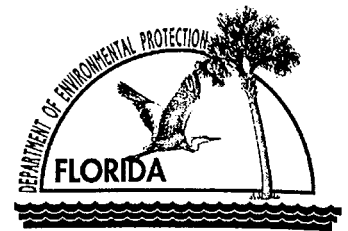


# Memorandum



**TO:** Everglades Technical Oversight Committee  
**FROM:** Frank Nearhoof, FDEP Representative  
**DATE:** February 8, 2001  
**RE:** Proposed guidelines for Everglades laboratories

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The Department has noted significant concerns regarding data quality during implementation of programs required under the Everglades Forever Act (EFA). In response to these concerns, the Department has implemented the Everglades Round Robin (ERR) laboratory evaluation program, has conducted numerous laboratory audits and has worked directly with a number of laboratories to improve the quality of their data. The department expects concerns over data quality to continue and potentially become even more important during implementation of the Comprehensive Everglades Restoration Plan (CERP).

To ensure the highest possible data quality during implementation of the CERP and EFA projects, the Department has drafted a set of proposed guidelines (attached) for selecting laboratories for Everglades phosphorus measurements. We are also developing a revised version of the ERR program aimed at evaluating laboratories involved in CERP implementation projects. Please review the attached draft guidelines and provide us comments on proposed revisions. Once we have agreed upon the details of these guidelines, we recommend formal adoption of and adherence to these guidelines by the Department, South Florida Water Management District and U.S. Army Corps of Engineers for any projects related to EFA or CERP implementation. Please note that the proposed revisions to the ERR program are included with the proposed guidelines.

Thank you for your prompt attention to this important proposal. If you have any questions, please contact me at (850) 921-9489 or SC 291-9489.

Attachments

cc: Jerry Brooks  
Jennifer Fitzwater

# Guidelines for Selecting Laboratories for Everglades Phosphorus Measurements

*Florida Department of Environmental Protection  
Bureau of Laboratories*

## Background

Phosphorus has been identified in the Everglades Forever Act as the chemical agent responsible for undesirable ecological changes in the Everglades. Studies focused on establishing and quantifying ecological impacts due to phosphorus inputs have revealed the importance of accurately detecting and measuring phosphorus at very low concentrations. Typically, decisions for Everglades ecological preservation and restoration projects require that detection limits for total phosphorus be established at levels near or below marsh background concentrations.

Some of the historical Everglades data sets have been found to be inadequate for quantifying ecological change, primarily because the phosphorus measurements generated for those studies lacked sufficient sensitivity, accuracy and/or precision. The intent of this paper is to establish guidelines for procuring laboratory services with reasonable assurance that all phosphorus data generated will meet or exceed data quality objectives for Everglades restoration projects.

## Laboratory Accreditation – *must be pre-qualified*

All analytical work for Everglades restoration projects must be performed by a laboratory that maintains accreditation under the National Environmental Laboratory Accreditation Program (NELAP). NELAP provides for a minimum set of standards to ensure a) that a documentation history of all essential data elements necessary to reconstruct reported results is maintained, b) that analyst training and demonstration of proficiency has been performed and documented, and c) that satisfactory analytical performance has been achieved on proficiency testing samples. NELAP accreditation must be obtained for all test methods that support Everglades restorations projects and must be maintained for the duration of the project.

## Methodology

All methodology utilized must be accredited under NELAP for the duration of the project and must comply with FAC 62-160. Methods must be based on EPA or AWWA Standard Methods or validation data for performance based measurement systems (PBMS) must have been submitted to the Florida Dept. of Environmental Protection (FDEP) and approved. All preservation techniques and holding times must comply with guidelines published in 40 CFR Part 136 Table 2.

### **Method Detection Limits**

Laboratories participating in Everglades restoration projects must maintain, and have documented, routinely achievable detection limits for total phosphorus of less than 5 ug/L. All detection limits studies must have been conducted in accordance with FAC 62-160. Validation data for detection limit studies must have been submitted to the FDEP and approved.

### **Practical Quantitation Limits**

Practical quantitation limits (PQLs) are defined in FAC 62-4 as the lowest measured value that can be quantified within specified limits of accuracy and precision. At values above the detection limit, the relative precision of a series of measurements (the measurement precision divided by the measured mean value) increases greatly as the detection limit is approached. For Everglades restoration projects, accuracy within 70% - 130% and long term precision of less than 15% relative standard deviation (RSD) must be documented and maintained for total phosphorus concentrations of 10 ug/L or less in laboratory check standards. The accuracy at 10 ug/L must be evaluated at least once during each analytical run. Any data reported below the laboratory's practical quantitation limits must be qualified as specified in FAC 62-160.

### **Quality Control Requirements**

All quality control requirements specified in NELAP Chapter 5 must be documented and maintained. For total phosphorus, a minimum of 5 calibration standards (excluding any calibration blank) must be included in analytical calibration curves. For background marsh samples, it is highly recommended that the upper calibration range not exceed 200 ug/L. Analytical sensitivity must be evaluated using a check standard prepared at the practical quantitation limit for each analytical run as described above. Analytical sensitivity evaluations must pass the criterion for accuracy specified for PQLs (70% - 130% recovery). Sample matrix spikes, using actual Everglades samples, must be evaluated with each analytical batch. Spike fortification should target a final concentration of 2-5 times the amount of phosphorus expected in the samples. Control limits for sample matrix spikes must not exceed 85% - 115% accuracy. If control limits for any measurements specified in NELAP Chapter 5 are exceeded (including control limits for sample matrix spikes), either the analysis must be repeated or all data reported for the analytical batch must be appropriately qualified as specified in FAC 62-160.

### **Performance Demonstrations**

Prior to performing any analytical work on Everglades restoration projects, laboratories must have demonstrated acceptable performance for total phosphorus measurements. Acceptable performance for initial consideration is either a) adequate performance in at least one recent exercises of the Everglades Phosphorus Round Robin program or b) an average score of 2.0 or greater for total phosphorus on two or more consecutive, recent proficiency evaluation studies sponsored by the U.S. Geological Survey National Water

Quality Laboratory (NWQL), with no individual score for any total phosphorus measurement to be less than 1.0.

In addition to the initial demonstration of performance, laboratories must agree to continue to participate and achieve acceptable performance (as described above) in both the Everglades Phosphorus Round Robin program and the U.S. Geological Survey proficiency evaluation study.

### **Audits**

Prior to beginning any analytical work for Everglades restoration projects, laboratories must be audited by the FDEP for the purpose of determining their suitability to perform the analytical work. The FDEP audit will consist of a data validation audit and/or on-site performance audit. Electronic data must be available to FDEP from participating laboratories. Any critical deficiencies noted in audits must be corrected prior to performing analytical work on an Everglades restoration project.

### **Everglades Round Robin Program**

FDEP will conduct an Everglades Round Robin program twice annually. The program will consist of samples collected at Everglades marsh and canal sites as well as independent reference standards. The samples will be sent to participating laboratories for total phosphorus analysis and the results will be evaluated by FDEP using statistical methods recommended by the Florida State University Statistics Department for this exercise.