Chemical Analysis Report

CEN-DIST-2022-09-08-01

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Lakes: Crooked, Lotta, Ingram**
Request ID: **RQ-2022-09-05-25**
Customer: **CEN-DIST**
Project ID: **SMP**

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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 by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

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

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

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

Precision is reported as relative percent difference unless otherwise noted.

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

QC Codes used in this report may include:

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

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

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

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

Sample Location: Lake Lotta at Center of Southern Lobe **Collection Date/Time: 09/07/2022 12:36**

Field ID: G2CE0093 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2355036	DEP SOP: NU-094-1	Color (true)	81		PCU	P419332	
	EPA 180.1 Rev. 2.0	Turbidity	2.3		NTU	P419325	
	EPA 300.0 Rev. 2.1	Chloride	9.1	A	mg Cl/L	P419741	
		Sulfate	6.8	A	mg SO4/L	P419744	
	SM 2320 B-2011	Total Alkalinity	53		mg CaCO3/L	P419620	
	SM 2540 C-2011	TDS	100		mg/L	P419475	
	SM 2540 D-2011	TSS	4	I	mg/L	P419440	
	SM 4500-F- C-2011	Fluoride	0.13		mg F/L	P419622	
2355037	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P419364	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.94		mg N/L	P419517	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P419541	
	EPA 365.1 Rev. 2.0	Total-P	0.056		mg P/L	P419533	
	SM 5310 B-2011	Organic Carbon	13		mg C/L	P419491	
2355038	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P419312	
2355050	EPA 200.7 Rev. 4.4	Calcium	20.0		mg/L	P419409	
		Iron	30	U	ug/L	P419409	
		Magnesium	2.76		mg/L	P419409	
		Potassium	2.3		mg/L	P419409	
		Sodium	6.0		mg/L	P419409	
		Strontium	44.3		ug/L	P419409	
		Tin	3.1	I	ug/L	P419409	
		Titanium	0.75	U	ug/L	P419409	
		Vanadium	2.0	U	ug/L	P419409	
		Zinc	5.0	U	ug/L	P419409	
	EPA 200.8 Rev. 5.4	Aluminum	12	I	ug/L	P419671	
		Antimony	0.14	I	ug/L	P419409	
		Arsenic	0.46		ug/L	P419409	
		Barium	11.3		ug/L	P419409	
		Beryllium	0.010	U	ug/L	P419409	
		Boron	27.4		ug/L	P419409	
		Cadmium	0.020	U	ug/L	P419409	
		Chromium	0.40	U	ug/L	P419409	
		Cobalt	0.037	I	ug/L	P419409	
		Copper	0.40	U	ug/L	P419409	
		Lead	0.20	U	ug/L	P419409	
		Manganese	14.0		ug/L	P419409	
		Molybdenum	0.60		ug/L	P419409	
		Nickel	0.50	U	ug/L	P419409	
		Selenium	0.20	U	ug/L	P419409	
		Silver	0.010	U	ug/L	P419409	
		Thallium	0.10	U	ug/L	P419409	
	SM 2340 B-2011	Hardness	61.3		mg/L	P419409	

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

Sample Location: Lake Ingram East **Collection Date/Time: 09/07/2022 11:02**

Field ID: G4CE0155 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2355039	DEP SOP: NU-094-1	Color (true)	26	A	PCU	P419332	
	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P419325	
	EPA 300.0 Rev. 2.1	Chloride	8.9		mg Cl/L	P419741	
		Sulfate	2.6		mg SO4/L	P419744	
	SM 2320 B-2011	Total Alkalinity	10		mg CaCO3/L	P419620	
	SM 2540 C-2011	TDS	47		mg/L	P419475	
	SM 2540 D-2011	TSS	2	U	mg/L	P419440	
	SM 4500-F- C-2011	Fluoride	0.035	U	mg F/L	P419622	
2355041	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P419364	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.78		mg N/L	P419455	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P419541	
	EPA 365.1 Rev. 2.0	Total-P	0.01		mg P/L	P419533	
	SM 5310 B-2011	Organic Carbon	9.5		mg C/L	P419491	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Crooked Lake @ Center of N Lobe **Collection Date/Time: 09/07/2022 13:18**

