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United States Environmental Protection Agency
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1200 Pennsylvania Avenue, NW
Washington, DC 20460
Attn: Docket ID No. EPA-HQ-OW-2009-0596

Subject: Proposed Water Quality Standards for the State of Florida's Lakes and Flowing Waters

Tri-TAC appreciates the opportunity to provide comments on the USEPA's proposed rule "Water Quality Standards for the State of Florida's Lakes and Flowing Waters." Tri-TAC is a California statewide organization of local public agency representatives responsible for wastewater collection, treatment, disposal, and reclamation. Tri-TAC is an advisory group jointly sponsored by the California Association of Sanitation Agencies, the California Water Environment Association, and the League of California Cities.

Tri-TAC members operate under individual NPDES permits and/or a variety of general NPDES permits. Most of our members are single purpose sanitation and sanitary districts; however, some of our members are municipalities responsible for wastewater, storm water, and other activities subject to NPDES permitting authority. Tri-TAC has significant concerns about the implications to our members if the USEPA took a similar approach to that proposed in the State of Florida to setting numeric nutrient standards in California.

Our comments are focused on three key areas, which include:

1. Fundamental concerns regarding the numeric nutrient standards approach;

2. Concerns with the technical approach used to derive the proposed Florida standards for flowing waters; and

3. Compliance ramifications of the proposed standards to regulated communities based on data from California POTWs.

There is often no clear linkage between nutrient concentrations and impairment of beneficial uses, as provided in the examples in the following detailed comments. These examples indicate that generic problems associated with algal blooms cannot necessarily be resolved through adoption and implementation of numeric nutrient water column standards. The Florida standards for flowing waters are based on a reference stream approach, which provides no definitive connection between the standards and the implied benefits. Standards established without definitive

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benefit, through an approach that is questionable for protecting stated beneficial uses, can cause significant compliance issues for NPDES permittees. If this approach and these standards were applied in California the result would be significant fines due to mandatory minimum penalties, which require automatic, nondiscretionary payments by POTWs for exceedances of NPDES permit limits. As a result, Tri-TAC requests that the proposed numeric standards be withdrawn and reconsidered to address the issues raised in the detailed comments below.

1. Concern that the control of water column concentrations of nutrients through adoption of numeric nutrient standards will not result in implied beneficial use improvement

Nutrient management is not analogous to toxic pollutant management. The clearly defined relationships that exist between toxic pollutant concentrations and specific toxicological end points are not present for nutrients. In other words, it is likely that an expectation that changes in ambient nutrient concentrations will produce desired end points in natural systems will not be fulfilled. The numerous other factors that influence algal growth confound the ability to unilaterally manage this condition through water quality modification.

Our overarching concerns with the proposed numeric nutrient standard approach are as follows:

- Lack of scientific linkage between the proposed standards and the benefit to be achieved;
- Lack of clarity over the problem to be addressed by specific standards;
- Concern that adoption and implementation of numeric total nitrogen or total phosphorus standards are unlikely to accomplish stated or implied goals;
- Concern that the definitive effects of proposed numeric nutrient standards will be significant regulatory and cost impacts on communities, without reasonable assurance of commensurate benefit; and
- Concern whether proposed standards may do more harm than good.

The rationale for numeric nutrient standards, apart from ease of regulation, often consists of preventing algal blooms to eliminate or reduce one or more of the following:

- Proliferation of harmful algal species or toxins
- Low dissolved oxygen
- Taste and odor episodes in water supplies
- Degraded biological communities
- Fish kills
- Nuisance conditions (e.g. objectionable aesthetics or odors)
- Reduced water clarity
- Changes in food web

Often, the numeric standards that are proposed are not specifically linked to or derived from the resolution of these issues.

For instance, the stated purpose for developing numeric nutrient standards for the State of in Florida is that "nutrient pollution can significantly impact aquatic life and long-term ecosystem health, diversity, and balance." The proposed rule introduces specific concerns from nutrient and phosphorus loadings, namely "harmful algal blooms (HABs), reduced spawning grounds and nursery habitats, fish kills . . . oxygen-starved hypoxic or "dead" zones. . . impaired drinking water sources." Yet, as is often the case, the proposed numeric nutrient standards in Florida are not specifically tailored or justified to address these stated problems. Therefore, the connection between the standards and the specific uses to be protected does not exist.

There are numerous factors and mechanisms that impact algal growth and resulting adverse effects. Research indicates that control of nutrient levels will not necessarily lead to improvements in beneficial uses. Two examples of this research are the drinking water supply issue related to control of tastes and odors (T&O) and harmful algal blooms.

