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Via First-Class Mail and E-Mail

Ms. Stephanie Sanzone
Designated Federal Officer (DFO)
EPA Science Advisory Board Staff Office (1400R)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW,
Washington, DC 20460

Re: Written Comments on EPA's Technical Support Document Entitled "Methods and Approaches for Deriving Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Estuaries, Coastal Waters, and Southern Inland Flowing Waters"

Dear Ms. Sanzone:

On November 17, 2010, EPA issued a technical support document entitled, "Methods and Approaches for Deriving Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Estuaries, Coastal Waters, and Southern Inland Flowing Waters" ("TSD"). At the request of numerous stakeholders, EPA elected to have this document, and the methodology set forth within, peer reviewed by the SAB. The public meeting for this review took place on December 13-14, 2010. In lieu of oral comments, the undersigned respectfully requests that the panel consider the following comments before providing their recommendations.

Comment 1: The document should adhere to the recommendations set forth in SAB's previous peer review of nutrient criteria derivation guidance.

Earlier this year, on April 27, 2010, the Science Advisory Board's Ecological Processes and Effects Committee finalized its recommendations on EPA guidance also to be used on for the development of scientifically defensible nutrient criteria.¹ This guidance, entitled *Review of Empirical Approaches for Nutrient Criteria Derivation*, discussed the merits of employing specific methodologies to develop numeric nutrient criteria (or TMDL endpoints) similar to one of the methods used in EPA's TSD presently being reviewed. Moreover, the earlier review identified important prerequisites that must be demonstrated and potential shortfalls if certain physical and biological factors are not properly considered. Unfortunately, many of the same mistakes made by EPA in the earlier guidance were also made in EPA's TSD presently under review. Specifically, EPA's TSD sets forth an approach which will

¹ Available at [http://yosemite.epa.gov/sab/sabproduct.nsf/0/E09317EC14CB3F2B85257713004BED5F/\\$File/EPA-SAB-10-006-unsigned.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/0/E09317EC14CB3F2B85257713004BED5F/$File/EPA-SAB-10-006-unsigned.pdf).

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result in (1) the adoption of uniform criteria regardless of site-specific factors, (2) the imposition of nutrient requirements without impairment demonstrations, (3) criteria which ignore well-recognized factors influencing whether nutrients are, in fact, causing or contributing to instream impairments, and (4) the scientifically indefensible regulatory position that nutrient levels, above those found in background streams, cause designated use impairment. Given the inherent overlap in subject matter between the two reviews, the SAB should make certain that, in this instance, EPA's TSD effectuates the earlier April 27, 2010 recommendations, including, but not limited to, the following:

Demonstrating Cause and Effect is Necessary

- “Without a mechanistic understanding and a clear causative link between nutrient levels and impairment, there is no assurance that managing for particular nutrient levels will lead to the desired outcome” (at 6, first paragraph). “Large uncertainties in the stressor-response relationship and the fact that causation is neither directly addressed nor documented indicate that the stressor-response approach using empirical data cannot be used in isolation to develop technically defensible water quality criteria that will ‘protect against environmental degradation by nutrients’” (at 38, bottom page). “The Guidance needs to clearly indicate that the empirical stressor-response approach does not result in cause-effect relationships; it only indicates correlations that need to be explored further” (at 41, bullet #1).

Must Document Relationship Between Pollutant and Use Impairment Threshold

- “The use of non-parametric change point analysis and discontinuous regression analysis must be associated with biological significance and the designated uses to be protected by numeric nutrient criteria. . . . However, although these methods may be able to identify and characterize breakpoints, such breakpoints may not necessarily have any biological significance, nor will they necessarily be related to designated uses that are to be protected by numeric nutrient criteria. Use of these methods must be associated with designated uses” (at 23, last bullet).

Must Consider Other Factors Influencing Nutrient Dynamics/Impairment Metric

- “For criteria that meet EPA’s stated goal of “protecting against environmental degradation by nutrients,” the underlying causal models must be correct. Habitat condition is a crucial consideration in this regard (e.g., light (for example, canopy cover), hydrology, grazer abundance, velocity, sediment type) that is not adequately addressed in the Guidance. Thus, a major uncertainty inherent in the Guidance is accounting for factors that influence biological responses to nutrient inputs. Addressing this uncertainty requires adequately accounting for these factors in different types of water bodies” (at 38, first bullet). “Numeric nutrient criteria developed and implemented without consideration of system specific conditions (e.g., from a classification based on site types) can lead to management actions that may have negative social and economic and unintended environmental consequences without additional environmental protection” (at 38, third bullet).

Nutrient Loading May be More Important Than Ambient Nutrient Concentrations

- “A basic conceptual problem concerning selection of nutrient concentrations as stressor variables (as illustrated in the Guidance) is that nutrient concentrations directly control only point-in-time, point-in-space kinetics, not peak or standing stock plant biomass. Plant biomass is driven by nutrient supply rates (*i.e.*, nutrient mass loads). Ambient nutrient concentrations are not necessarily good surrogates for nutrient mass loads. Relationships between nutrient mass loads and ambient nutrient concentrations are highly system-specific and depend on many factors including inflows, hydrology, bathymetry, sediment-water exchanges and chemical-biological processes. Consequently, there may be many systems for which nutrient concentrations will not be appropriate stressor variables. For such systems it may be more appropriate, and scientifically defensible, to use site-specific mechanistic models incorporating loading to determine the nutrient controls required to attain designated uses” (at 13, first bullet).

