

Chemical Analysis Report

CEN-DIST-2016-06-23-03

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

Event Description: **Lake Minneola**
Request ID: **RQ-2016-06-20-54**
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
Timothy W. Fitzpatrick
Liang-Tsair Lin, Ph.D.
Colin Wright, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 18-JUL-2016 10:37

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

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 Minneola @ half mile North of boat ramp Collection Date/Time: 06/22/2016 10:30

Field ID: G1CE0022

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1810894	EPA 180.1 Rev. 2.0	Turbidity	3.8	A	NTU	P306768	
	EPA 300.0 Rev. 2.1	Chloride	22		mg Cl/L	P307644	
		Sulfate	6.9		mg SO4/L	P307643	
	SM 2120 B	Color (true)	160		PCU	P306773	
	SM 2320 B-97	Total Alkalinity	5.5	A	mg CaCO3/L	P307267	
	SM 2540 C-97	TDS	113	A	mg/L	P307591	
	SM 2540 D-97	TSS	4	I	mg/L	P307452	
	SM 4500 F-C-97	Fluoride	0.090	I	mg F/L	P307268	
1810895	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P307088	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P306862	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.020		mg N/L	P306926	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P306959	
	SM 5310 B-00	Organic Carbon	27		mg C/L	P307215	
1810896	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P306759	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P306768

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P307643

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P307644

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P307088

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P306862

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306926

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306959

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306759

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

Reference Method: SM 2120 B
Batch ID: P306773

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P307267

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Reference Method: SM 2540 C-97
Batch ID: P307591

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P307452

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P307268

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P307215

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: P307643

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307644

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	107		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307088

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	90.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306862

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306926

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306959

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306759

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	104		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P307267

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P307268

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.3		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P307215

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	101		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811967	Sulfate	107		P	90 - 110
1811982	Sulfate	105		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307644

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1811967	Chloride	105		P	90 - 110
1811982	Chloride	106		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307088

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810634	Ammonia-N	91.3	91.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306862

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810765	Kjeldahl Nitrogen	99.4	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306926

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810704	NO2NO3-N	100	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306959

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810941	Total-P	98.6	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306759

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810947	O-Phosphate-P	100	99.5	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P307268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810894	Fluoride	97.8	99.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P307215

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1810895	Organic Carbon	107		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P306768

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810894	Turbidity	1.32	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811967	Sulfate	0.0666	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P307644

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1811967	Chloride	0.193	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P307088

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810634	Ammonia-N	0.163	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P306862

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810765	Kjeldahl Nitrogen	6.91	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306926

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
--------------------------	-----------	-----------	-------------------	-----------	----------------

Quality Assurance Report Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P306926

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810704	NO2NO3-N	0.990	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P306959

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810941	Total-P	1.08	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P306759

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810947	O-Phosphate-P	0.536	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P306773

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810758	Color (true)	3.25	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P307267

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810894	Total Alkalinity	0.179	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P307591

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810894	TDS	5.31	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P307268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810894	Fluoride	1.45	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P307215

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1810895	Organic Carbon	0.884	Spike	P	0 - 20

Quality Assurance Report Precision

* 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: EPA 365.1 Rev. 2.0 dissolved

Run ID: A70196

Included Lab Sample IDs: 1810896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.8	98.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A70197

Included Lab Sample IDs: 1810894

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

Reference Method: SM 2120 B

Run ID: A70198

Included Lab Sample IDs: 1810894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	98.8	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A70248

Included Lab Sample IDs: 1810895

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A70266

Included Lab Sample IDs: 1810895

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	99.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A70306

Included Lab Sample IDs: 1810895

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	93.5	92.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A70345

Included Lab Sample IDs: 1810895

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00
 Run ID: A70358
 Included Lab Sample IDs: 1810895

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	105	106	P/P	90 - 110

Reference Method: SM 2320 B-97
 Run ID: A70370
 Included Lab Sample IDs: 1810894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	99.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
 Run ID: A70370
 Included Lab Sample IDs: 1810894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.6	99.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
 Run ID: A70443
 Included Lab Sample IDs: 1810894

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	106	108	P/P	90 - 110
Sulfate	102	106	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 SMP	MS
EPA 180.1 Rev. 2.0	Turbidity					1.32	
EPA 300.0 Rev. 2.1	Chloride	107	105	106		0.193	
	Sulfate	105	107	105		0.0666	
EPA 350.1 Rev. 2.0	Ammonia-N	90.4	91.3	91.6			0.163
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	99.4	107			6.91
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	100	102			0.990
EPA 365.1 Rev. 2.0	Total-P	103	98.6	97.5			1.08
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	100	99.5			0.536
SM 2120 B	Color (true)					3.25	
SM 2320 B-97	Total Alkalinity	103				0.179	
SM 2540 C-97	TDS					5.31	
SM 4500 F-C-97	Fluoride	96.3	97.8	99.6			1.45
SM 5310 B-00	Organic Carbon	101	107				0.884

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1810894
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1810894
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1810894
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1810895
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1810895
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1810895
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1810895
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1810896
SM 2120 B / E31780	True Color measured at 450 nm	1810894
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1810894
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1810894
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1810894
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1810894
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1810895

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	06/23/2016			06/23/2016 15:44	Sima Feizi	1810894
EPA 300.0 Rev. 2.1	06/23/2016			07/08/2016	Ping Hua	1810894
EPA 350.1 Rev. 2.0	06/23/2016			06/29/2016	Diana M. Turner	1810895
EPA 351.2 Rev. 2.0	06/23/2016	06/27/2016	Sofia Elnemr	06/28/2016	Christopher Armour	1810895
EPA 353.2 Rev. 2.0	06/23/2016			06/27/2016	Peter D. Kaus	1810895
EPA 365.1 Rev. 2.0	06/23/2016	06/28/2016	Vijayalakshmi Reddy	06/29/2016	Lipi Saha	1810895
EPA 365.1 Rev. 2.0 dissolved	06/23/2016			06/23/2016 15:21	Julia Storbeck	1810896
SM 2120 B	06/23/2016			06/23/2016 17:15	Rochelle Y Jackson	1810894
SM 2320 B-97	06/23/2016			06/30/2016	Dale L. Simmons	1810894
SM 2540 C-97	06/23/2016			06/27/2016	Sima Feizi	1810894
SM 2540 D-97	06/23/2016			06/27/2016	Sima Feizi	1810894
SM 4500 F-C-97	06/23/2016			06/30/2016	Dale L. Simmons	1810894
SM 5310 B-00	06/23/2016			06/30/2016	Sofia Elnemr	1810895