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Sewerage Agencies

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May 9, 2001

Mr. Robert Cantilli
EPA Nutrient Program Coordinator
Health and Ecological Criteria Division (Mail Code 4304)
USEPA - Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Comments on Ecoregional Nutrient Criteria, 66 Fed. Reg. 1671

Dear Mr. Cantilli:

The Association of Metropolitan Sewerage Agencies (AMSA) is pleased to provide the following comments to the U.S. Environmental Protection Agency (EPA) regarding the Ecoregional Nutrient Criteria Recommendations documents (criteria documents). 66 Fed. Reg. 1671 (January 9, 2001). AMSA has represented the interests of the nation's publicly-owned wastewater treatment agencies (POTWs) for over 30 years. AMSA's more than 250 members serve the majority of the sewered population in the United States and collectively treat and reclaim more than 18 billion gallons of wastewater every day.

AMSA has been very active in the nutrient criteria development process, commenting on the National Strategy (November 1999), Lakes / Reservoirs Technical Guidance (July 2000), and Rivers and Streams Technical Guidance (September 2000) documents and participating as a stakeholder in discussions at the national and regional levels. AMSA has expressed concerns over what we consider to be critical problems at the foundation of the nutrient criteria program, including the disconnect between the criteria and designated uses. AMSA has devoted additional resources to develop potential solutions and has provided for independent technical reviews to substantiate our concerns.

Attached please find AMSA's comments on the latest nutrient criteria documents. The

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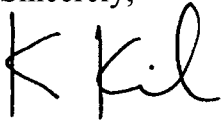
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comments are structured to highlight the commonality of AMSA's concerns with those of other stakeholders including states, universities, environmental management organizations, independent contracting firms, and monitoring councils. AMSA's review of the latest criteria documents reveals that the issues and recommendations that AMSA and other stakeholders have identified throughout the criteria development process have not been addressed.

According to our previous communication regarding the deadline for these comments, we have prepared this submittal consistent with an extension offered by the Agency to May 9, 2001 due to delays in the web posting and distribution of the criteria documents. AMSA intends to review the Nutrient Database and perform various data analyses to assess the validity of the ecoregional nutrient criteria values. Such analysis has been precluded to date by an inability to gain access to the database while EPA addressed security related issues. Once the data is available we recommend EPA allow a reasonable period (at least 90 days) for stakeholders to review the data and provide comments to the agency before considering a publication of final criteria values. AMSA plans to submit additional comments detailing the results of our assessment.

In light of our concerns and those of other stakeholders, AMSA believes more time is needed to develop valid nutrient criteria based on effects and beneficial uses, to better understand and address the impacts on fisheries, to QA the database, and to allow for sufficient data collection. EPA's expectation that states and tribes adopt or revise the nutrient criteria by 2004 allows too little time to accomplish these important and challenging tasks. As always, we extend the offer to meet with the Agency to constructively discuss and resolve our concerns. If you have any questions regarding our comments, please contact Christopher Hornback of my staff at 202/833-9106.

Sincerely,

A handwritten signature in black ink that reads "K Kirk". The "K" is large and stylized, followed by "Kirk" in a cursive script.

Ken Kirk
Executive Director

ATTACHMENTS

cc:

Diane Regas, U.S. EPA
Geoffry Grubbs, U.S. EPA

AMSA Comments on the Ecoregional Nutrient Criteria Recommendations Documents May 2001

I. General Comments/Issues

This section provides a summary of the major issues AMSA has previously commented on that are not addressed in the latest nutrient criteria documents. Although AMSA has relayed these concerns to EPA in the past, we feel it is vital they be addressed – as our concerns have only been amplified by the recently released nutrient criteria documents. Where appropriate, we indicate where our previous comments are consistent with the concerns of other agencies and institutions.

