

# STATE OF COLORADO

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Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department  
of Public Health  
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Dr Judith L Meyer, Chair  
Ecological Processes and Effects Committee  
EPA Science Advisory Board (1400F)  
U. S. Environmental Protection Agency  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

November 30, 2009

Re: Draft Report: SAB Review of Empirical Approaches for Nutrient Criteria Derivation

Dear Dr Meyer,

We appreciate having the opportunity to comment on the SAB Ecological Processes and Effects Committee's ("Committee") draft report, and we recognize the substantial investment that the Committee has made in an effort to improve guidance for developing nutrient criteria.

Colorado's Water Quality Control Division is poised to propose numeric nutrient criteria for consideration by the Colorado Water Quality Control Commission in 2011. We have been working on developing these proposed criteria for nearly ten years. While we are not dependent on empirical methods for criteria, we plan to include this approach in our criteria development process. We are grateful for the national attention to this issue; however, we are concerned that aspects of the draft report may result in misleading impressions. We are hopeful that the Committee's report can be re-cast to improve its usefulness, and accordingly, we offer some suggestions. We have three general comments described below, as well as specific comments provided in an attachment to this letter.

Scope of the Charge: It appears that the focus of the review has expanded beyond the scope of the Charge. Expansion of scope was evident in September's public hearing and in the draft report. In the documentation provided to the Committee by EPA, it was clear that the "empirical approaches guidance document" described only *one* of three major approaches that EPA has outlined for developing nutrient criteria. Committee draft comments extend well beyond this relatively narrow scope and seem to imply that this guidance document should become a stand-alone guidance for nutrient criteria development in general.

Return to original Charge and address EPA's questions: Under the broadened scope, the Committee recommends substantial changes to the nature and content of this guidance document, yet fails to answer many of EPA's questions in the original charge. By recommending that EPA expand the document to provide more thorough treatment of the context for nutrient criteria development, the Committee has raised doubts about aspects of nutrient criteria development that go beyond the scope of this review. States and Tribes are familiar with the existing documents and would benefit from timely and succinct guidance on the empirical approaches, as per the original Charge for the Committee. We suggest that the Committee retain its comments relevant to the Charge and if necessary, create an appendix to contain those comments that may be relevant to nutrient criteria development in general or mechanistic modeling, specifically.

Acknowledge Role of States and Tribes: The Committee draft report overlooks the role of States and Tribes in criteria development. EPA has determined that development of nutrient criteria is a priority and offers substantial technical guidance in various forms. States and Tribes have the responsibility for developing those criteria and have considerable latitude in applying methods that are scientifically defensible.

In addition, States and Tribes have the prerogative to make the policy decisions that balance environmental, social and economic considerations in protecting designated uses. The draft report seems to be predicated on the assumption that there is one correct criterion from a technical perspective. In essence, such a position ignores the policy role accorded to the States and Tribes. Criteria selection involves tradeoffs that are made as a matter of public policy, and this is not acknowledged in the Committee's draft report.<sup>1</sup> The policy decisions that balance risks and benefits are informed by the technical issues. For example, a policy choice is required to balance the benefits of protecting a specific recreational or aquatic life resource against the cost of increased wastewater treatment.

Thank you again for your hard work on this issue; we recognize that this is a difficult task. We encourage you to be more selective in the comments that address the specific Charge questions and provide EPA with constructive suggestions for improving the Empirical Approaches guidance document.

Sincerely yours

Sarah Johnson  
Standards Unit Manager  
Colorado Water Quality Control Division

Attachment: Colorado Comments Regarding Draft Report: SAB Review of Empirical Approaches for Nutrient Criteria Derivation

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<sup>1</sup> Page 36: "...selection of inappropriate criteria will result in negative environmental, social, and economic consequences."

## **Colorado Comments Regarding Draft Report: SAB Review of Empirical Approaches for Nutrient Criteria Derivation**

Most of the following comments are directed at specific “findings” or “recommendations.” Although most recommendations are derived from specific findings, we have not tried to link each comment to both the “finding” and the “recommendation” to which it might apply.

### **Executive Summary**

Page vii, lines 12-13: Although the preceding introductory material is clear on the point that the stressor-response models are just one approach among three promoted by EPA, this sentence (“The draft Guidance provides a primer...”) and the rest of the paragraph seem to create the impression that all nutrient criteria development is jeopardized unless this empirical approach is improved. Clearly that would be beyond the scope of the charge, and probably not what the Committee intended.

### **Chapter 2 Introduction**

Page 2, lines 41-42: The cautionary note about statistical association vs. cause-and-effect seems overdone. This is a guidance document and users of the guidance (e.g., States and Tribes) still must justify the technical merits of approaches used to develop criteria, all of which must be approved by EPA.

Page 3, lines 3-5: We concur that it is useful for EPA to explain how this particular guidance document fits in the broader context of nutrient criteria development. However, we thought EPA had provided this information succinctly in the introduction to the draft guidance. We caution against encumbering the document with much more introductory material than it already contains. States and Tribes are very familiar with the process of criteria development.

