

# Memorandum



**TO:** Everglades Technical Oversight Committee  
**FROM:** Frank Nearhoof, FDEP Representative  
**DATE:** February 8, 2001  
**RE:** C111 Total Phosphorus Monitoring

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At the prior TOC meeting, concerns were expressed over data quality for monitoring associated with implementation of the U.S. Army Corps of Engineer's (USACE) C-111 project. In response to those concerns, the Florida Department of Environmental Protection (Department) has conducted a review of total phosphorus data collected for the USACE by its contract lab (PPB Environmental Laboratories). This review included an audit of PPB on November 14, 2000, and analysis of inter-laboratory split-samples. Based on its review, the Department believes that there are precision and accuracy problems with USACE C-111 phosphorus data for two distinct time periods and recommends these data be qualified as follows:

- 1) In accordance with Rule 62-160, Florida Administrative Code (FAC), all total phosphorus data analyzed by PPB prior to June 2000 should be qualified with a "?" ("Data is rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data."). This recommendation is based on the large positive bias (approx. 16 µg/L) in PPB total phosphorus results demonstrated by split-samples between PPB Labs and FDEP for the period February-May 2000 (Figure 1).
- 2) Also, subsequent to June 2000, any total phosphorus values reported by PPB that are less than 16 µg/L should be qualified with a "I" (Estimated value between the method detection limit and practical quantitation limit (PQL)) in accordance with Rule 62-160, F.A.C. This code is required since the reported values are below the estimated PQL for the laboratory. Since the intent of the monitoring being performed by PPB is to determine compliance relative to phosphorus levels in the 5-10 µg/L range, as stated in the C-111 draft General Reevaluation Report supplement, it is necessary for the laboratory to have accuracy and precision commensurate with that intent. The lack of sensitivity (precision) below 16 µg/L is demonstrated by:
  - a) A laboratory audit (report attached) of PPB by FDEP staff on November 14, 2000, which concluded that PPB has not demonstrated adequate precision

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and accuracy below its PQL (16 µg/L) and therefore results less than 16 µg/L should be qualified as estimated;

- b) Split-samples among PPB, SFWMD, and FDEP laboratories for the period June-November 2000 indicate that results from PPB are more variable and have a greater frequency of values reported as less than the MDL than either other laboratory (Figures 2 and 3). However, these results do not indicate a PPB bias as seen in the earlier split-samples (Figure 2).

Temporal trends in the USACE C-111 monitoring data are supportive of the above conclusions regarding the accuracy of the two time periods. Prior to July 2000 USACE total phosphorus measurements (auto-sampler) were substantially greater than SFWMD measurements (grab sample).

If you have any questions regarding these findings and recommendations please contact me at (850) 921-9489.

Attachments

cc: Jerry Brooks

Jennifer Fitzwater

Figure 1. Summary of split sample results between FDEP and PPB laboratories for the period February-May, 2000. The top, solid mid-line, and bottom of each box represents the 75<sup>th</sup>, 50<sup>th</sup> (median), and 25<sup>th</sup> percentiles, respectively; the vertical lines represent the 10<sup>th</sup> and 90<sup>th</sup> percentiles; the horizontal dashed line is the arithmetic mean; and small circles are observations outside the 10<sup>th</sup> and 90<sup>th</sup> percentiles. Values reported as less than the MDL were replaced with ½ MDL (2 µg/L).

