

Chemical Analysis Report

SO-DIST-2019-01-09-01

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

Event Description: **Highlands Lakes**
Request ID: **RQ-2019-01-07-54**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
Attn: Maryann Dugan

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: Liang Lin, Environmental Administrator

Date Certified: 29-JAN-2019 11:41

A handwritten signature in black ink, appearing to read "Liang Lin", is shown 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 Damon @ Middle

Collection Date/Time: 01/08/2019 11:45

Field ID: G4SD0168

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2052878	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P357060	
	EPA 300.0 Rev. 2.1	Chloride	16	A	mg Cl/L	P357204	
		Sulfate	31	A	mg SO4/L	P357206	
	SM 2120 B	Color (true)	11		PCU	P357038	
	SM 2320 B-97	Total Alkalinity	17		mg CaCO3/L	P357389	
	SM 2540 C-97	TDS	92		mg/L	P357443	
	SM 2540 D-97	TSS	2	I	mg/L	P357571	
	SM 4500 F-C-97	Fluoride	0.099	I	mg F/L	P357523	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P357249	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.45		mg N/L	P357221	
2052883	EPA 353.2 Rev. 2.0	NO2NO3-N	0.008	I	mg N/L	P357134	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P357225	
	SM 5310 B-00	Organic Carbon	4.7		mg C/L	P357196	
	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.004	U	mg P/L	P357035	
	dissolved						

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Lake Pythias @ Middle

Collection Date/Time: 01/08/2019 12:40

Field ID: G4SD0138

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2052879	EPA 180.1 Rev. 2.0	Turbidity	2.3		NTU	P357060	
	EPA 300.0 Rev. 2.1	Chloride	19	A	mg Cl/L	P357205	
		Sulfate	32	A	mg SO4/L	P357207	
	SM 2120 B	Color (true)	11		PCU	P357038	
	SM 2320 B-97	Total Alkalinity	4.0		mg CaCO3/L	P357389	
	SM 2540 C-97	TDS	81		mg/L	P357444	
	SM 2540 D-97	TSS	2	I	mg/L	P357572	
	SM 4500 F-C-97	Fluoride	0.11		mg F/L	P357523	
2052884	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P357249	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.42		mg N/L	P357222	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P357134	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P357225	
	SM 5310 B-00	Organic Carbon	4.6		mg C/L	P357196	
2052889	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P357035	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: LittleBonnetLake@Middle

Collection Date/Time: 01/08/2019 13:15

Field ID: G4SD0169

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2052880	EPA 180.1 Rev. 2.0	Turbidity	3.6		NTU	P357060	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P357205	
		Sulfate	24		mg SO4/L	P357207	
	SM 2120 B	Color (true)	12		PCU	P357038	
	SM 2320 B-97	Total Alkalinity	36	A	mg CaCO3/L	P357389	
	SM 2540 C-97	TDS	101		mg/L	P357444	
	SM 2540 D-97	TSS	2	I	mg/L	P357572	
	SM 4500 F-C-97	Fluoride	0.070	I	mg F/L	P357523	
2052885	EPA 350.1 Rev. 2.0	Ammonia-N	0.048		mg N/L	P357315	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.76		mg N/L	P357222	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.88		mg N/L	P357135	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P357226	
	SM 5310 B-00	Organic Carbon	6.0		mg C/L	P357196	
2052890	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P357035	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Bonnet Lake @ Middle

Collection Date/Time: 01/08/2019 13:40

Field ID: G4SD0170

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2052881	EPA 180.1 Rev. 2.0	Turbidity	26	A	NTU	P357060	
	EPA 300.0 Rev. 2.1	Chloride	22		mg Cl/L	P357205	
		Sulfate	37		mg SO4/L	P357207	
	SM 2120 B	Color (true)	12		PCU	P357040	
	SM 2320 B-97	Total Alkalinity	32		mg CaCO3/L	P357389	
	SM 2540 C-97	TDS	112		mg/L	P357444	
	SM 2540 D-97	TSS	17		mg/L	P357572	
	SM 4500 F-C-97	Fluoride	0.075	I	mg F/L	P357523	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P357315	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P357222	
2052886	EPA 353.2 Rev. 2.0	NO2NO3-N	0.59		mg N/L	P357135	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P357226	
	SM 5310 B-00	Organic Carbon	7.2		mg C/L	P357196	
	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.004	U	mg P/L	P357035	
	dissolved						
2052891	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.004	U	mg P/L	P357035	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: LittleRedWaterLake@Mid