### **Section 3.1 Charge Question 1**

Page 3, paragraph beginning line 39: While it might be desirable in the abstract to have all approaches to nutrient criteria development described in one document, it is not necessary. Moreover, it seems to go beyond the Charge to insist on a wholesale reorganization of the way in which EPA produces and distributes its guidance.

Page 3, lines 41-43: We do not agree that it would be useful to include guidance regarding the use of mechanistic models and the reference condition approach in this document. They belong in separate guidance documents.

Page 4, paragraph beginning on line 24: This assertion seems at odds with much of the rest of the document. If there is a conceptual model in place, that does demonstrate knowledge of causal pathways. With this comment, is the Committee intending to reject the empirical approaches outlined by EPA?

Page 4, paragraph beginning line 33 (see also recommendation #1 on page 5): The observation about load-response models may be accurate, but seems inappropriate given the Charge. Consequently, we question the need to highlight the comment in the Executive Summary. Perhaps the Committee could make a recommendation for an additional review to cover this topic at a later date (as seems to be the intent of item 4 on page 6).

Page 5, recommendation 3: This recommendation goes beyond the purpose of the Empirical Approaches guidance. A risk/performance-based approach would be more appropriately considered in a context other than a guidance document focused on empirical approaches.

Page 6, recommendation 5: Discussion of State progress toward developing nutrient criteria is not necessary in this document. We understand that EPA will be responding separately to the recent Office of Inspector General's report<sup>1</sup>.

Page 6, recommendation 6: The bulk of this recommendation is confusing. However, we concur with the element concerning development of a conceptual framework early in the process.

Page 7, recommendation 7: We encourage the Committee to be less insistent about increasing the level of detail and the number of caveats in the guidance document. States are fully capable of tailoring approaches to regional criteria setting (as mentioned in the case of Florida). We suggest that the guidance document be viewed as a way of enabling States and Tribes to take the lead in developing numeric nutrient criteria rather than as a prescriptive mechanism for EPA oversight.

Page 7, recommendation 10: The comment about the level of technical expertise available in State agencies<sup>2</sup> is unfounded and unnecessary. If States lack expertise in-house, they have access to other resources through regional EPA offices, RTAGs, or even academic institutions (as Virginia did effectively with an Academic Advisory Council during their development of nutrient criteria).

Page 8, recommendation 11: The caveats about appropriate use of statistical techniques are not necessary. It is not up to EPA to identify potentially confounding variables for each and every relationship for every State. States do have capacity for technical analysis.

Page 8, recommendation 11, item "b": This assertion is false. Site-specific criteria can be developed where appropriate, but are not the general rule.

Page 8, recommendation 12: We agree with the recommendation that a case study might be helpful to illustrate the application of each method. It is less clear that all methods could or should be applied to a single case study.

Page 8, recommendation 13: We suggest that it would be sufficient for EPA to refer to DQO documents and encourage users to consult them. EPA routinely offers training in DQO to the States and Tribes.

### **Section 3.2 Charge Question 2**

Page 9, paragraph beginning line 23: We agree that MMIs or IBIs are powerful integrators of community response. However, the conclusion of this "finding" seems at odds with earlier parts of the paragraph. Using the phrase "glaring omission" is a serious charge. Is the Committee saying that an approach which focuses on a multi-metric response variable is unacceptable unless it also considers the single variable DO?

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<sup>1</sup> U.S. EPA. 2009, EPA Needs to Accelerate Adoption of Numeric Nutrient Water Quality Standards, Report No. 09-P-0223, Office of Inspector General, Washington, D.C. August 26, 2009.

<sup>2</sup> "The Committee finds that that the current draft of the Guidance is written for a user with far more expertise than is likely possessed by water managers."

Page 10, paragraph beginning line 10: The Committee needs to better explain why effort should be directed specifically to detritus-based systems rather than a designated use.

Pages 10-11, paragraph beginning on line 37: Most water quality practitioners with some knowledge of eutrophication are aware of these issues. It seems unlikely, however, that definitive answers will be readily available on all subjects, or that such answers would be applicable to each and every State. It would be more helpful for the Committee to address the specific Charge (i.e., Can the proposed methods be applied as part of a weight of evidence approach, albeit an imperfect one, that seeks to address the problems nutrients cause today, or should all criteria development be stopped until everything is known about eutrophication in lakes and streams?).

Page 12, recommendation 1: The Committee has already suggested that a case study be included to illustrate application of methods. Why insist on DO? States already have independent DO criteria.

Page 13, recommendation 4: In other documents, EPA has recommended inorganic components to nutrient criteria development. States can choose to include them, or not. The eutrophication literature is replete with discussion on the topic.

### **Section 3.3 Charge Question 3**

Page 14, paragraph beginning line 26: The considerations of strengths and limitations of statistical methods are important, but it should be sufficient for EPA to encourage States and Tribes to use statistics *responsibly*. The guidance document is not a statistics textbook.

