

Chemical Analysis Report

CEN-DIST-2022-09-16-01

Florida DEP Laboratory
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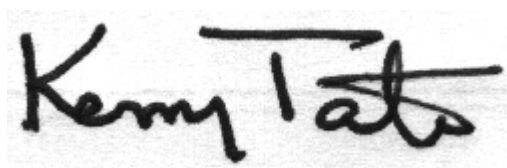
Event Description: **Livingston Creek and Reedy Lake Basin**
Request ID: **RQ-2022-09-12-20**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 07-OCT-2022 08:59

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line extending from the end of the name.

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: Reedy Lake Basin @ Lake Reedy Blvd- Bridge Collection Date/Time: 09/15/2022 11:26

Field ID: G4CE0224

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2357236	DEP SOP: NU-094-1	Color (true)	13		PCU	P419734	
	EPA 180.1 Rev. 2.0	Turbidity	6.2		NTU	P419746	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P420089	
		Sulfate	42		mg SO4/L	P420094	
	SM 2320 B-2011	Total Alkalinity	43	A	mg CaCO3/L	P420275	
	SM 2540 C-2011	TDS	134	A	mg/L	P420189	
	SM 2540 D-2011	TSS	8	IA	mg/L	P420146	
	SM 4500-F- C-2011	Fluoride	0.091	I	mg F/L	P420215	
2357237	EPA 350.1 Rev. 2.0	Ammonia-N	0.37		mg N/L	P419911	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P419876	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.090		mg N/L	P420164	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P419839	
	SM 5310 B-2011	Organic Carbon	11		mg C/L	P419944	

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: Livingston Creek @ Old Avon Park Rd

Collection Date/Time: 09/15/2022 11:49

Field ID: G4CE0210

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2357234	DEP SOP: NU-094-1	Color (true)	190		PCU	P419734	
	EPA 180.1 Rev. 2.0	Turbidity	2.2		NTU	P419746	
	EPA 300.0 Rev. 2.1	Chloride	20		mg Cl/L	P420089	
		Sulfate	8.9		mg SO4/L	P420094	
	SM 2320 B-2011	Total Alkalinity	12		mg CaCO3/L	P420275	
	SM 2540 C-2011	TDS	105		mg/L	P420189	
	SM 2540 D-2011	TSS	2	I	mg/L	P420146	
2357235	SM 4500-F- C-2011	Fluoride	0.11		mg F/L	P420215	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.044		mg N/L	P419911	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P419876	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P420319	
	EPA 365.1 Rev. 2.0	Total-P	0.20		mg P/L	P419839	
2357249	SM 5310 B-2011	Organic Carbon	22		mg C/L	P419944	
	EPA 200.7 Rev. 4.4	Calcium	5.54		mg/L	P419802	
		Iron	240		ug/L	P419802	
		Magnesium	4.43		mg/L	P419802	
		Potassium	8.8		mg/L	P419802	
		Sodium	8.7		mg/L	P419802	
		Strontium	130		ug/L	P419802	
		Tin	3.0	U	ug/L	P419802	
		Titanium	0.75	U	ug/L	P419802	
		Vanadium	2.0	U	ug/L	P419802	
		Zinc	5.0	U	ug/L	P419802	
	EPA 200.8 Rev. 5.4	Aluminum	61		ug/L	P419802	
		Antimony	0.050	U	ug/L	P419802	
		Arsenic	0.37		ug/L	P419802	
		Barium	7.14		ug/L	P419802	
		Beryllium	0.010	U	ug/L	P419802	
		Boron	43.2		ug/L	P419802	
		Cadmium	0.020	U	ug/L	P419802	
		Chromium	0.40	U	ug/L	P419802	
		Cobalt	0.070	I	ug/L	P419802	
		Copper	0.40	U	ug/L	P419802	
		Lead	0.20	U	ug/L	P419802	
		Manganese	18.7		ug/L	P419802	
		Molybdenum	0.15	U	ug/L	P419802	
		Nickel	0.50	U	ug/L	P419802	
		Selenium	0.20	U	ug/L	P419802	
		Silver	0.010	U	ug/L	P419802	
		Thallium	0.10	U	ug/L	P419802	
	SM 2340 B-2011	Hardness	32.1		mg/L	P419802	

