

July 29, 2011

Via Electronic Delivery phmoershel@owrb.ok.gov

Mr. Phillip Moershel
Water Quality Standards Section
Oklahoma Water Resources Board
3800 North Classen Boulevard
Oklahoma City, Oklahoma 73118

RE: Oklahoma Water Resources Board Technical Advisory Group
Public request for "best scientific information" regarding numerical phosphorus criteria

Dear Mr. Moershel:

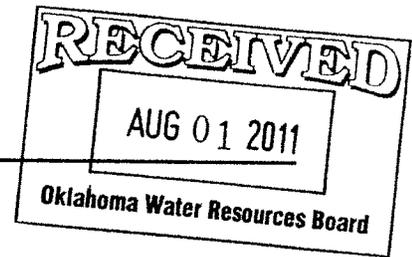
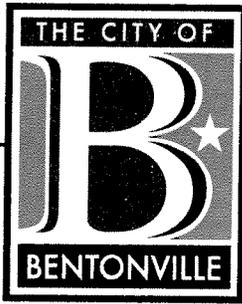
The City of Bentonville greatly appreciates the opportunity to participate in the Oklahoma Water Resources Board's re-evaluation of the 0.037 mg/L phosphorus criterion. The City has great interest in the phosphorus standard as it directly affects the City of Bentonville and its ratepayers. The City has expended substantial resources to improve the quality of wastewater and stormwater contributions to the region's water resources and will continue to pursue environmentally steadfast practices; however, we must be reasonable and have sound justification for our actions. The Illinois River Watershed is a developing watershed with significant human impact. Returning the river to a pristine, natural state is both impractical and unreasonable. I agree that we need to do all we can to protect the environment, especially our water resources; however, I fear the lower limits we may encounter will be financially straining without producing environmental benefits or improvement. I have great concern that we may be facing unnecessary monetary expenditures and exhausting our vital resources to attain goals that have no measurable environmental benefit.

Attached you will find detailed comments gathered and prepared by City of Bentonville staff and our consulting team. Thank you again for the opportunity to participate in the re-evaluation process.

Respectfully,

Bob McCaslin
Mayor

Cc: Honorable John Boozman, US Senate
Honorable Steve Womack, US Congress
Teresa Marks, Director, ADEQ
George Spence, City Attorney, City of Bentonville
Camille Thompson, Staff Attorney, City of Bentonville
Linda Martin, Doerner, Saunders, Daniel & Anderson, LLP



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RE: Oklahoma Water Resources Board Technical Advisory Group
Public request for "best scientific information" regarding numerical phosphorus criteria

Dear Mr. Moershel:

The City of Bentonville (City) commends the Oklahoma Water Resources Board (OWRB) and its efforts to protect invaluable water resources and is pleased to have the opportunity to comment on the re-evaluation of the numerical phosphorus criterion. The City is notably conscientious about the environment; however, the City has great concern that the 0.037 mg/L phosphorus criterion currently being reviewed by the OWRB Technical Advisory Group is unrealistic and lacks sound scientific support. The City of Bentonville, in collaboration with Geosyntec Consultants, Inc., respectfully offers the following comments and concerns for consideration.

Comment #1: It is not clear what environmental condition is being targeted in the Illinois River by the proposed total phosphorus (TP) criterion.

In the document titled "Rationale for Promulgation of a 0.037 mg/L Total Phosphorus Criteria for Scenic River Protection" (Rationale Document), OWRB infers that the proposed total phosphorus concentration is needed to control 'significant' growths of algae that may lead to adverse ecological and recreational impacts. Absent from the Rationale Document are quantitative descriptions of algae, primary production, ecological, or recreational conditions that will be achieved by implementing the proposed TP criterion. Without a quantitative description, the City questions how OWRB can objectively (i.e., statistical hypothesis testing) determine policy success. *Therefore, the City requests that OWRB quantify the algal, ecological, and recreational conditions protected through implementation of the proposed criterion.* In making this request, the City notes that the EPA nutrient criteria guidance document cited in the Rationale Document includes a recommendation that States adopt both a response variable (e.g., algal biomass, turbidity etc.) and nutrient concentration (e.g., TP or total nitrogen). Given the projected capital investments needed to meet the proposed criterion, it seems reasonable

that watershed stakeholders have a clear and testable metric to measure implementation success.

