)(b)(ii)(A) and (3)(b)(ii)(B) of this Rule; discharges ~~which~~ that qualify for a General Permit pursuant to 15A NCAC 02H .0127, trout farm discharges, recycle (closed loop) systems that only discharge in response to 10-year storm events, other stormwater ~~discharges~~ discharges, and domestic wastewater discharges shall be allowed in the protected and critical areas; treated industrial wastewater discharges ~~are~~ shall be allowed in the protected and critical areas; however, new industrial wastewater discharges in the critical area shall be required to meet the provisions of 15A NCAC 02B .0224(1)(b)(iv), (v) and (vii), and 15A NCAC 02B .0203; new industrial connections and expansions to existing municipal discharges with a pretreatment program pursuant to 15A NCAC 02H .0904 ~~are~~ shall be allowed; the waters, following treatment required by the ~~Division of Environmental Health,~~Division, shall meet the Maximum Contaminant Level concentrations considered safe for drinking, culinary, or food-processing purposes ~~which~~ that are specified in the national drinking water regulations and in the North Carolina Rules Governing Public Water Supplies, 15A NCAC 18C .1500. Sources of water pollution ~~which~~ that preclude any of these uses on either a short-term or long-term basis shall be considered to be violating a water quality standard. The Class WS-II or WS-III classifications may be used to protect portions of Class WS-IV water supplies. For reclassifications of these portions of WS-IV water supplies occurring after the July 1, 1992 statewide reclassification, the more protective classification requested by local governments shall be considered by the Commission when all local governments having jurisdiction in the affected area(s) have adopted a resolution and the appropriate ordinances to protect the watershed or the Commission acts to protect a watershed when one or more local governments has failed to adopt necessary protection measures;

(3) Quality standards applicable to Class WS-IV Waters ~~are~~ shall be as follows:

(a) Sewage, industrial wastes, non-process industrial wastes, or other wastes: none shall be allowed except for those specified in Item (2) of this Rule and Rule .0104 of this Subchapter and none shall be allowed that ~~shall~~ have an adverse effect on human health

or that are not ~~effectively~~ treated to the satisfaction of the Commission and in accordance with the requirements of the ~~Division of Environmental Health, North Carolina Department of Environment and Natural Resources.~~Division. Any ~~dischargesdischargers~~ or industrial users subject to pretreatment standards may be required by the Commission to disclose all chemical constituents present or potentially present in their wastes and chemicals ~~which~~ that could be spilled or be present in runoff from their facility which may have an adverse impact on downstream water supplies. These facilities may be required to have spill and treatment failure control plans as well as perform special monitoring for toxic substances;

(b) Nonpoint Source and Stormwater Pollution: none shall be allowed that would adversely impact the waters for use as water supply or any other designated use.

(i) Nonpoint Source and Stormwater Pollution Control Criteria For Entire Watershed or Protected Area:

(A) Low Density Option: development activities ~~which~~ that require a Sedimentation/Erosion Control Plan in accordance with 15A NCAC 4 established by the North Carolina Sedimentation Control Commission or approved local government programs as delegated by the Sedimentation Control Commission shall be limited to no more than either: two dwelling units of single family detached development per acre (or 20,000 square foot lot excluding roadway ~~right-of-way)~~ right-of-way), or 24 percent built-upon on area for all other residential and non-residential development; or three dwelling units per ~~acre~~ acre, or 36 percent built-upon area for projects without curb and gutter street systems in the protected area outside of the critical area; stormwater runoff from the development shall be transported by vegetated conveyances to the maximum extent practicable;

(B) High Density Option: if new development activities ~~which~~ that require a Sedimentation/Erosion Control Plan exceed the low density requirements of Sub-Item (3)(b)(i)(A) of this ~~Rule~~ Rule, then development shall control the runoff from the first inch of rainfall; new residential and non-residential development shall not exceed 70 percent built-upon area;

(C) Land within the critical and protected area shall be deemed compliant with the density requirements if the following condition is met: the density of all existing development at the time of reclassification does not exceed the density requirement when densities are averaged throughout the entire area;

(D) Cluster development shall be allowed on a project-by-project basis as follows:

(I) overall density of the project meets associated density or stormwater control requirements of this Rule;

(II) buffers meet the minimum statewide water supply watershed protection requirements;

(III) built-upon areas ~~are~~ shall be designed and located to minimize stormwater runoff impact to the receiving waters, minimize concentrated stormwater flow, maximize the use of sheet flow through vegetated areas, and maximize the flow length through vegetated areas;

(IV) areas of concentrated development ~~are~~ shall be located in upland areas and away, to the maximum extent practicable, from surface waters and drainageways;

(V) remainder of tract to remain in vegetated or natural state;

(VI) area in the vegetated or natural state may be conveyed to a property owners association, a local government for preservation as a park or greenway, a conservation organization, or placed in a permanent conservation or farmland preservation easement;

(VII) a maintenance agreement for the vegetated or natural area shall be filed with the Register of Deeds; and

(VIII) cluster development that meets the applicable low density option requirements shall transport stormwater runoff from the development by vegetated conveyances to the maximum extent practicable;

(E) If local governments choose the high density development option ~~which~~ that requires engineered stormwater controls, then they shall assume ~~ultimate~~ responsibility for operation and maintenance of the required controls as outlined in Rule .0104 of this Subchapter;

(F) ~~Minimum~~A minimum 100 foot vegetative buffer ~~is~~ shall be required for all new development activities that exceed the low density option requirements as specified in Sub-Item (3)(b)(i)(A) or Sub-Item (3)(b)(ii)(A) of this Rule, otherwise a minimum 30 foot vegetative buffer for development shall be required along all perennial waters indicated on the most recent versions of U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps or as determined by local government studies;

(G) No new development shall be allowed in the buffer; water dependent structures, or other structures, such as flag poles, ~~signs~~ signs, and security lights, which result in only de minimus increases in impervious area and public projects such as road crossings and greenways may be allowed where no practicable alternative exists. These activities shall minimize built-upon ~~surface area, divert runoff away from surface waters and maximize the utilization of BMPs;~~ surface area and avoid channelizing stormwater;

