

Chemical Analysis Report

CEN-DIST-2021-08-25-03

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Lake Farrar - WBID 3168X7**
Request ID: **RQ-2021-08-09-33**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matthew Bearden

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 20-SEP-2021 09:50



Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical group are included in this report: Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Lake Farrar @ Center

Collection Date/Time: 08/24/2021 12:16

Field ID: G4CE0200

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2271819	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P402982	
	EPA 300.0 Rev. 2.1	Chloride	24		mg Cl/L	P403238	
		Sulfate	30		mg SO4/L	P403242	
		Color (true)	6.8		PCU	P402990	
	SM 2320 B-2011	Total Alkalinity	20		mg CaCO3/L	P403060	
	SM 2540 C-2011	TDS	109		mg/L	P403400	
	SM 2540 D-2011	TSS	4	I	mg/L	P403393	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P403064	
2271820	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P403139	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.48		mg N/L	P403265	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P403073	
	EPA 365.1 Rev. 2.0	Total-P	0.021		mg P/L	P403076	
	SM 5310 B-2011	Organic Carbon	4.0		mg C/L	P403373	
2271821	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P402970	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P402982

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403238

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403242

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403139

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403265

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403073

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403076

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402970

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2120 B-2011
Batch ID: P402990

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-2011
Batch ID: P403060

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-2011
Batch ID: P403400

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P403393

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P403064

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P403373

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403238

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403242

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403139

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403265

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	101		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403073

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403076

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	105		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402970

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	101		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P402990

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P403060

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	94 - 106

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P403064

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.9		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P403373

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271671	Chloride	101		P	90 - 110
2271970	Chloride	99.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403242

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271970	Sulfate	99.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403139

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271794	Ammonia-N	94.6	95.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403265

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271748	Kjeldahl Nitrogen	106	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403073

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271675	NO2NO3-N	99.5	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403076

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271619	Total-P	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402970

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271821	O-Phosphate-P	97.0	99.4	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P403064

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271893	Fluoride	100	99.4	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P403373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271437	Organic Carbon	103		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P402982

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271808	Turbidity	7.74	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271671	Chloride	0.720	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P403242

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271671	Sulfate	0.781	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403139

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271794	Ammonia-N	0.339	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403265

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271748	Kjeldahl Nitrogen	0.873	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271675	NO2NO3-N	0.606	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403076

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271619	Total-P	1.08	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402970

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271821	O-Phosphate-P	2.44	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B-2011
Batch ID: P402990

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271893	Color (true)	0.989	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P403060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271893	Total Alkalinity	1.36	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P403400

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271747	TDS	6.21	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P403064

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271893	Fluoride	0.457	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P403373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271437	Organic Carbon	0.165	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A107463

Included Lab Sample IDs: 2271821

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	101	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A107470

Included Lab Sample IDs: 2271819

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	101	P/P	95 - 105

Reference Method: SM 2120 B-2011

Run ID: A107472

Included Lab Sample IDs: 2271819

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	90 - 115

Reference Method: SM 2320 B-2011

Run ID: A107502

Included Lab Sample IDs: 2271819

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	101	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A107502

Included Lab Sample IDs: 2271819

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A107506

Included Lab Sample IDs: 2271820

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A107544

Included Lab Sample IDs: 2271820

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.4	99.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A107552

Included Lab Sample IDs: 2271820

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A107592

Included Lab Sample IDs: 2271819

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Sulfate	100	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107619

Included Lab Sample IDs: 2271820

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	102	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A107644

Included Lab Sample IDs: 2271820

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.2	98.8	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision	MS
						SMP	
EPA 180.1 Rev. 2.0	Turbidity					7.74	
EPA 300.0 Rev. 2.1	Chloride	101	101	99.7		0.720	
	Sulfate	101		99.6		0.781	
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	94.6	95.0			0.339
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	106	105			0.873
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.0	99.5	98.5			0.606
EPA 365.1 Rev. 2.0	Total-P	105	102	103			1.08
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	97.0	99.4			2.44
SM 2120 B-2011	Color (true)	101				0.989	
SM 2320 B-2011	Total Alkalinity	102				1.36	
SM 2540 C-2011	TDS					6.21	
SM 4500 F-C-2011	Fluoride	99.9	100	99.4			0.457
SM 5310 B-2011	Organic Carbon	95.8	103				0.165

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2271819
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2271819
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2271819
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2271820
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2271820
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2271820
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2271820
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2271821
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2271819
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2271819
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2271819
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2271819
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2271819
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2271820

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	08/25/2021			08/25/2021 15:37	Sarah A Nixon	2271819
EPA 300.0 Rev. 2.1	08/25/2021			08/31/2021 17:09	Lipi Saha	2271819
EPA 350.1 Rev. 2.0	08/25/2021			08/30/2021 13:31	Ping Hua	2271820
EPA 351.2 Rev. 2.0	08/25/2021	09/01/2021 12:17	Benjamin T. Nordmann	09/02/2021 11:44	Alexandra J Mattheus	2271820
EPA 353.2 Rev. 2.0	08/25/2021			08/27/2021 11:51	Beverly Y. Sanders	2271820
EPA 365.1 Rev. 2.0	08/25/2021	08/27/2021 14:47	Simonne.V. Calhoun	08/30/2021 15:17	Lipi Saha	2271820
EPA 365.1 Rev. 2.0 dissolved	08/25/2021			08/25/2021 14:32	James L Waggerby	2271821
SM 2120 B-2011	08/25/2021			08/25/2021 16:49	Sarah A Nixon	2271819
SM 2320 B-2011	08/25/2021			08/26/2021 23:25	Dale L. Simmons	2271819
SM 2540 C-2011	08/25/2021			08/30/2021 15:46	Yijie Li	2271819
SM 2540 D-2011	08/25/2021			08/30/2021 14:36	Yijie Li	2271819
SM 4500 F-C-2011	08/25/2021			08/26/2021 23:25	Dale L. Simmons	2271819
SM 5310 B-2011	08/25/2021			09/03/2021 09:57	Touraj Touran	2271820