

**South Florida Water Management District's Basis for Concluding that  
the State's Phosphorus Rule is Both More Protective and Lower than  
Appendix B of the Consent Decree**

By

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The South Florida Water Management District submits the following comparison of the State's phosphorus water quality standard, Rule 62-302.540, F.A.C. (the "phosphorus rule" or "four-part test") and Appendix B of the Consent Decree. As explained below, the phosphorus rule is more protective and lower and, as a result, should be incorporated into the Decree as part of the "transfer of these proceedings to a State administrative forum." *United States v. South Florida Water Management District*, 28 F.3d 1563, 1569 (11th Cir. 1994).

**1. "Lower" should be construed as "more protective" to be consistent with the purpose of the Consent Decree, but even without this interpretation, the State's phosphorus water quality standard is lower than Appendix B.**

The opening paragraph to the Settlement Agreement provides that the Settling Parties have an obligation to restore, preserve and protect the unique flora and fauna of the Park and the Refuge, and to maintain a cooperative relationship in accomplishing these goals. Based on this language, it is difficult to believe that drafters of the Settlement actually envisioned a process by which a less protective test could be selected over a more protective one, simply because it could somehow be characterized arithmetically as "lower."

As discussed below, the State's phosphorus water quality standard, 62-302.540, F.A.C. (the "four-part test"), is more protective than Appendix B of the Decree and, as such, this test should be used for future compliance purposes. While some TOC representatives may decide to follow a strict application of the term "lower" without taking into consideration the protection of the resource, there are two reasons why the four-part test is "lower" than Appendix B and more wholly protective of the Refuge.

First, it is important to note that the Settlement Agreement does not indicate how to quantify which test is lower, nor does it require use of the existing 14 monitoring stations when making the comparison. This is important because the Appendix B monitoring network does not assess water quality in the phosphorus-impacted areas of the Refuge – arguably the primary area the Settlement sought to address – while the four-part test does. As a result, during the past water year (May 1, 2005–April 30, 2006), while the State met both the interim and long-term phosphorus levels in the Refuge as measured at the 14 interior stations, Appendix B tolerated annual phosphorus concentrations in the impacted areas ranging from 8 to 80 ppb (concentrations at the 14 interior stations range from 4 to

19 ppb, excluding May and June 2005). Given that the four-part test applies to both impacted and unimpacted areas of the entire Refuge and seeks to achieve a long-term geometric mean of 10 ppb in its impacted and unimpacted areas, *overall* it should be considered lower because it requires significantly lower concentrations in impacted areas while simultaneously maintaining comparable and protective values in the marsh's interior. It is important that the U.S. Environmental Protection Agency (USEPA) determined that 10 ppb as an annual or longer term mean is protective of Everglades flora and fauna when the agency approved the State's phosphorus rule and that of the Miccosukee Tribe. This point is further underscored by the fact that under Appendix B, annual inflow phosphorus concentrations have been above 100 ppb for the past year, while at the same time the interior 14 stations are experiencing the lowest average concentrations for the entire compliance period of record.

The second reason the four-part test is lower is because Appendix B allows for higher phosphorus concentrations, as demonstrated in Goforth 2006. This analysis indicates that the five-year geometric mean of the predicted long-term monthly concentration levels (i.e., the Appendix B equation predicted values) averaged 10 to 11 ppb, with an annual geometric mean of 10 to 12 ppb. The phosphorus rule requires a five-year geometric mean of 10 ppb and an annual geometric mean of 11 ppb for its monitoring network, and these values are lower than computed long-term levels provided in Appendix B. In other words, Appendix B would tolerate levels that would violate the phosphorus rule. The response to Dr. Goforth's analysis, presented by the Federal parties during the TOC meeting on November 7, 2006, is not considered valid, as it compares predicted median concentrations (i.e., the 50<sup>th</sup> percentile value generated by a permutation of the Appendix B equation) with the 90% confidence limits established by the four-part test (which are actually based on a 90% confidence interval) (Payne et al., 2003). Assuming an evaluation of the equation's predicted median concentrations is even relevant, it would need to be compared with median concentration used to establish the 10 ppb criterion in the State's water quality standard and not against the 90% confidence limit used to track compliance. Regardless, the Settlement Agreement does not require a comparison of medians but a comparison of the long-term levels and the Class III standard – both predicated on 90% confidence intervals, as Dr. Goforth performed in his analysis.

## **2. USEPA has determined the State's rule is more protective.**

The USEPA is the Federal agency charged with evaluating water quality standards and is a party to the Settlement Agreement. The USEPA's position should be given deference in this case. The original State phosphorus rule submitted for approval used Appendix B to track compliance, and the USEPA did not approve the rule because "states must adopt those water quality criteria that protect designated use." (USEPA, January 24, 2005). Clearly stated, Appendix B was not shown to be protective.