(H) For local governments that do not use the high density option, a maximum of 10 percent of each jurisdiction's portion of the watershed outside of the critical area as delineated on July 1,. 1995 may be developed with new development projects and expansions to existing development of up to 70 percent built-upon surface area (the "10/70 option") in addition to the new development approved in compliance with the appropriate requirements of Sub-Item (3)(b)(i)(A) of this Rule. For expansions to existing development, the existing built-upon surface area shall not be counted toward the allowed 70 percent built-upon surface area. A local government having jurisdiction within the watershed may transfer, in whole or in part, its right to the ~~10 percent/70 percent~~ 10/70 option land area to another local government within the watershed upon submittal of a joint resolution for review by the Commission. When the designated water supply watershed area is composed of public land, such as National Forest land, local governments may count the public land acreage within the designated watershed area outside of the critical area in figuring the acreage allowed under this provision. Each project shall, to the maximum extent practicable, minimize built-upon surface area, direct stormwater runoff away from surface waters and incorporate best management ~~practices~~ practices, as defined in Rule .0202 of this Section, to minimize water quality impacts;

(ii) Critical Area Nonpoint Source and Stormwater Pollution Control Criteria:

(A) Low Density Option: new development activities ~~which~~ that require a Sedimentation/Erosion Control Plan in accordance with 15A NCAC 4 established by the North Carolina Sedimentation Control Commission or approved local government programs as delegated by the Sedimentation Control Commission shall be limited to no more than two dwelling units of single family detached development per acre (or

20,000 square foot lot excluding roadway ~~right-of-way)~~ right-of-way), or 24 percent built-upon area for all other residential and non-residential development; stormwater runoff from the development shall be transported by vegetated conveyances to the maximum extent practicable;

(B) High Density Option: if new development density exceeds the low density requirements specified in Sub-Item (3)(b)(ii)(A) of this Rule, engineered stormwater controls shall be used to control runoff from the first inch of rainfall; new residential and non-residential development shall not exceed 50 percent built-upon area;

(C) No new permitted sites for land application of residuals or petroleum contaminated soils shall be allowed;

(D) No new landfills shall be allowed;

(c) MBAS (Methylene-Blue Active Substances): not greater than 0.5 mg/l to protect the aesthetic qualities of water supplies and to prevent foaming;

(d) Odor producing substances contained in sewage, industrial wastes, or other wastes: only such amounts, whether alone or in combination with other substances or waste, as will not cause taste and odor difficulties in water supplies ~~which~~ that ~~can not~~ cannot be corrected by treatment, impair the palatability of fish, or have a deleterious effect upon any best usage established for waters of this class;

(e) Chlorinated phenolic compounds: not greater than 1.0 ug/l to protect water supplies from taste and odor problems due to chlorinated phenols shall be allowed. Specific phenolic compounds may be given a different limit if it is demonstrated not to cause taste and odor problems and not to be detrimental to other best usage;

(f) Total hardness shall not exceed 100 mg/l as calcium ~~carbonate;~~carbonate ($CaCO_3$ or Ca + Mg);

(g) Total dissolved solids shall not exceed 500 mg/l;

(h) Toxic and other deleterious substances:

(i) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for non-carcinogens in Class WS-IV waters:

(A) Barium: 1.0 mg/l;

(B) Chloride: 250 mg/l;

~~(C) Manganese: 200 ug/l;~~

~~(D)~~(C) Nickel: 25 ug/l;

~~(E)~~(D) Nitrate nitrogen: 10.0 mg/l;

~~(F)~~(E) 2,4-D: ~~100 ug/l;~~ 70 ug/l;

~~(G)~~(F) 2,4,5-TP (Silvex): 10 ~~ug/l;~~ ug/l; and

~~(H)~~(G) Sulfates: 250 mg/l;

(ii) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for carcinogens in Class WS-IV waters:

(A) Aldrin: 0.05 ng/l;

(B) Arsenic: 10 ug/l;

(C) Benzene: 1.19 ug/l;

(D) Carbon tetrachloride: 0.254 ug/l;

(E) Chlordane: 0.8 ng/l;

(F) Chlorinated benzenes: 488 ug/l;

(G) DDT: 0.2 ng/l;

(H) Dieldrin: 0.05 ng/l;

(I) Dioxin: 0.000005 ng/l;

(J) Heptachlor: 0.08 ng/l;

(K) Hexachlorobutadiene: 0.44 ug/l;

(L) Polynuclear aromatic hydrocarbons (total of all PAHs): 2.8 ng/l;

(M) Tetrachloroethane (1,1,2,2): 0.17 ug/l;

(N) Tetrachloroethylene: 0.7 ug/l;

(O) Trichloroethylene: 2.5 ug/l; and

(P) Vinyl Chloride: 0.025 ug/l.

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. February 1, 1986;
Amended Eff. January 1, 2015; May 1, 2007; April 1, 2003; June 1, 1996; October 1, 1995; August 1, 1995; June 1, 1994.

15A NCAC 02B .0218 is amended with changes as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0218 FRESH SURFACE WATER QUALITY STANDARDS FOR CLASS WS-V WATERS

The following water quality standards apply to surface waters within water supply ~~waters~~ watersheds ~~that are~~ classified as WS-V. Water quality standards applicable to Class C waters as described in Rule .0211 of this Section shall also apply to Class WS-V waters.

(1) The best usage of WS-V waters ~~are~~ shall be as follows: waters that are protected as water supplies ~~which~~ that are ~~generally~~ upstream and draining to Class WS-IV waters; or waters previously used for drinking water supply purposes; or waters used by industry to supply their employees, but not municipalities or counties, with a raw drinking water supply source, although this type of use ~~is not~~ shall not be restricted to WS-V classification; and all Class C uses. The Commission may consider a more protective classification for the water supply if a resolution requesting a more protective classification is submitted from all local governments having land use jurisdiction within the affected watershed;

(2) The conditions related to the best usage ~~are~~ shall be as follows: waters of this class are protected water supplies; the waters, following treatment required by the ~~Division of Environmental Health,~~Division, shall meet the Maximum Contaminant Level concentrations considered safe for drinking, culinary, or food-processing purposes ~~which~~ that are specified in the national drinking water regulations and in the North Carolina Rules Governing Public Water Supplies, 15A NCAC 18C .1500; no categorical restrictions on watershed development or wastewater discharges ~~are~~ shall be required, however, the Commission or its designee may apply management requirements for the protection of waters downstream of receiving waters (15A NCAC 02B .0203). Sources of water pollution ~~which~~ that preclude any of these uses on either a short-term or long-term basis shall be considered to be violating a water quality standard;

(3) Quality standards applicable to Class WS-V Waters ~~are~~ shall be as follows:

(a) Sewage, industrial wastes, non-process industrial wastes, or other wastes: none shall be allowed that have an adverse effect on human health or that are not ~~effectively~~ treated to the satisfaction of the Commission and in accordance with the requirements of the ~~Division of Environmental Health, North Carolina Department of Environment and Natural Resources.~~Division. Any discharges or industrial users subject to pretreatment standards ~~may~~ shall be required by the Commission to disclose all chemical constituents present or potentially present in their wastes and chemicals ~~which~~ that could be spilled or be present in runoff from their facility which may have an adverse impact on downstream water supplies. These facilities may be required to have spill and treatment failure control plans as well as perform special monitoring for toxic substances;

(b) MBAS (Methylene-Blue Active Substances): not greater than 0.5 mg/l to protect the aesthetic qualities of water supplies and to prevent foaming;

(c) Nonpoint Source and Stormwater Pollution: none that would adversely impact the waters for use as water supply or any other designated use;

(d) Odor producing substances contained in sewage, industrial wastes, or other wastes: only such amounts, whether alone or in combination with other substances or waste, as will not cause taste and odor difficulties in water supplies ~~which~~ that ~~can not~~ cannot be corrected by treatment, impair the palatability of fish, or have a deleterious effect upon any best usage established for waters of this class;

(e) Chlorinated phenolic compounds: not greater than 1.0 ug/l to protect water supplies from taste and odor problems due to chlorinated phenols; specific phenolic compounds may be given a different limit if it is demonstrated not to cause taste and odor problems and not to be detrimental to other best usage;

(f) Total hardness: not greater than 100 mg/l as calcium ~~carbonate;~~carbonate ($CaCO_3$ or Ca + Mg);

(g) Total dissolved solids: not greater than 500 mg/l;

(h) Toxic and other deleterious substances:

(i) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for non-carcinogens in Class WS-V waters:

(A) Barium: 1.0 mg/l;

(B) Chloride: 250 mg/l;

~~(C) Manganese: 200 ug/l;~~

~~(D)~~(C) Nickel: 25 ug/l;

~~(E)~~(D) Nitrate nitrogen: 10.0 mg/l;

~~(F)~~(E) 2,4-D: ~~100 ug/l;~~70 ug/l;

~~(G)~~(F) 2,4,5-TP (Silvex): 10 ~~ug/l;~~ ug/l; and

~~(H)~~(G) Sulfates: 250 mg/l.

(ii) Water quality standards (maximum permissible concentrations) to protect human health through water consumption and fish tissue consumption for carcinogens in Class WS-V waters:

(A) Aldrin: 0.05 ng/l;

(B) Arsenic: 10 ug/l;

(C) Benzene: 1.19 ug/l;

(D) Carbon tetrachloride: 0.254 ug/l;

(E) Chlordane: 0.8 ng/l;

(F) Chlorinated benzenes: 488 ug/l;

(G) DDT: 0.2 ng/l;

(H) Dieldrin: 0.05 ng/l;

(I) Dioxin: 0.000005 ng/l;

(J) Heptachlor: 0.08 ng/l;

(K) Hexachlorobutadiene: 0.44 ug/l;

(L) Polynuclear aromatic hydrocarbons (total of all PAHs): 2.8 ng/l;

(M) Tetrachloroethane (1,1,2,2): 0.17 ug/l;

(N) Tetrachloroethylene: 0.7 ug/l;

(O) Trichloroethylene: 2.5 ~~ug/l;~~ ug/l; and

(P) Vinyl Chloride: 0.025 ug/l.

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. October 1, 1989;
Amended Eff. January 1, 2015; May 1, 2007; April 1, 2003; October 1, 1995.

15A NCAC 02B .0220 is amended with changes as published in 28:24 NCR 3004-3032 as follows:

15A NCAC 02B .0220 TIDAL SALT WATER QUALITY STANDARDS FOR CLASS SC WATERS

General. The water quality standards for all tidal salt waters ~~are~~ shall be the basic standards applicable to Class SC waters. Additional and more stringent standards applicable to other specific tidal salt water classifications are specified in Rules .0221 and .0222 of this Section. Action Levels, for purposes of National Pollutant Discharge Elimination System (NPDES)[~~NPDES~~] permitting, are specified in Item (20) of this Rule.

(1) Best Usage of Waters: any usage except primary recreation or shellfishing for market purposes; usages include aquatic life propagation and maintenance of biological integrity (including fishing, fish and functioning ~~PNAs),~~ Primary Nursery Areas (PNAs)), wildlife, and secondary recreation;

(2) Conditions Related to Best Usage: the waters shall be suitable for aquatic life propagation and maintenance of biological integrity, wildlife, and secondary recreation. Any source of water pollution ~~which~~ that precludes any of these uses, including their functioning as PNAs, on either a short-term or a long-term basis shall be considered to be violating a water quality standard;

~~(3) Quality standards applicable to all tidal salt waters:~~

~~(a)~~(3) Chlorophyll a (corrected): not greater than 40 ug/l in sounds, estuaries, and other waters subject to growths of macroscopic or microscopic vegetation. The Commission or its designee may prohibit or limit any discharge of waste into surface waters if, in the opinion of the Director, the surface waters experience or the discharge would result in growths of microscopic or macroscopic vegetation such that the standards established pursuant to this Rule would be violated or the intended best usage of the waters would be impaired;

(4) Cyanide: 1 ug/l;

~~(b)~~(5) Dissolved oxygen: not less than 5.0 mg/l, except that swamp waters, poorly flushed tidally influenced streams or embayments, or estuarine bottom waters may have lower values if caused by natural conditions;

(6) Enterococcus, including *Enterococcus faecalis*, *Enterococcus faecium*, *Enterococcus avium* and *Enterococcus gallinarium*: not to exceed a geometric mean of 35 enterococci per 100 ml based upon a minimum of five samples within any consecutive 30 days. [~~In accordance with 33 U.S.C. 1313 (Federal Water Pollution Control Act) for~~]For purposes of beach monitoring and notification, "Coastal Recreational Waters Monitoring, Evaluation and Notification" regulations (15A NCAC 18A .3400), available free of charge at: http://www.ncoah.com/ , are hereby incorporated by reference including any subsequent amendments;

~~(c)~~(7) Floating solids, settleable solids, or sludge deposits: only such amounts attributable to sewage, industrial ~~wastes~~ wastes, or other wastes, as shall not make the waters unsafe or unsuitable for aquatic life and wildlife, or impair the waters for any designated uses;

~~(d)~~(8) Gases, total dissolved: not greater than 110 percent of saturation;

