

# Quality Assessment Report for Water Quality Monitoring

October – December 2025



Prepared for the  
Technical Oversight Committee

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## INTRODUCTION

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This report is an assessment of the South Florida Water Management District (SFWMD) field sampling and laboratory analysis for total phosphorus (TP) in surface water, primarily for the projects and their associated stations as shown in **Table 1** from October 1, 2025, through December 31, 2025. The analysis reflects the status of the data at the time of download and does not account for changes made to the data after February 25, 2026.

**Table 1.** Projects and associated stations.

Project Name	Project ID	Stations
Everglades National Park Inflows North	PIN	S12A, S12B, S12C, S12D, S333, S333N, S355A, S355B, and S356-334
Everglades National Park Inflows East	PIE	G737, S332DX, S18C, and S328
Everglades Protection Area	EVPA	LOX3, LOX4, LOX5, LOX6, LOX7, LOX8, LOX9, LOX10, LOX11, LOX12, LOX13, LOX14, LOX15, and LOX16

The Water Quality Monitoring Section (WQM) *Field Quality Manual* (SFWMD-FIELD-QM-001) and *Field Sampling Manual* (SFWMD-FIELD-FSM-001) provided the quality system requirements, and the field sampling procedures were followed in field sample collection from October 1, 2025, to December 31, 2025. The Analytical Services Section’s *Chemistry Laboratory Quality Manual* (SFWMD-LAB-QM-001) provides the guidance and requirements for preparing and analyzing laboratory samples, as well as data verification and validation. The *Field Sampling Quality Assessment* and *Laboratory Analysis Quality Assessment* sections in this report provide a comprehensive evaluation and validation of the TP results for surface water samples collected from the locations and timeframe described above.

To prepare this report, a Microsoft Excel workbook named “qa\_report\_oct\_dec\_2025\_data.xlsx” was also created, containing all TP results obtained from DBHYDRO, SFWMD’s corporate environmental database, for all sampling events. This includes grab samples collected for the projects/stations listed above during the period specified in this report. The Excel workbook will be referred to as the Reference Data Set (RDS) throughout this report and both of the documents are available on the Everglades Technical Oversight Committee (TOC) website (<https://www.sfwmd.gov/our-work/toc>). TP analyses were completed at the SFWMD Analytical Services Chemistry Laboratory (Florida Department of Health Identification # E46077).

If available, TP sample results for biannual laboratory proficiency testing as required by the National Environmental Laboratory Accreditation Program (NELAP) or results from other laboratory performance evaluation studies completed during the period specified in this report will also be included.

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## FIELD SAMPLING QUALITY ASSESSMENT

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### SAMPLE COLLECTION

All samples were collected by Water Quality Monitoring (WQM) staff. A total of 45 sampling events were conducted that included collection of samples for the projects/locations and timeframe described in the *Introduction* to this report. A complete list of the laboratory work orders obtained from the Laboratory Information Management System (LIMS) for these sampling events is shown in **Table 2**. The table details the work order identifiers, work order numbers, project codes, and sample collection dates.

**Table 2.** Sampling events for the reporting period.

Work Order Identifier	Work Order	Project <sup>a</sup>	Date Collected
P161623	96807	PIN	12/9/2025
P161677	96834	PIE	12/9/2025
P161647	96819	PIE	12/9/2025
P161613	96803	PIN	12/30/2025
P162617	97301	PIE	12/30/2025
P162633	97311	EVPA	12/3/2025
P161678	96835	PIE	12/23/2025
P161624	96808	PIN	12/23/2025
P161648	96820	PIE	12/23/2025
P160958	96480	PIE	12/2/2025
P160942	96472	PIE	12/2/2025
P161611	96801	PIN	12/2/2025
P162631	97310	EVPA	12/2/2025
P161612	96802	PIN	12/16/2025
P162616	97300	PIE	12/16/2025
P162604	97294	PIE	12/16/2025
P162229	97122	EVPA	11/5/2025
P161609	96799	PIN	11/4/2025
P160956	96478	PIE	11/4/2025
P162223	97119	EVPA	11/4/2025
P160940	96470	PIE	11/4/2025
P161676	96833	PIE	11/25/2025
P161646	96818	PIE	11/25/2025
P161622	96806	PIN	11/25/2025
P161610	96800	PIN	11/18/2025
P160941	96471	PIE	11/18/2025
P160957	96479	PIE	11/18/2025
P161621	96805	PIN	11/12/2025
P161675	96832	PIE	11/12/2025
P161645	96817	PIE	11/12/2025
P161675	96832	PIE	11/12/2025
P159099	95540	PIN	10/7/2025
P160954	96476	PIE	10/7/2025
P160938	96468	PIE	10/7/2025
P161644	96816	PIE	10/28/2025
P161674	96831	PIE	10/28/2025
P161620	96804	PIN	10/28/2025
P161608	96798	PIN	10/21/2025
P160939	96469	PIE	10/21/2025
P160955	96477	PIE	10/21/2025
P161569	96781	EVPA	10/2/2025
P159173	95578	PIE	10/14/2025
P159103	95542	PIN	10/14/2025
P159203	95592	PIE	10/14/2025
P161567	96780	EVPA	10/1/2025

