NC Triennial Review 2008-2014
Responsiveness Summary

40 CFR 131.20: State Review and Revision of Water Quality Standards -refers to compliance with 40 CFR 25. The US EPA requested additional clarification of considerations undertaken during the states Triennial Review. Specifically 40 CFR 25.8 -Responsiveness summaries:

> *"Each agency which conducts any activities required under this part shall prepare a Responsiveness Summary at specific decision points as specified in program regulations or in the approved public participation work plan. Responsiveness Summaries are also required for rulemaking activities under § 25.10. Each Responsiveness Summary shall identify the public participation activity conducted; describe the matters on which the public was consulted; summarize the public's views, significant comments, criticisms and suggestions; and set forth the agency's specific responses in terms of modifications of the proposed action or an explanation for rejection of proposals made by the public. Responsiveness Summaries prepared by agencies receiving EPA financial assistance shall also include evaluations by the agency of the effectiveness of the public participation program. Assisted agencies shall request such evaluations from any advisory group and provide an opportunity for other participating members of the public to contribute to the evaluation. (In the case of programs with multiple responsiveness summary requirements, these analyses need only be prepared and submitted with the final summary required.) Responsiveness summaries shall be forwarded to the appropriate decision-making official and shall be made available to the public. Responsiveness Summaries shall be used as part of evaluations required under this part or elsewhere in this chapter."*

The State received comments and suggestions throughout the timeframe of 2009 – 2014 with approximately 60 staff presentations to numerous interested parties and formal proceedings of the Environmental Management Commission, in accordance with state statutes (State of North Carolina's Administrative Procedures Act). The following is a brief synopsis of the comments received in either oral or written form throughout the process of developing revised water quality standards in accordance with the Clean Water Act and a summary of the state's evaluation and consideration of those comments, suggestions and or recommendations:

Metals (by topic):

- **Adoption of Dissolved/Equation-based Criteria/National Recommended Water Quality Criteria (NRWQC) for Metals**

  Stakeholder input:

  All interested parties exhibited general support for the adoption of published NRWQC for metals. Numerous private citizens expressed concern for the delays that had prolonged the adoption of the proposed revisions.

Federal agencies, private citizens, Non-Governmental Organizations (NGOs): supported NRWQC for metals in dissolved form and total forms.

Local governments/representatives of local governments, and industries: Support adoption of instream dissolved metals with *implementation* as NPDES total recoverable permit limits using US EPA approved translators. {Note: the US EPA translators are part of an implementation policy and are not "water quality standards"}

DEQ Response:

Previous North Carolina water quality standards for metals reflected total recoverable metal concentrations and were calculated to consider the toxic impact of all measurable forms of the specified metal present in the water column. Staff considered the fact that the use of Total Recoverable Metals may be overly conservative and recommended the change to aquatic life water quality standards (for most metals) to reflect the toxic impacts of the dissolved portion of the metals present in the ecosystem. Dissolved metals are currently understood to be the most important fraction to consider when looking at the toxic impacts of metals to aquatic organisms. The adopted rules continue to incorporate the use of total recoverable metal measurements for mercury and selenium, as these are bioaccumulative metals.

Additionally, North Carolina water quality standards for metals calculated to protect human health (ex. arsenic) were not proposed for revision and will continue to be expressed as total recoverable metals concentrations. This is appropriate as human exposure to toxicity from metals would not be specific to the dissolved metal concentration but could come from all metal forms present in a water body.

- **Adoption of Hardness Dependent Equation-Based Criteria**

Stakeholder input:

Adoption of hardness dependent equation-based water quality standards was supported by federal agencies, private citizens and local governments, and was discussed as far back as the previous Triennial Review. However, the discussions often varied widely as to how to implement the use of the hardness variable in both ambient and NPDES applications. NC DEQ received numerous comments, questions and suggestions related to the application of varying hardness values in the state's waters.

Local governments/representatives of local governments/industries with pre-treatment agreements supported the adoption of the median/mean instream hardness values for permitting purposes.

The US EPA supported a "floor" of hardness at 20 mg/L and noted that waters of the state are often below 25 mg/L.

DEQ Response:

Previous North Carolina water quality standards for hardness dependent metals were based upon the mean of hardness data from across the state (50 mg/l). While this application was progressive at the time of its adoption (other states were applying an "across the board" use of 100 mg/L), additional consideration of the more localized conditions of waters across the state was deemed appropriate and in line with public comments.