Collection Date/Time: 01/08/2019 14:10

Field ID: G4SD0171

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2052882	EPA 180.1 Rev. 2.0	Turbidity	2.4		NTU	P357060	
	EPA 300.0 Rev. 2.1	Chloride	16		mg Cl/L	P357205	
		Sulfate	9.6		mg SO4/L	P357207	
	SM 2120 B	Color (true)	58		PCU	P357038	
	SM 2320 B-97	Total Alkalinity	4.0		mg CaCO3/L	P357389	
	SM 2540 C-97	TDS	55		mg/L	P357444	
	SM 2540 D-97	TSS	2	I	mg/L	P357572	
	SM 4500 F-C-97	Fluoride	0.047	I	mg F/L	P357523	
2052887	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P357315	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.72		mg N/L	P357222	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P357135	
	EPA 365.1 Rev. 2.0	Total-P	0.041		mg P/L	P357226	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P357197	
2052892	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P357035	

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: P357060

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357204

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357205

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357206

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357207

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357249

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357315

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357221

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357222

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: P357134

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357135

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357225

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357226

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357035

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

Reference Method: SM 2120 B
Batch ID: P357038

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P357040

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P357389

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

Reference Method: SM 2540 C-97
Batch ID: P357443

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P357444

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P357571

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P357572

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P357523

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P357196

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

Reference Method: SM 5310 B-00
Batch ID: P357197

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: P357204

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357205

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357206

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	95.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357207

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	96.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357249

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357315

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357221

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357222

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357134

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357135

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: P357225

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357226

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357035

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.9		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P357038

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	106		P	85 - 115

Reference Method: SM 2120 B
Batch ID: P357040

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	103		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P357389

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P357523

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.2		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P357196

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.4		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P357197

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357204

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052768	Chloride	93.0		P	90 - 110
2052878	Chloride	97.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357205

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052879	Chloride	96.0		P	90 - 110
2053054	Chloride	99.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357206

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052768	Sulfate	95.2		P	90 - 110
2052878	Sulfate	96.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357207

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052879	Sulfate	93.5		P	90 - 110
2053054	Sulfate	95.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357249

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052883	Ammonia-N	94.5	95.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357315

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052885	Ammonia-N	109	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357221

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052874	Kjeldahl Nitrogen	100	94.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357222

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052885	Kjeldahl Nitrogen	99.6	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357134

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
---------------	-----------	---------	---------	-----------	----------------

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357134

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052823	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357135

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052887	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357225

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052884	Total-P	102	95.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357226

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052885	Total-P	103	99.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357035

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052889	O-Phosphate-P	95.0	97.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P357523

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052880	Fluoride	101	103	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P357196

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052770	Organic Carbon	99.9	99.3	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P357197

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2052887	Organic Carbon	103	101	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P357060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052881	Turbidity	1.17	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357204

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052878	Chloride	0.758	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357205

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052879	Chloride	0.00262	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357206

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052878	Sulfate	0.156	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357207

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052879	Sulfate	0.136	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357249

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052883	Ammonia-N	1.06	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052885	Ammonia-N	3.75	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357221

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052874	Kjeldahl Nitrogen	3.36	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357222

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052885	Kjeldahl Nitrogen	0.839	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357134

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052823	NO2NO3-N	0.480	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357135

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052887	NO2NO3-N	0.484	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357225

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052884	Total-P	5.70	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357226

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052885	Total-P	3.38	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357035

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052889	O-Phosphate-P	2.29	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P357038

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052871	Color (true)	0.321	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P357040

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052754	Color (true)	0.337	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
 Batch ID: P357389

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052880	Total Alkalinity	0.752	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
 Batch ID: P357443

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052776	TDS	3.54	Sample	P	0 - 10

Reference Method: SM 2540 C-97
 Batch ID: P357444

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052931	TDS	5.31	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P357523

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052880	Fluoride	1.01	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
 Batch ID: P357196

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052770	Organic Carbon	0.406	Spike	P	0 - 20

Reference Method: SM 5310 B-00
 Batch ID: P357197

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2052887	Organic Carbon	1.80	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: EPA 365.1 Rev. 2.0 dissolved

Run ID: A88720

Included Lab Sample IDs: 2052888, 2052889, 2052890, 2052891, 2052892

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	97.0	P/P	90 - 110
O-Phosphate-P	98.9	98.1	P/P	90 - 110
O-Phosphate-P	99.0	98.8	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A88721

Included Lab Sample IDs: 2052878, 2052879, 2052880, 2052881, 2052882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	104	106	P/P	90 - 115
Color (true)	104	106	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A88736