~~(e) Enterococcus, including *Enterococcus faecalis*, *Enterococcus faecium*, *Enterococcus avium* and *Enterococcus gallinarium*: not to exceed a geometric mean of 35 enterococci per 100 ml based upon a minimum of five samples within any consecutive 30 days. In accordance with 33 U.S.C. 1313 (Federal Water Pollution Control Act) for purposes of beach monitoring and notification, "Coastal Recreational Waters Monitoring, Evaluation and Notification" regulations (15A NCAC 18A .3400) are hereby incorporated by reference including any subsequent amendments;~~

(9) Metals:

(a) With the exception of mercury and selenium, tidal salt water quality standards for metals shall be based upon measurement of the dissolved fraction of the metals. Mercury and [~~Selenium~~] selenium [~~must~~] shall be based upon measurement of the total recoverable [~~metal.~~] metal; [~~Alternative site-specific standards can be developed where studies are designed according to the "Water Quality Standards Handbook: Second Edition" published by the US Environmental Protection Agency (EPA 823-B-94-005a) hereby incorporated by reference, including any subsequent amendments;~~]

(b) Compliance with acute instream metals standards shall only be evaluated using an average of two or more samples collected within one hour. 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;

[~~(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 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;~~]

(c) Metals criteria [~~will~~]shall be used for proactive environmental management. An instream exceedence of the numeric criterion for metals shall not be considered to have caused an adverse impact to the aquatic community without biological confirmation and a comparison of all available monitoring data and applicable water quality standards. This weight of evidence evaluation [~~will~~]shall take into account data quality and the overall confidence in how representative the sampling is of conditions in the waterbody segment before an assessment of aquatic life use attainment, or non-attainment, is made by the Division. Recognizing the synergistic and antagonistic complexities of other water quality variables on the actual toxicity of metals, with the exception of mercury and selenium, biological monitoring [~~will~~]shall be used to validate, by direct measurement, whether or not the aquatic life use is supported.

(d) Acute and chronic tidal salt water quality metals standards are as follows:

(i) Arsenic, acute: WER· 69 ug/l;

(ii) Arsenic, chronic: WER· 36 ug/l;

(iii) Cadmium, acute: WER· 40 ug/l;

(iv) Cadmium, chronic: WER· 8.8 ug/l;

(v) Chromium VI, acute: WER· 1100 ug/l;

(vi) Chromium VI, chronic: WER· 50 ug/l;

(vii) Copper, acute: WER· 4.8 ug/l;

(viii) Copper, chronic: WER· 3.1 ug/l;

(ix) Lead, acute: WER· 210 ug/l;

(x) Lead, chronic: WER· 8.1 ug/l;

(xi) Mercury, total recoverable, chronic: 0.025 ug/l;

(xii) Nickel, acute: WER· 74 ug/l;

(xiii) Nickel, chronic: WER· 8.2 ug/l;

(xiv) Selenium, total recoverable, chronic: 71 ug/l;

(xv) Silver, acute: WER· 1.9 ug/l;

(xvi) Silver, chronic: WER· 0.1 ug/l;

(xvii) Zinc, acute: WER· 90 [ug/l;]ug/l; and

(xviii) Zinc, chronic: WER· 81 ug/l;

With the exception of mercury and selenium, acute and chronic tidal saltwater quality aquatic life standards for metals listed above apply to the dissolved form of the metal and apply as a function of the pollutant's water effect ratio (WER). A WER [~~is a factor that~~] expresses the difference between the measures of the toxicity of a substance in laboratory waters and the toxicity in site water. The WER [~~is~~]shall be assigned a value equal to one [~~(1)~~] unless any person demonstrates to the [~~Department's~~]Division's satisfaction in a permit proceeding that another value is [~~appropriately~~] developed in accordance with the "Water Quality Standards Handbook: Second Edition" published by the US Environmental Protection Agency (EPA-823-B-12-002), free of charge, at http://water.epa.gov/scitech/swguidance/standards/handbook/, hereby incorporated by reference including any subsequent amendments. Alternative site-specific standards [~~can~~] may also be developed when any person submits values that demonstrate to the Commissions' satisfaction that they were derived in accordance with the "Water Quality Standards Handbook: Second Edition, Recalculation Procedure or the Resident Species [~~Procedure".~~]Procedure", hereby incorporated by reference including subsequent amendments at http://water.epa.gov/scitech/swguidance/standards/handbook/.

This material is available free of charge;

~~(f)~~(10) Oils, deleterious substances, ~~colored~~ colored, or other wastes: only such amounts as shall not render the waters injurious to public health, secondary ~~recreation~~ recreation, ~~or~~ aquatic ~~life~~ life, and wildlife or adversely affect the palatability of fish,

aesthetic ~~quality~~ quality, or impair the waters for any designated uses. For the purpose of implementing this Rule, oils, deleterious substances, ~~colored~~ colored, or other wastes shall include ~~but not be limited to~~ substances that cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines pursuant to 40 CFR 110.3;

(11) Pesticides:

(a) Aldrin: 0.003 ug/l;

(b) Chlordane: 0.004 ug/l;

(c) DDT: 0.001 ug/l;

(d) Demeton: 0.1 ug/l;

(e) Dieldrin: 0.002 ug/l;

(f) Endosulfan: 0.009 ug/l;

(g) Endrin: 0.002 ug/l;

(h) Guthion: 0.01 ug/l;

(i) Heptachlor: 0.004 ug/l;

(j) Lindane: 0.004 ug/l;

(k) Methoxychlor: 0.03 ug/l;

(l) Mirex: 0.001 ug/l;

(m) Parathion: 0.178 [ug/l;]ug/l; and

(n) Toxaphene: 0.0002 ug/l;

~~(g)~~(12) pH: shall be normal for the waters in the area, which ~~generally shall~~ range between 6.8 and ~~8.5~~ 8.5, except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions;

~~(h)~~(13) Phenolic compounds: only such levels as shall not result in fish-flesh tainting or impairment of other best usage;

(14) Polychlorinated biphenyls: (total of all PCBs and congeners identified) 0.001 ug/l;

~~(i)~~(15) Radioactive substances:

~~(i)~~(a) Combined radium-226 and radium-228: The ~~maximum~~ average annual activity level (based on at least one sample collected per quarter)~~four samples collected quarterly)~~ for combined radium-226, and radium-228 shall not exceed five picoCuries per liter;

~~(ii)~~(b) Alpha Emitters. The average annual gross alpha particle activity (including radium-226, but excluding radon and uranium) shall not exceed 15 picoCuries per liter;

