Chemical Analysis Report

NE-DIST-2018-05-23-01

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

Event Description: **Ocklawaha lakes**
Request ID: **RQ-2018-05-21-19**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
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8800 Baymeadows Way West
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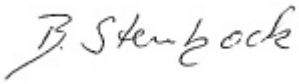
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 18-JUN-2018 14:28



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 groups are included in this report: Metals and 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: Pegram Lake Center **Collection Date/Time: 05/22/2018 12:15**

Field ID: G1NE0866 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1994776	EPA 180.1 Rev. 2.0	Turbidity	1.3	A	NTU	P345831	
	EPA 300.0 Rev. 2.1	Chloride	10		mg Cl/L	P346220	
		Sulfate	3.0		mg SO4/L	P346224	
	SM 2120 B	Color (true)	27		PCU	P345847	
	SM 2320 B-97	Total Alkalinity	2.8		mg CaCO3/L	P346083	
	SM 2540 C-97	TDS	56		mg/L	P346319	
	SM 2540 D-97	TSS	2	I	mg/L	P346365	
	SM 4500 F-C-97	Fluoride	0.041	I	mg F/L	P346087	
1994778	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P346259	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.67		mg N/L	P346033	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P345900	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P345893	
	SM 5310 B-00	Organic Carbon	8.1		mg C/L	P346312	
1994780	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P345825	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Hewitt Lake Center **Collection Date/Time: 05/22/2018 13:10**

Field ID: G1NE0865 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1994777	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P345831	
	EPA 300.0 Rev. 2.1	Chloride	9.0		mg Cl/L	P346220	
		Sulfate	7.2		mg SO4/L	P346224	
	SM 2120 B	Color (true)	6.7		PCU	P345847	
	SM 2320 B-97	Total Alkalinity	1.5	I	mg CaCO3/L	P346083	
	SM 2540 C-97	TDS	30		mg/L	P346319	
	SM 2540 D-97	TSS	3	I	mg/L	P346365	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P346087	
1994779	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P346259	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.37		mg N/L	P346033	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P345900	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P345893	
	SM 5310 B-00	Organic Carbon	2.7		mg C/L	P346312	
1994781	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P345825	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Penner Pond Center **Collection Date/Time: 05/22/2018 10:55**

Field ID: G1NE0864 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1994782	EPA 180.1 Rev. 2.0	Turbidity	0.90		NTU	P345831	

Field ID: G1NE0864 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1994782	EPA 300.0 Rev. 2.1	Chloride	4.3		mg Cl/L	P346220	
		Sulfate	0.20	U	mg SO4/L	P346224	
	SM 2120 B	Color (true)	110		PCU	P345847	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P346083	
	SM 2540 C-97	TDS	51		mg/L	P346319	
	SM 2540 D-97	TSS	3	I	mg/L	P346365	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P346087	
1994783	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P346259	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.65		mg N/L	P346033	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.011		mg N/L	P345900	
	EPA 365.1 Rev. 2.0	Total-P	0.017		mg P/L	P345893	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P346312	
1994784	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P345825	
1994808	EPA 200.7 Rev. 4.4	Calcium	0.68		mg/L	P345876	
		Iron	230		ug/L	P345876	
		Magnesium	0.57		mg/L	P345876	
		Potassium	0.30	U	mg/L	P345876	
		Sodium	2.7		mg/L	P345876	
		Zinc	5.0	U	ug/L	P345876	
	EPA 200.8 Rev. 5.4	Arsenic	0.24		ug/L	P345876	
		Cadmium	0.020	U	ug/L	P345876	
		Chromium	0.40	U	ug/L	P345876	
		Copper	0.20	I	ug/L	P345876	
		Lead	0.11	I	ug/L	P345876	
		Nickel	0.20	U	ug/L	P345876	
		Silver	0.010	U	ug/L	P345876	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: NE ROC DI Field Blank **Collection Date/Time: 05/22/2018 11:55**