Included Lab Sample IDs: 2052878, 2052879, 2052880, 2052881, 2052882

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A88763

Included Lab Sample IDs: 2052883, 2052884, 2052885, 2052886, 2052887

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

Reference Method: SM 5310 B-00

Run ID: A88786

Included Lab Sample IDs: 2052883, 2052884, 2052885, 2052886, 2052887

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	101	99.3	P/P	90 - 110
Organic Carbon	99.8	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A88788

Included Lab Sample IDs: 2052878, 2052879, 2052880, 2052881, 2052882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	102	P/P	90 - 110
Chloride	99.3	100	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110
Sulfate	100	99.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A88802

Included Lab Sample IDs: 2052883, 2052884

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	103	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A88802

Included Lab Sample IDs: 2052883, 2052884

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A88815

Included Lab Sample IDs: 2052883

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A88829

Included Lab Sample IDs: 2052884, 2052885, 2052886, 2052887

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.6	101	P/P	90 - 110
Kjeldahl Nitrogen	99.0	98.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A88830

Included Lab Sample IDs: 2052885, 2052886, 2052887

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A88845

Included Lab Sample IDs: 2052883, 2052884, 2052885, 2052886, 2052887

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	101	P/P	90 - 110
Total-P	102	101	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A88858

Included Lab Sample IDs: 2052878, 2052879, 2052880, 2052881, 2052882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	103	P/P	90 - 110
Total Alkalinity	103	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A88903

Included Lab Sample IDs: 2052878, 2052879, 2052880, 2052881, 2052882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	101	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		Precision	
					LCS	MS
EPA 180.1 Rev. 2.0	Turbidity				1.17	
EPA 300.0 Rev. 2.1	Chloride	98.2	97.3	93.0	0.758	
	Chloride	98.4	96.0	99.4	0.0026	
	Sulfate	95.5	96.3	95.2	0.156	
	Sulfate	96.8	93.5	95.4	0.136	
EPA 350.1 Rev. 2.0	Ammonia-N	100	94.5	95.7		1.06
	Ammonia-N	100	109	102		3.75
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	100	94.4		3.36
	Kjeldahl Nitrogen	97.5	99.6	101		0.839
EPA 353.2 Rev. 2.0	NO2NO3-N	102	104	104		0.480
	NO2NO3-N	102	101	101		0.484
EPA 365.1 Rev. 2.0	Total-P	105	102	95.7		5.70
	Total-P	102	103	99.2		3.38
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.9	95.0	97.2		2.29
SM 2120 B	Color (true)	106			0.321	
	Color (true)	103			0.337	
SM 2320 B-97	Total Alkalinity	101			0.752	
SM 2540 C-97	TDS				3.54	
	TDS				5.31	
SM 4500 F-C-97	Fluoride	98.2	101	103		1.01
SM 5310 B-00	Organic Carbon	98.4	99.9	99.3		0.406
	Organic Carbon	99.4	103	101		1.80

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2052878, 2052879, 2052880, 2052881, 2052882
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2052878, 2052879, 2052880, 2052881, 2052882
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2052878, 2052879, 2052880, 2052881, 2052882
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2052883, 2052884, 2052885, 2052886, 2052887
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2052883, 2052884, 2052885, 2052886, 2052887
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2052883, 2052884, 2052885, 2052886, 2052887
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2052883, 2052884, 2052885, 2052886, 2052887
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2052888, 2052889, 2052890, 2052891, 2052892
SM 2120 B / E31780	True Color measured at 450 nm	2052878, 2052879, 2052880, 2052881, 2052882
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2052878, 2052879, 2052880, 2052881, 2052882
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2052878, 2052879, 2052880, 2052881, 2052882
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2052878, 2052879, 2052880, 2052881, 2052882
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2052878, 2052879, 2052880, 2052881, 2052882
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2052883, 2052884, 2052885, 2052886, 2052887