~~(iii)~~(c) Beta Emitters. The ~~maximum~~ average annual activity level (based on at least one sample collected per quarter)~~four samples collected quarterly)~~ for strontium-90 shall not exceed eight picoCuries per liter; nor shall the average annual gross beta particle activity (excluding potassium-40 and other naturally occurring ~~radio-nuclides)~~ radionuclides exceed 50 picoCuries per liter; nor shall the ~~maximum~~ average annual activity level for tritium exceed 20,000 picoCuries per liter;

~~(j)~~(16) Salinity: changes in salinity due to hydrological modifications shall not result in removal of the functions of a PNA. Projects that are determined by the Director to result in modifications of salinity such that functions of a PNA are impaired ~~will~~ shall be required to employ water management practices to mitigate salinity impacts;

~~(k)~~(17) Temperature: shall not be increased above the natural water temperature by more than 0.8 degrees C (1.44 degrees F) during the months of June, July, and August nor more than 2.2 degrees C (3.96 degrees F) during other months and in no cases to exceed 32 degrees C (89.6 degrees F) due to the discharge of heated liquids;

(18) Trialkyltin compounds: 0.007 ug/l expressed as tributyltin;

~~(l)~~(19) Turbidity: the turbidity in the receiving water shall not exceed 25 Nephelometric Turbidity Units (NTU); ~~NTU;~~ if turbidity exceeds this level due to natural background conditions, the existing turbidity level shall not be increased. Compliance with this turbidity standard can be met when land management activities employ Best Management Practices (BMPs) [as defined by Rule .0202 of this Section] recommended by the Designated Nonpoint Source Agency (as defined by Rule .0202 of this Section). BMPs ~~must~~ shall be in full compliance with all specifications governing the proper design, installation, ~~operation~~ operation, and maintenance of such BMPs;

~~(m) Toxic substances: numerical water quality standards (maximum permissible levels) to protect aquatic life applicable to all tidal saltwaters:~~

~~(i) Arsenic, total recoverable: 50 ug/l;~~

~~(ii) Cadmium: 5.0 ug/l; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;~~

~~(iii) Chromium, total: 20 ug/l;~~

~~(iv) Cyanide: 1.0 ug/l;~~

~~(v) Mercury: 0.025 ug/l;~~

~~(vi) Lead, total recoverable: 25 ug/l; collection of data on sources, transport and fate of lead shall be required as part of the toxicity reduction evaluation for~~

~~dischargers that are out of compliance with whole effluent toxicity testing requirements and the concentration of lead in the effluent is concomitantly determined to exceed an instream level of 3.1 ug/l from the discharge;~~

~~(vii) Nickel: 8.3 ug/l; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators;~~

~~(viii) Pesticides:~~

~~(A) Aldrin: 0.003 ug/l;~~

~~(B) Chlordane: 0.004 ug/l;~~

~~(C) DDT: 0.001 ug/l;~~

~~(D) Demeton: 0.1 ug/l;~~

~~(E) Dieldrin: 0.002 ug/l;~~

~~(F) Endosulfan: 0.009 ug/l;~~

~~(G) Endrin: 0.002 ug/l;~~

~~(H) Guthion: 0.01 ug/l;~~

~~(I) Heptachlor: 0.004 ug/l;~~

~~(J) Lindane: 0.004 ug/l;~~

~~(K) Methoxychlor: 0.03 ug/l;~~

~~(L) Mirex: 0.001 ug/l;~~

~~(M) Parathion: 0.178 ug/l;~~

~~(N) Toxaphene: 0.0002 ug/l;~~

~~(ix) Polychlorinated biphenyls: (total of all PCBs and congeners identified) 0.001 ug/l;~~

~~(x) Selenium: 71 ug/l;~~

~~(xi) Trialkyltin compounds: 0.007 ug/l expressed as tributyltin.~~

~~(4)~~(20) Action Levels for Toxic ~~Substances:~~Substances Applicable to NPDES Permits:

(a) ~~Copper:~~Copper, dissolved, chronic: ~~3 ug/l;~~3.1 ug/l;

(b) ~~Silver:~~Silver, dissolved, chronic: 0.1 ug/l;

(c) ~~Zinc:~~Zinc, dissolved, chronic: ~~86 ug/l;~~81 ug/l

If the [~~chronic~~] ~~Action Levels~~ action levels for any of the substances listed in this ~~Subparagraph~~Item (which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream ~~characteristics~~ characteristics, or associated waste characteristics) ~~are~~ shall be determined by the waste load allocation to be exceeded in a receiving water by a discharge under the ~~specified low~~7Q10 flow criterion for toxic ~~substances (Rule .0206 in this Section),~~substances, the discharger shall ~~be required to~~ 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~~ action levels are listed in this ~~Subparagraph~~Item ~~may~~shall be limited as appropriate in the NPDES permit if sufficient information (to be determined for metals by measurements of that portion of the dissolved instream concentration of the ~~Action Level~~ 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. ~~NPDES permit limits may be based on translation of the toxic form to total recoverable metals. Studies used to determine the toxic form or translators must be designed according to: "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators.~~

History Note: *Authority G.S. 143-214.1; 143-215.3(a)(1);*
Eff. October 1, 1995;
Amended Eff. January 1, 2015; May 1, 2007; August 1, 2000.

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

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

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
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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

Connie,

Please accept these comments from the U.S. Environmental Protection Agency on the current North Carolina Triennial Review.

The EPA has provided earlier comments dated January 3, 2014 and August 20th, 2010, for this triennial review. We resubmit those comments in their entirety for your consideration for this triennial review as many of the revisions and comments remain the same. In particular, please note the comments in these letters that specifically address the proposed changes to the metals criteria, the low end hardness cap, the biological 'trump' and the action levels, as well as the request to ensure that the State submit the methods and analyses conducted to support the revised WQS as required by 40 CFR 131.6. This is important for all revisions but especially important for those areas that are not adopting federally recommended criteria (40 CFR 131.11(b)). We are also including as part of our comments EPA's February 4th, 2014, letter encouraging the State to consider adoption of the EPA's most recent ammonia and bacteria criteria. For those changes in our letters that NC does not intend to address in this triennial, we urge NC to fully evaluate in the next triennial.

In addition to those previous comments, we add the following:

1. Since the date of our January 3rd, 2014 letter, the EPA and NC Division of Water Resources have entered into a mutually agreed plan to develop numeric nutrient criteria. The work in that plan has already begun and the EPA looks forward to continuing to work with the State on that process so that numeric nutrient criteria can be adopted into the State WQS in a future triennial review as outlined in the milestone section of that plan.

