

Chemical Analysis Report

CEN-DIST-2018-07-06-01

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

Event Description: **Starke Lake**
Request ID: **RQ-2018-07-02-29**
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: Mike Linger

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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 20-JUL-2018 13:00



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 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 Winyah @ Center

Collection Date/Time: 07/05/2018 11:25

Field ID: G2CE0004

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2005177	EPA 180.1 Rev. 2.0	Turbidity	4.6		NTU	P348045	
	EPA 300.0 Rev. 2.1	Chloride	15		mg Cl/L	P348519	
		Sulfate	12		mg SO4/L	P348525	
	SM 2120 B	Color (true)	19	A	PCU	P348037	
	SM 2320 B-97	Total Alkalinity	54		mg CaCO3/L	P348194	
	SM 2540 C-97	TDS	103		mg/L	P348269	
	SM 2540 D-97	TSS	7	IA	mg/L	P348321	
	SM 4500 F-C-97	Fluoride	0.050	I	mg F/L	P348197	
2005178	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P348473	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P348216	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P348204	
	EPA 365.1 Rev. 2.0	Total-P	0.043		mg P/L	P348248	
	SM 5310 B-00	Organic Carbon	5.6		mg C/L	P348454	
2005179	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P348041	

Ref. Method and Comment:

SM 2540 D-97: 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: P348045

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P348519

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P348525

Component	Result	Code	Units
Sulfate	0.20	U	mg SO ₄ /L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348473

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348216

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348204

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348248

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348041

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

Reference Method: SM 2120 B
Batch ID: P348037

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P348194

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

Reference Method: SM 2540 C-97
Batch ID: P348269

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P348321

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P348454

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: P348519

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	96.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P348525

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348473

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	102		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348216

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348204

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348248

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	91.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348041

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.1		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P348037

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.7		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P348194

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	105		P	98 - 107

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P348454

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P348519

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005056	Chloride	90.8	94.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P348525

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005056	Sulfate	90.8	94.3	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348473

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005178	Ammonia-N	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005178	Kjeldahl Nitrogen	95.8	98.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348204

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005178	NO2NO3-N	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348248

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005178	Total-P	96.2	95.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348041

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005179	O-Phosphate-P	90.2	91.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2005058	Fluoride	96.3	95.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P348454

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2004540	Organic Carbon	97.0	97.7	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P348045

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005119	Turbidity	4.96	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P348519

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005056	Chloride	3.14	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P348525

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005056	Sulfate	3.47	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P348473

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005178	Ammonia-N	0.982	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005178	Kjeldahl Nitrogen	1.50	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P348204

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005178	NO2NO3-N	1.45	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P348248

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005178	Total-P	0.717	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P348041

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005179	O-Phosphate-P	1.16	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P348037

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005177	Color (true)	2.99	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P348194

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005058	Total Alkalinity	0.239	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P348269

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005059	TDS	0.695	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P348197

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2005058	Fluoride	0.470	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P348454

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2004540	Organic Carbon	0.735	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B
Run ID: A85058
Included Lab Sample IDs: 2005177

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.2	99.8	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A85062
Included Lab Sample IDs: 2005179

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.6	93.1	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A85063
Included Lab Sample IDs: 2005177

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	98.5	P/P	95 - 105

Reference Method: SM 2320 B-97
Run ID: A85129
Included Lab Sample IDs: 2005177

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	103	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A85129
Included Lab Sample IDs: 2005177

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.6	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A85130
Included Lab Sample IDs: 2005178

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A85140
Included Lab Sample IDs: 2005178

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	99.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A85187
Included Lab Sample IDs: 2005177

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.5	98.1	P/P	90 - 110
Sulfate	95.5	96.1	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A85205

Included Lab Sample IDs: 2005178

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.5	104	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A85235

Included Lab Sample IDs: 2005178

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.2	97.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A85243

Included Lab Sample IDs: 2005178

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	102	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					4.96	
EPA 300.0 Rev. 2.1	Chloride	96.2	90.8	94.7			3.14
	Sulfate	94.3	90.8	94.3			3.47
EPA 350.1 Rev. 2.0	Ammonia-N	102	102	103			0.982
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.6	95.8	98.0			1.50
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	104			1.45
EPA 365.1 Rev. 2.0	Total-P	91.0	96.2	95.4			0.717
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.1	90.2	91.3			1.16
SM 2120 B	Color (true)	99.7				2.99	
SM 2320 B-97	Total Alkalinity	105				0.239	
SM 2540 C-97	TDS					0.695	
SM 4500 F-C-97	Fluoride	97.5	96.3	95.7			0.470
SM 5310 B-00	Organic Carbon	97.4	97.0	97.7			0.735

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2005177
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2005177
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2005177
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2005178
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2005178
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2005178
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2005178
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2005179
SM 2120 B / E31780	True Color measured at 450 nm	2005177
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2005177
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2005177
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2005177
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2005177
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2005178

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	07/06/2018			07/06/2018 14:35	William L. Brown IV	2005177
EPA 300.0 Rev. 2.1	07/06/2018			07/11/2018 22:24	Lipi Saha	2005177
EPA 350.1 Rev. 2.0	07/06/2018			07/13/2018 11:39	Ping Hua	2005178
EPA 351.2 Rev. 2.0	07/06/2018	07/11/2018 10:45	Adrian Shelby	07/13/2018 09:23	Joseph Suarez	2005178
EPA 353.2 Rev. 2.0	07/06/2018			07/09/2018 14:31	Lauren Bottorf	2005178
EPA 365.1 Rev. 2.0	07/06/2018	07/10/2018 13:00	Sima Feizi	07/11/2018 12:33	Beverly Y. Sanders	2005178
EPA 365.1 Rev. 2.0 dissolved	07/06/2018			07/06/2018 14:06	Megan Treadwell	2005179
SM 2120 B	07/06/2018			07/06/2018 15:22	Tanya Welborn	2005177
SM 2320 B-97	07/06/2018			07/10/2018 16:16	Dale L. Simmons	2005177
SM 2540 C-97	07/06/2018			07/06/2018 19:00	William L. Brown IV	2005177
SM 2540 D-97	07/06/2018			07/06/2018 19:00	William L. Brown IV	2005177
SM 4500 F-C-97	07/06/2018			07/10/2018 16:16	Dale L. Simmons	2005177
SM 5310 B-00	07/06/2018			07/13/2018 03:41	Megan Treadwell	2005178