

DRAFT
**Quality Assessment Report for
Water Quality Monitoring**
April 1999 – June 1999



**Submitted to the
Technical Oversight Committee**

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Quality Assessment Report to the Technical Oversight Committee April 1999 – June 1999

This report is an assessment of the SFWMD laboratory's performance specific for Total Phosphorus (TP) analysis and field performance specific for the following projects for the second quarter of 1999 (field audit summaries for Jan.-June 1999 are included):

- Conservation Area Inflow and Outflows (CAMB)
- Everglades National Park Inflow Monitoring (ENP)
- Everglades National Park/Marsh (EVER)
- Everglades Nutrient Removal Organics (ENRG)
- Everglades Nutrient Removal Hydrogeology (ENRH)
- Everglades Nutrient Removal Project (ENRP)
- Everglades Nutrient Removal Research (ENRR, ENRU)
- Everglades Protection Area (EVPA)
- Holeyland (HOLY)

The South Florida Water Management District's Comprehensive Quality Assurance Plan (CQAP) requires analysis of laboratory quality control (QC) samples and the collection and analysis of field QC samples along with routine samples to assess the data quality.

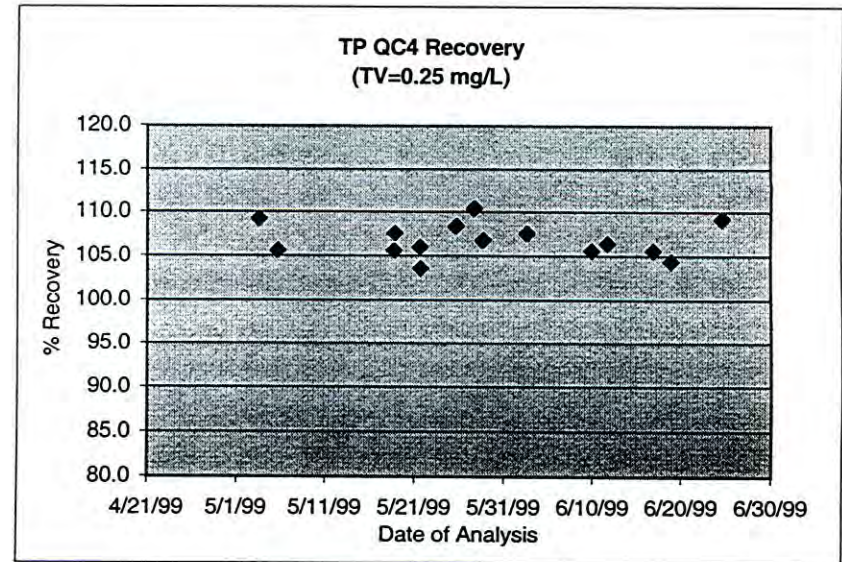
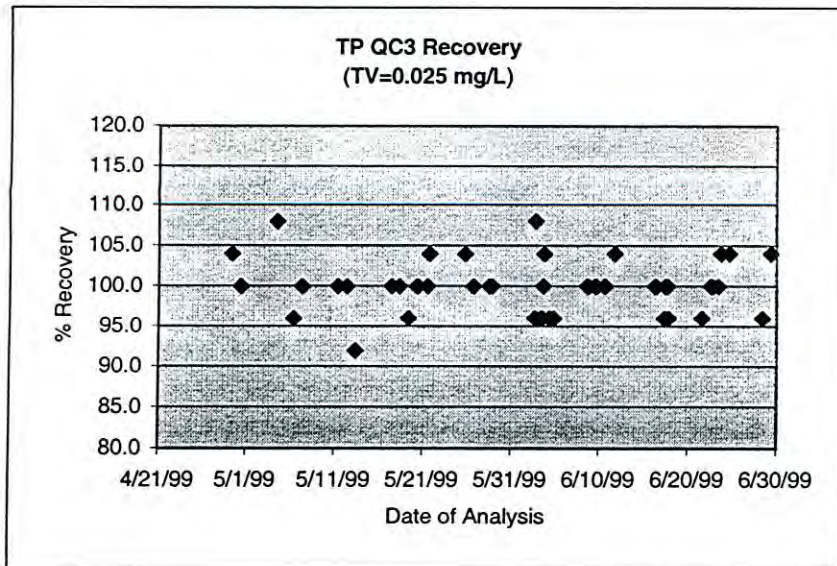
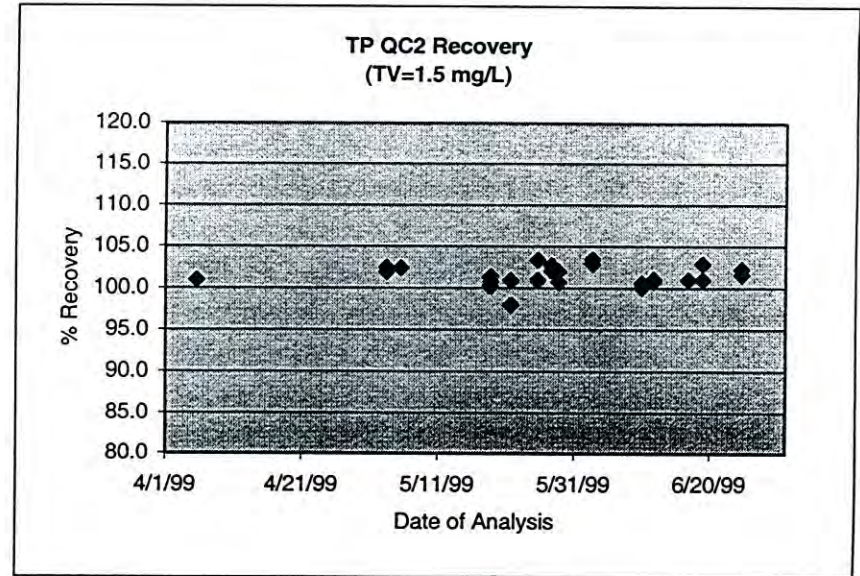
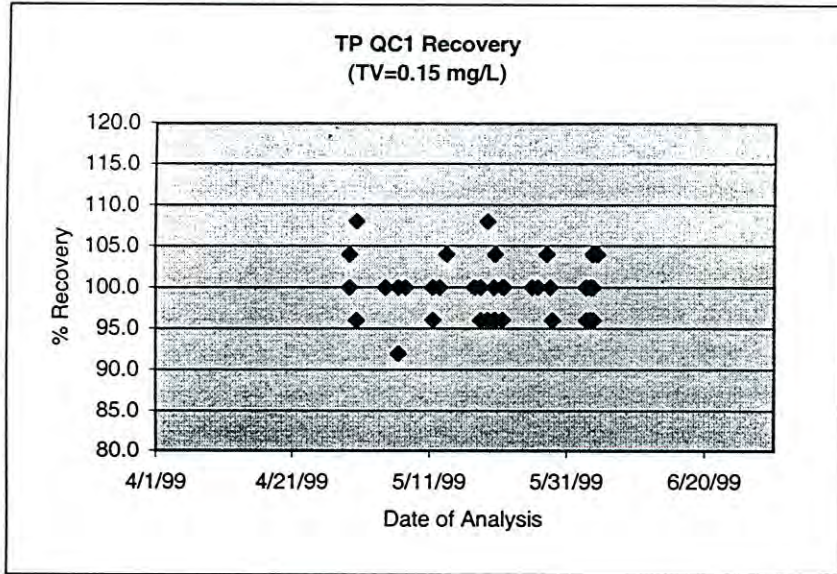
Laboratory Quality Assessment

Routine laboratory QC measures include QC checks, matrix spikes, and precision checks. QC checks are solutions with known concentration of the analyte that is processed and analyzed as a sample. QC and spike recoveries are indication of accuracy of analysis. A randomly selected field sample is analyzed at least a second time in the same analytical batch as a measure of precision. The charts presented on the following pages show recoveries from various levels of QC samples for Total Phosphorus (TP) analysis at SFWMD laboratory. Statistical evaluation of precision and matrix spike recoveries are also included. Portion of or an entire analytical run is generally rejected if QC recoveries are outside the set limits. Data is flagged accordingly if any deficiency is noted after the samples have exceeded the required holding times.