2. The EPA attended the public hearings in both Raleigh and Statesville, NC on July 15th and 16th. During those hearings, numerous suggestions were made to modify the proposed metals criteria by including a multiplier of "x 1 WER" to allow for the use of a Water Effects Ratio. The EPA supports the use of this multiplier. Appendix L of the U.S. Environmental Protection Agency Wate. 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.
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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APPENDIX C

U.S. FISH AND WILDLIFE SERVICES LETTERS TO NORTH CAROLINA

United States Department of the Interior

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

August 22, 2014

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

Dear Ms. Brower:

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

Tom Augspurger

For Pete Benjamin
Field Supervisor

United States Department of the Interior

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

January 3, 2014

Connie Brower
North Carolina Department of Environment and Natural Resources
Division of Water Resources/Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Dear Ms. Brower:

This letter conveys the U.S. Fish and Wildlife Service's (Service) comments on potential revisions to North Carolina water quality regulations in Title 15A NCAC 02B .0100-.0110, .0201-.0228, .0230-.0231 and .0300-.0317, *Surface Water and Wetland Standards*. The Division of Water Resources (DWR), on behalf of the Environmental Management Commission (EMC), is seeking comments on water quality standards to protect human health and the aquatic environment. While no changes are proposed by the EMC at this time, DWR is seeking input required by the Clean Water Act's triennial review provisions.

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

We offer the following comments for DWR consideration in revising water quality standards. Our recommendations are focused on adoption of up-to-date water quality criteria (particularly for ammonia and metals) as State standards to reflect the latest science, adoption of final or interim nutrient standards for all fresh and estuarine waters, development of site-specific water quality standards in habitats important for endangered species recovery, and more explicit definition of instream flow requirements. We also procedurally encourage a more interactive approach to crafting revisions to take advantage of the expertise available in the State.

1) Adopt U.S. Environmental Protection Agency's (US EPA) 2013 Ammonia Water Quality Criteria

On August 22, 2013, the US EPA published new national recommended ambient water quality criteria for the protection of aquatic life from effects of ammonia in freshwater. Those criteria should now be adopted in North Carolina water quality standards as the state-wide foundation, and more protective standards should be pursued on a case by case basis in waters essential for recovery of endangered mollusks.

The 2013 criteria are current and have undergone extensive peer review

The US EPA revised ammonia criteria between 2004 and 2013; the new document is 242 pages, with three technical support documents and two responses to public and expert panel review comments totaling more than 1,000 pages. The 2013 ammonia criteria recommendations take into account freshwater toxicity information for ammonia available through 2012, and they include toxicity data for over 100 species in 69 genera (acute data) and 16 genera (chronic data). The US EPA provides a rationale for their recommendations drawn from these data in a transparent fashion.

The Service has previously provided DWR with published results of freshwater mussel toxicity data indicating the sensitivity of mussels to ammonia. We suggested development of State standards for ammonia during the 2001-2003 and 2004-2006 triennial reviews. The feedback at those times was that no changes would be made until US EPA completed re-evaluation of the ammonia criteria; those criteria are now ready for State implementation.

The 2013 criteria include data for species known to occur in North Carolina

The most sensitive species in the revised ammonia criteria are freshwater mussels (Family: Unionidae). Freshwater mussels are suspension-feeding bivalves. As biofiltering animals which historically occurred in high abundance in the State's waters, mussels provide important ecosystem services such as removing phytoplankton and suspended particulate matter from the water. Mussels also are long lived and on a population basis may store large amounts of nutrients that otherwise would be transferred downstream. Mussels play other important roles in the aquatic ecosystem: they provide food for other animals and help stabilize stream sediments.

There are about 300 species of freshwater mussels known from North America, and the revised criteria document has ammonia toxicity data for 17 of those species (Table 1). Among those 17 species are eight which are known from North Carolina, including three species federally-listed or petitioned to be listed as threatened or endangered. Water quality criteria typically have data for a very small fraction of the nation's aquatic life, as indicators of the sensitivity of the vast majority of taxa which remain untested. In the case of ammonia however, the criteria includes data for sensitive species known to occur in North Carolina which clearly indicates the need for the more protective limits to be applied here.

Adopting the criteria into standards is an important foundation for freshwater mussel conservation

Ammonia is a constituent of nitrogen pollution, and it is considered one of the most important pollutants in the aquatic environment because of its highly toxic nature and common occurrence, entering the environment directly in municipal and industrial wastewater discharges and runoff. The 2013 criteria recommend lower ammonia concentrations in the nation's waters – from 1.5 to 2.5 times less than those in effect previously under certain conditions. With the sensitivity of mollusks to ammonia and the many sources of ammonia, it is important that North Carolina adopt the new water quality criteria as State standards to better manage this potential limiting factor for freshwater mussels.

The laboratory studies upon which the criteria are based are supported by field observations. Ammonia has been a concern for freshwater mussel survival and recovery for over 30 years (e.g.,

Horne and McIntosh 1979, Wade et al. 1992, Goudreau et al. 1993). Recently, Strayer and Malcolm (2012) rule-out some potential factors limiting mussel recruitment but report a strong correlation between interstitial ammonia concentrations and recruitment failure. Haag's (2012) recent mussel conservation synthesis discusses ammonia as the type of factor that may have the temporal and geographic pervasiveness and trends to explain mussel declines nationwide.

In waters important for freshwater mussel recovery, more protective ammonia concentrations should be considered on a case by case basis

The US EPA 2013 ammonia criteria document indicates that where sensitive species occur at a site and sufficient data indicate that a criterion may not be sufficiently protective at that site, it is appropriate to consider deriving a site-specific criterion. US EPA's (2013) assessment endpoint (page 9) and conceptual model (page 18) indicate the national criteria are to protect populations and community structure:

> Criteria are designed to be protective of the vast majority of aquatic animal species in an aquatic community (i.e., approximately 95th percentile of tested aquatic animals representing the aquatic community). As a result, health of the aquatic ecosystem may be considered as an assessment endpoint indicated by survival, growth, and reproduction.

That perspective is a different goal than recovery of aquatic threatened and endangered mollusks. We recently presented results of a site-specific ammonia instream water quality target derivation (Augspurger 2013) which demonstrates a sound approach for deriving standards in waters important for mussel recovery. We also recently completed ammonia toxicity tests for four additional species of mussels that occur in North Carolina: the endangered Tar River spinymussel (*Elliptio steinstansana*), notched rainbow (*Villosa constricta*), yellow lampmussel (*Lampsilis cariosa*) and yellow lance (*Elliptio lanceolata*). We encourage that the 2013 USEPA ammonia criteria be adopted state-wide now. In certain areas, the 15A NCAC 02B .0110 *Considerations for Federally-Listed Threatened or Endangered Aquatic Species* provisions could then be used to provide standards focused on mussel recovery which would be lower than those recommended by US EPA in areas important for delisting, or preventing the need to list, imperiled mussels.