In determining an applicable hardness range to apply in NPDES permit limits, DEQ reviewed numerous EPA guidance documents, considered the actions of other states, and evaluated our available data in several contexts:

(1) adoption of a river basin default – area was deemed too large and water hardness could vary significantly over the span of the river,

(2) statewide adoption of a revised single number – although other states maintain this concept, NC determined that it did not answer the concerns that the public had over the wide ranges of hardness seen across the state

(3) examination of hardness values applicable to NPDES permit limits, at the 10th percentile , as a mean or median of an 8-digit, 10-digit or 12-digit HUC - North Carolina has an extensive data set which enabled a review of "location relevant" data. Starting with the 12-digit HUC, the scale was deemed too small, only ~ 30 % of the 12-Digit HUCs had sampling stations. The 10-digit HUC scale offered possibilities, as ~73% had at least one sampling station. Using an 8digit HUC evaluation point, there were 53 HUCs (subbasin scale) with ~91 % of them having at least one monitoring station. The strength of the data set in each subbasin made it ideal for a uniform, normalized assessment to be applied to dischargers, while protecting downstream uses. Early drafts of the 15A NCAC 02B proposed modifications to the hardness dependent metals limits were reflected at the 10th percentile of the data set. The Hearing Officer for the EMC determined that a significant number of comments raised the question that this choice was overly conservative and approved language to be modified that incorporates the use of the mean of the hardness data within the 8-digit HUC for NPDES permitting purposes.

While US EPA Region IV has recommended the use of values for hardness below 25 mg/L, and has noted correctly that NC waters may be below 25 mg/L hardness in some areas of the state, EPA has also struggled with recommendations for the application of hardness values when the hardness of fresh surface water is less than 25 mg/L. US EPA expresses concern that the use of 25 mg/l hardness as a floor may not be fully protective and in EPA-822-R-02-047 states that, "available toxicity data in this range for copper, zinc and cadmium (EPA 44015-84-03 1, EPA 44015-87-003, and EPA-822-R-01-001) are somewhat limited, and are quite limited for silver, lead, chromium III and nickel (EPA 44015-80-071, EPA 44015-84-027, EPA 44015-84-029 and EPA 44015-86-004). Even fewer data are available below 20 mg/l hardness for copper, zinc and cadmium and none are available for silver, lead, chromium III and nickel. EPA evaluated these limited data, available in the current metals' criteria documents, and determined that they are inconclusive."

NC DWR staff heard concerns from the regulated community that lack of sufficient aquatic toxicity data at the lower hardness may be overly protective and noted that aquatic toxicity laboratories have

a difficult time maintaining hardness in laboratory conditions below 25 mg/l so justification that the toxicity can be extrapolated to such levels would be a challenge. With this in mind, NC DEQ publicly noticed the ability to use a WER to assure that numerical applications were protective. This modification was met with support from most commenters.

In determining an applicable hardness to use for instream water quality assessments, again DEQ reviewed numerous EPA guidance documents, considered the actions of other states, and evaluated our ambient monitoring collection of data to determine the most accurate method of collecting samples that would be representative of the revised standards. As the revised North Carolina regulations incorporate the current NRWQC hardness-dependent equations or, in the case of Cadmium, a modified NRWQC, as the water quality standards, it was determined that direct measurement of hardness in an ambient water body could be accomplished by collecting a sample to be analyzed in the laboratory along with the metals analysis. The ambient hardness of water can be measured and factored into the equations creating a sample-to-sample water quality standard that is then compared to the actual ambient sample reported result for assessment purposes. We remain confident that this approach will provide a much clearer idea of potential impacts to aquatic life.

- **Adoption of NRWQC for acute metals criteria**

Stakeholder input:

All interested parties cited agreement that an acute criterion, along with our current (and revised) chronic criterion would be useful for proper decisions on the quality of NC waters. Many concerned municipalities and regulated parties had shown concern that waters were being 303(d) listed as "impaired" – when data was collected in a manner that did not clearly indicate a chronic impact.

Numerous parties (local government, federal agencies, private citizens, NGOs) expressed concern about funding for adequate monitoring.

DEQ Response:

Previously, North Carolina had language that implied that metals standards existed as a concentration of a metal in the water column that was equivalent to a "never to exceed value" or a "maximum concentration". As these metals standards were meant to be calculated for the protection of chronic (long term) impacts, the application of a "maximum" "never to exceed" value was incorrect. Therefore, adoption of an acute criterion was deemed appropriate as it would better represent our intentions with respect to assessments of waters.

In revising North Carolina's standards to address updated numerical criteria, NC DWR followed revisions to many 1980's and 1990's criteria documents that included both acute and chronic expressions of the numerical concentrations. Additionally, NC DEQ identified mechanisms for assuring that samples were collected in a uniform manner for assessments purposes. The regulated

communities have worked with DEQ to develop sampling plans that are reasonable, cost effective and practical to implement across the state.