Lack of Relationship With Beneficial Uses

AMSA's primary concern with the ecoregional nutrient criteria is the lack of relationship between the criteria and beneficial uses (AMSA, 1999; AMSA 2000a; and AMSA 2000b). These concerns are echoed by HydroQual (2000, 2001), the Methods and Data Comparability Board (2001), NCDENR (1999, 2001), the NEIWPC (2000), and a group of Region V states (Region V, 2001). This issue is of significant concern because the lack of connectivity between "default" criteria values and beneficial uses results in criteria values that are not defensible under the Clean Water Act. NCDENR (2001) states that "*...it can be concluded that EPA believes that use support is a critical component to criteria development, but the EPA did not have the time nor the scientific information to develop defensible criteria and expeditiously meet the demands of the established timetable. It is our conclusion that the documents as they currently exist are clearly the wrong answer.*" This conclusion supports our previous remarks (AMSA 2000b) where we stated "*..expedient approaches will serve to establish criteria numbers but will do so without regard for technical defensibility or the associated regulatory consequences.*" We urge the agency to take this matter of beneficial use connectivity seriously because it represents one of the core requirements of the criteria program and the Clean Water Act.

Percentile Methods Produce Ecoregion Criteria That are Meaningless in Relation to Effects / Beneficial Uses

For water quality assessment and enforcement purposes, it is essential to establish a criteria value that distinguishes between "enrichment" and "impairment" with regard to effects on beneficial uses. However, the percentile based approach does not perform this function. Since the beginning of the nutrient development process, AMSA has been a vocal critic of the statistical – percentile approach – employed by EPA to develop nutrient criteria (i.e., 25th percentile and related centiles). As indicated in an independent review by HydroQual (2000) "*...evaluation based on frequency distributions of primary variables from a variety of streams even within some defined ecoregion simply does not contain information about the causal relationships between those variables and the potential for impairment of biological integrity in any given stream or reach.*" They also state "*it is this philosophical departure from effects based criteria setting that is most disagreeable and which creates a fundamental problem of credibility for the nutrient criteria setting process.*" The problems associated with the percentile based approach are strongly linked to the inability to relate the criteria to beneficial uses. A lack of association between the criteria and the beneficial uses represents the core problem, and the statistical percentile approach is the cause of that problem. Statistical

percentiles of a data set only represent the properties of a data distribution. Without “ground truthing” and further analysis of associated effects on beneficial uses it is not possible to ascertain whether the given percentile value reported as a criteria will address an impairment. For example, a total nitrogen criteria value of 0.31 mg/l in Aggregate Ecoregion XI represents a value such that 25 percent of the observations in the database are lower than the value; with the remaining 75 percent being above it. This value of 0.31 mg/l TN bears no relation to aesthetics, fisheries, etc. In fact, the beneficial use or uses intended for protection by this value have not even been identified, and a determination of how the value relates to a potential use has not been made. The same argument can be made for the criteria generically given the template approach of using the 25th percentile to generate the criteria values.

Ecoregion Criteria are Likely to Create Regulatory Burdens

In earlier comments AMSA expressed concern that the percentile based approaches to “default” nutrient criteria derivation will likely result in burdensome regulatory and compliance costs. The establishment of 304(a) ecoregional nutrient criteria upon the 25th percentile values confirmed the basis for those concerns. These proposed criteria values are likely to trigger numerous additional 303(d) impairment determinations and associated TMDLs that do not reflect actual impairments to beneficial uses. Although AMSA is concerned that these values are very “low” from a compliance and attainment cost stand point, our larger concern rests with the fact that there is no correlation between criteria values and impairments. The potential regulatory outcomes associated with State or Tribal adoption of “default” nutrient criteria into WQS is not particularly difficult to comprehend, as a 25th percentile based approach will, by definition, result in 75 percent of the data indicating non-attainment. As noted in earlier comments, a preliminary analysis indicates that up to 75% of the monitored lakes in the New England area would violate nutrient criteria while only a small percentage of those lakes fail to meet their designated uses (NEIWPC, 2000). These new nutrient criteria come to the States at a time when they are struggling to address the existing TMDL requirements and other Federal regulatory initiatives such as SSO requirements. The placement of additional sites on 303(d) lists for nutrients on top of these existing burdens without adequate cause is troubling.