Ref. Method and Comment:

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

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for manganese are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P419734

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P419746

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419802

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: P419802

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
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 300.0 Rev. 2.1
Batch ID: P420089

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P420094

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419911

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419876

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420164

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420319

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419839

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

Reference Method: SM 2320 B-2011
Batch ID: P420275

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

Reference Method: SM 2540 C-2011
Batch ID: P420189

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P420146

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500-F- C-2011
Batch ID: P420215

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P419944

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: P419734

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P419746

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419802

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	102		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	103		P	85 - 115
Sodium	106		P	85 - 115
Strontium	101		P	85 - 115
Tin	98.4		P	85 - 115
Titanium	99.9		P	85 - 115
Vanadium	99.4		P	85 - 115
Zinc	96.6		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419802

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	102		P	85 - 115
Barium	105		P	85 - 115
Beryllium	92.8		P	85 - 115
Boron	105		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	102		P	85 - 115
Cobalt	104		P	85 - 115
Copper	101		P	85 - 115
Lead	97.4		P	85 - 115
Manganese	104		P	85 - 115
Molybdenum	99.0		P	85 - 115
Nickel	102		P	85 - 115
Selenium	101		P	85 - 115
Silver	87.3		P	85 - 115
Thallium	96.2		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P420089

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P420094

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419911

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419876

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420164

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	92.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420319

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419839

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

Reference Method: SM 2320 B-2011
Batch ID: P420275

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.5		P	94 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P420215

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.9		P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P419944

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.0		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419802

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357289	Calcium	99.5	98.9	P/P	80 - 120
2357289	Iron	104	102	P/P	80 - 120
2357289	Magnesium	102	100	P/P	80 - 120
2357289	Potassium	101	101	P/P	80 - 120
2357289	Sodium	99.6	99.0	P/P	80 - 120
2357289	Strontium	105	104	P/P	80 - 120
2357289	Tin	101	101	P/P	80 - 120
2357289	Titanium	102	102	P/P	80 - 120
2357289	Vanadium	100	100	P/P	80 - 120
2357289	Zinc	96.5	96.1	P/P	80 - 120
2357338	Calcium	98.5		P	80 - 120
2357338	Iron	101		P	80 - 120
2357338	Magnesium	102		P	80 - 120
2357338	Potassium	101		P	80 - 120
2357338	Sodium	103		P	80 - 120
2357338	Strontium	103		P	80 - 120
2357338	Tin	98.4		P	80 - 120
2357338	Titanium	100		P	80 - 120
2357338	Vanadium	99.3		P	80 - 120
2357338	Zinc	95.6		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419802

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357289	Aluminum	98.5	98.1	P/P	80 - 120
2357289	Antimony	101	100	P/P	80 - 120
2357289	Arsenic	99.8	99.1	P/P	80 - 120
2357289	Barium	101	100	P/P	80 - 120
2357289	Beryllium	91.1	90.1	P/P	80 - 120
2357289	Boron	100	101	P/P	80 - 120
2357289	Cadmium	98.6	99.4	P/P	80 - 120
2357289	Chromium	99.9	100	P/P	80 - 120
2357289	Cobalt	101	101	P/P	80 - 120
2357289	Copper	98.9	99.4	P/P	80 - 120
2357289	Lead	96.1	95.6	P/P	80 - 120
2357289	Manganese	98.3	99.2	P/P	80 - 120
2357289	Molybdenum	96.2	96.1	P/P	80 - 120
2357289	Nickel	99.8	99.8	P/P	80 - 120
2357289	Selenium	98.3	95.9	P/P	80 - 120
2357289	Silver	83.2	83.7	P/P	80 - 120
2357289	Thallium	95.3	95.3	P/P	80 - 120
2357338	Aluminum	100		P	80 - 120
2357338	Antimony	99.8		P	80 - 120
2357338	Arsenic	100		P	80 - 120
2357338	Barium	101		P	80 - 120
2357338	Beryllium	89.9		P	80 - 120
2357338	Boron	104		P	80 - 120
2357338	Cadmium	99.3		P	80 - 120
2357338	Chromium	100		P	80 - 120
2357338	Cobalt	102		P	80 - 120
2357338	Copper	100		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419802