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	01/09/2019			01/09/2019 14:47	Megan Treadwell	2052878, 2052879, 2052880, 2052881, 2052882
EPA 300.0 Rev. 2.1	01/09/2019			01/11/2019 15:05	Lipi Saha	2052878
	01/09/2019			01/11/2019 21:19	Lipi Saha	2052879
	01/09/2019			01/11/2019 22:07	Lipi Saha	2052880
	01/09/2019			01/11/2019 22:19	Lipi Saha	2052881
	01/09/2019			01/11/2019 22:31	Lipi Saha	2052882
EPA 350.1 Rev. 2.0	01/09/2019			01/14/2019 13:56	Ping Hua	2052883
	01/09/2019			01/14/2019 14:16	Ping Hua	2052884
	01/09/2019			01/15/2019 11:04	Ping Hua	2052885
	01/09/2019			01/15/2019 11:08	Ping Hua	2052886
	01/09/2019			01/15/2019 11:17	Ping Hua	2052887
EPA 351.2 Rev. 2.0	01/09/2019	01/14/2019 11:25	Adrian Shelby	01/15/2019 12:40	Joseph Suarez	2052883
	01/09/2019	01/14/2019 11:25	Adrian Shelby	01/15/2019 14:48	Joseph Suarez	2052884
	01/09/2019	01/14/2019 11:25	Adrian Shelby	01/15/2019 14:50	Joseph Suarez	2052885
	01/09/2019	01/14/2019 11:25	Adrian Shelby	01/15/2019 14:54	Joseph Suarez	2052886
	01/09/2019	01/14/2019 11:25	Adrian Shelby	01/15/2019 14:59	Joseph Suarez	2052887
EPA 353.2 Rev. 2.0	01/09/2019			01/11/2019 10:09	Beverly Y. Sanders	2052883
	01/09/2019			01/11/2019 10:10	Beverly Y. Sanders	2052884
	01/09/2019			01/11/2019 10:23	Beverly Y. Sanders	2052886
	01/09/2019			01/11/2019 10:24	Beverly Y. Sanders	2052887
	01/09/2019			01/11/2019 11:53	Beverly Y. Sanders	2052885
EPA 365.1 Rev. 2.0	01/09/2019	01/14/2019 12:30	Sima Feizi	01/15/2019 18:16	Rosalyn Ballman	2052883
	01/09/2019	01/14/2019 12:30	Sima Feizi	01/15/2019 18:17	Rosalyn Ballman	2052884
	01/09/2019	01/14/2019 12:30	Sima Feizi	01/15/2019 18:19	Rosalyn Ballman	2052885
	01/09/2019	01/14/2019 12:30	Sima Feizi	01/15/2019 18:26	Rosalyn Ballman	2052886
	01/09/2019	01/14/2019 12:30	Sima Feizi	01/15/2019 18:27	Rosalyn Ballman	2052887
EPA 365.1 Rev. 2.0 dissolved	01/09/2019			01/09/2019 15:24	Jhamieka S. Greenwood	2052889
	01/09/2019			01/09/2019 15:55	Jhamieka S. Greenwood	2052888
	01/09/2019			01/09/2019 16:02	Jhamieka S. Greenwood	2052890
	01/09/2019			01/09/2019 16:03	Jhamieka S. Greenwood	2052891
	01/09/2019			01/09/2019 16:04	Jhamieka S. Greenwood	2052892
SM 2120 B	01/09/2019			01/09/2019 15:58	Chelsea Hernandez	2052878
	01/09/2019			01/09/2019 15:59	Chelsea Hernandez	2052879
	01/09/2019			01/09/2019 16:00	Chelsea Hernandez	2052880
	01/09/2019			01/09/2019 16:01	Chelsea Hernandez	2052882
	01/09/2019			01/09/2019 16:18	Chelsea Hernandez	2052881
SM 2320 B-97	01/09/2019			01/16/2019 09:34	Dale L. Simmons	2052880
	01/09/2019			01/16/2019 12:25	Dale L. Simmons	2052878
	01/09/2019			01/16/2019 12:41	Dale L. Simmons	2052879

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 2320 B-97	01/09/2019			01/16/2019 12:56	Dale L. Simmons	2052881
	01/09/2019			01/16/2019 13:37	Dale L. Simmons	2052882
SM 2540 C-97	01/09/2019			01/10/2019 14:35	Yijie Li	2052878, 2052879, 2052880, 2052881, 2052882
SM 2540 D-97	01/09/2019			01/10/2019 14:35	Yijie Li	2052878, 2052879, 2052880, 2052881, 2052882
SM 4500 F-C-97	01/09/2019			01/18/2019 03:14	Dale L. Simmons	2052880
	01/09/2019			01/18/2019 04:38	Dale L. Simmons	2052878
	01/09/2019			01/18/2019 04:46	Dale L. Simmons	2052879
	01/09/2019			01/18/2019 04:54	Dale L. Simmons	2052881
	01/09/2019			01/18/2019 05:02	Dale L. Simmons	2052882
SM 5310 B-00	01/09/2019			01/12/2019 01:21	Megan Treadwell	2052883
	01/09/2019			01/12/2019 01:36	Megan Treadwell	2052884
	01/09/2019			01/12/2019 01:48	Megan Treadwell	2052885
	01/09/2019			01/12/2019 02:24	Megan Treadwell	2052886
	01/09/2019			01/12/2019 03:01	Megan Treadwell	2052887