The issue of TMDLs and water quality criteria was a topic at the Water Environment Federations (WEF) TMDL Science Issues Conference, held March 5-7, 2001 in St Louis, MO. At this conference Dr. Dominic DiToro, Professor of Environmental Engineering at Manhattan College, focused on the need for appropriate criteria and the proper use of water quality models. Dr. DiToro indicated that water quality criteria for metals and dissolved oxygen (DO), which include the effect of duration, meet his definition of modern criteria. On the other hand he indicated that nutrient criteria are moving in the opposite direction and that nutrient criteria will not advance the TMDL process.

AMSA is concerned that many States will lack the data, resources, and expertise to develop the criteria correctly. The expedient approach in these cases would be a simple adoption of the Agency’s recommendations into standards. In fact, as we explain in the next section, the Agency’s recommended approaches for adopting nutrient criteria could actually impede the adoption process, resulting in state

adoption of the existing 304(a) criteria as written.

II. Comments/Issues on New Ecoregional Documents

304(a) Criteria vs. "Starting Points"

There are two basic messages being sent to the reader of the criteria documents. One is that the criteria values represent real 304(a) criteria and the second is that the numbers are not really criteria, but rather "starting points." The Federal Register notice and document foreword indicate the former while the body of the criteria documents inconsistently suggests the latter. For example, the Federal Register notice indicates quite clearly that the ecoregion criteria values are intended as 304(a) criteria by statements including: "*EPA expects States and Tribes to adopt or revise EPA regional criteria published in 2000 into State or Tribal WQS by 2004*" with reference to the specific values as "*these recommended section 304(a) criteria for nutrients.*" On the other hand, the authors of the criteria documents tend to suggest they may not be 304(a) criteria at all but rather "starting points" by stating: "*The values for both causal, biological and physical response variables represent a set of starting points (emphasis added) for States and Tribes to use in establishing their own criteria in standards to protect uses.*" This statement was supported by the following additional disclaimer statements: (1) "*EPA expects that, in most cases, it will be necessary for States and Tribes to identify with greater precision the nutrient levels that protect aquatic life and recreational uses,*" and (2) "*For example more sensitive uses may require more stringent values as criteria to ensure adequate protection . On the other hand, overly stringent levels of protection against the adverse effects of cultural eutrophication may actually fall below levels that represent the natural load of nutrients for certain water bodies. In cases such as these, the level of nutrients specified may not be sufficient to support a productive fishery.*"

AMSA's detailed review of the criteria documents leads us to the conclusion that EPA intends the criteria to be 304(a) criteria and not "starting points." Although a cursory reading of the documents or Federal Register notice may suggest the criteria are designed as "starting points," a closer examination reveals that the ecoregion criteria values are really 304(a) criteria and as such, their direct application as "default" criteria in future 303(d) listings and permit limits represents a genuine and possible outcome. On this matter AMSA agrees with the Methods Comparability Board (2001) recommendation that the agency consider defining the percentile values given in the documents as a "screening tool" rather than 304(a) criteria as presently proposed. However, even its use as a screening tool appears to be quite limited from our perspective.

Ecoregional Criteria Documents are Vague Regarding Acceptability of 304(a) Value Substitutes

The foreword of the ecoregional criteria documents (page iii) indicates the following with regard to State / Tribal adoption of the nutrient criteria:

EPA recommends the following approaches in order of preference (our emphasis):

(1) Wherever possible, develop nutrient criteria that fully reflect localized conditions and protect specific designated uses using the process described in EPA's Technical Guidance Manuals for nutrient criteria development. Such criteria may be expressed either as numeric criteria or as procedures to translate a State or Tribal narrative criterion into a quantified end point in State or Tribal water quality standards;

(2) Adopt EPA's section 304(a) water quality criteria for nutrients, either as numeric criteria or procedures to translate a State or Tribal narrative nutrient criterion into a quantified end point;

(3) Develop nutrient criteria protective of designated uses using other scientifically defensible methods and appropriate water quality data.