- **Allowance of a Water Effects Ratio (WER) to be applied to water quality standards for metals.**

  Stakeholder input:

  During the public notice of November 1, 2013 – January 3, 2014 and over the months that followed, numerous commenters requested the ability to apply the Water Effects Ratio to the applicable water quality standards for metals. With this question in mind, public comments on this policy were specifically requested in the *NC Register,* Notice of Text, June 14, 2014. (See text below.)

  DEQ Response:

  The following text appeared in the NC Register: "variances from applicable standards, revisions to water quality standards, or site-specific water quality standards may be granted by the Environmental Management Commission on a case-by-case basis pursuant to GS 143-215.3(e), 143-214.3 or 143-214.1. For metals standards, the proposed language details that alternative site-specific standards can be developed when 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). The mechanisms outlined in the US EPA publication are for the Water Effect Ratio, the Recalculation Procedure, and the Resident Species Procedure."

  After reviewing other states use of WER in standard derivation, and discussions with EPA staff, DWR staff recommended to the EMC that the addition of the WER language would not alter any permittees ability to use the Water Effects Ratio, and would not alter other uses of a site-specific derivation. The addition of the text would however, make it more straightforward for DWR to allow the use of a site-specific standard to be derived by a WER, in accordance with US EPA protocol, if desired by any party.

  The EMC, after public hearing and comments, allowed the application of the WER with respect to modifying the metals criteria.

- **Adoption of NRWQC for Arsenic for the Protection of Aquatic Life**

  Stakeholder input:

  This proposal was not supported by private citizens and NGOs, citing a decreased protection of aquatic life and/or human health.

DEQ Response:

It became apparent that most responders were unfamiliar with how water quality standards are designed to protect for various designated uses. The opinions expressed were that, by adopting the NRWQC for arsenic, the numeric aquatic life criterion would be allowed to increase to the point that aquatic life would/could be harmed. In reality, the previous NC water quality standard for arsenic (50 ug/l), as it appeared in the NC Water Quality Standards in March 1, 1977, was based upon the State of California's Water Quality Criteria; Second Edition (1963). It was established by California for the protection of domestic water supplies and its inclusion within the NC regulations offered protection for aquatic life that was lower than that recommended by the US EPA at the time and served a dual purpose of protecting water supplies as well.

The EMC and RRC, after the required public hearings and review, adopted the "1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water (EPA 820-B-96-001) (1995) for dissolved arsenic for the protection of aquatic life as published.

- **Adoption of Aquatic Life Protective Chromium VI Criteria and Chromium III criteria/ Elimination of Total Chromium values**

Stakeholder input:

Generally supported by federal agencies, private citizens and NGOs. Most cited importance of noting toxicity of Cr VI and regulating appropriately for protection of human health and aquatic life.

DEQ Response:

The previous NC criteria for total chromium was derived using recommendations for chromium III in the "1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water" (EPA-820-B-96-001; September 1996) at an assumed statewide hardness of 50 mg/l. While it is not clear in the historical records, it is presumed that no standard was adopted for chromium III as no analytical method for the chromium III species existed, and a separate chromium VI criterion was (likewise) not established due to the limits of quantitation for chromium VI at the time. The previous saltwater standard of 20 ug/l total chromium is assumed to be from the US EPA "Quality Criteria for Water: 1986: EPA 440/5-86-001" (or, The "Gold Book") as derived using regulations in 15A NCAC 02B .0200:

After review of the guidance on chromium III and chromium VI issued in "National Recommended Water Quality Criteria-Correction; EPA 822-Z-99-001; April 1999, (62 FR 42160), North Carolina determined that adoption of speciated chromium values would more closely align with concerns over the toxicities of these in aquatic environments and would potentially eliminate any over-protectiveness that may occur with an evaluation of Total Recoverable Chromium (Cr III + Cr VI). These US EPA freshwater criterion (1999) were a modification of previously published 304(a) aquatic life criteria that

were issued in the "1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water" (EPA-820-B-96-001, September 1996). The values were derived using GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A).

- **Maintenance of "Action Level" Regulations with respect to NPDES Permits**

  Stakeholder input:

  Maintenance of the "Action Level" policy was not supported by the US EPA, nor the NGOs and most of the private citizens that commented on the topic. US EPA states that the policy is not in alignment with 40 CFR 122.44(1)(i), the Clean Water Act, and Section 304(a) national recommendations (NRWQC). Most comments indicated a potential for effluent limits to be established that did not protect the designated uses, and permit limits that provided a decreased protection of aquatic life and/or human health. Conversely, the regulated parties (local governments, industries, representatives of local governments) across the state consistently supported the use of Action Levels in the permitting process as an adequate means, combined with Whole Effluent Toxicity testing, to assure that waters were protected from discharges.