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357338	Lead	95.6		P	80 - 120
2357338	Molybdenum	96.7		P	80 - 120
2357338	Nickel	101		P	80 - 120
2357338	Selenium	98.0		P	80 - 120
2357338	Silver	84.2		P	80 - 120
2357338	Thallium	93.9		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P420089

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357095	Chloride	101		P	90 - 110
2357194	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P420094

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357095	Sulfate	98.8		P	90 - 110
2357194	Sulfate	99.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419911

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357181	Ammonia-N	98.2	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419876

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357150	Kjeldahl Nitrogen	100	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420164

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357237	NO2NO3-N	91.8	91.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420319

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357235	NO2NO3-N	92.0	92.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419839

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357151	Total-P	106	106	P/P	90 - 110

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 4500-F- C-2011
Batch ID: P420215

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357236	Fluoride	100	99.8	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P419944

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2357184	Organic Carbon	99.4	100	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P419734

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357232	Color (true)	2.20	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P419746

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357047	Turbidity	3.42	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P419802

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357289	Calcium	0.389	Spike	P	0 - 20
2357289	Iron	1.93	Spike	P	0 - 20
2357289	Magnesium	1.59	Spike	P	0 - 20
2357289	Potassium	0.258	Spike	P	0 - 20
2357289	Sodium	0.359	Spike	P	0 - 20
2357289	Strontium	0.731	Spike	P	0 - 20
2357289	Tin	0.0959	Spike	P	0 - 20
2357289	Titanium	0.204	Spike	P	0 - 20
2357289	Vanadium	0.354	Spike	P	0 - 20
2357289	Zinc	0.352	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P419802

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357289	Aluminum	0.373	Spike	P	0 - 20
2357289	Antimony	1.08	Spike	P	0 - 20
2357289	Arsenic	0.750	Spike	P	0 - 20
2357289	Barium	0.167	Spike	P	0 - 20
2357289	Beryllium	0.982	Spike	P	0 - 20
2357289	Boron	0.968	Spike	P	0 - 20
2357289	Cadmium	0.851	Spike	P	0 - 20
2357289	Chromium	0.403	Spike	P	0 - 20
2357289	Cobalt	0.156	Spike	P	0 - 20
2357289	Copper	0.479	Spike	P	0 - 20
2357289	Lead	0.487	Spike	P	0 - 20
2357289	Manganese	0.604	Spike	P	0 - 20
2357289	Molybdenum	0.0779	Spike	P	0 - 20
2357289	Nickel	0.0631	Spike	P	0 - 20
2357289	Selenium	2.47	Spike	P	0 - 20
2357289	Silver	0.603	Spike	P	0 - 20
2357289	Thallium	0.0495	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P420089

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357095	Chloride	0.287	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P420094

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357095	Sulfate	0.287	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419911

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357181	Ammonia-N	0.345	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419876

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357150	Kjeldahl Nitrogen	1.79	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420164

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357237	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420319

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357235	NO2NO3-N	0.542	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419839

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357151	Total-P	0.0	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P420275

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357236	Total Alkalinity	1.79	Sample	P	0 - 3.8

Quality Assurance Report Precision

Reference Method: SM 2540 C-2011
Batch ID: P420189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357236	TDS	6.69	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P420215

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357236	Fluoride	0.479	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P419944

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2357184	Organic Carbon	0.656	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: DEP SOP: NU-094-1

Run ID: A114787

Included Lab Sample IDs: 2357234, 2357236

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	90 - 110
Color (true)	102	102	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A114790

Included Lab Sample IDs: 2357234, 2357236

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	100	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A114854

Included Lab Sample IDs: 2357235, 2357237

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	97.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A114857