In a related manner the document indicates on page 3 that *“while States and authorized tribes would not necessarily need to incorporate all five elements (RTAG, historical data, reference condition, models, downstream effects), the best assurance of a representative and effective criterion for nutrient management decision making is the balanced incorporation of all five elements, or at least all elements except modeling.”*

Our review of the order of preference listed above, along with the elements indicated prerequisite for nutrient criteria, revealed the following concerns.

- Adoption of “default” criteria values (option 2) is preferred over criteria developed using “other scientifically defensible methods” (option 3). “Other” scientifically defensible methods is misleading as it incorrectly assumes the original default 304(a) criteria are defensible. The first and only option should be to develop nutrient criteria using methods that relate the criteria to designated uses in a sound and scientifically defensible manner.
- The stated preferences of criteria development methods and continued reliance on the “five elements” indicates to AMSA that a State could experience resistance from the Agency when seeking approval for nutrient criteria that do not closely align with the original recommendations. The Agency alludes that the states have measurable flexibility with regard to establishing criteria. However, a closer scrutiny of the specific language indicates that the methods considered to be “preferred” for criteria development are quite narrow in nature. The language essentially suggests that the agency would accept some minor revisions to the criteria relative to the database or other minor deviations. However, it also seems likely that the agency would be critical of alternative criteria value development methods that did not employ reference conditions and/or that produced values significantly greater than the “natural load” or equivalent 304(a) criteria values. AMSA believes that valid criteria values need not be based on reference conditions

or reflect the “natural” load provided the criteria value was properly aligned with meeting the designated uses.

- At meetings and other nutrient forums EPA represents that the use of “other methods” would be acceptable and that the States would be granted considerable flexibility in establishing the criteria values. If EPA intends to grant wide flexibility as it has been inferred, then the criteria document language needs to reflect those positions. This issue must be clear to avoid future inconsistent interpretations of “flexibility” between various EPA Regions and states.

Recommended Nutrient Criteria Represent a Defined Risk to Fisheries

AMSA is particularly concerned that the nutrient criteria documents fail to recognize the competing nature of “clean water” objectives and water quality necessary to support healthy sport fisheries. In our previous comments associated with the strategy and the guidance documents we indicated that conflicts between designated uses should be examined and addressed. However, at that time we were unaware of a large body of literature that has been devoted to the issue of fishery stocks and nutrient levels. After reviewing a number of literature references on the subject, we contacted Drs. Brian Murphy and John Ney of the Virginia Polytechnic Institute (Virginia Tech) to gather their professional opinion regarding the association between fisheries and the recommended 304(a) criteria. Their comments in the capacity of professors of fisheries ecology and fisheries management (Virginia Tech, 2001) are provided as an attachment. Their comments indicate that the 304(a) criteria as proposed are generally too stringent to support fisheries in Lakes and Reservoirs and that this issue is in need of serious attention. Further, they recommend caution on this issue due to the financial revenues that fresh water sport fishing generates in the economy. They also urge that fisheries scientists be included on the RTAGs.

AMSA’s review of the documents and Virginia Tech (2001) indicated that EPA acknowledged concern that fisheries may be impacted by overly stringent nutrient criteria. However, no attempt is made to address these concerns. In addition, EPA’s insistence that the “5 elements” (RTAG, historical data, reference condition, models, downstream effects) be incorporated into the decision making process, limits the flexibility needed to address the concerns over fisheries.

With nutrients less is not necessarily better. In the case of fisheries, overly stringent nutrient criteria can lead to loss or reduction in designated uses. AMSA cannot over emphasize the importance of this issue in regard to fisheries because we believe it is very closely aligned with the public’s expectations relative to the objectives of environmental protection.

Criteria Generated With Problematic Data

AMSA believes that the statistical percentile based approach employed by EPA was inappropriate for establishing criteria due to the factors previously discussed. However, we agree that a representative database

containing information on the primary, secondary, and response variables including biology is necessary to develop sound criteria. Although our analysis of the Nutrient Database has been precluded during this comment period by an inability to access the database, we still question the quality of the existing data for the purposes of criteria derivation based on a review of comments from HydroQual (2001), the Methods and Data Comparability Board (2001), and Tetra Tech, Inc. (2001), which indicate a number of problems exist with the present database.