  DEQ Response:

  No proposals were made to eliminate "Action Level" policies.

  It is important to note that the proposed regulations in 15A NCAC 02B .0211 and .0220 modify the numerical concentration (by equation), but maintain instream water quality standards for Copper, Silver and Zinc.

  In 1984, North Carolina adopted Action Level water quality policies for copper, zinc, iron, and silver with respect to NPDES permitting activities. This adoption did not alter the instream water quality standards for these parameters. These policies were developed to allow dischargers some flexibility in meeting the NPDES permit limits derived from the applicable instream water quality standards. The regulatory language was written to permit an examination of the bioavailability of the metal, using Whole Effluent Toxicity (WET) testing. Under the Clean Water Act, the state has primacy for establishment of water quality standards and classifications; EPA must approve all state standards and reclassifications. In 1985, 1986 and 1990 when EPA reviewed the action level water quality policies, in conjunction with the applicable water quality standards, they only conditionally approved the policies and subsequently requested information on how the Action Level policies would be implemented. The implementation procedure presented to EPA involved establishing WET testing limits and monitoring for discharges with the metals in their effluent. No permit limits for the metals were to be given if the facility continued to pass their WET limits or if upon failure of the WET testing an action level parameter was not found to be a causative factor. The Division's implementation procedure was reviewed by EPA and reworked by the Division several times during 1999 and 2000 before EPA finally approved it in October 2000. The implementation procedures will be rewritten to

address the adoption of dissolved metals.

The EMC, after review and examination, supported maintenance of the Action Level implementation policy for metals.

- **Removal of Iron and Manganese from Applicable Metal Standards**

  Stakeholder input:

  Support/Concern with these proposals was mixed. The comments received were varied in nature and in content, with some commenters noting possible human health concerns, and other noting that the US EPA does not recognize either as a particularly harmful issue

  DEQ Response:

  The two elements are not currently known to disrupt public water supplies, nor designated uses.

  North Carolina surface water monitoring data indicates levels of iron that are quite often higher than the State's existing water quality criterion of 1000 ug/L. Surface water monitoring results from NC DWR's basinwide assessment reports indicated exceedances of the iron criteria in every basin. Evaluations of elevated levels did not correlate with individual dischargers, urban settings nor mining operations, but instead show a generally increasing value from the Blue Ridge area through the Piedmont area and to the coastal Southeastern Plain.

  Likewise, as higher concentrations were seen in areas of the state predicted to be influenced by inflow of groundwater, an assessment of groundwater quality data from research stations and ambient groundwater quality monitoring wells across North Carolina was evaluated to estimate the average concentration of iron in groundwater. While groundwater concentrations varied widely from one location to another, data indicated that iron occurs naturally at significant concentrations in the groundwaters of NC.

  DEQ evaluated regulations at 40 CFR 131.11 that States must adopt "those water quality criteria that protect the designated use." Further 40 CFR Part 122.44 requires that both numeric and narrative criteria be considered when establishing appropriate effluent limits. This standard (located in 15A NCAC 02B .0211) was originally derived using the National Recommended Water Quality Criteria for the protection of freshwater aquatic life as noted in the "Red Book" (EPA 440/9-76-023, July 1976). While the records indicate that NC adopted the iron criterion in March of 1977, it is challenging for the state to continue to defend it when the criterion was, and remains, based upon field data (1937) that observed healthy fish fauna at upwards of 10 mg/l.

  Additionally, the NRWQC for the non-priority pollutant also appears to have chosen the iron value based upon field observations and recognized the ameliorating effects ambient waters (alkalinity, pH, temperature and ligands) have on iron toxicity and 1993 USGS studies chose a number of water

bodies to represent natural conditions across the state and found that iron values ranged from < 10 ug/l to 8900 ug/l. Noting these values in "natural waters", the standard established at 1000 ug/l was determined to be unnecessary and potentially overly protective. NC further believes that removal of the iron standard from the current 15A NCAC 02B regulations will not cause any adverse effects on water quality and on any designated uses.

Manganese is one of the most abundant metals and is prevalent in North Carolina waters. NC DWR reviewed the existing manganese criterion for human health protection, examined surface water data and groundwater monitoring data for manganese from across the state, and evaluated the needs of the state in regulating potential manganese concentrations.