Data Sufficiency is a Key Consideration

- “The document should better address data requirements (including data acquisition and data quality requirements). Without providing guidelines on data requirements, the potential for applying techniques to inappropriate or inadequate data sets is great” (at 10, bullet #13).

Characterizing an Approach as a Weight of Evidence Approach is Not Enough

- “The Guidance should contain a quantitatively based weight-of-evidence framework using multiple methods and then combining them into figures and tables for visualization. Multiple statistical methods on one data set do not equate to a reasonable weight-of-evidence that significantly reduces uncertainty. Rather, the weight-of-evidence should involve different assessment methods (*e.g.*, different data sets, different biological endpoints, measures of habitat, etc.). This premise has been embraced by other EPA programs and the scientific community” (at 18, bullet #7). “The Guidance can be used to develop nutrient criteria in a tiered weight of evidence assessment using appropriately modified EPA approved procedures together with other approaches that address causation” (at 38, last bullet).

Comment 2: Despite EPA’s assertion, cause and effect has not been well-documented in this TSD.

It is a general principle of the Clean Water Act, or any environmental statute for that matter, that pollutants be regulated if and only if they are causing harm or impairment. In generating numeric water quality criteria, EPA must abide by the same principle. CWA §§ 303(c)(2)(A) & 304(a); 40 C.F.R. § 131.3(b). Moreover, the Clean Water Act and EPA’s criteria setting guidelines require that criteria are set at the level “necessary to protect the use.” 40 C.F.R. §§ 131.2 & 131.3(b). Similarly, the proposed methods, that are the subject of this review, are intended to implement Florida’s narrative water quality criteria which states:

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[I]n no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna.

F.A.C. 62-302-530(47)(b) (emphasis supplied). With regard to nutrients such as phosphorus and nitrogen, this causal relationship is extremely complicated to establish because of the multiple variables that affect whether excessive plant growth will occur. In many cases the concentration or loading of nutrients into a waterbody is completely unrelated to the impairment of concern, which may be controlled by physical factors.

With regard to the TSD under review, any attempt by EPA to claim that this critical “cause and effect” relationship has been established or is “very well-documented,” such that generic basin wide standards are justified, is simply untrue. EPA asserted that in the Florida inland waters rule, it made this demonstration through the “60 or so odd references provided therein.” This claim is completely misleading. First, when EPA initially proposed the inland waters rule, it specifically acknowledged the Agency’s inability to document a cause and effect relationship with the available site-specific data stream systems. 75 Fed. Reg. 4174, 4215 (January 26, 2010) (“EPA also concluded that a scientifically defensible cause and effect relationship could not be demonstrated with the available data and that a distribution-based approach was most appropriate.”). Second, the publications referenced in the inland waters rule merely support the position that in some locations, at certain times, given certain conditions, nutrients are responsible for causing impairment. These publications do not speak to the crux of the matter, whether such information confirms that it is scientifically-defensible to impose a uniform nutrient standard in all of Florida’s marine waters and/or canals.

Thus, the earlier inland waters rule (relied on by EPA as its basis for claiming a “cause and effect” relationship) was (1) unable to document a site-specific causal relationship and (2) relied entirely on generalized information because the site-specific data could not confirm this relationship. Any assertion or inference that this TSD contains the necessary cause and effect demonstration is simply untrue.

Comment 3: Claiming that the TSD was developed using a “weight of evidence” approach does not make the TSD scientifically defensible

The SAB’s prior evaluation of EPA guidance on numeric nutrient criteria development included recommendations regarding the use of “weight of evidence” to develop numeric nutrient criteria. For example, the April 27, 2010 recommendations stated:

- “[T]he final Guidance should provide more information on the supporting analyses needed to improve the basis for conclusions that specific stressor-response associations can predict nutrient responses with an acceptable degree of uncertainty. Such predictive relationships can then be used with mechanistic or other approaches in a tiered weight-of-evidence assessment including cause and effect relationships to develop nutrient criteria” (April 27, 2010 SAB Final Report at xii).

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- “Policy makers require information to understand the uncertainty associated with regulatory decisions, and to determine how much uncertainty may or may not be acceptable in particular decision-making contexts. Weight-of-evidence typically determines the tier at which uncertainty has been reduced sufficiently for informed management decision-making. It is important to explicitly describe and consider uncertainty at each step of the criteria development and decision-making process. The level of uncertainty of the conceptual model is likely to be rather low, as it is mostly based on well-established general principles of aquatic systems. Here the uncertainty is about how well the selected conceptual model fits the specific stressors and ecological systems under consideration. As criteria are developed it is important to address uncertainty associated with more specific factors that influence biological responses to nutrient inputs because uncertainty may cascade down through the analysis, in effect multiplying the uncertainty in later steps of the analysis” (April 27, 2010 SAB Final Report at xiii).

These recommendations clearly direct EPA to identify an acceptable degree of uncertainty necessary to support numeric nutrient criteria and to assess the amount of uncertainty in its recommended criteria. Moreover, the weight of evidence assessment must include cause and effect relationships as an integral part of the criteria development process.

In its testimony before the SAB, EPA has made reference to its use of a “weight of evidence” approach to the development of numeric nutrient criteria for Florida’s coastal waters and canals. A review of the TSD indicates that the term, “weight of evidence,” is not used. Consequently, neither the “evidence” nor the methodology for “weighing” the “evidence” is provided for review. If such an approach is being used by EPA, it is appropriate that the Agency provide a scientifically defensible basis for deriving a “weight of evidence”-based water quality standard.

Thank you for the panel’s consideration of these comments.

Respectfully,

Hall & Associates