a. EVPA – Everglades Protection Area; PIE – Everglades National Park Inflows East; and PIN – Everglades National Park Inflows North.

During the 45 sampling events described in **Table 2**, a total of 10 grab sample records for the projects/locations described in the *Introduction* indicate that a sample was not collected in most cases due to observed oily sheen in sampling area, gates closed and/or the site being no flow or too shallow to collect. The grab sample identifiers and reasons these samples were rejected or not collected are shown in **Table 3**.

**Table 3.** Grab samples rejected or not collected during the reporting period.

Work Order Identifier	Project <sup>a</sup>	Sample Identifier	Station	Date	Reason Sample Was Rejected or Not Collected <sup>b</sup>
96471009	PIE	P160941-9	S18C	11/18/2025	Unable to collect a representative sample. No sample collected.
96472009	PIE	P160942-9	S18C	12/2/2025	Gates close, no flow
96800031	PIN	P161610-31	S12C	11/18/2025	Unable to collect a representative sample. Gates Closed.
96804002	PIN	P161620-2	S356-334	10/28/2025	Unable to collect a representative sample. Gates closed, pumps running.
96804030	PIN	P161620-30	S12A	10/28/2025	Unable to collect a representative sample. Gates closed, no flow.
96819009	PIE	P161647-9	S18C	12/9/2025	Gates Closed, no flow
96820009	PIE	P161648-9	S18C	12/23/2025	Gates closed, no flow.
97294009	PIE	P162604-9	S18C	12/16/2025	Gates closed, no flow.
97295005	PIE	P162605-5	G737	12/30/2025	Gates closed, no flow.
97295009	PIE	P162605-9	S18C	12/30/2025	Gates closed, no flow.

a. PIN – Everglades National Park Inflows North; and PIE – Everglades National Park Inflows East.

b. These abbreviated notes do not necessarily convey all the details from the sample comments that can be seen in DBHYDRO.

## FIELD QUALITY CONTROL

Field quality control (QC) samples were collected during each sampling event in accordance with the procedures outlined in the *Field Sampling Manual*. These QC samples were used to evaluate the integrity of the sample collection process and were associated with all environmental samples collected during the corresponding sampling day.

If any field QC sample failed to meet the criteria established by the Florida Department of Environmental Protection (DEP) Quality Assurance Rule (Chapter 62-160, Florida Administrative Code [F.A.C.]), appropriate data qualifiers were applied to the affected sample results to indicate potential limitations in data quality.

Field QC samples may include replicate samples (RSs), field quality control blanks, field-generated equipment blanks (EBs), field-cleaned equipment blanks (FCEBs), and field blanks (FBs). It should be noted that the sampling events listed in **Table 2** may include field QC samples collected at locations not specified in **Table 1**.

Grab samples collected at the locations listed in **Table 1** were not assigned a Project Manager Remark (PMR). However, three samples (referenced in **Table 4**) received “J” qualifiers, indicating estimated values. These qualifiers were applied because the laboratory analysis was performed on samples collected from a disconnected pool of water using a field protocol that did not conform to the requirements outlined in the DEP Quality Assurance Rule (Chapter 62-160, Florida Administrative Code [F.A.C.]).

**Table 4.** Results with qualifiers and remark codes during the reporting period for the 45 sample events listed in Table 2.