Page 16, recommendation 7: It is not clear that quantifying the weight-of-evidence approach will yield a useful result. Not all methods are equally applicable or appropriate, and it seems unrealistic to standardize the approach for all States and Tribes. Moreover, there may be justification for placing more emphasis on one approach than another. States and Tribes have flexibility in this matter, especially in view of the policy prerogative that they hold.

Page 17, recommendation 9: This recommendation seems inappropriate because the Charge does not include review of a mechanistic modeling approach.

Page 17, recommendation 12: The Committee seems insistent that EPA produce an overly prescriptive document, presumably based on the (well-intentioned, but incorrect) assumption that States and Tribes are unable to address these issues on their own.

### **Section 3.4 Charge Question 4**

Page 18, paragraph beginning on line 39: The commentary regarding “support” vs. “strength” makes a good point.

Page 19, paragraph beginning on line 41: The comment touches on the important issue of *potential* response to nutrients. It is no surprise that potential algal abundance is not commonly achieved because growth or biomass may have been suppressed by one or more of many factors. From a regulatory perspective, it is appropriate to ask “what is the potential response to nutrients and how long would the potential have to be sustained before there would be a response?” Prediction of average conditions is not as helpful in setting thresholds for impairment as is the prediction of the potential condition.

Page 20, recommendation 2: Mechanistic models are mentioned in the introduction of the Empirical Approaches Guidance. Guidance concerning application of mechanistic models belongs in a separate document.

### **Section 3.5 Charge Question 5**

Page 21, paragraph beginning line 38: We find it encouraging that the Committee believes all six statistical methods proposed by EPA may be useful for developing nutrient criteria.<sup>3</sup> These methods provide flexibility to identify the most appropriate approach for specific situation. We encourage the Committee to incorporate this comment in the Executive Summary.

Page 22, paragraph beginning line 27: Concentrations are the basic currency for most water quality standards, and that is not likely to change. While the observation about the importance of mass loading is probably correct in an academic sense, it is of little practical value for standards development. On the other hand, it is central to TMDL development.

Page 24, paragraph beginning line 31: While it is encouraging to see acknowledgement that the Committee is not expecting the guidance to be a statistics textbook,<sup>4</sup> the comment goes on to ask for still more information on assumptions, etc. It should be sufficient for EPA to caution readers to use statistics responsibly and to provide a list of pertinent references.

Page 26, paragraph beginning line 7: It is inappropriate for the Committee to encourage EPA to endorse statistical analysis products. Reviews are available on-line, and selection of packages may be influenced by a wide range of issues at the State level.

### **Section 3.6 Charge Question 6**

Page 35, recommendation 3, 4<sup>th</sup> bullet: This recommendation deals with policy, which is beyond the scope of this guidance document, and does not belong in this technical guidance document.

### **Section 3.7 Charge Question 7**

Page 36, paragraph beginning on line 16: We disagree with this assertion<sup>5</sup> about the negative consequences of selecting “inappropriate criteria.” First, it implies that an inappropriate criterion has uniformly negative consequences (environmental, social, *and* economic), and second, it assumes implicitly that the “appropriate” answer can be derived exclusively from technical considerations. Neither position is accurate. States make policy decisions that balance risks and benefits and these decisions are informed by the technical issues. For example, the benefits of protecting a specific recreational or aquatic life use might have to be balanced against the cost of increased wastewater treatment as a matter of policy.

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<sup>3</sup> “The six methods identified in the Guidance generally provide appropriate options for describing stressor-response relationships that may be sufficiently predictive to support setting numeric nutrient criteria.”

<sup>4</sup> “Although the Guidance should not be expected to provide the same level of detail on the implementation of statistical procedures contained in a statistics textbook ....”

<sup>5</sup> “Section 5 of the Guidance is an important part of the document because selection of inappropriate criteria will result in negative environmental, social, and economic consequences.”

Page 38, paragraph beginning line 1: The comment<sup>6</sup> about predicting “post-implementation conditions” seems to imply that standards are self-implementing. Standards set the goals that are appropriate for protecting uses. If a standard is not being attained, a TMDL is developed, the objective of which is to identify and remedy the sources of impairment. Addressing the problem after significant impairment has occurred is not a guarantee of swift return to pre-impairment conditions (e.g., internal phosphorus loading as an enduring legacy of nutrient enrichment in lakes).

Page 38, paragraph beginning line 30: It is unclear what adaptive management has to do with the empirical approach to developing nutrient criteria. The same is true of the two bullets that follow.

Page 40, recommendation 8: When using an *empirical* model, a practitioner is limited to data that reflect current conditions. Does this recommendation to encompass “predicted values” mean that the Empirical Approach should be abandoned?

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<sup>6</sup> “The selection of target numeric criteria as outlined in the Guidance is enhanced by the attempt to predict post-implementation conditions.”