Nutrient control measures have proven ineffective as management tools to control T&O events in drinking water supplies. A diverse array of volatile organic compounds (VOC) are implicated in T&O episodes, including the terpenoid compounds geosmin and 2-methylisoborneol [MIB] (which account for the majority of drinking water complaints) but also polyunsaturated fatty acids (PUFA) derivatives, isopropylthiols, and pigment derivatives such as b-cyclocitral. Nutrient control approaches for T&O problems are undermined by the fact that many aquatic organisms which produce T&O compounds are not algae and thus not ecologically well-linked to inorganic nutrient levels in water bodies. For example, geosmin and MIB are produced by cyanobacteria (*blue-green algae*), but also by actinomycete bacteria (especially in relation to bivalve colonies)[1], myxobacteria (slime molds), fungi (especially in activated filters and distribution pipes), the amoeba *Vanella*, and even a liverwort[2]. Where T&O episodes have been linked to phytoplankton, the events are not well explained by the nutrient status or planktonic productivity of the systems. For example, chrysophytes (golden algae) and their PUFA derivatives show little apparent relationship to nutrients on a broad scale[3]. Although the Great Lakes have undergone nutrient remediation, they are now exhibiting erratic T&O outbreaks in areas with reduced offshore nutrient levels and low phytoplankton biomass. Despite years of extensive field and laboratory research to determine the major causes of T&O outbreaks in the Great Lakes and identify key predictors, managers are still not able to predict the interannual variation in the intensity of the events[4].

Although surface blooms are perceived as primary sources of water odor, twice as many known odor-causing cyanobacterial species reside at the surface of bottom

[1] Zaitlin et al., 2003; Zaitlin & Watson, 2006
[2] Juttner & Watson, 2007
[3] Watson et al., 1997, 2001a, 2001b
[4] Watson et al., 2007, 2008

sediments, not free-floating in the water column[5]. Cyanobacteria growing on sides of reservoirs, or on dams, are responsible for most of the T&O events reported in the literature for terminal reservoirs receiving water from the State Water Project in California[6]. Because these colonies access nutrients released at the sediment/water interface, their occurrence is not predicted by nutrient concentrations in the water column; reservoir design and draw-down procedures are increasingly being considered as factors for T&O management[7]. Ironically, because nutrient reduction strategies have increased water transparency and production close to the shore in many systems, they may have improved conditions for attached algae that produce T&O compounds[8]. Although nutrient concentrations are poor predictors of T&O events, regression approaches using a suite of environmental variables have shown air and/or water temperature to be strongly correlated with T&O compound concentrations in at least four reservoirs[9].

Similarly, control of nutrient levels is not necessarily the path to effective management of harmful algal blooms (HAB). In the San Francisco Bay-Delta, HAB caused by dinoflagellates are rare. However, toxic blooms of *Microcystis aeruginosa* have recently occurred in the northern portion of the estuary during summer months. Despite speculation that nutrient levels (e.g., ammonium) or ratios (e.g. Nitrogen:Phosporous-N:P) would explain patterns of abundance or toxicity of *Microcystis* blooms in this system, several detailed field studies so far indicate that flow rates, residence time, water temperature, and possibly water transparency - but not nutrient levels or ratios - are the environmental factors correlated with *Microcystis* abundance and toxin production in the upper San Fransisco Estuary[10].

The examples above are cases where - contrary to public perception or regulatory implication - there is no clear linkage between nutrient concentrations and impairment of beneficial uses. These examples indicate that generic problems that are associated with algal blooms cannot necessarily be resolved through adoption and implementation of numeric nutrient water column standards.

2. Concern that a relationship does not exist between the proposed Florida nutrient standards and biological or other impairments.

Tri-TAC's fundamental concern with the approach used to derive the proposed standards for flowing waters in the State of Florida is that there is no demonstration of a stressor-response relationship. Such a relationship is needed to demonstrate that a reasonable expectation of cause and effect exists between the proposed standards and the desired outcomes.

In the proposed State of Florida standards development, USEPA has classified watersheds with substantially different ratios of Total Nitrogen (Total N) and Total

[5] Jutter & Watson, 2007; Burlingame et al., 1986; Sugiura et al., 1998; Watson & Ridal, 2004; Baker et al., 2006
[6] Izaguirre & Taylor, 2007; Losee, 2008
[7] Lee, 2008; Losee, 2008;
[8] Juttner & Watson, 2007
[9] Tung et al., 2008; Uwins et al., 2007; Yen et al., 2007
[10] Lehman et al. 2008; Lehman et al. 2010; Mioni 2010.

Phosporous (Total P) export into four nutrient watershed regions. The biological conditions of streams were evaluated using the stream condition index (SCI), previously applied by the Florida Department of Environmental Protection (FDEP), using benthic macroinvertebrate community composition and taxonomic data. USEPA evaluated but was unable to find a correlation between these biological response indicators and ambient TN and TP concentrations. In the absence of a correlation, however, EPA still used the approach of estimating a distribution of nutrient concentrations from biologically healthy reference streams, and establishing the standards from the 75th percentile of the distribution.