Except for QC5 with a true value of 0.008, recoveries for the QC samples are within $\pm 10\%$ from the true value, which are acceptable. Recoveries from high level analysis (0.2-2 mg/L) tend to be slightly biased on the upper level. The cause of bias is being investigated and corrective measures will be taken immediately. QC5, with a true value of 0.008 mg/L, is less than the practical quantitation limit (PQL=0.016) and recoveries were mostly in the 110-125 % range.

Organic check is a solution prepared from phytic acid, a stable form of organic phosphate. Recoveries for this check sample are between 100-105%, indicating that the digestion process was effective. The same material is used to do matrix spikes, the mean recovery for which was 101%.

The mean Relative Percent Difference (RPD) achieved for both low and high levels of analyses was less than the precision target (5.8%) during that period, which indicates good



precision in TP analysis. For low level analysis, there was an isolated occurrence with 16% RPD, which could be attributable to low TP concentration in the sample that was used as a duplicate. %. The mean % RPD for low level analysis was 1.8. For high level analysis, mean RPD was 1.1, with a maximum value of <3.5%.

Field Sampling Quality Assessment

Field QC measures consist of equipment blanks (EB), field blanks (FB), split samples (SS), and replicate samples (RS). Data not meeting set criteria are flagged using the Florida Department of Environmental Protection's (FDEP) data qualifier codes which are presented below. Code use depends on the type of quality control measures not met or when deemed necessary by District project managers. Comments are provided along with the codes.

Commonly Used Data Qualifier Codes Used in SFWMD's Water Quality Database

Code	Comments	Code	Comments
!	Data deviates from historically established concentration ranges.	K	Off-scale low. Actual value is known to be less than the value given.
?	Data is rejected and should not be used.	NVZ	Not a valid zero value; request original value from lab.
J	Estimated value; value not accurate.	PMR	Flag set at project managers request; invalid data.
J3	Precision or Accuracy Criteria Not Met.	Q	Sampled, but analysis lost or not performed.
J4	Matrix Interference.	V	Indicates that the analyte was detected in both the sample and the associated method blank.
J5	Improper Lab or Field Protocol.	Y	The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.

A summary assessment of monitoring quality, including laboratory and field activities, based on percentage of flagged data is presented in the table below. A comprehensive list of all data flagged for these projects from April to June, 1999 is presented on the following page.

Project	# Samples Collected	Laboratory	# Data Flagged	% Flagged
CAMB	249		15	6.0
ENP	36		0	0
ENRP	39		3	7.7*
ENRR	49		0	0
ENRU	71	USGS	3	4.2
EVER	16		0	0
EVPA	36		0	0
HOLY	21		0	0

* ENRP Flags are all for unacceptable trip spike recovery.

A comprehensive list of all data flagged for these projects from April to June, 1999 is presented on the following page.

Comprehensive List of All Data Flagged for CAMB, ENP, ENRP, ENRG, ENRR, ENRU, EVPA and HOLY, April –June 1999