In summary, ammonia is a common pollutant for which a robust, expert-reviewed water quality criteria derivation has just been completed. Those criteria should be adopted in North Carolina water quality standards so that pollutant discharge permit limits, water quality use support ratings, total maximum daily load allocations, and nonpoint source pollution reduction targets are properly guided. Adoption should improve conditions for freshwater mollusks and other aquatic life; that's important in North Carolina's rivers and streams which include about 50 species of freshwater mussels, 66 species of freshwater snails, and 15 species of clams.

2) Adopt up-to-date metals criteria as State standards, but modified from those proposed in the unfinished 2008 - 2010 Triennial Review

Between January and March 2010, the DWR presented proposed amendments to the Water Quality Committee of the EMC then the full EMC. The EMC approved proceeding to hearings with the proposed rules, but they have been delayed for more than three years in economic

analyses. We reference our September 7, 2010 comments to you on those proposed changes which should move to public hearing. Some additional context on those changes is offered here.

North Carolina should adopt the dissolved metals criteria

The DWR proposed adoption of new standards for metals in 2010. The proposed changes will provide more protective standards in freshwater for chromium, copper, lead, nickel, and zinc; and in the saltwater environment for arsenic and lead. It is known that freshwater mussels are at the sensitive end of the range with regard to metal toxicity (March et al. 2007, Wang et al. 2007a, 2007b, 2009, 2010), so more stringent standards will provide a greater level of protection for them.

The Service is supportive of DWRs proposed regulation of metals on a dissolved rather than total recoverable basis. While there are concerns, the dissolved fraction is a better predictor of toxicity to aquatic life and therefore an advance in water quality management (one that many other states have already adopted). Our only concern with this approach is that in regulating based on dissolved metals, the fraction of metal bound to solids may go unregulated. From an aquatic toxicity perspective the dissolved fraction is the most appropriate form to regulate, therefore we support DWR's actions. But, from a more holistic environmental protection perspective, metals enriched on sediment particles could accumulate in sediments at concentrations of concern. Because there are no national sediment quality criteria or State sediment quality standards, we encourage the DWR to consider how regulation of metals in water will not create an unregulated burden in sediments. Some components of addressing this concern could include 1) continuing to measure total and dissolved metals in ambient and effluent samples (because there are metals for which particulate forms are important); 2) ensuring the new dissolved metals standards will be used / applicable to evaluating metals in sediment pore water too; and 3) establishing or adopting existing sediment quality benchmarks used elsewhere and a framework for incorporating them into the overall water quality management program in North Carolina.

Hardness Dependent Metals

Because the DWR's analyses indicate that a significant portion of the State periodically has hardness values equal to or less than 25 mg/L, the Service believes the proposed recommendation that numerical standards for hardness-dependent metals use a default hardness of 25 mg/L is a positive change. We note that waters with hardness less than 25 mg/L may continue to be under-protected by this approach, but we envision that site-specific use of hardness data allows a means to compensate for this when needed.

Other considerations

We encourage the DWR to more thoroughly consider revising two aspects of the 2010 proposed rule changes: the retention of action levels, in lieu of standards, for copper and zinc; and, the codification of biological diversity scores trumping numeric water quality standards in determining use attainment.

The rationale for retaining action levels versus more enforceable standards for copper and zinc is unclear to us. It appears that the analytical chemistry and toxicological considerations for interpretation of ambient copper data are no longer an issue. If there are implementation issues

that are limiting the development of standards, these should be made explicit along with a plan for how to address those issues in the future.

Our concern regarding biological monitoring and use of it to trump numeric ambient water quality standards for metals is that the biological monitoring is limited in terms of spatial, temporal and even ecosystem coverage. The State's well-recognized expertise in biological monitoring should not be a substitute for numerical water chemistry standards, especially in view of the spatial and temporal limitations of sampling. Further, the USEPA water quality criteria (upon which State standards are based) are often derived with databases that include taxa which are not part of biological monitoring in North Carolina. We know mussels, snails and cladocerans are at the sensitive end of the range for copper toxicity, as reflected in the criteria document and current literature on mussels. As noted above, it is also known that mussels are sensitive to zinc and lead relative to other tested freshwater organisms. However, mussels, snails, and cladocerans are not among the organisms with good metrics in our State's biological monitoring program (these species, known to be sensitive to metals, are not adequately covered by the biomonitoring program). As such, the numeric and biological portions of water quality standards are essential and complimentary, but one should not trump the other.

3) Adopt final or interim nutrient standards for all fresh and estuarine waters

U.S. EPA (2012) lists nutrient pollution as the leading causes of water quality impairment nationwide. Effects of elevated nutrients in lakes, rivers, and estuaries are well known and include severe impacts on fish and invertebrates from nuisance algal blooms resulting in oxygen depletion (with associated fish kills and reduced recruitment) as well as increased bacterial, harmful algal bloom-related biotoxin, aesthetic, and odor problems in both fresh and estuarine waters. These concerns are documented in lakes and estuaries of North Carolina (e.g., Paerl et al. 2004 and references therein, Isaacs et al. 2014). Strayer (2013) notes the concern with excessive nutrients for freshwater mussel conservation which, as noted above, is a focus for our office. While well-known and pervasive water quality concerns, it is troublesome that there are no State standards for nitrogen or phosphorous.

Because there are no aquatic life nitrogen or phosphorus standards for North Carolina's surface waters, damaging effects of nutrient over-enrichment have occurred at which time water quality impairment leads to time- and fiscal-intensive derivations of nutrient reduction targets which only apply to the impaired waterbody. This reactive approach is undesirable for a common water quality concern like nutrient enrichment (i.e., a widespread concern, likely to continue, with important ecological consequences). The US EPA and others have synthesized the science and recommended ecoregionally-appropriate standards for nitrogen and phosphorous that should be adopted now while more geographically-refined approaches are pursued later.

Adopting nitrogen and phosphorous standards should help in ameliorating nuisance algal blooms in lakes, estuaries and sounds in the future. New standards on these causal parameters of eutrophication would complement the State's eutrophication response standard, chlorophyll, and provide triggers for use support rating and for focusing actions to restore water quality and reduce nutrient loading. The monitoring system necessary for using nitrogen and phosphorous standards as a management tool is already in place in North Carolina (DWR Ambient Monitoring System, as well as data from discharge monitoring consortiums, university researchers, and U.S. Geological Survey) and should not add to costs required for monitoring.