North Carolina surface water monitoring data indicated levels of manganese that were quite often higher than the State's water quality criterion in Water Supply classified waters. This finding was supported by two USGS reports (92-4129 & 2185 A-D) that showed varying levels of manganese occurring naturally in surface waters across the state as a result of local geography and high flow and suspended sediment conditions induced by stormwater runoff.

An evaluation of groundwater quality data from research stations and ambient groundwater quality monitoring wells across North Carolina (2001-2007) was used to estimate the average concentration of manganese in groundwater. The groundwater samples were taken primarily from dedicated groundwater quality monitoring wells, but a few samples from the coastal plain were obtained from private water supply wells.

The data indicated that concentrations of manganese in groundwater vary widely throughout the state, ranging from 41 ug/L to 221 ug/L, and that manganese occurs naturally at significant concentrations in the groundwater of NC.

Ingestion of manganese via consumption of water and fish was investigated for human health protection. After careful review, we could not determine that the manganese standard provided a measureable human health protective benefit and proposed to withdraw it from regulations. The following is a synopsis of staff review:

- *The chemical is considered a non-priority pollutant by US EPA*
- *The current "water and fish ingestion" criterion published by US EPA predates the 1980 methodology and therefore does not utilize fish ingestion bioconcentration factor (BCF) approaches. It is not based upon human health effects and the US EPA has not recommended a water and fish ingestion value for human health protection.*
- *The US EPA, under the Safe Drinking Water Act, has not published a Maximum Contaminant Level (MCL) for manganese.*
- *The US EPA, under the Safe Drinking Water Act, has published a Secondary Maximum Contaminant Level (MCL) for manganese of 50 µg/l. NC DWR believes that this guidance could be used by water suppliers, if ever warranted, to protect users from objectionable taste and/or staining of laundry.*
- *NC DWR has no evidence to conclude that discharges of manganese will impact any designated uses of NC's waters.*
- *North Carolina does not need a numeric manganese criterion to protect waters supplies based upon organoleptic effects. North Carolina has an applicable criterion in 15A NCAC*

02B .0211 (12) that 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 waters for any designated uses…."

- *The current manganese standard was a negotiated number with the US EPA (Adopted 1993) after consultation with NC Public Health officials. Records indicate that the state did not, even at that time, believe that ill effects from manganese were occurring and noted high naturally occurring levels of manganese.*

The EMC, after public notice and review, approved removal of the water quality standards for both iron and manganese.

- **Cadmium Criteria Recalculation**

Stakeholder input:

The recalculation of the NRWQC for Cadmium is an acceptable mechanism under the Clean Water Act and was in accordance with the requirements for derivation as noted in the Water Quality Standards Handbook. It is supported by federal agencies, local governments/representatives of local governments. Non-governmental Organizations cite that the calculation is inadequately protective of aquatic life because it is numerically higher than the federal.

DEQ Response:

While the NC adopted Cadmium criterion is numerically higher than the NRWQC, it is equally protective of the species known to inhabit the state's waters based upon use of toxicity assessments relevant to our waters. All relevant materials were submitted in support of the recalculation.

- **Revision of current Mercury standard, adoption of Methyl Mercury Criteria (water column and/or and fish tissue), and development of a mercury TMDL**

Stakeholder input:

No proposals were made by NC DWR to modify the current Mercury standard, nor were proposals made to add a criterion for Methyl Mercury for fish tissue or ambient water.

Revised mercury (or methyl mercury) standards for either the water column or the addition of methyl-mercury fish tissue criterion were supported by federal agencies, private citizens and NGOs.

DEQ response:

Total Mercury

The existing NC total mercury freshwater water column standard of 12 ug/L was based on EPA's "Quality Criteria for Water: Mercury, 1986"(EPA 440/5-86-001) using the freshwater Final Residual

Value (fish tissue) as discussed in "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (Stephan et al 1985).

Methyl Mercury

For methyl mercury, North Carolina reviewed the criterion published in EPA's 2001 "Water Quality Criterion for the Protection of Human Health: Methyl Mercury" (EPA-823-R-01-001) and, after working with numerous federal and state workgroups, determined that the state would await release of the EPA 2010 "Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion" before attempting to propose adoption of a methyl mercury fish tissue or water quality standard.

NC DWR recognized that the ultimate goal was to reduce mercury concentrations in the water column to achieve reductions to fish tissue. After a thorough review of the 2010 Implementation Guidance and potential instream numbers, NC considered adoption of a methyl mercury criterion using the options provided by EPA:

- *Adopt the 2001 criterion/other scientifically defensible criterion as a fish tissue residue concentration, and implement it without water column translation; or*
- *Adopt a water column concentration, using the translation methodologies outlined and implement it using traditional approaches (a "back-calculation"); or*
- *Use a combination of the above approaches. (Adopt a fish tissue criterion, implement it without water column translation for some/all waters, maintain/translate the criterion to water column values for some/all waters; investigate other options/pathways to minimize mercury)*

TMDL Development and Criteria Examination

The Division had undertaken significant steps (beginning late 2008) to develop a statewide TMDL for Mercury (approved by the US EPA on October 12, 2012). The goal of the TMDL was to estimate the proportions of mercury contributions to water and fish from wastewater discharges, in-state air sources, and out-of-state air sources, and to calculate appropriate reductions needed.