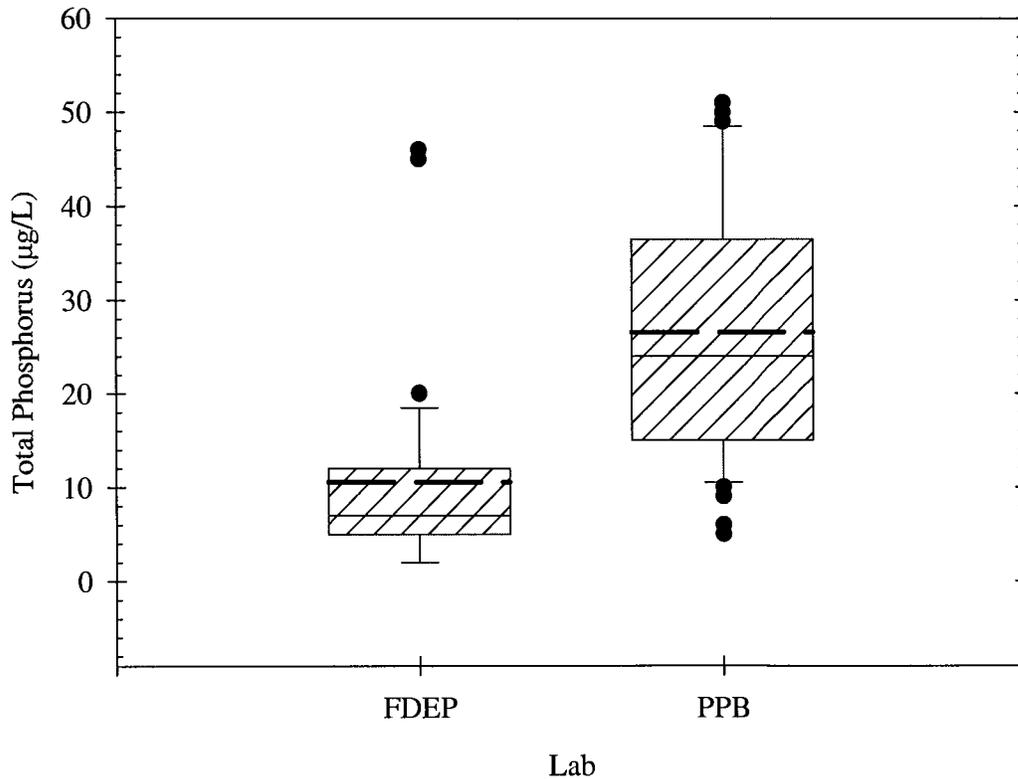


Figure 2. Summary of inter-laboratory split-sample variability among SFWMD, FDEP, and PPB labs for the period June-December, 2000. Variability is expressed as the difference of individual split-sample results from the average result, where average result is defined as the arithmetic mean result of the three laboratories. Values reported as less than the MDL were replaced with  $\frac{1}{2}$  MDL ( $2 \mu\text{g/L}$ ).