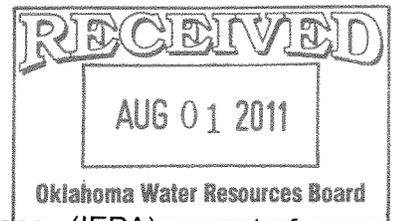
Comment #2: A cause and effect relationship between beneficial use attainment and the proposed total phosphorus criterion has not been established for the Illinois River.

It is the City's understanding that the Clean Water Act was authored to maintain and protect beneficial uses (e.g., fishable and swimmable goals). Historically, EPA and delegated States have measured attainment of beneficial uses with chemical or physical criteria surrogates. Examples of these surrogates include chronic lead criteria or dissolved oxygen minima. These surrogates were determined through carefully performed experiments with aquatic biota designed to detect measurable toxicological endpoints (e.g., LC₅₀ etc.). In the 1980s, some States (notably Ohio), initiated development of biocriteria. Biocriteria are direct measurements of aquatic life use attainment and often take the form of macroinvertebrate, fish, or algae demographical metrics. In deriving chemical surrogate criteria, a quantitative relationship between the designated use and the surrogate is determined through experimentation. In the case of numeric biocriteria, aquatic life use attainment is measured directly. However, it seems that OWRB has not quantitatively linked the proposed TP criterion with beneficial use attainment.

The reference condition approach supported in the Rationale Document does not quantitatively relate the proposed TP criterion to beneficial use attainment in the Illinois River. The City questions why OWRB has not developed this relationship between nutrients and aquatic life. Clearly, EPA has invested the technical and material resources to develop this relationship for other chemical surrogates such as heavy metals, ammonia, and dissolved oxygen. Given the projected capital investments needed to meet the proposed criterion, it seems reasonable that OWRB quantitatively demonstrate that the proposed criterion is needed to meet beneficial uses in the Illinois River. Furthermore, without this linkage, the City questions how OWRB can determine if the criterion is over or under protective of beneficial uses. *Therefore, the City requests that a quantitative linkage between targeted environmental condition(s) (see **Comment #1**) and the proposed TP criterion be developed before the criterion is used within regulatory programs, i.e. NPDES permits or TMDLs.*

Comment #3: The proposed rule and phosphorus criterion should reflect the site-specific nature of nutrient concentration, algal biomass, and biologic integrity relationships.

Nitrogen and phosphorus are inorganic macronutrients needed to support the metabolic needs and growth of primary producers including suspended and benthic forms of algae, as well as aquatic macrophytes. While some minimum level of nutrient supply (i.e., nutrient limitation concept) is needed to sustain primary production, there are several other well documented processes that may co-limit, or override, the influence of nutrient concentrations on algal biomass or demographics. These processes include scour from shear stresses exerted at high streamflows, predation by macroinvertebrate and fish grazers, light limitation from dense canopies or water column turbidity, and the general availability of stable attachment substrate. In addition, seasonal changes in dominant algal taxa, each with unique light and nutrient requirements, further emphasize the site-specific nature between nutrient supply and primary production.



Research studies supported by the Illinois Environmental Protection Agency (IEPA) as part of nutrient criteria development acknowledge these processes. In fact, results of these studies indicate that light and habitat (substrate) limit algal biomass before nutrients in several systems, suggesting that nutrient controls in habitat limited streams may not yield substantive improvements or changes in aquatic life use. *Therefore, the City requests that OWRB commit to substantive process-based study of nutrient, algal, and aquatic life relationships in the Illinois River.*

Comment #4: The role of laboratory analytical detection limits in determining the proposed phosphorus criterion is not clear.