Included Lab Sample IDs: 2357234, 2357236

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A114861

Included Lab Sample IDs: 2357235

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A114864

Included Lab Sample IDs: 2357237

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.0	96.8	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A114868

Included Lab Sample IDs: 2357235, 2357237

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.6	95.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A114892

Included Lab Sample IDs: 2357235, 2357237

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A114892

Included Lab Sample IDs: 2357235, 2357237

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.9	97.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A114903

Included Lab Sample IDs: 2357249

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	103	P/P	90 - 110
Antimony	97.5	97.0	P/P	90 - 110
Arsenic	99.4	98.4	P/P	90 - 110
Barium	97.7	96.9	P/P	90 - 110
Beryllium	94.9	93.7	P/P	90 - 110
Boron	100	103	P/P	90 - 110
Cadmium	99.8	98.6	P/P	90 - 110
Chromium	98.4	96.7	P/P	90 - 110
Cobalt	101	99.4	P/P	90 - 110
Copper	99.0	97.1	P/P	90 - 110
Lead	95.6	95.9	P/P	90 - 110
Manganese	100	98.8	P/P	90 - 110
Molybdenum	97.3	95.8	P/P	90 - 110
Nickel	100	98.3	P/P	90 - 110
Selenium	99.4	98.7	P/P	90 - 110
Silver	99.5	98.4	P/P	90 - 110
Thallium	93.3	93.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A114960

Included Lab Sample IDs: 2357237

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	93.5	92.0	P/P	90 - 110

Reference Method: SM 4500-F- C-2011

Run ID: A114980

Included Lab Sample IDs: 2357234, 2357236

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	97.1	P/P	90 - 110
Fluoride	101	100	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A115007

Included Lab Sample IDs: 2357234, 2357236

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.5	P/P	90 - 110
Total Alkalinity	96.7	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A115017

Included Lab Sample IDs: 2357249

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.5	98.2	P/P	90 - 110
Iron	99.1	99.9	P/P	90 - 110
Magnesium	97.6	97.9	P/P	90 - 110
Potassium	98.7	98.6	P/P	90 - 110
Sodium	101	102	P/P	90 - 110
Strontium	98.6	99.3	P/P	90 - 110
Tin	95.2	95.5	P/P	90 - 110
Titanium	98.2	98.9	P/P	90 - 110
Vanadium	97.4	98.0	P/P	90 - 110
Zinc	93.4	95.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A115032

Included Lab Sample IDs: 2357235

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	99.5	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 SMP	MS
			LCS				
DEP SOP: NU-094-1	Color (true)	102				2.20	
EPA 180.1 Rev. 2.0	Turbidity	100				3.42	
EPA 200.7 Rev. 4.4	Calcium	103	99.5	98.9	98.5		0.389
	Iron	102	104	102	101		1.93
	Magnesium	102	102	100	102		1.59
	Potassium	103	101	101	101		0.258
	Sodium	106	99.6	99.0	103		0.359
	Strontium	101	105	104	103		0.731
	Tin	98.4	101	101	98.4		0.0959
	Titanium	99.9	102	102	100		0.204
	Vanadium	99.4	100	100	99.3		0.354
	Zinc	96.6	96.5	96.1	95.6		0.352
EPA 200.8 Rev. 5.4	Aluminum	102	98.5	98.1	100		0.373
	Antimony	104	101	100	99.8		1.08
	Arsenic	102	99.8	99.1	100		0.750
	Barium	105	101	100	101		0.167
	Beryllium	92.8	91.1	90.1	89.9		0.982
	Boron	105	100	101	104		0.968
	Cadmium	102	98.6	99.4	99.3		0.851
	Chromium	102	99.9	100	100		0.403
	Cobalt	104	101	101	102		0.156
	Copper	101	98.9	99.4	100		0.479
	Lead	97.4	96.1	95.6	95.6		0.487
	Manganese	104	98.3	99.2			0.604
	Molybdenum	99.0	96.2	96.1	96.7		0.0779
	Nickel	102	99.8	99.8	101		0.0631
	Selenium	101	98.3	95.9	98.0		2.47
	Silver	87.3	83.2	83.7	84.2		0.603
	Thallium	96.2	95.3	95.3	93.9		0.0495
EPA 300.0 Rev. 2.1	Chloride	103	101	101		0.287	
	Sulfate	103	98.8	99.0		0.287	
EPA 350.1 Rev. 2.0	Ammonia-N	95.8	98.2	97.8			0.345
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.0	100	103			1.79
EPA 353.2 Rev. 2.0	NO2NO3-N	92.0	91.8	91.8			0.0
	NO2NO3-N	100	92.0	92.5			0.542
EPA 365.1 Rev. 2.0	Total-P	105	106	106			0.0
SM 2320 B-2011	Total Alkalinity	98.5				1.79	
SM 2540 C-2011	TDS					6.69	
SM 4500-F- C-2011	Fluoride	99.9	100	99.8			0.479
SM 5310 B-2011	Organic Carbon	95.0	99.4	100			0.656