The FDEP amended the phosphorus rule to include the four-part test in the Refuge. Based on the USEPA's independent evaluation of existing data, it approved the four-part test as protective of the designated use, noting that it "provides the level of protection necessary to protect the designated use . . . a bench mark for restoration of the Everglades." (USEPA, July 27, 2005).

### **3. Data demonstrates that the four-part test is more protective.**

It is important to recognize that the State's 10 ppb limit was derived from annual data between 1994 and 2001 from a series of reference sites in both WCA-2A and in the Refuge. The long-term level equation of Appendix B was derived from 5 monthly geometric means of 14 sites in the Refuge only. The dependence of the equation in Appendix B on this limited data from a spatially and temporally limited network underscores its limitation to protect the designated use of the Refuge.

In order to be protective, any compliance system must have the capability to respond to phosphorus inputs from the Refuge's peripheral canal. If large areas of the marsh can be impacted without any response from the Appendix B methodology, then it cannot be considered protective. Appendix B is structurally incapable of being protective of the marsh as a whole given that it is based solely on 14 stations scattered unevenly across the Refuge interior and only a few of these stations are close to the Rim Canal. The phosphorus rule will use a total network of 24 stations across the entire marsh, with 17 monitoring stations in the interior and 7 stations in the peripheral portions of the Refuge, areas known to be influenced by external inputs. Proximity to the Rim Canal ensures a stronger and more protective relationship to inflows and loads. Furthermore, the State's rule requires that individual stations be examined annually, including those in impacted areas, while the Appendix B equation does not address individual stations nor does it have the capability to protect impacted areas due to the limited spatial coverage of its network. The ability to track compliance at individual stations is a major difference in the approaches and an important means of ensuring resource protection at individual sites and signaling changes long before they would be observed at interior sites.

Finally, there is also no appreciable correlation between inflow and canal loads and concentrations and geometric mean 14 interior stations even on very long-time scales, so Appendix B is not protective of Refuge as a whole. Stated simply, the periphery of the Refuge can be impacted without the Appendix B compliance signaling a problem. There is also no appreciable correlation between external loading and interior concentration levels in the Appendix B equation, while there is a significant correlation between external loading and impacted areas, which is required to be assessed as part of the phosphorus rule.

**4. Appendix B is dysfunctional and does not reliably predict water quality in the Refuge. Therefore, it can not be considered either lower or more protective than the State's phosphorus rule.**

The Appendix B equation over predicts total phosphorus values at low stages and under predicts TP values at high stages and during periods of rapidly rising stages. This bias in predictions is one important reason for the observed bias for at high stages and in the fall. (Marks, 2006). Notably, the State's rule does not rely on any regression relationship to marsh water level, and therefore, is not subject to any bias related to derivation of the equation and changed conditions that may influence its ability to make reliable predictions. The equation in Appendix B was derived from samples collected at irregular temporal frequencies and has no capability to account for short-term marsh phosphorus dynamics or short term marsh responses to rapidly changing water levels. The State's rule uses annual and longer duration averages so that short term dynamics do not unduly influence the results. The phosphorus rule of the Miccosukee Tribe also uses annual means to assess compliance. Appendix B has a high false positive rate because it is applied iteratively. Compliance with the State's rule is assessed only once per year, such that its overall uncertainty is not compounded beyond the 10 % false positive frequency used in its derivation.

**5. Appendix B allows higher phosphorus levels in inflows.**

The "which is lower" comparison should also include a comparison of inflow concentrations. Assuming the Decree imposes a 50 ppb discharge limit, even when the State is meeting long-term limits, it is not as protective as the State's phosphorus rule. The rule requires implementation of the Best Available Phosphorus Reduction Technology, which in the interim means discharge levels ranging from 35 to 45 ppb and, in the long-term, lower levels as new projects and enhanced treatment technology comes on line until the 10 ppb criterion can be achieved in the Everglades Protection Area.

Appendix B contemplates a lowering of the discharge limits if the long-term levels are not met. However, during the causation hearing before the Special Master, it became evident that the Federal Government is unable to quantify the relationship between Refuge inflow phosphorus concentrations and changes in water quality at its 14 interior monitoring stations. Because the relationship cannot be quantified, establishing new, lower discharge limits would largely depend on subjective deduction. A regime that links discharge limits to best available technology with a continuous improvement process, rather than relying on weak argumentation, can be reasonably expected to be more protective of the resource.

**References:**

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