The ability to quantify an environmental parameter, such as total phosphorus, is constrained by the ability to measure it. The proposed criterion magnitude of 0.037 mg/L is near or below the 'method detection-level' of several EPA-approved analytical methods for TP. In the Rationale Document, OWRB does not 1) describe how many reference stream measurements were below detection limit, 2) discuss how non-detection levels were dealt with in deriving the criterion, and 3) evaluate the uncertainty in the proposed criterion contributed by non-detectable values. Notwithstanding significant concerns outlined in preceding comments, *the City requests that OWRB provide additional information that documents the effect and uncertainty of non-detect measurements in deriving the proposed criterion.*

Comment #5: Soluble inorganic nutrient concentration is a more defensible and appropriate process-based expression of phosphorus concentration.

Algae and aquatic macrophytes generally uptake soluble inorganic (i.e. bioavailable) forms of phosphorus to fulfill metabolic and life cycle needs. With the exception of very oligotrophic (nutrient poor) systems where organic phosphorus can be used by adapted producers, lotic primary production is supported by inorganic nutrient supply. While we recognize that TP data are more widely available and easily measured, inorganic phosphorus or soluble reactive phosphorus is clearly the more appropriate process-based expression of nutrient concentration. As particulate or organic-bound phosphorus captured by the TP measurement does not contribute to biologic response, we assert that a non-negligible source of uncertainty will be introduced into cause-effect studies should the use of TP continue. *Therefore, the City requests that the proposed rule incorporate allowances to revisit the expression of phosphorus following additional data collection and cause and effect studies.*

Comment #6: We agree that a phosphorus criterion, if imposed, should be expressed as a long-term, central tendency target.

Given the uncertainties described in preceding comments and flow-TP correlations outlined in the Rationale Document, the City agrees that the proposed criterion be expressed as a long-term target. However, the City offers that compliance with that target be measured as a long-term *median* as opposed to an arithmetic average. As a result of the flow-TP correlations, the distribution of TP values is likely to be skewed and log-normal. For distributions that deviate from normality, having infrequent large values (right-skewed), the arithmetic mean is a biased estimator of central tendencies. *Therefore, the City requests that compliance with a proposed criterion be measured using the median statistic, or geometric mean, of applicable phosphorus*

data. Specifically, OAC 785:45-5-25(c) 1.(C) should be modified to include the term 'median' instead of 'average'.

In addition, the City believes the 30-day averaging period is not appropriate for measuring compliance with the proposed criterion. First, it is not clear what level of averaging or aggregation were performed on the data used to derive the proposed criteria (a percentile). In other words, was the proposed percentile criterion generated from a dataset of site medians, site averages, site percentiles, site 30-day averages, or individual data points? It is well understood that averaging reduces statistical variation. For example, if the dataset used to generate proposed criteria are composed of long-term site averages (or medians), why would the compliance averaging period be less than an annual value? The second reason for concern is the rate of biological response. The City questions if there is any information or evidence available that suggest that the algal community and aquatic life uses in the Illinois River quantitatively respond to a 30-day nutrient pulse above 0.037 mg/L. *The City requests that OWRB more clearly link the averaging period to biological response, and further consider the comparability of the 30-day averaging period with timescales used in deriving the proposed criterion.*

We also note that water quality criteria are typically described by three numeric characteristics: magnitude, excursion frequency, and duration (averaging period). The Rationale Document sets forth two of these components, the criterion magnitude (0.037 mg/L) and the duration (30-day average). The Rationale Document does not specify an allowed excursion frequency. *The City requests that the OWRB specify and provide rationale for an allowed excursion frequency.*

The City appreciates the opportunity to provide the above comments and sincerely hopes the OWRB will act reasonably and responsibly in its review of the phosphorus criterion. Please consider the negative social and economic ramifications an incomplete, rushed, or haphazard review will have on the citizens and culture within the affected watershed, especially without justified or documented environmental improvement. Please feel free to contact me at 479-271-6720 or mbender@bentonvillear.com if you have any questions or wish to further discuss any comments.

Respectfully,



Mike Bender, PE
Public Works Director

Cc: Honorable Bob McCaslin, Mayor, City of Bentonville
Honorable John Boozman, US Senate
Honorable Steve Womack, US Congress
Teresa Marks, Director, ADEQ
George Spence, City Attorney, City of Bentonville
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