4) Better use should be made of antidegradation and use restoration tools aimed at ecologically significant species and their habitat

The 15A NCAC 02B .0110 *Considerations for Federally-Listed Threatened or Endangered Aquatic Species* and 15A NCAC 02B .0101 (e) (7) *Unique Wetlands* rules are important provisions of State standards that have not been used to their full potential. Each includes mechanisms to provide locally-tailored water quality conservation actions to habitat important for survival and recovery of federally-listed threatened or endangered species. We have previously shared ideas for streamlining the development of these site-specific standards and continue to encourage that they be used to their fullest extent.

5) Establish flows that protect the ecological integrity of streams and rivers in North Carolina

The Service was a participant in the Ecological Flows Scientific Advisory Board (EFSAB), and we encourage adoption of a statewide approach to establishing ecological flows based on the simultaneous use of two strategies (EFSAB 2013):

1) The percentage of flow strategy using 80-90% flow-by combined with a critical low flow component as the ecological flow threshold. If the basinwide hydrologic models indicate that there is insufficient water available to meet all needs, essential water uses and ecological flows at a given location, then further review by North Carolina Department of Environment and Natural Resources (DENR) is recommended. [Flow-by is defined as "the percentage of ambient modeled flow that remains in the stream"]

2) The biological response strategy should be used to determine the current and future modeled biological condition of locations in the basinwide hydrologic models. DENR should evaluate the change in current and future biological condition as a decision criterion. A 5-10% reduction in biological condition is suggested as a threshold for further review by DENR.

As indicated in the final report, the flow requirements of listed species are not often fully understood. In order to conserve state and federally listed species, we support the EFSAB recommendations that the flow needs of these species should be considered by DENR in addition to the standard recommendations offered. For planning purposes, portions of basins that include listed species should be treated by DENR as needing additional analysis in consultation with WRC, NMFS, and USFWS. When a decision moves beyond planning, then applicable environmental review documents will be sought from appropriate agencies. We also encourage DENR and other appropriate agencies to support further research on the flow requirements of listed species.

6) Consider revision to the dissolved oxygen standard in important fish spawning areas

North Carolina's freshwater dissolved oxygen (DO) standard is not less than 6.0 mg/l for trout waters. For non-trout waters, the standard is not less than a daily average of 5.0 mg/l with a minimum instantaneous value of not less than 4.0 mg/l (NCDWQ 2007). The standards also contain a provision for swamp waters, lake coves or backwaters, and lake bottom waters to have lower values if caused by natural conditions. Those are similar to part of USEPA's (1986a, b) DO recommended *minimum* values which they define as foreseeing as having the potential for

production impairment to fish. Accordingly, the national criteria document also includes DO concentration recommended for "no production impairment" of 8 to 11 mg/L in waters important for Salmonids and 6.5 to 8 mg/L in non-Salmonid waters (USEPA 1986a, b). The Service encourages those be considered the lower end of water quality standards for waters known to be critically important spawning and nursery areas. At concentrations below these, larval mortality, altered growth, and behavioral changes have been reported in both field and lab studies (McMahon et al. 1982; Stuber et al. 1982).

Experience in fish culture, where the objective is to ensure robust spawning and survival of young (rather than conditions below which stress and other adverse effects are readily apparent) is relevant to this issue. Fish culturists identify DO concentrations >6 mg/l as desirable with optimal development of embryos and fry at or near the point of oxygen saturation (Piper et al. 1989). For example, published information on optimal DO ranges for larvae and juvenile striped bass are >6 to 12 mg/l (Hill et al. 1989; Nicholson et al. 1990). Higher DO standards in important fish nursery areas, based on conditions for robust fish production, would be helpful because ambient conditions in excess of standards are frequently allocated to assimilative capacity for oxygen consuming wastes.

7) Once existing criteria are established as State standards, reform the Triennial Review Advisory Committee to guide future revisions

The Service has interacted with the State on triennial reviews for more than 30 years. Over that time, the most productive and efficient exchanges were during the 1997-2000 triennial when a Triennial Review Advisory Committee was used throughout the process of scoping, modification, public hearing, and final revisions. That group included diverse stakeholders and got to consensus on the scope and content of revisions; the subsequent changes were adopted and on time. The State has an exemplary university system with extensive local expertise in water quality science and management which could better be used through a collaborative approach to rules review similar to the Triennial Review Advisory Committee.

Thank you for your consideration of these comments on potential revisions to North Carolina *Surface Water and Wetland Standards*. Several of the revisions we suggest should be done without delay based on the availability of technically-sound criteria to adopt as standards and the demonstrated need for revisions. Moving forward from those revisions, we would be pleased to participate in a collaborative venture to explore further changes to the State's rules for maintenance and restoration of water quality for the benefit of fish, wildlife and people. If you would like additional detail on any of our recommendations, please contact Tom Augspurger at tom_augspurger@fws.gov or 919-856-4520 x.21.

Sincerely,

Tom Augspurger

For Pete Benjamin
Field Supervisor

References:

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Table 1. Freshwater mussel species represented in the database used to calculate the ambient water quality criteria for the protection of aquatic life from effects of ammonia in freshwater (USEPA 2013).

Species	Status in North Carolina
Mucket, *Actinonaias ligamentina*	
Pheasantshell, *Actinonaias pectorosa*	
Dwarf wedgemussel, *Alasmidonta heterodon*	Occurs in NC, federally-listed as Endangered
Oyster mussel, *Epioblasma capsaeformis*	Occurred historically in NC - federally-listed as Endangered
Atlantic pigtoe, *Fusconaia masoni*	Occurs in NC
Pink mucket, *Lampsilis abrupta*	
Plain pocketbook, *Lampsilis cardium*	
Wavy-rayed lampmussel, *Lampsilis fasciola*	Occurs in NC
Higgin's eye, *Lampsilis higginsii*	
Neosho mucket, *Lampsilis rafinesqueana*	
Fatmucket, *Lampsilis siliquoidea*	
Green floater, *Lasmigona subviridus*	Occurs in NC, petitioned to be listed
Pink papershell, *Potamilus ohiensis*	
Giant floater, *Pyganodon grandis*	Occurs in NC
Paper pondshell, *Utterbackia imbecillis*	Occurs in NC
Ellipse, *Venustaconcha ellipsiformis*	
Rainbow, *Villosa iris*	Occurs in NC

USEPA. 2013. Aquatic life ambient water quality criteria for ammonia – freshwater. EPA 822–R–13–001. Office of Water, Office of Science and Technology, Washington, DC.