In the absence of access to the database, HydroQual (2001) provided AMSA with a cursory review of the criteria values and associated data. A summary of their review on data quality indicated the following:

- There are general concerns regarding the Legacy STORET, NAQUA, and NASQAN database that are well known and documented. A letter from NCDENR (2001) states that the North Carolina data used to construct the criteria documents are in error or have been mislabeled. AMSA questions the validity of the entire database given this gross level of error.
- The Ecoregion IX document for Rivers and Streams was evaluated with respect to periphyton. This ecoregion was selected because it was the only document where the criteria were based on a response variable, in this case chlorophyll a. Their review indicated that the periphyton data were too limited, and as such, the associated statistics (i.e., 25th percentiles) would likely not represent a valid statistical distribution because it would not capture the wide range of conditions expected (low to high). Further, the recommended criteria values (20.35 mg/m²) seem much too low (approximately an order of magnitude) in comparison to the accepted literature values generally associated with nuisance levels or aquatic impacts (100-200 mg/m²). The use of incorrect units was suspected but could not be confirmed.
- The Rivers and Streams guidance document for Ecoregion XII contained a number of discrepancies between the executive summary and the tables in the text.
- Comparisons between the summary table of ecoregion criteria found on the OST web site and the ecoregion documents themselves indicated a number of discrepancies with respect to values as well as units. This demonstrates the need for consistency among data sets.

The Methods and Data Comparability Board (2001) also indicated concerns over the quality of the data. In summary of their comments: (1) most databases were not designed to assess nutrient effects, (2) different analytical methods and detection limits involving unknown quality were used in the Legacy STORET, and (3) different collection and preservation techniques are used between nutrient and biological data collection, which may make them incomparable.

Finally, comments from Tetra Tech, Inc. to the EPA Region IX RTAG (Tetra Tech, 2001) also speak to the issue of data and data quality. Their concerns include (1) the limited bioassessment data in Region IX, since many have just recently initiated biomonitoring programs, (2) the constraints on assessing the potential effects

of nutrients due to limited bioassessment data, and (3) the substantial deficiencies in the water quality database.

Given these types of gross level errors it seems that the database is unreliable and thus inappropriate for nutrient criteria development. Additional reviews are likely to identify other errors.

Criteria Are Incomplete; Duration and Frequency of Exposure Are Not Addressed

Water quality criteria are traditionally based on the duration of exposure to the parameter of concern and the frequency of that exposure. For example, different standard values are provided for dissolved oxygen (DO) based on acute and chronic exposure. A similar approach regarding exposure is taken with ammonia, pH, metals, organics, etc. The nutrient criteria are absent a consideration of duration of exposure due to a lack of understanding of effects. How are the nutrient criteria supposed to be applied? Are they to be expressed as instantaneous values, monthly averages, long term multiyear averages, seasonal averages, medians, etc.? How do we address extreme hydrological events such as wet and dry years? The ecoregion criteria documents are completely silent on these points. AMSA believes that a defensible 304(a) criteria recommendation must include considerations of exposure and averaging periods. It will not be possible to apply the recommended criteria because the relevant exposure period and averaging period has not been determined or recommended. The lack of consideration for exposure period is another reason why the nutrient criteria recommendations are indefensible.

Need to "Ground Truth" the Criteria

In the earlier section related to the lack of association between the criteria and beneficial use, AMSA mentioned a need to "ground truth" the criteria values. In "ground truthing" we refer to a means of relating the criteria values to an effect. It is not enough to develop criteria values on the basis of statistical distribution (i.e., 25th percentile) and then assume an effect has occurred or will occur. Rather, the effect due to these criteria must be defined and validated.