Project	Station	Coll Date	Type	Lab ID	mg/L	QC	Source	Flag	Comments
CAMB	S5A	6-Apr-99	24	L12144-2	0.050		SFWMD	J5	Autosampler Error
CAMB	S5A	13-Apr-99	24	L12190-2	0.027		SFWMD	J5	Autosampler Error
CAMB	S5A	13-Apr-99	9	L12190-3	0.030	SS	SFWMD	J5	Autosampler Error
CAMB	G136	8-Apr-99	24	L12173-2	0.102		SFWMD	J3	failed lab precision criteria
CAMB	G137	8-Apr-99	9	L12173-3	0.073	SS	SFWMD	J3	failed lab precision criteria
CAMB	G138	15-Apr-99	24	L12222-2	0.076		SFWMD	J5	Suspect sample contamination
CAMB	S6	27-Apr-99	24	L12289-3	0.044		SFWMD	J5	Autosampler error
CAMB	S150	27-Apr-99	24	L12289-6	0.120		SFWMD	J5	Suspect sample contamination
CAMB	G136	29-Apr-99	24	L12310-2	0.059		SFWMD	J5	Suspect sample contamination
CAMB	S145	3-May-99	0	L12321-12	0.037		SFWMD	V	Sample associated with EB > 2*MDL.
CAMB	S146	3-May-99	0	L12321-13	0.038		SFWMD	V	Sample associated with EB > 2*MDL.
CAMB	S38	3-May-99	0	L12321-14	0.036		SFWMD	V	Sample associated with EB > 2*MDL.
CAMB	S145	3-May-99	9	L12321-16	0.039	SS	SFWMD	V	Sample associated with EB > 2*MDL.
CAMB	S145	3-May-99	9	L12321-17	0.039	RS	SFWMD	V	Sample associated with EB > 2*MDL.
CAMB	S5A	4-May-99	24	L12329-2	0.054		SFWMD	J5	Autosampler error
CAMB	LABQC	19-Apr-99	9	L12233-1	3.204	TS	SFWMD	J3	High percent recovery for trip spike
ENRP	LABQC	26-Apr-99	9	L12276-1	3.214	TS	SFWMD	J3	
ENRP	LABQC	26-Apr-99	9	L12275-1	3.264	TS	SFWMD	J3	
ENRU	G256	10-May-99	9	9906415	0.005	EB	USGS/	V	Equipment Blank > 2*MDL.
ENRU	G256	10-May-99	7	9906416	0.012		USGS	V	Sample associated with equipment blank > 2*MDL.
ENRU	G256	10-May-99	9	9906417	0.012	SS	USGS	V	Sample associated with equipment blank > 2*MDL.

Field Precision Checks and Blanks

Project Code	Source Lab	Field Precision		Blanks	
		Mean % RPD/RSD	Comments	Result	Comments
CAMB	SFWMD	10.4	Acceptable	5/99 EB>2xMDL	EB and assoc. samples flagged with V
ENP	SFWMD	2.6	Acceptable	<2xMDL	All acceptable
ENRP	SFWMD	4.1	Acceptable	<2xMDL	All acceptable
ENRR	USGS	4.9	Acceptable	<2xMDL	All acceptable
ENRU	USGS	1.5	Acceptable	1 EB>2xMDL	EB and assoc. samples flagged with V
EVPA	SFWMD	2.4	Acceptable	<2xMDL	All acceptable
HOLY	SFWMD	5.3	Acceptable	<2xMDL	All acceptable

Notes:

- 1) Field precision acceptance criteria: <15%
- 2) FB and EB acceptance criteria: must be <2xMDL
- 3) samples with concentration low enough compared to blank values are also flagged for possibility of contamination.
- 4) USGS TP MDL=0.002 mg/L

Based on field precision checks and blanks, only about 3.5% of 517 TP data points did not meet the QC criteria and had to be flagged. Field sampling precision is generally excellent, with poorer recoveries at or below PQL.

Field Audit Summary from January to June 1999

Project	Date of audit	Summary	Suggestions and/or Recommended Corrective Action
HOLY	13-Jan-1999	No discrepancies noted. The sampling team worked efficiently and effectively toward accomplishing all project objectives accurately.	Consider using a larger, or additional, cooler when collecting a very large quantity of samples.
CAMB & ENP	20-Jan-1999	Effective communication between three people, one of whom was new to these projects, accomplishing all of the projects' objectives accurately. The sampling team effectively managed three separate field books, five separate Chemistry Field Data Logs and processing of over one hundred samples.	None
ENRG	03-Mar-1999	The crew's performance stood out in the areas of organization, communication and improvisation. Despite the contingencies of strong rainstorms and heavy winds, the sampling team performed all project objectives without fault. Preservation not noted on field book.	Make note of all preservatives used, including NaOH and containers that are pre-preserved. No other corrective action is necessary.