Field ID: BLANK 05172018 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1994785	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P345831	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P346220	
		Sulfate	0.20	U	mg SO4/L	P346224	
	SM 2120 B	Color (true)	2.5	U	PCU	P345847	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P346083	
	SM 2540 C-97	TDS	15	U	mg/L	P346315	
	SM 2540 D-97	TSS	2	U	mg/L	P346361	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P346087	
1994786	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P346260	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P346034	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P345901	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P345894	

Field ID: BLANK 05172018 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1994786	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P346312	
1994787	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P345825	
1994809	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P345876	
		Iron	30	U	ug/L	P345876	
		Magnesium	0.040	U	mg/L	P345876	
		Potassium	0.30	U	mg/L	P345876	
		Sodium	0.50	U	mg/L	P345876	
		Zinc	5.0	U	ug/L	P345876	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P345876	
		Cadmium	0.020	U	ug/L	P345876	
		Chromium	0.40	U	ug/L	P345876	
		Copper	0.20	U	ug/L	P345876	
		Lead	0.050	U	ug/L	P345876	
		Nickel	0.20	U	ug/L	P345876	
		Silver	0.010	U	ug/L	P345876	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
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: P345831

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P345876

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345876

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346220

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346224

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P346259

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P346260

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346033

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346034

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345900

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345901

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345893

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345894

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345825

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

Reference Method: SM 2120 B
Batch ID: P345847

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P346083

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

Reference Method: SM 2540 C-97
Batch ID: P346315

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P346319

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P346361

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P346365

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P346087

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P346312

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P345876

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	99.3		P	85 - 115
Iron	102		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	102		P	85 - 115
Sodium	102		P	85 - 115
Zinc	94.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345876

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	98.6		P	85 - 115
Chromium	96.6		P	85 - 115
Copper	95.2		P	85 - 115
Lead	94.8		P	85 - 115
Nickel	97.9		P	85 - 115
Silver	98.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346220

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346224

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P346259

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: P346260

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346033

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346034

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345900

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345901

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345893

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345894

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	97.7		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345825

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

Reference Method: SM 2320 B-97
Batch ID: P346083

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P346087

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.0		P	91 - 105

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P346312

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P345876

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994756	Calcium	99.0		P	80 - 120
1994756	Iron	101	102	P/P	80 - 120
1994756	Magnesium	101	104	P/P	80 - 120
1994756	Potassium	103	105	P/P	80 - 120
1994756	Sodium	103		P	80 - 120
1994756	Zinc	97.7	99.2	P/P	80 - 120
1994870	Calcium	102		P	80 - 120
1994870	Iron	103		P	80 - 120
1994870	Magnesium	105		P	80 - 120
1994870	Potassium	104		P	80 - 120
1994870	Sodium	103		P	80 - 120
1994870	Zinc	97.2		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345876

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994756	Arsenic	100	102	P/P	80 - 120
1994756	Cadmium	96.2	101	P/P	80 - 120
1994756	Chromium	92.9	95.7	P/P	80 - 120
1994756	Copper	94.3	96.8	P/P	80 - 120
1994756	Lead	94.3	95.9	P/P	80 - 120
1994756	Nickel	97.2	99.8	P/P	80 - 120
1994756	Silver	96.9	100	P/P	80 - 120
1994870	Arsenic	103		P	80 - 120
1994870	Cadmium	97.9		P	80 - 120
1994870	Chromium	94.6		P	80 - 120
1994870	Copper	95.1		P	80 - 120
1994870	Lead	95.2		P	80 - 120
1994870	Nickel	98.2		P	80 - 120
1994870	Silver	97.8		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346220

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994739	Chloride	95.2		P	90 - 110
1994825	Chloride	100		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346224

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994739	Sulfate	97.4		P	90 - 110
1994825	Sulfate	98.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P346259

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994734	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P346260

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994826	Ammonia-N	104	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346033

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994778	Kjeldahl Nitrogen	98.3	94.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346034

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994836	Kjeldahl Nitrogen	103	95.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345900

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994734	NO2NO3-N	99.0	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345901

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994826	NO2NO3-N	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345893

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994772	Total-P	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345894

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994828	Total-P	103	99.0	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345825