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2357234, 2357236
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2357234, 2357236
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2357249
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2357249
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2357234, 2357236
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2357234, 2357236
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2357235, 2357237

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2357235, 2357237
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2357235, 2357237
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2357235, 2357237
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2357234, 2357236
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2357249
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2357234, 2357236
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2357234, 2357236
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2357234, 2357236
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2357235, 2357237

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	09/16/2022			09/16/2022 14:34	Samantha L Bates	2357236
	09/16/2022			09/16/2022 14:41	Samantha L Bates	2357234
EPA 180.1 Rev. 2.0	09/16/2022			09/16/2022 14:40	Chandler E Cox	2357234, 2357236
EPA 200.7 Rev. 4.4	09/16/2022	09/20/2022 08:20	Megan Whitefoot	09/28/2022 20:32	Betina Topolski	2357249
EPA 200.8 Rev. 5.4	09/16/2022	09/20/2022 08:20	Megan Whitefoot	09/22/2022 18:29	Alexander Thompson	2357249
EPA 300.0 Rev. 2.1	09/16/2022			09/23/2022 07:36	Anna M. Plaviak	2357234
	09/16/2022			09/23/2022 07:51	Anna M. Plaviak	2357236
EPA 350.1 Rev. 2.0	09/16/2022			09/21/2022 13:11	Ping Hua	2357235
	09/16/2022			09/21/2022 13:14	Ping Hua	2357237
EPA 351.2 Rev. 2.0	09/16/2022	09/21/2022 13:07	Samantha L Bates	09/22/2022 13:28	Samantha L Bates	2357235
	09/16/2022	09/21/2022 13:07	Samantha L Bates	09/22/2022 13:30	Samantha L Bates	2357237
EPA 353.2 Rev. 2.0	09/16/2022			09/27/2022 11:58	Beverly Y. Sanders	2357237
	09/16/2022			09/29/2022 14:19	Judith K. Clark	2357235
EPA 365.1 Rev. 2.0	09/16/2022	09/21/2022 08:40	Adam P Silver	09/21/2022 15:11	Simonne.V. Calhoun	2357235
	09/16/2022	09/21/2022 08:40	Adam P Silver	09/21/2022 16:54	Simonne.V. Calhoun	2357237
SM 2320 B-2011	09/16/2022			09/28/2022 17:53	Adam P Silver	2357236
	09/16/2022			09/28/2022 20:57	Adam P Silver	2357234
SM 2340 B-2011	09/16/2022			09/28/2022 20:32	Betina Topolski	2357249
SM 2540 C-2011	09/16/2022			09/20/2022 15:08	Yijie Li	2357234, 2357236
SM 2540 D-2011	09/16/2022			09/20/2022 15:08	Yijie Li	2357234, 2357236
SM 4500-F- C-2011	09/16/2022			09/28/2022 00:22	Adam P Silver	2357236
	09/16/2022			09/28/2022 02:24	Adam P Silver	2357234
SM 5310 B-2011	09/16/2022			09/21/2022 19:30	Khloe J Berg	2357235
	09/16/2022			09/21/2022 19:44	Khloe J Berg	2357237