Work Identifier	Project <sup>a</sup>	Sample Identifier	Station	Collection Date	Qualifier or Remark Code / Reason
96833007	PIE	P161676-7	S328	11/25/2025	J: Estimated value because of improper laboratory or field protocols
96834007	PIE	P161677-7	S328	12/9/2025	J: Estimated value because of improper laboratory or field protocols
96835007	PIE	P161678-7	S328	12/23/2025	J: Estimated value because of improper laboratory or field protocols

a. PIE – Everglades National Park Inflows East

## FIELD AUDITS

SFWMD did not conduct any field audits on TOC-related projects during the fourth quarter of 2025.

## FIELD PROCEDURE UPDATES

No major procedural updates related to TP sample collection were made during the period specified in this report.

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# LABORATORY ANALYSIS QUALITY ASSESSMENT

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## SAMPLE ANALYSES

SFWMD Analytical Services Chemistry Laboratory staff conducted 208 TP analyses for the grab samples collected during the 45 sampling events listed in **Table 2** and detailed in the RDS. Of those 208 TP results, 182 were for grab samples collected from projects/locations listed in **Table 1** (excluding field quality control samples). For reference, a complete set of all 208 grab TP results can be found in the RDS described in **Table 1** with the sample identifiers, sampling locations, collection dates, etc.

## LABORATORY QUALITY CONTROL

TP analyses are routinely conducted in the SFWMD Analytical Services Chemistry Laboratory in analytical batches of approximately 100 samples. To assess the quality of the sample results produced during the analyses of these batches, various types of laboratory control samples are included according to the requirements described in the *Chemistry Laboratory Quality Manual* (SFWMD-LAB-QM-001). The results of these laboratory quality control samples are associated with the analyses conducted in each batch, and qualifiers are added to the data as required by the DEP *Quality Assurance Rule* (Chapter 62-160, F.A.C.), which is based on the specifications found in the *Chemistry Laboratory Quality Manual* (SFWMD-LAB-QM-001). The types of laboratory quality control samples typically run in a batch include samples with certified concentrations (laboratory control samples), matrix spikes, precision checks (duplicates or matrix spike duplicates), and method blanks. Since the laboratory exhibited no quality control failures for batches associated with the RDS, none of the laboratory operation related qualifiers were added for the 208 TP results of samples collected from projects/locations listed in **Table 1**.

## METHOD DETECTION LIMIT AND PRACTICAL QUANTITATION LIMIT

The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined by the laboratory on an annual basis using the procedure described in the Code of Federal Regulations (CFR), 40 CFR 136, Appendix B. The practical quantitation limit (PQL) is the minimum concentration of an analyte that can be measured with a high degree of confidence that the analyte is present at or above that concentration. However, there is not any universally accepted (or required) method for determining the PQL. In the case of TP analyses, the SFWMD Analytical Services Chemistry Laboratory PQL (0.004 mg/L) is set to the concentration of the lowest standard used for calibration, which is a typical approach among analytical laboratories. Any TP results that are below the MDL (0.002 mg/L) are assigned a “U” qualifier indicating that there is high confidence that the analyte is not present. The reported TP values between the MDL (0.002 mg/L) and the PQL (0.004 mg/L) are assigned an “I” qualifier, indicating that the results are at concentrations that cannot be accurately quantified. Of the 193 TP results reported, no results were below the MDL, and only ten samples had a concentration between the MDL (0.002 mg/L) and the PQL (0.004 mg/L).

## ESTIMATION OF ANALYTICAL MEASUREMENT UNCERTAINTY

All measurements are subject to uncertainty, and a measured value is only complete if a statement of the associated uncertainty accompanies it. The definition of uncertainty (of measurement) can be found in the *International Vocabulary of Basic and General Standard Terms in Metrology*: “A parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurand” (JCGM 1993). The uncertainty has a probabilistic basis and reflects incomplete knowledge of the quantity. The SFWMD Analytical Services Chemistry Laboratory provides uncertainty estimates using the nested hierarchical methodology by Ingersoll (2001) in combination with a mathematical model found in Eurachem/CITAC (2012). This quality control-based nested approach uses the statistical quality control data attributed to laboratory measurement activities and does not include uncertainty attributed to field sampling activities. The estimated uncertainty is calculated using the following equation:

$$U(x) = \sqrt{S_0^2 + (S_1 x)^2}$$

$U(x)$  is the combined standard uncertainty in the result  $x$  at the 95% confidence interval (CI).