The approach does not meaningfully relate elevated nutrient levels to biological impairment. A demonstrated linkage between nutrient levels and biological integrity is missing from the USEPA analysis. The USEPA admits that they did not find a sufficiently strong correlation between biological response indicators (SCI, chlorophyll *a*, periphyton biomass) and TN or TP concentrations in Florida streams, yet still base their criteria on nutrient distributions within reference streams. The USEPA explained that there may be several reasons for the weak correlation between nutrient stressors and biological response -- the relationship could be confounded by the presence of other stressors (i.e., excessive scour), or because algal biomass accumulation is difficult to characterize in individual streams due to dynamic conditions where biomass fluctuates. The analysis fails to consider or identify other mechanisms that might impair invertebrate diversity, such as ecological factors including light availability, sedimentation, and habitat quality or alteration.

Without linking low biological productivity with elevated nutrient levels in the streams where the standards will be implemented, it is tenuous to suggest or imply that limiting nutrient levels to reflect levels present in reference streams will protect beneficial uses

Furthermore, Tri-TAC is concerned that the implication is that the proposed standards in Florida will provide various benefits, including improved attainment of biological criteria, control of harmful algal blooms, reduction of fish kills, elimination of hypoxic zones, and resolution of drinking water concerns. For the one benefit that was examined (improved biological condition) in detail, no predictive relationship was identified. For the other benefits, no science was developed to support a connection between the proposed standards and these conditions. In the final analysis, as noted above, the Florida standards are based on a reference stream approach, which provides no definitive connection between the standards and the implied benefits.

3. Adoption of standards similar to those proposed in the State of Florida would result in significant compliance problems in California

One of the few predictable outcomes of the adoption of the proposed standards will be the application of those standards in the NPDES permitting process. An assessment of effluent quality from existing California POTWs that nitrify and denitrify has been performed to examine the ability to attain projected effluent limits.

For a number of plants in California and other areas of the arid west which discharge to receiving streams with little or no dilution, the permitting approach will be to apply standards at the end of pipe. The following analysis focuses on the ability of advanced treatment facilities in California to comply with effluent limits based on approximations using the proposed Florida nutrient standards as projected limits.

The proposed Florida standards for Total N and Total P for flowing rivers are summarized in Table 1.

Table 1. Proposed Criteria for Florida Streams (Annual Geometric Mean)

Watershed Region	Total N	Total P
Panhandle	0.824	0.043
Bone Valley	1.798	0.739
Peninsula	1.206	0.107
North Central	1.479	0.359

Using the maximum and minimum standards for Total N and Total P shown in Table 1 as projected effluent limits, the compliance frequency for existing nitrification and denitrification treatment facilities has been assessed and is illustrated described in Attachments A and B. Probability plots of effluent quality in comparison to projected effluent limits for Total N and Total P are shown as colored bands in the attachments. The point of intersection between the probability plot and the colored bands indicate the compliance percentages for each individual POTW represented. Full compliance would be represented by a figure with the colored band above the effluent concentration probability plot. Total noncompliance would be the case where the colored band is below the probability plot.

The analysis indicates that all of the 18 POTWs examined would have significant compliance problems if the Florida Total N standards were applied in California. Of the 12 California POTWs for which Total P data were available, all would have problems with the most restrictive Florida standards and most would have problems with the full range of proposed Florida standards. Clearly, adoption of the proposed Florida standards would require installation of additional nitrogen and/or phosphorus removal facilities at all of the POTWs in California discharging to freshwater receiving waters with limited dilution capacity if those standards were applied at the end of pipe.

Adding to these significant compliance concern are the findings of a recent WERF study[11] which examined the effluent quality of twelve total nitrogen and fifteen total phosphorus removal facilities from around the US. None of the total nitrogen facilities could reliably meet any of the effluent limits derived from the proposed Florida standards if they were applied at end of pipe. Only two of the fifteen total phosphorus plants could possibly meet the most restrictive phosphorus limits derived from the proposed Florida standards as end of pipe limits. Therefore, a question exists as to the availability of treatment technology which could produce

[11] Bott, C, 2010.

effluent of the required quality. In California, compliance attainability is of particular importance, because mandatory minimum penalties require automatic, nondiscretionary payments by POTWs for exceedances of NPDES permit limits.

Requested Action

The proposed standards for the State of Florida do not consider economic impacts or technological feasibility of meeting the standards in ambient water. Without demonstrating a clear tie between reduction of nutrients and improvement of biological health of streams or other beneficial outcomes, uncertainty prevails whether reduction in nutrients would improve water quality or beneficial uses. Therefore, the real costs to achieve compliance with NPDES permit limits would likely not be offset by a commensurate benefit in terms of beneficial use improvement.

As a result, it is requested that the proposed numeric standards be withdrawn and reconsidered to address the issues raised in this letter. It is also requested that provisions be added to a modified rule to avoid unreasonable NPDES permitting consequences in the implementation of nutrient standards. If USEPA does promulgate numeric nutrient criteria in Florida, we specifically request that both the preamble and the rule itself contain language making it clear that neither the numeric water quality criteria for Florida nor the methodology are intended to be a precedent for other states.

Again, we thank you for the opportunity to submit these comments.

Sincerely,

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Attachments

Attachment A: Nitrogen graphs
Attachment B: Phosphorus graphs
Attachment C: References