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994741	O-Phosphate-P	94.8	95.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P346087

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994835	Fluoride	101	101	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P346312

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1994734	Organic Carbon	94.2	92.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P345831

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994776	Turbidity	3.05	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P345876

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994756	Calcium	1.22	Spike	P	0 - 20
1994756	Iron	1.13	Spike	P	0 - 20
1994756	Magnesium	1.91	Spike	P	0 - 20
1994756	Potassium	1.12	Spike	P	0 - 20
1994756	Sodium	1.23	Spike	P	0 - 20
1994756	Zinc	1.54	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P345876

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994756	Arsenic	2.17	Spike	P	0 - 20
1994756	Cadmium	4.42	Spike	P	0 - 20
1994756	Chromium	3.00	Spike	P	0 - 20
1994756	Copper	2.55	Spike	P	0 - 20
1994756	Lead	1.68	Spike	P	0 - 20
1994756	Nickel	2.60	Spike	P	0 - 20
1994756	Silver	3.16	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P346220

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994739	Chloride	0.431	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P346259

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994734	Ammonia-N	1.17	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P346260

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994826	Ammonia-N	2.35	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346033

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994778	Kjeldahl Nitrogen	2.46	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P346034

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994836	Kjeldahl Nitrogen	5.35	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345900

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994734	NO2NO3-N	1.87	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P345901

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994826	NO2NO3-N	0.484	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345893

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994772	Total-P	0.440	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P345894

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994828	Total-P	4.08	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P345825

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994741	O-Phosphate-P	1.05	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P345847

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994742	Color (true)	0.222	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P346083

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994835	Total Alkalinity	0.226	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P346315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994353	TDS	3.10	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P346319

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994825	TDS	8.37	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P346087

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994835	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P346312

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1994734	Organic Carbon	1.18	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: A84113
Included Lab Sample IDs: 1994780, 1994781, 1994784, 1994787

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A84114
Included Lab Sample IDs: 1994776, 1994777, 1994782, 1994785

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	102	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A84124
Included Lab Sample IDs: 1994776, 1994777, 1994782, 1994785

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	100	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A84142
Included Lab Sample IDs: 1994778, 1994779, 1994783, 1994786

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

Reference Method: SM 2320 B-97
Run ID: A84181
Included Lab Sample IDs: 1994776, 1994777, 1994782, 1994785

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	99.6	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A84181
Included Lab Sample IDs: 1994776, 1994777, 1994782, 1994785

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	96.7	98.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A84201
Included Lab Sample IDs: 1994778, 1994779, 1994783, 1994786

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A84216
Included Lab Sample IDs: 1994808, 1994809

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	97.9	98.1	P/P	90 - 110
Calcium	98.3	97.4	P/P	90 - 110
Iron	96.1	99.3	P/P	90 - 110
Iron	97.3	98.5	P/P	90 - 110
Magnesium	96.6	100	P/P	90 - 110
Magnesium	97.5	98.7	P/P	90 - 110
Potassium	101	102	P/P	90 - 110
Potassium	99.3	102	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Zinc	95.7	97.7	P/P	90 - 110
Zinc	96.7	95.1	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A84230
Included Lab Sample IDs: 1994776, 1994777, 1994782, 1994785

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	105	P/P	90 - 110
Chloride	105	104	P/P	90 - 110
Sulfate	100	102	P/P	90 - 110
Sulfate	102	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A84231
Included Lab Sample IDs: 1994778, 1994779, 1994783

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	105	P/P	90 - 110
Kjeldahl Nitrogen	105	106	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A84247
Included Lab Sample IDs: 1994808, 1994809

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	101	P/P	90 - 110
Arsenic	98.3	99.0	P/P	90 - 110
Cadmium	96.3	97.1	P/P	90 - 110
Cadmium	97.3	97.4	P/P	90 - 110
Chromium	94.9	97.1	P/P	90 - 110
Chromium	97.2	97.4	P/P	90 - 110
Copper	96.7	97.0	P/P	90 - 110
Copper	98.5	98.9	P/P	90 - 110
Lead	94.2	94.7	P/P	90 - 110
Lead	95.5	95.5	P/P	90 - 110
Nickel	96.4	96.5	P/P	90 - 110
Nickel	97.9	98.4	P/P	90 - 110
Silver	96.5	97.5	P/P	90 - 110
Silver	97.2	97.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A84295
Included Lab Sample IDs: 1994786