Field ID: G2CE0265 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2355040	DEP SOP: NU-094-1	Color (true)	120		PCU	P419332	
	EPA 180.1 Rev. 2.0	Turbidity	7.2		NTU	P419325	
	EPA 300.0 Rev. 2.1	Chloride	16		mg Cl/L	P419741	
		Sulfate	3.2		mg SO4/L	P419744	
	SM 2320 B-2011	Total Alkalinity	15		mg CaCO3/L	P419620	
	SM 2540 C-2011	TDS	102		mg/L	P419475	
	SM 2540 D-2011	TSS	14		mg/L	P419440	
	SM 4500-F- C-2011	Fluoride	0.076	I	mg F/L	P419622	
2355042	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P419364	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.9		mg N/L	P419518	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P420057	
	EPA 365.1 Rev. 2.0	Total-P	0.094		mg P/L	P419533	
	SM 5310 B-2011	Organic Carbon	27		mg C/L	P419491	

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

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P419332

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P419325

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419409

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
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419409

Component	Result	Code	Units
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419671

Component	Result	Code	Units
Aluminum	5.0	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419741

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419744

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419364

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419455

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419517

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419518

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P419541

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420057

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419533

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 dissolved
Batch ID: P419312

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

Reference Method: SM 2320 B-2011
Batch ID: P419620

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

Reference Method: SM 2540 C-2011
Batch ID: P419475

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P419440

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P419622

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P419491

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P419332

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	94.4		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P419325

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	96.4		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419409

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	106		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	106		P	85 - 115
Sodium	105		P	85 - 115
Strontium	103		P	85 - 115
Tin	107		P	85 - 115
Titanium	103		P	85 - 115
Vanadium	102		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419409

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Antimony	102		P	85 - 115
Arsenic	102		P	85 - 115
Barium	105		P	85 - 115
Beryllium	100		P	85 - 115
Boron	101		P	85 - 115
Cadmium	98.8		P	85 - 115
Chromium	100		P	85 - 115
Cobalt	96.5		P	85 - 115
Copper	99.4		P	85 - 115
Lead	91.8		P	85 - 115
Manganese	98.9		P	85 - 115
Molybdenum	97.6		P	85 - 115
Nickel	101		P	85 - 115
Selenium	102		P	85 - 115
Silver	88.3		P	85 - 115
Thallium	97.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419671

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.1		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419741

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419744

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419364

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419455

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: P419517

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419518

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P419541

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: P420057

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419533

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P419312

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.2		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P419620

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.9		P	94 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P419622

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.6		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P419491

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.5		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419409

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355246	Calcium	109	85.0	P/P	80 - 120
2355246	Iron	108	106	P/P	80 - 120
2355246	Magnesium	107	102	P/P	80 - 120
2355246	Potassium	106	102	P/P	80 - 120
2355246	Sodium	102		P	80 - 120
2355246	Strontium	103	101	P/P	80 - 120
2355246	Tin	107	104	P/P	80 - 120
2355246	Titanium	105	102	P/P	80 - 120
2355246	Vanadium	104	100	P/P	80 - 120
2355246	Zinc	101	98.9	P/P	80 - 120
2355260	Calcium	107		P	80 - 120
2355260	Iron	107		P	80 - 120
2355260	Magnesium	108		P	80 - 120
2355260	Potassium	108		P	80 - 120
2355260	Sodium	104		P	80 - 120
2355260	Strontium	103		P	80 - 120
2355260	Tin	106		P	80 - 120
2355260	Titanium	102		P	80 - 120
2355260	Vanadium	101		P	80 - 120
2355260	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419409

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355246	Antimony	104	102	P/P	80 - 120
2355246	Arsenic	102	101	P/P	80 - 120
2355246	Barium	105	104	P/P	80 - 120
2355246	Beryllium	98.4	96.8	P/P	80 - 120
2355246	Boron	105	103	P/P	80 - 120
2355246	Cadmium	99.8	98.3	P/P	80 - 120
2355246	Chromium	106	105	P/P	80 - 120
2355246	Cobalt	97.3	95.0	P/P	80 - 120
2355246	Copper	98.5	97.2	P/P	80 - 120
2355246	Lead	93.8	92.8	P/P	80 - 120
2355246	Manganese	104	100	P/P	80 - 120
2355246	Molybdenum	100	98.0	P/P	80 - 120
2355246	Nickel	101	99.0	P/P	80 - 120
2355246	Selenium	102	99.2	P/P	80 - 120
2355246	Silver	88.3	86.8	P/P	80 - 120
2355246	Thallium	99.5	99.8	P/P	80 - 120
2355260	Antimony	107		P	80 - 120
2355260	Arsenic	104		P	80 - 120
2355260	Barium	109		P	80 - 120
2355260	Beryllium	98.4		P	80 - 120
2355260	Boron	105		P	80 - 120
2355260	Cadmium	103		P	80 - 120
2355260	Chromium	106		P	80 - 120
2355260	Cobalt	98.7		P	80 - 120
2355260	Copper	102		P	80 - 120
2355260	Lead	95.5		P	80 - 120
2355260	Manganese	104		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419409