As the federal Clean Water Act requires that a Margin of Safety (MOS) be included in a TMDL to account for uncertainty that may be present in the calculations, the MOS contained conservative assumptions used to develop this TMDL. These assumptions also aligned with those noted in the national methylmercury fish tissue criterion documents.

- *The 90th percentile fish mercury concentration based on a standardized-length largemouth bass was used. As largemouth bass are predator fish and tend to have relatively higher concentrations of mercury among fish species commonly caught in North Carolina waters, use of the 90th percentile Largemouth Bass incorporates a margin of safety into the TMDL analysis.*

- *The US EPA fish tissue mercury criterion of 0.3 mg meHg / kg fish tissue was used as the target level for the TMDL development, with the goal to have safe-level mercury concentrations in fish caught in North Carolina waters, and the fish consumption advisory in NC could be removed.*

- *The EPA fish tissue criterion are based on concentrations of methylmercury. The state measures total mercury in fish instead of methylmercury. Approximately 90 percent of total mercury in fish is methylmercury, so if NC is meeting a concentration of 0.3 mg total mercury /kg fish, the concentration of methylmercury is actually about ten percent lower than this value, allowing for another level of added human health protection.*

The approved Mercury Statewide TMDL protects for the concentration of 0.3 mg/kg methylmercury proposed US EPA criterion. Therefore, NC did not proposed any modifications to the current standards as protective mechanisms are already established by an approved NPDES monitoring strategy as well as an approved TMDL. NC will reevaluate this consideration in future Triennial Reviews. Additional supporting information is located:

http://portal.ncDEQ.org/web/wq/ps/mtu/tmdl/tmdls/mercury

- **Biological Assessment Used in Conjunction with Chemistry for Water Body Assessments**

Stakeholder input:

This provision was not supported by federal agencies, private citizens and NGOs, citing that biological indicators are more restorative in nature – as opposed the Clean Water Act mandate to protect water quality.

The regulated community supported the effort to more completely and thoroughly assess the conditions of the waters before making decisions of the waters attainment of uses

DEQ response:

North Carolina DEQ, is concerned with maintaining protections for surface waters and making justifiable determinations that environmental impacts have occurred, or have not occurred. In reviewing the revised metals proposals, we were reminded often that the capability of a laboratory to accurately measure many of these criteria in a wastewater or surface water matrix was a challenge. This represented a problem to our regulated parties and to our assessment programs, as we wanted to always represent, to the best of our ability, the extent of impacts in a clear and definitive manner.

North Carolina decided to further its use of biocriteria in its decision making efforts. The Biological Assessment Branch of NC DWR is charged with evaluating the water quality of streams and rivers using the biological communities that live there. The group is divided into two areas of expertise: fisheries, and benthic macroinvertebrates. These biological communities reflect both long and short-term environmental conditions given the variety of life cycles these organisms exhibit (from less than one to several years in duration). NC DWR's biocriteria have been developed using the diversity, abundance, and pollution sensitivity of the organisms that inhabit lotic (flowing) waterbodies in NC. One of five bioclassifications are typically assigned to each water body sampled. These bioclassifications, are used to assess the various impacts of both point source discharges and nonpoint source runoff. The resulting information is used to document both spatial and temporal changes in water quality, and to complement water chemistry analyses, ambient toxicity data, and

habitat evaluations. The idea of bioconfirmation seeks to address challenges in making proper environmental decisions when measuring the concentrations of metals at or near the limits of quantitation.

NC DWR staff, working with the Hearing Officer and reviewing stakeholder comments on analytical reliability, proposed, and the EMC adopted, the following language in 15A NCAC 02B .0211 (similar language appears in .0220).

> *(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;*

In circumstances where the calculated water quality standard(s) derived by the equations listed in 15A NCAC .0200 are at, or near, the limits of analytical capability using methods required by 15A NCAC 02B .0103, an instream exceedance may inaccurately indicate that a water is unsuitable for the uses described in 15A NCAC 02B .0211. In these circumstances, and in other instances, a comprehensive evaluation of the biological integrity (as defined in 15A NCAC 02B .0202) will be undertaken to assure that a balanced and indigenous population of aquatic organism exists. If, after evaluation, the waterbody is rated excellent to good, it may be determined that the water body is supporting its designated use. If the water body is rated good-fair or poorer, the waters shall be assessed as unsuitable for aquatic life propagation and maintenance of biological integrity. Where it is not feasible to determine the biological integrity due to site conditions, the situation will be fully examined and assessed for the need to initiate additional monitoring and/or further evaluation.