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A84301
Included Lab Sample IDs: 1994778, 1994779, 1994783, 1994786

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

Reference Method: SM 5310 B-00
Run ID: A84324
Included Lab Sample IDs: 1994778, 1994779, 1994783, 1994786

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.7	96.0	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	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						3.05	
EPA 200.7 Rev. 4.4	Calcium	99.3	99.0	102				1.22
	Iron	102	101	102	103			1.13
	Magnesium	105	101	104	105			1.91
	Potassium	102	103	105	104			1.12
	Sodium	102	103	103				1.23
	Zinc	94.3	97.7	99.2	97.2			1.54
EPA 200.8 Rev. 5.4	Arsenic	100	100	102	103			2.17
	Cadmium	98.6	96.2	101	97.9			4.42
	Chromium	96.6	92.9	95.7	94.6			3.00
	Copper	95.2	94.3	96.8	95.1			2.55
	Lead	94.8	94.3	95.9	95.2			1.68
	Nickel	97.9	97.2	99.8	98.2			2.60
	Silver	98.9	96.9	100	97.8			3.16
EPA 300.0 Rev. 2.1	Chloride	101	95.2	100			0.431	
	Sulfate	99.6	97.4	98.4				
EPA 350.1 Rev. 2.0	Ammonia-N	100	101	102				1.17
	Ammonia-N	102	104	106				2.35
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	98.3	94.6				2.46
	Kjeldahl Nitrogen	108	103	95.9				5.35
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.0	101				1.87
	NO2NO3-N	101	103	104				0.484
EPA 365.1 Rev. 2.0	Total-P	103	102	101				0.440
	Total-P	97.7	103	99.0				4.08
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.5	94.8	95.8				1.05

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
SM 2120 B	Color (true)					0.222	
SM 2320 B-97	Total Alkalinity	104				0.226	
SM 2540 C-97	TDS					3.10	
	TDS					8.37	
SM 4500 F-C-97	Fluoride	94.0	101	101			0.0
SM 5310 B-00	Organic Carbon	95.4	94.2	92.2			1.18

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1994776, 1994777, 1994782, 1994785
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1994808, 1994809
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1994808, 1994809
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1994776, 1994777, 1994782, 1994785
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1994776, 1994777, 1994782, 1994785
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1994778, 1994779, 1994783, 1994786
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1994778, 1994779, 1994783, 1994786
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1994778, 1994779, 1994783, 1994786
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1994778, 1994779, 1994783, 1994786
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1994780, 1994781, 1994784, 1994787
SM 2120 B / E31780	True Color measured at 450 nm	1994776, 1994777, 1994782, 1994785
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1994776, 1994777, 1994782, 1994785
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1994776, 1994777, 1994782, 1994785
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	1994776, 1994777, 1994782, 1994785
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1994776, 1994777, 1994782, 1994785
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1994778, 1994779, 1994783, 1994786