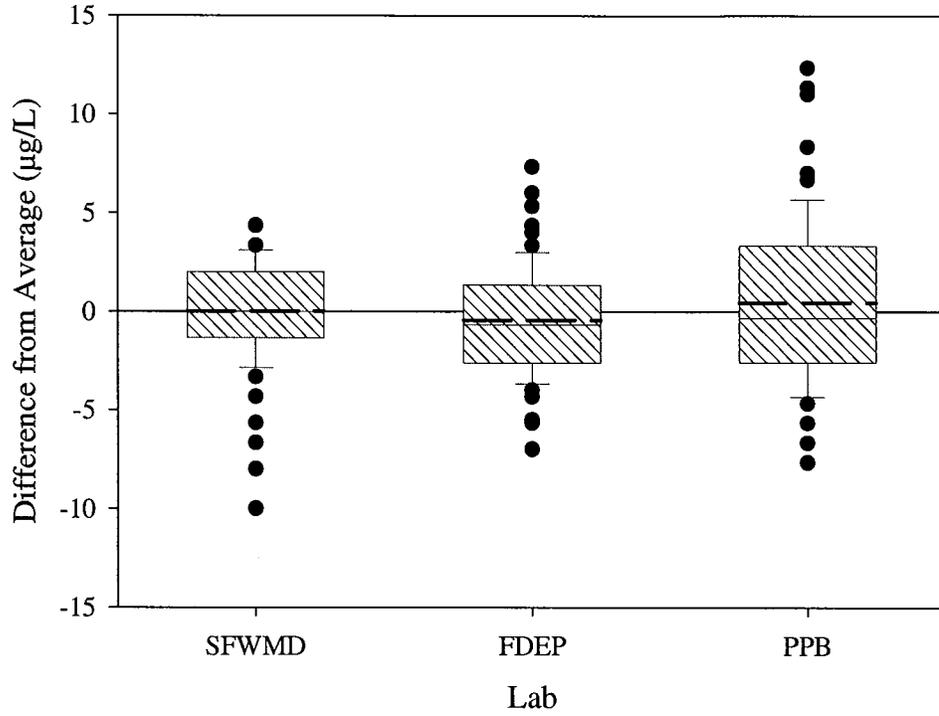


Figure 3. Inter-laboratory comparison among PPB, SFWMD and FDEP for split-samples collected by PPB between June 5, 2000 and December 11, 2000. Red solid lines are regression lines between the labs. Black dashed lines show the 95% confidence intervals of the regressions. Values reported as less than the MDL were replaced with 1/2 MDL (2  $\mu\text{g/L}$ ).

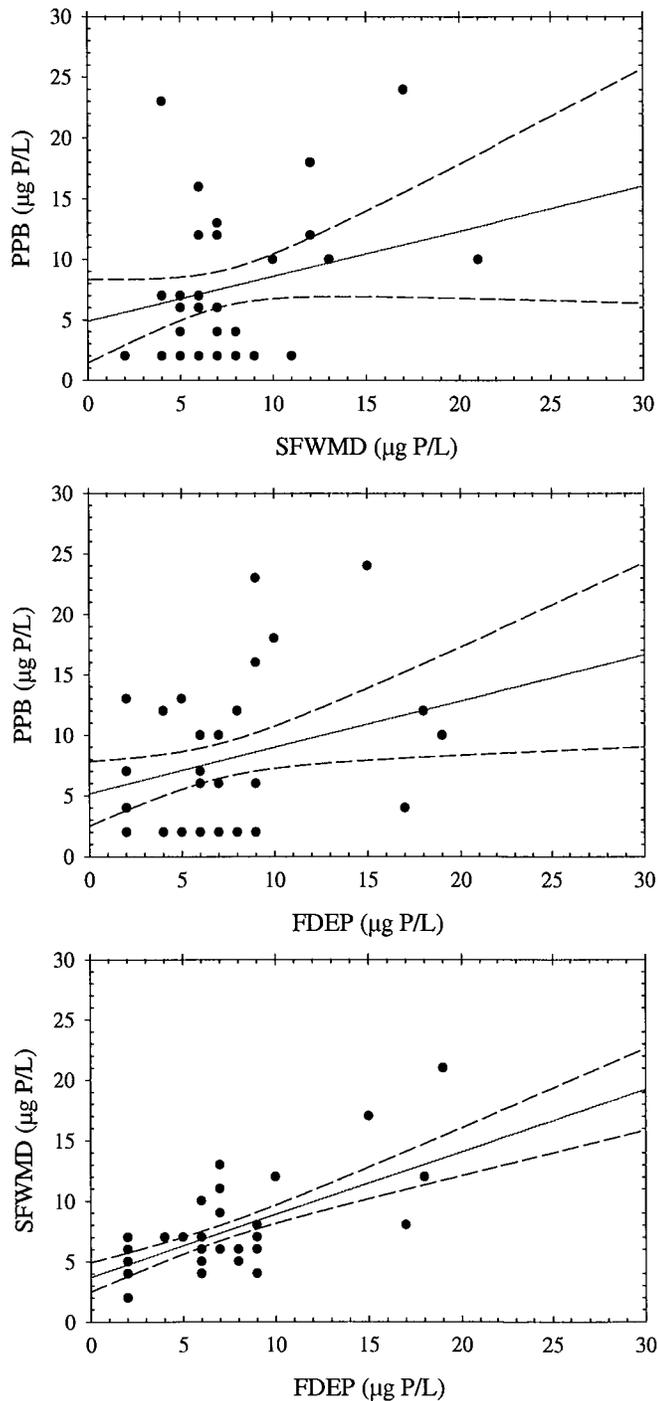


Figure 4. Monthly geometric mean  $\pm$  standard deviation total phosphorus concentrations calculated from USACE auto-sampler and SFWMD grab sample data at the S332, S331, and S332D structures. Values reported as less than the MDL were replaced with  $\frac{1}{2}$  MDL ( $2 \mu\text{g/L}$ ).