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355260	Molybdenum	101		P	80 - 120
2355260	Nickel	101		P	80 - 120
2355260	Selenium	104		P	80 - 120
2355260	Silver	90.8		P	80 - 120
2355260	Thallium	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419671

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2354242	Aluminum	97.8	98.9	P/P	80 - 120
2355245	Aluminum	99.1		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419741

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355036	Chloride	103		P	90 - 110
2355063	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419744

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355036	Sulfate	101		P	90 - 110
2355063	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419364

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2354989	Ammonia-N	103	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419517

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355037	Kjeldahl Nitrogen	105	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419518

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2354862	Kjeldahl Nitrogen	99.0	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P419541

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355037	NO2NO3-N	98.5	100	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420057

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2356160	NO2NO3-N	96.3	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419533

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355042	Total-P	102	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P419312

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2354990	O-Phosphate-P	95.4	95.7	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P419622

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2355112	Fluoride	99.7	98.5	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P419491

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2354958	Organic Carbon	96.6	97.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P419332

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355039	Color (true)	4.95	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P419325

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355026	Turbidity	8.53	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419409

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355246	Calcium	4.90	Spike	P	0 - 20
2355246	Iron	2.43	Spike	P	0 - 20
2355246	Magnesium	2.84	Spike	P	0 - 20
2355246	Potassium	2.29	Spike	P	0 - 20
2355246	Sodium	2.44	Spike	P	0 - 20
2355246	Strontium	2.08	Spike	P	0 - 20
2355246	Tin	2.23	Spike	P	0 - 20
2355246	Titanium	2.84	Spike	P	0 - 20
2355246	Vanadium	3.33	Spike	P	0 - 20
2355246	Zinc	2.52	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419409

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355246	Antimony	2.11	Spike	P	0 - 20
2355246	Arsenic	1.45	Spike	P	0 - 20
2355246	Barium	1.08	Spike	P	0 - 20
2355246	Beryllium	1.58	Spike	P	0 - 20
2355246	Boron	1.02	Spike	P	0 - 20
2355246	Cadmium	1.50	Spike	P	0 - 20
2355246	Chromium	0.819	Spike	P	0 - 20
2355246	Cobalt	2.31	Spike	P	0 - 20
2355246	Copper	1.37	Spike	P	0 - 20
2355246	Lead	1.11	Spike	P	0 - 20
2355246	Manganese	1.14	Spike	P	0 - 20
2355246	Molybdenum	2.07	Spike	P	0 - 20
2355246	Nickel	1.95	Spike	P	0 - 20
2355246	Selenium	2.79	Spike	P	0 - 20
2355246	Silver	1.71	Spike	P	0 - 20
2355246	Thallium	0.302	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419671

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2354242	Aluminum	0.856	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419741

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355036	Chloride	0.346	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P419744

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355036	Sulfate	1.07	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419364

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2354989	Ammonia-N	3.83	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419455

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2354942	Kjeldahl Nitrogen	5.99	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419517

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355037	Kjeldahl Nitrogen	1.89	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419518

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2354862	Kjeldahl Nitrogen	2.64	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P419541

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355037	NO2NO3-N	2.01	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420057

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2356160	NO2NO3-N	3.28	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419533

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355042	Total-P	2.66	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P419312

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2354990	O-Phosphate-P	0.300	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P419620

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355112	Total Alkalinity	1.74	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2011
Batch ID: P419475

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2354138	TDS	0.976	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P419622

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2355112	Fluoride	0.953	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P419491

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2354958	Organic Carbon	0.248	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A114614
Included Lab Sample IDs: 2355038

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	97.4	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A114618
Included Lab Sample IDs: 2355036, 2355039, 2355040

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

Reference Method: DEP SOP: NU-094-1
Run ID: A114621
Included Lab Sample IDs: 2355036, 2355039, 2355040

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	94.5	93.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A114639
Included Lab Sample IDs: 2355037, 2355041, 2355042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.0	97.4	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A114693
Included Lab Sample IDs: 2355037, 2355041, 2355042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.4	96.6	P/P	90 - 110
Organic Carbon	97.0	95.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A114704
Included Lab Sample IDs: 2355050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	100	100	P/P	90 - 110
Arsenic	102	102	P/P	90 - 110
Barium	100	99.2	P/P	90 - 110
Beryllium	99.6	99.3	P/P	90 - 110
Boron	98.7	97.1	P/P	90 - 110
Cadmium	103	102	P/P	90 - 110
Chromium	104	103	P/P	90 - 110
Cobalt	97.8	96.8	P/P	90 - 110
Copper	101	99.9	P/P	90 - 110
Lead	90.7	90.2	P/P	90 - 110
Manganese	101	102	P/P	90 - 110
Molybdenum	98.0	97.4	P/P	90 - 110
Nickel	101	99.8	P/P	90 - 110
Selenium	103	101	P/P	90 - 110
Silver	96.3	95.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A114704
Included Lab Sample IDs: 2355050

