



May 10, 2011

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Subject: Comments on the Draft Document (dated April 8, 2011) prepared by the EPA Science Advisory Board Nutrient Criteria Review Panel

Dear Dr. Armitage,

On behalf of the Everglades Agricultural Area Environmental Protection District (EAA-EPD), I appreciate the opportunity to provide comments to the Science Advisory Board (SAB) Review Panel on their Draft Report dated April 8, 2011. The Panel's Draft Report consists of a review of selected aspects of EPA's draft document, *Methods and Approaches for Deriving Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida 's Estuaries, Coastal Waters, and Southern Inland Flowing Waters* (November 17, 2010 draft; hereafter "Methods Document").

In my view, the SAB Panel rightly questions the rationale for setting numeric nutrient criteria for the man-made, highly managed canals that comprise ~90% of South Florida inland flowing waters. Further, the Panel notes that neither the potential assessment endpoints of aquatic macroinvertebrates or phytoplankton, nor the reference or stressor response approaches can be scientifically supported given the available data.

The Panel raises several ostensibly helpful suggestions for additional data collection and analyses, such as assessment of data/approaches for other "artificial" systems such as reservoirs, or retrieval and comparison of additional data (i.e., for macroinvertebrates) to determine if different patterns in the various data sets can be explained and related to nutrients. While such efforts can be instructive, they do not surmount the fundamental challenges to the deriving of scientifically-defensible nutrient criteria for South Florida inland flowing waters: namely, due to the physical configuration, operations and management of the man-made canals, their ecological attributes are limited, and nutrients will be, at most, a distant second-order control variable in these systems to master factors such as habitat and flow regime. I therefore believe it will be

extremely unlikely that any improvement in “in-stream” ecological attributes of canals will occur as a result of stringent nutrient controls.

In their Methods Document, EPA cites the work of Snyder et al.¹ in Dade County showing that macroinvertebrate communities in canals surrounded by wetlands exhibited some characteristics similar to healthy populations found in Florida’s least-impacted streams, while macroinvertebrates in canals surrounded by other land uses were more often degraded. The EPA’s Methods Document suggests, based on Snyder’s work, that a quantitative measure of land use (e.g. the Landscape Development Intensity [LDI] index) could be used to identify least-impacted areas for establishing reference conditions. However, relationships between land use and nutrients, or between nutrients and macroinvertebrates, are not supported by these data.

Snyder et al. highlight the importance of physical habitat in their study: “An evaluation of physical habitat quality is critical to any assessment of biological condition because aquatic fauna often have very specific habitat requirements, independent of water quality condition.” It should be noted that Snyder et al. did not measure nutrients in their assessment, so it is impossible to determine whether nutrient levels, in-stream habitat, characteristics of the surrounding landscapes, or an interaction of these factors were responsible for the improved macroinvertebrate communities adjacent to wetlands. The report did conclude, “parameters contributing greatest to the relative high total scores (or elevated habitat quality) noted for canals surrounded by wetlands included bottom substrate/available cover, riparian zone width, and riparian zone quality.”

A study in southwest Florida by FDEP² compared canal macroinvertebrates and nutrient concentrations between “test” and “reference” sites (based on degree of residential development). The results “were unexpected, since nutrient concentrations and algal growth potential measurements (AGP) tended to be higher at water quality reference sites than at water quality test sites.” Two canal sites (Faka-Union canal and Seadrift canal) had “excellent” biological health (based on the Stream Condition Index [SCI]) at TP concentrations of 0.11 and 0.053 mg/L, respectively. Sites with “good” biological health exhibited TP levels of up to 0.23 mg/L, while “poor” conditions were found across a wide nutrient range, 0.015 – 0.31 mg TP/L (FDEP). The study concluded, “no correlation between the water quality data and the SCI scores could be determined.”

This finding agrees with our characterization of macroinvertebrates in South Florida canals, where impaired macroinvertebrate community health was observed across a range of TP (0.059 - 0.259 mg/L, 6-month average) concentrations (DBE)³. The canals in our study, which was

¹ Snyder, B. D., M. T. Barbour, E. W. Leppo. 1998. Development of a watershed-based approach for biomonitoring of fresh surface waters in Southern Florida canals system. Prepared for Miami-Dade Environmental Resources Management Miami, FL.

² FDEP 2001. An investigation of canals in southwest Florida: Relationships between biological health, water quality, and habitat. Tallahassee, FL.

³ DB Environmental, Inc. (DBE) 2009. Characteristics of Macroinvertebrate Populations in South Florida Canals. Prepared for the Everglades Agricultural Area Environmental Protection District.

summarized in a presentation to the SAB, exhibited “steep unstable banks, sparse riparian habitat, and low flow velocities.”

Taken collectively, the three studies of aquatic macroinvertebrates in South Florida canals demonstrate the constraints imposed by poor habitat on canal macroinvertebrates, with little or no indication that improvements in these communities can be expected through further control of nutrients.

To expand on this, on p. 26 of their Draft Report, the SAB Panel poses the question, “If no water quality improvement or indicator biological response is seen after numeric nutrient criteria are put in place, is that because (1) the nutrient criteria are not stringent enough, (2) legacy nutrient inputs are an increasingly significant contributor, or (3) the monitoring interval is not long enough to capture the response of dynamic ecosystems and watersheds?” Based on our analyses of the three aquatic macroinvertebrate data sets for south Florida canals, an additional, and more likely explanation would be that nutrients are not the primary cause of stress to the biological communities.

In summary, the available data suggest that a low level of biological health for benthic invertebrates exists across a range of nutrient concentrations in South Florida canals. I support the Panel’s contention that these highly altered systems must be separated from natural, free-flowing streams in order to establish adequate protection for the latter systems, and to avoid unrealistic expectations of improved biological health for the highly managed, man-made canals.

Respectfully submitted,

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