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	05/23/2018			05/23/2018 17:13	William L. Brown IV	1994776, 1994777, 1994782, 1994785
EPA 200.7 Rev. 4.4	05/23/2018	05/24/2018 14:46	Allison Taylor	05/30/2018 02:26	Betina Topolski	1994809
	05/23/2018	05/24/2018 14:46	Allison Taylor	05/30/2018 05:41	Betina Topolski	1994808
EPA 200.8 Rev. 5.4	05/23/2018	05/24/2018 14:46	Allison Taylor	05/25/2018 19:49	Nadine Brooks	1994809
	05/23/2018	05/24/2018 14:46	Allison Taylor	05/26/2018 01:07	Nadine Brooks	1994808
EPA 300.0 Rev. 2.1	05/23/2018			05/31/2018 21:16	Lipi Saha	1994776
	05/23/2018			05/31/2018 21:28	Lipi Saha	1994777
	05/23/2018			05/31/2018 22:04	Lipi Saha	1994782
	05/23/2018			05/31/2018 22:16	Lipi Saha	1994785
EPA 350.1 Rev. 2.0	05/23/2018			06/01/2018 11:53	Ping Hua	1994778
	05/23/2018			06/01/2018 11:54	Ping Hua	1994779
	05/23/2018			06/01/2018 11:56	Ping Hua	1994783
	05/23/2018			06/01/2018 12:05	Ping Hua	1994786
EPA 351.2 Rev. 2.0	05/23/2018	05/29/2018 10:30	Adrian Shelby	05/30/2018 11:28	Joseph Suarez	1994778
	05/23/2018	05/29/2018 10:30	Adrian Shelby	05/30/2018 11:36	Joseph Suarez	1994779
	05/23/2018	05/29/2018 10:30	Adrian Shelby	05/30/2018 11:37	Joseph Suarez	1994783
	05/23/2018	05/29/2018 16:00	Adrian Shelby	06/01/2018 12:57	Joseph Suarez	1994786
EPA 353.2 Rev. 2.0	05/23/2018			05/24/2018 12:54	Lauren Bottorf	1994778
	05/23/2018			05/24/2018 12:56	Lauren Bottorf	1994779
	05/23/2018			05/24/2018 12:57	Lauren Bottorf	1994783
	05/23/2018			05/24/2018 13:10	Lauren Bottorf	1994786
EPA 365.1 Rev. 2.0	05/23/2018	05/24/2018 13:10	Sima Feizi	05/29/2018 12:18	Lipi Saha	1994778
	05/23/2018	05/24/2018 13:10	Sima Feizi	05/29/2018 12:19	Lipi Saha	1994779
	05/23/2018	05/24/2018 13:10	Sima Feizi	05/29/2018 12:20	Lipi Saha	1994783
	05/23/2018	05/24/2018 13:10	Sima Feizi	05/29/2018 12:22	Lipi Saha	1994786
EPA 365.1 Rev. 2.0 dissolved	05/23/2018			05/23/2018 16:22	Megan Treadwell	1994780
	05/23/2018			05/23/2018 16:23	Megan Treadwell	1994781
	05/23/2018			05/23/2018 16:24	Megan Treadwell	1994784
	05/23/2018			05/23/2018 16:25	Megan Treadwell	1994787
SM 2120 B	05/23/2018			05/23/2018 15:58	Tanya Welborn	1994776
	05/23/2018			05/23/2018 15:59	Tanya Welborn	1994777
	05/23/2018			05/23/2018 16:00	Tanya Welborn	1994782
	05/23/2018			05/23/2018 16:01	Tanya Welborn	1994785
SM 2320 B-97	05/23/2018			05/25/2018 18:54	Dale L. Simmons	1994776
	05/23/2018			05/25/2018 19:05	Dale L. Simmons	1994777
	05/23/2018			05/25/2018 19:15	Dale L. Simmons	1994782
	05/23/2018			05/25/2018 19:28	Dale L. Simmons	1994785
SM 2540 C-97	05/23/2018			05/25/2018 16:24	Yijie Li	1994776, 1994777, 1994782, 1994785
SM 2540 D-97	05/23/2018			05/25/2018 16:24	Yijie Li	1994776, 1994777, 1994782, 1994785
SM 4500 F-C-97	05/23/2018			05/25/2018 18:54	Dale L. Simmons	1994776

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 4500 F-C-97	05/23/2018			05/25/2018 19:05	Dale L. Simmons	1994777
	05/23/2018			05/25/2018 19:15	Dale L. Simmons	1994782
	05/23/2018			05/25/2018 19:28	Dale L. Simmons	1994785
SM 5310 B-00	05/23/2018			06/01/2018 23:32	Megan Treadwell	1994778
	05/23/2018			06/01/2018 23:46	Megan Treadwell	1994779
	05/23/2018			06/02/2018 00:01	Megan Treadwell	1994783
	05/23/2018			06/02/2018 00:15	Megan Treadwell	1994786