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A114711
Included Lab Sample IDs: 2355037, 2355041

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A114728
Included Lab Sample IDs: 2355050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	100	104	P/P	90 - 110
Potassium	102	105	P/P	90 - 110
Sodium	100	102	P/P	90 - 110
Strontium	99.2	99.6	P/P	90 - 110
Tin	101	102	P/P	90 - 110
Titanium	98.3	97.6	P/P	90 - 110
Vanadium	97.9	98.3	P/P	90 - 110
Zinc	97.5	97.1	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A114739
Included Lab Sample IDs: 2355036, 2355039, 2355040

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	97.0	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A114739
Included Lab Sample IDs: 2355036, 2355039, 2355040

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A114742
Included Lab Sample IDs: 2355041

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A114750
Included Lab Sample IDs: 2355037, 2355042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	99.5	P/P	90 - 110
Kjeldahl Nitrogen	103	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A114752
Included Lab Sample IDs: 2355037, 2355042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.8	P/P	90 - 110
Total-P	99.8	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A114755
Included Lab Sample IDs: 2355041

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	98.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A114771
Included Lab Sample IDs: 2355050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	102	P/P	90 - 110
Magnesium	98.9	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A114789
Included Lab Sample IDs: 2355036, 2355039, 2355040

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A114798
Included Lab Sample IDs: 2355050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.3	96.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A114919
Included Lab Sample IDs: 2355042

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	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
DEP SOP: NU-094-1	Color (true)	94.4					4.95	
EPA 180.1 Rev. 2.0	Turbidity	96.4					8.53	
EPA 200.7 Rev. 4.4	Calcium	103	109	85.0	107			4.90
	Iron	106	108	106	107			2.43
	Magnesium	106	107	102	108			2.84
	Potassium	106	106	102	108			2.29
	Sodium	105	102	104				2.44
	Strontium	103	103	101	103			2.08
	Tin	107	107	104	106			2.23
	Titanium	103	105	102	102			2.84
	Vanadium	102	104	100	101			3.33
	Zinc	102	101	98.9	101			2.52
EPA 200.8 Rev. 5.4	Aluminum	99.1	97.8	98.9	99.1			0.856
	Antimony	102	104	102	107			2.11
	Arsenic	102	102	101	104			1.45
	Barium	105	105	104	109			1.08
	Beryllium	100	98.4	96.8	98.4			1.58
	Boron	101	105	105	103			1.02
	Cadmium	98.8	99.8	98.3	103			1.50
	Chromium	100	106	105	106			0.819
	Cobalt	96.5	97.3	95.0	98.7			2.31
	Copper	99.4	98.5	97.2	102			1.37
	Lead	91.8	93.8	92.8	95.5			1.11
	Manganese	98.9	104	100	104			1.14
	Molybdenum	97.6	100	98.0	101			2.07
	Nickel	101	101	99.0	101			1.95
	Selenium	102	102	99.2	104			2.79
	Silver	88.3	88.3	86.8	90.8			1.71
	Thallium	97.4	99.5	99.8	101			0.302
EPA 300.0 Rev. 2.1	Chloride	102	103	101			0.346	
	Sulfate	100	101	100			1.07	
EPA 350.1 Rev. 2.0	Ammonia-N	96.0	103	108				3.83
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106						5.99
	Kjeldahl Nitrogen	99.4	105	108				1.89
	Kjeldahl Nitrogen	99.4	99.0	103				2.64
EPA 353.2 Rev. 2.0	NO2NO3-N	100	98.5	100				2.01
	NO2NO3-N	98.5	96.3	99.8				3.28
EPA 365.1 Rev. 2.0	Total-P	99.8	102	99.0				2.66
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.2	95.4	95.7				0.300
SM 2320 B-2011	Total Alkalinity	98.9					1.74	
SM 2540 C-2011	TDS						0.976	
SM 4500-F- C-2011	Fluoride	99.6	99.7	98.5				0.953
SM 5310 B-2011	Organic Carbon	95.5	96.6	97.0				0.248

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2355036, 2355039, 2355040
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2355036, 2355039, 2355040
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2355050
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2355050