NC DWR intends that the "weight of evidence" approach contains careful and thoughtful examination of any and all of the following, where data is available.

- *Data quality:*
  - *Is the reported data sufficiently above the field blanks or other analytical blanks to assure that the measurement is sound?*
- *Overall confidence in representative sampling:*
  - *Were conditions at the time of collection unusual for the stream?*
  - *Where samples are collected for a chronic event, was any data point so statistically different from the rest as to cause concern about collection, contamination or other factors?*
- *Antagonistic complexities of water quality variables:*
  - *Were samples particularly turbid?*
  - *Where the biological classification is less than desirable, are naturally occurring situations the cause of the low rating and perhaps not due to the detection of a single exceedance of a metal? (examples: extremely low flow, no flow, low pH, low DO, oligotrophic conditions, the occurrence of anakeesta rock, the occurrence of naturally high conductivity in groundwater, etc.)*

- *Downstream protection*
    - *Examinations of impacts from exceedances of the standard will also include an assessment of downstream impacts to assure compliance with 02B regulations.*

The above considerations help focus the Division's attention on specific water bodies and will enable NC DWR to target additional monitoring and comprehensive evaluations to maximize and prioritize efforts under expected budget constraints. These evaluations will provide a more consistent assessment of aquatic resource condition and allow us to set clearer aquatic life protection and restoration goals. Like other programs related to holistic approaches, most notably the Biological Condition Gradient (BCG) and Tiered Aquatic Life Uses (TALU), it requires us to look at ecological information more critically in making assessments.

NC DWR strongly believes that, using its robust chemical knowledge base and incorporating scientifically sound biological monitoring methodology assessments of waterbody health will provide us with strong legal foundations on which to: base Section 303 (d) listing decisions; enable revised standards to be more readily defended; fortify management goals; and, provide additional information to protect the designated uses. All of these are in keeping with the goals of the Clean Water Act.

- **Adoption of Site Specific Criterion**

Stakeholder input:

No specific amendments were initially proposed for derivation of a "site-specific criterion".

Commenters supported amendments to more specifically allow for SSC derivation using the federally approved Water Effects Ratio (WER).

DEQ Response:

*See **Page 5** for further information on amendments related to the use of WERs.*

- **Nutrient/Nutrient Related Criteria/Nutrient Criteria Development Plan**

Stakeholder input:

While no specific amendments were proposed with respect to nutrients, a significant number of comments were submitted in support of the state' s Nutrient Criteria Development Plan (NCDP)

Support from agricultural interests, local governments/representatives of local governments and some citizens. These commenters were varied in their support of the current chlorophyll a standard.

A number of private citizens and NGOs expressed concern that we lack speed in determining appropriate nutrient standards (TN, TP, chlorophyll a criteria for all water bodies).

DEQ response:

DEQ was in negotiations with the US EPA and stakeholders regarding nutrient criteria throughout the 2007-2014 timeframe. In June of 2014, NC DEQ received mutual agreement on a plan of action, the Nutrient Criteria Development Plan (NCDP). Additional information on that process is located here: http://portal.ncDEQ.org/web/wq/nutrientcriteria

- **Adoption of Revised NRWQ Ammonia Criteria**

Stakeholder input:

Although no proposals were made to adopt ammonia criteria, the adoption of the recently published NRWQC criteria was supported by federal agencies, private citizens, Non-governmental Organizations.

Adoption of the NRWQC criteria was not supported by local governments/representatives of local governments, noting that control was inherent in other programmatic efforts (notably the NPDES permits).

DEQ Response:

US EPA published revised criteria for Ammonia in August of 2013. (EPA 822-R-13-001). At that point in time, significant efforts to develop the state required fiscal note were well underway. NC DEQ determined that reopening the proposals to include ammonia at that time would further delay the triennial review package.

NC DEQ has been consulting with the US Fish and Wildlife Service and reviewing data on concentration of ammonia in both surface waters and discharges to enable a proposal to be considered during the subsequent triennial review.

- **Adoption of Revised Recreational Water Quality Criteria**

Stakeholder input:

Although no proposals were made to adopt revised recreational water quality criteria for *e. coli* or *enterococci*, the adoption of the recently published NRWQC criteria was supported by federal agencies, private citizens, Non-governmental Organizations.