In relation to this issue HydroQual (2001) evaluated the effects of various nutrient percentiles in NAWQA data (i.e., 25th and 75th percentiles) relative to DO and pH. The NAWQA database represents conditions associated with undeveloped watersheds. They found that the 75th percentile value of this data set (as "un-impacted") compared well to the recommended EPA ecoregion criteria for that area. However, their analysis indicated that there were no discernible relationships between nutrients and DO / pH. They state that *"..the link between cause and response variables can be complicated by many variables not currently included in the USEPA's approach to developing nutrient criteria."* This shows that although the values of nutrients agree with EPA's recommendations they still do not reveal an effect and are thus not "ground truthed".

Tetra Tech (2001) also evaluated the relationship between nutrients and effects in their region and indicated

that "It is possible that bioassessment data may be useful in identifying nutrient criteria concentration values. However, the current data and analysis does not provide any evidence that would support specific recommendations for the values."

AMSA believes that without "ground truthing" as to effects, EPA has not clearly supported its recommended criteria values.

III. Closing Comments

AMSA has significant concerns with the validity of the current nutrient criteria program. The program continues to move forward despite the fundamental problems that plague its foundation. At this stage in the process AMSA believes that it has been adequately demonstrated and widely acknowledged that the criteria values recommended in the documents are indefensible. Existing Federal Register language and document text suggest EPA has taken the position that nutrient criteria do not have to be defensible for use and incorporation into state water quality standards. We vigorously disagree and find this apparent position untenable given the water quality goals of the Clean Water Act.

The problems with the beneficial use connections (or lack thereof), the gross errors in the data set, and the risks posed to fisheries are enormous and undeniable. AMSA believes the magnitude of these problems demands a critical evaluation of the program's future direction and merits a retraction of the criteria documents and the associated values. The existing problems cannot be addressed by minor adjustments of the data sets, nor should the inherent problems be transferred to the states and stakeholders. AMSA's concerns do not represent an isolated opinion, but rather reflect a general consensus among a large group of stakeholders with varying interests and perspectives on environmental protection.

REFERENCES

- AMSA. 1999. Letter to Charles Fox. Comments on EPA Nutrient Strategy Document. November 19, 1999.
- AMSA. 2000a. Letter to Robert Cantilli. Comments on Nutrient Criteria Technical Guidance Manual – Lakes and Reservoirs. July 24, 2000.
- AMSA. 2000b. Letter to Robert Cantilli (USEPA). Comments on Nutrient Criteria Technical Guidance Manual – Rivers and Streams. September 25, 2000.
- HydroQual Inc. 2000. Review of Nutrient Criteria Technical Guidance Manual – Rivers and Streams. July 2000.
- HydroQual Inc. 2001. Letter to William Hunley (HRSD) and Chris Hornback (AMSA). Comments on EPA Ecoregion Criteria Documents. May 7, 2001.
- Methods & Data Comparability Board - National Water Quality Monitoring Council. 2001. Letter and white paper written to National Council Co-Chairs from the Methods and Data Comparability Board re USEPA Nutrient Criteria. April 23, 2001.
- NEIWPC. 2000. (New England Interstate Water Pollution Control Commission). Letter to Geoffrey Grubbs re: Comments on nutrient criteria development.
- NCDENR. 1999. (State of North Carolina Department of Environmental and Natural Resources). Letter to Robert Cantilli (USEPA) re: Comments on Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs. November 22, 1999.
- NCDENR. 2001. (State of North Carolina Department of Environmental and Natural Resources). Letter to Robert Cantilli (USEPA) re: Comments on Nutrient Criteria Documents Ambient Water Quality Criteria Recommendations. March 30, 2001.
- Region V. 2001. Letter from water directors of Region V states (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin) to Geoffrey H. Grubbs (EPA). May 2001.
- Tetra Tech, Inc. 2001. Letter to EPA Region IX RTAG re: Draft Findings and Recommendations for EPA Region 9 Nutrient Criteria. April 12, 2001.
- Virginia Tech. 2001. Letter to William Hunley (HRSD) providing professional opinion on ecoregion criteria as related to fisheries in Lakes and Reservoirs. Written by Brian Murphy, and John Ney. April 25, 2001.

Note: These references are provided as attachments at the end of this document in alphabetical order.