$S_0$  is a constant contribution to the overall uncertainty derived from the procedure to determine the MDL.

$S_1$  is a proportionality constant derived from nested hierarchical methodology by Ingersoll (2001).

During this reporting period, the uncertainty constants are  $S_0 = 0.002$  and  $S_1 = 0.068$ . Estimated uncertainties are calculated automatically by LIMS using the equation and constants shown above and are provided with all TP results. The percentage measurement uncertainty (95% CI) is 100% at MDL, nearly 30% at PQL, and remains relatively constant at higher concentrations.

## **PROFICIENCY TESTING AND PERFORMANCE EVALUATION**

The SFWMD Analytical Services Chemistry Laboratory participates in a variety of studies to evaluate the proficiency of the laboratory's quality system. During the fourth quarter of 2025, the laboratory received TP results for the Phenova WP1025 proficiency testing study. The reported results were evaluated as "acceptable" with calculated Z-scores of  $\leq 0.3$ .

## **LABORATORY AUDITS**

During this reporting period no quality system laboratory audits were conducted.

## **PROCEDURE UPDATES**

The TP sample preparation (Standard Method 4500-P B (5)-2011, Persulfate Digestion Method) and analytical procedure (Standard Method 4500-P H-2011, Automated Ascorbic Acid Reduction Method) did not change during this reporting period.

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## REFERENCES

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## GLOSSARY

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**Accuracy:** The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations.

**Confidence Interval (CI):** A range of values so defined that there is a specified probability that the value of a parameter lies within it.

**Equipment Blank (EB):** Field quality control sample prepared using sampling equipment that has been brought to the site or processing area precleaned and is collected before the equipment has been used. The results of these blanks are used to monitor the on-site sampling environment, sampling equipment decontamination, sample container cleaning, suitability of sample preservatives and analyte-free water, sample transport and storage conditions, and laboratory process.

**Field Blank (FB):** FBs are collected by pouring analyte-free water directly into the sample container, preserved, and kept open for the same approximate time and interval as required for collection and/or processing of the routine sample. The results of this blank are used to monitor the on-site sampling environment, sample container cleaning, the suitability of sample preservatives and analyte-free water, sample transport and storage conditions, and laboratory process.

**Field Cleaned Equipment Blank (FCEB):** Field quality control sample prepared using sampling equipment that has been cleaned in the field or in the processing area. The results of this blank are used to monitor the on-site sampling environment, sampling equipment field decontamination, sample container cleaning, suitability of sample preservatives and analyte-free water, sample transport and storage conditions, and laboratory process.

**Measurand:** Particular quantity subject to measurement.

**Method Detection Limit (MDL):** The smallest concentration of an analyte of interest that can be measured and reported with 99% confidence that the concentration is greater than zero. The MDLs are determined from the analysis of a sample in a given matrix, using accepted sampling and analytical preparation procedures, containing the analyte at a specified level. The MDL is determined by the protocol defined in the Code of Federal Regulations (CFR) Section 40 CFR, Part 136, Appendix B, as established by the United States Environmental Protection Agency.

**Practical Quantitation Limit (PQL):** The smallest concentration of an analyte of interest that can be quantitatively reported with a specific degree of confidence. The PQL is verified for each matrix, technology, and analyte. The validity of the PQL is verified by analysis of a quality control sample containing the analyte of concern.

**Precision:** The agreement or closeness between two or more results is an indication that the measurement system is operating consistently and is a quantifiable indication of variations introduced by the analytical systems over a given time and field sampling period.

**Replicate Sample (RS):** An RS is collected by repeating (simultaneously or in rapid succession) the entire sample acquisition technique that was used to obtain the routine sample. A single RS set (e.g., one sample and two RSs) is collected per quarter, per project, at the same station, for the longest parameter list. RS data are compared to routine sample data to evaluate sampling precision.

**Uncertainty:** The range of values within which the true value is estimated to lie. It is a best estimate of possible inaccuracy due to both random and systematic error.

**Z-Score:** A measure of the deviation of the result ( $X_i$ ) from the assigned value ( $X$ ) for that determinant (calculated as  $z = (X_i - X)/\sigma$ , where  $\sigma$  is a standard deviation) (Eurachem/CITAC 2012).