Reference Method Descriptions

Method	Description	Associated Samples
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2355036, 2355039, 2355040
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2355036, 2355039, 2355040
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2355037, 2355041, 2355042
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2355037, 2355041, 2355042
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2355037, 2355041, 2355042
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2355037, 2355041, 2355042
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2355038
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2355036, 2355039, 2355040
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2355050
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2355036, 2355039, 2355040
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2355036, 2355039, 2355040
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2355036, 2355039, 2355040
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2355037, 2355041, 2355042

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	09/08/2022			09/08/2022 15:51	Anna M. Plaviak	2355036
	09/08/2022			09/08/2022 15:52	Anna M. Plaviak	2355039, 2355040
EPA 180.1 Rev. 2.0	09/08/2022			09/08/2022 13:38	Chandler E Cox	2355036
	09/08/2022			09/08/2022 13:39	Chandler E Cox	2355039
	09/08/2022			09/08/2022 13:40	Chandler E Cox	2355040
EPA 200.7 Rev. 4.4	09/08/2022	09/12/2022 10:30	Megan Whitefoot	09/14/2022 22:56	McKinley C Carter	2355050
	09/08/2022	09/12/2022 10:30	Megan Whitefoot	09/15/2022 21:46	McKinley C Carter	2355050
EPA 200.8 Rev. 5.4	09/08/2022	09/12/2022 10:30	Megan Whitefoot	09/13/2022 18:04	Megan Whitefoot	2355050
	09/08/2022	09/16/2022 09:25	Megan Whitefoot	09/17/2022 01:19	Emily M Philpot	2355050
EPA 300.0 Rev. 2.1	09/08/2022			09/15/2022 08:27	Anna M. Plaviak	2355036
	09/08/2022			09/15/2022 10:58	Anna M. Plaviak	2355039
	09/08/2022			09/15/2022 11:13	Anna M. Plaviak	2355040
EPA 350.1 Rev. 2.0	09/08/2022			09/09/2022 11:23	Judith K. Clark	2355037
	09/08/2022			09/09/2022 11:25	Judith K. Clark	2355041
	09/08/2022			09/09/2022 11:26	Judith K. Clark	2355042
EPA 351.2 Rev. 2.0	09/08/2022	09/13/2022 11:52	Alexandra J Mattheus	09/14/2022 14:33	Alexandra J Mattheus	2355041
	09/08/2022	09/14/2022 13:25	Samantha L Bates	09/15/2022 12:12	Samantha L Bates	2355037
	09/08/2022	09/14/2022 13:25	Samantha L Bates	09/15/2022 12:50	Samantha L Bates	2355042
EPA 353.2 Rev. 2.0	09/08/2022			09/14/2022 09:20	Judith K. Clark	2355037
	09/08/2022			09/14/2022 09:27	Judith K. Clark	2355041
	09/08/2022			09/23/2022 14:55	Judith K. Clark	2355042
EPA 365.1 Rev. 2.0	09/08/2022	09/14/2022 16:15	Simonne.V. Calhoun	09/15/2022 12:53	Simonne.V. Calhoun	2355042
	09/08/2022	09/14/2022 16:15	Simonne.V. Calhoun	09/15/2022 13:06	Simonne.V. Calhoun	2355037
	09/08/2022	09/14/2022 16:15	Simonne.V. Calhoun	09/15/2022 15:46	James L Waggerby	2355041
EPA 365.1 Rev. 2.0 dissolved	09/08/2022			09/08/2022 14:19	James L Waggerby	2355038
SM 2320 B-2011	09/08/2022			09/15/2022 00:46	Dale L. Simmons	2355036
	09/08/2022			09/15/2022 00:57	Dale L. Simmons	2355039
	09/08/2022			09/15/2022 01:10	Dale L. Simmons	2355040
SM 2340 B-2011	09/08/2022			09/15/2022 21:46	McKinley C Carter	2355050
SM 2540 C-2011	09/08/2022			09/09/2022 13:16	Ping Hua	2355036, 2355039, 2355040
SM 2540 D-2011	09/08/2022			09/09/2022 13:16	Ping Hua	2355036, 2355039, 2355040
SM 4500-F- C-2011	09/08/2022			09/15/2022 00:46	Dale L. Simmons	2355036
	09/08/2022			09/15/2022 00:57	Dale L. Simmons	2355039
	09/08/2022			09/15/2022 01:10	Dale L. Simmons	2355040
SM 5310 B-2011	09/08/2022			09/12/2022 15:45	Khloe J Berg	2355037
	09/08/2022			09/12/2022 21:12	Khloe J Berg	2355041
	09/08/2022			09/12/2022 21:29	Khloe J Berg	2355042