DEQ Response:

US EPA published revised bacteriological criteria for recreational waters in December of 2012 (EPA 820-F-12-061). At that point in time, significant efforts to develop the state required fiscal note were

well underway. NC DEQ determined that reopening the proposals to include revisions to recreation waters at that time would further delay the triennial review package. Additionally, the staff of the DWR will be working closely with the Division of Marine Fisheries (NC Recreational Water Quality Program) to assure that amendments made to water quality standards are in alignment with those used for public notification in accordance with the Beaches Environmental Assessment and Coastal Health Act.

- **Adoption of Instream "Flow" as a Criterion**

  Stakeholder input:

  Protective standards for flow were suggested by private citizens, federal agencies and NGOs. Concern was expressed that adequate flow is warranted to protect aquatic life. Commenters expressed the desire to have standards established for flow (quantity) in addition to protection of water quality.

  DEQ response:

  Existing statutes provide regulatory authority to protect instream flows. The Division of Water Resources has adopted a river basin approach for the long-range planning that is necessary to guide the use of North Carolina's water resources in a sustainable manner. Put simply, this means that for planning purposes DWR will evaluate the current and projected uses of surface waters against the amount of water available in each of the 17 major river basins in North Carolina. The analysis of this information, and whether there is enough water to meet instream needs and support existing and projected stream uses, is regularly presented in individual plans specifically prepared for each of the major river basins.

- **Reorganization of Current Standards**

  Stakeholder input:

  US EPA noted that a separate section for standards applicable to trout waters would be helpful.

  DEQ Response:

  This concept will be explored as we move through the Rules Review Process mandated by North Carolina General Statute 150 (B).

- **Protection of Recreational Opportunities, Public Water Supplies, Sensitive Species**

  Stakeholder input:

  Business noted that standards that assure recreational opportunities are protected are a means to attract commercial and residential development to the state.

  One local government suggested we adopt criteria for bromides to protect water supplies.

  Federal agencies encouraged adoption of revised standards as a means to protect sensitive and vulnerable species.

  DEQ Response:

  Staff review of needed changes always consists of these concepts with the idea that NC values its water resources for recreation, aquatic life protection and all other designated uses. Staff is continuing to: explore revisions to recreational criteria; examine EPA efforts and other states' efforts in managing the effects of bromides on public waters supplies; examining ammonia and other criteria (selenium) that may negatively impact sensitive species.

- **Variances – Chloride**

  Stakeholder input:

  Agricultural Interests indicated support of current variances, specifically for chlorides at pickle plants as a mechanism to sustain agricultural efforts.

  Private citizens and NGOs cited concern for sufficient regulation to control discharges as reason for disapproval.

  DEQ Response:

  The current variances for chlorides are opened for examination both during the Triennial Review process and the NPDES permit renewal to assure that control measures remain in place.

- **Triennial Review Process and Procedures**

  Stakeholder input:

  Some commented that there be more public hearings for the Triennial Review (requested more hearings throughout the state), and some requested more stakeholder meetings on the Triennial process.

DEQ response:

Staff of DWR will begin the process of public involvement as soon as approval is reached on the current submittal to assure that the public has ample opportunity to be involved.

- **Additional Comments and Concerns**

Stakeholder input:

- Dissolved oxygen criteria for varying water column depths. Comments cited concern with lack of protection for aquatic species throughout the water column;
- Readjustment of the Fish Consumption Rate (FCR), used to calculate protective human health standards, to account for subsistence fishermen;
- Examine fate and transport as it relates to adoption of any new or revised criteria;
- Stronger control of "emerging contaminants" such as: flame retardants, endocrine disrupting compounds, pharmaceuticals;
- Sediment criteria: concerns with possible re-suspension of heavy metals, nitrogen and phosphorus to the water column;
- The general state of North Carolina's surface water and ground waters was noted and the specific need for more ambient monitoring and oversight of NPDES dischargers;
- Lack of progress in implementing rulemaking efforts in both Falls and Jordan Lakes;
- Concerns with the effects of HB 74 (GS 150B) and Rules Review Commission reviews that could hamper water quality improvements and regulations;
- Concerns related to climate change;
- Concerns related to storm water controls.

DEQ Response:

- *Staff recognizes that additional areas require continued examination. Many of the above comments are being addressed by national efforts (reexamination of the FCR, additional health effects studies for emerging contaminates, etc.). Others, such as Falls and Jordan Lake management concerns, are being directed by the NC General Assembly and will be addressed as soon as possible. The NC DEQ staff remains active in national programs to stay informed as to needed or recommended changes.*