

Chemical Analysis Report

SO-DIST-2021-02-05-01

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

Event Description: **2021 SMP : Smol Highlands**
Request ID: **RQ-2021-01-11-35**
Customer: **SO-DIST**
Project ID: **SMP**

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FLDEP South District Office
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Date Certified: 25-FEB-2021 10:27



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 Denton

Collection Date/Time: 02/04/2021 12:20

Field ID: G4SD0180

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2223691	EPA 180.1 Rev. 2.0	Turbidity	0.40		NTU	P393511	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P393613	
		Sulfate	42		mg SO4/L	P393616	
	SM 2120 B-2011	Color (true)	2.5	U	PCU	P393449	
	SM 2320 B-2011	Total Alkalinity	37	A	mg CaCO3/L	P393639	
	SM 2540 C-2011	TDS	140		mg/L	P393819	
	SM 2540 D-2011	TSS	2	U	mg/L	P393812	
	SM 4500 F-C-2011	Fluoride	0.22		mg F/L	P393645	
2223694	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P393633	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.21		mg N/L	P393722	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.6		mg N/L	P393531	
	EPA 365.1 Rev. 2.0	Total-P	0.002	I	mg P/L	P393627	
	SM 5310 B-2011	Organic Carbon	1.6		mg C/L	P393623	
2223697	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P393439	

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 Apthorpe

Collection Date/Time: 02/04/2021 13:35

Field ID: G4SD0185

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2223692	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P393511	
	EPA 300.0 Rev. 2.1	Chloride	19		mg Cl/L	P393613	
		Sulfate	28		mg SO4/L	P393616	
	SM 2120 B-2011	Color (true)	28		PCU	P393449	
	SM 2320 B-2011	Total Alkalinity	12		mg CaCO3/L	P393639	
	SM 2540 C-2011	TDS	111		mg/L	P393819	
	SM 2540 D-2011	TSS	3	I	mg/L	P393812	
	SM 4500 F-C-2011	Fluoride	0.048	I	mg F/L	P393645	
2223695	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P393633	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P393722	
	EPA 353.2 Rev. 2.0	NO2NO3-N	1.2		mg N/L	P393531	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P393627	
	SM 5310 B-2011	Organic Carbon	7.6		mg C/L	P393623	
2223698	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P393439	

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: Little Bonnet Lake @ Middle

Collection Date/Time: 02/04/2021 11:05

Field ID: G4SD0169

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2223693	EPA 180.1 Rev. 2.0	Turbidity	11		NTU	P393511	
	EPA 300.0 Rev. 2.1	Chloride	18		mg Cl/L	P393613	
		Sulfate	36		mg SO4/L	P393616	
	SM 2120 B-2011	Color (true)	11	A	PCU	P393449	
	SM 2320 B-2011	Total Alkalinity	31		mg CaCO3/L	P393639	
	SM 2540 C-2011	TDS	141		mg/L	P393819	
	SM 2540 D-2011	TSS	8	I	mg/L	P393812	
	SM 4500 F-C-2011	Fluoride	0.070	I	mg F/L	P393645	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.39		mg N/L	P393781	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P393722	
2223696	EPA 353.2 Rev. 2.0	NO2NO3-N	0.48		mg N/L	P393531	
	EPA 365.1 Rev. 2.0	Total-P	0.028		mg P/L	P393628	
	SM 5310 B-2011	Organic Carbon	8.7		mg C/L	P393623	
	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.004	U	mg P/L	P393439	
	dissolved						

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 Damon @ Middle

Collection Date/Time: 02/04/2021 10:10

Field ID: G4SD0168

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2223700	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P393511	
	EPA 300.0 Rev. 2.1	Chloride	16		mg Cl/L	P393613	
		Sulfate	35		mg SO4/L	P393616	
	SM 2120 B-2011	Color (true)	11		PCU	P393449	
	SM 2320 B-2011	Total Alkalinity	11		mg CaCO3/L	P393639	
	SM 2540 C-2011	TDS	112		mg/L	P393819	
	SM 2540 D-2011	TSS	2	I	mg/L	P393812	
	SM 4500 F-C-2011	Fluoride	0.099	I	mg F/L	P393645	
2223701	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P393780	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.31		mg N/L	P393722	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.055		mg N/L	P393531	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P393628	
	SM 5310 B-2011	Organic Carbon	4.2		mg C/L	P393623	
2223702	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P393439	
2223728	EPA 200.7 Rev. 4.4	Barium	16.2		ug/L	P393508	
		Calcium	10.7		mg/L	P393508	
		Iron	30	U	ug/L	P393508	
		Magnesium	6.91		mg/L	P393508	
		Manganese	1.1	I	ug/L	P393508	
		Potassium	8.5		mg/L	P393508	
		Sodium	5.1		mg/L	P393508	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P393508	
		Aluminum	32		ug/L	P393508	
		Antimony	0.11	I	ug/L	P393508	
		Arsenic	0.62		ug/L	P393508	
		Beryllium	0.010	U	ug/L	P393508	
		Boron**	46.1		ug/L	P393508	
		Cadmium	0.020	U	ug/L	P393508	
		Chromium	0.40	U	ug/L	P393508	
		Copper	0.40	U	ug/L	P393508	
		Lead	0.20	U	ug/L	P393508	
		Nickel	0.50	U	ug/L	P393508	
		Selenium	0.20	U	ug/L	P393508	
		Silver	0.010	U	ug/L	P393508	
		Thallium	0.10	U	ug/L	P393508	
	SM 2340B	Hardness	55.1		mg/L	P393508	

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: EPA 180.1 Rev. 2.0
Batch ID: P393511

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393508

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Manganese	1.0	U	ug/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: P393508

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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
Copper	0.40	U	ug/L
Lead	0.20	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: P393613

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393616

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393633

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393780

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393781

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393722

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393531

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393627

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393628

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393439

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

Reference Method: SM 2120 B-2011
Batch ID: P393449

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P393639

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P393819

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P393812

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P393645

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P393623

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: P393508

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	96.8		P	85 - 115
Calcium	105		P	85 - 115
Iron	104		P	85 - 115
Magnesium	105		P	85 - 115
Manganese	98.6		P	85 - 115
Potassium	98.9		P	85 - 115
Sodium	103		P	85 - 115
Zinc	93.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P393508

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.0		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	96.7		P	85 - 115
Beryllium	89.3		P	85 - 115
Boron	96.8		P	85 - 115
Cadmium	93.7		P	85 - 115
Chromium	92.6		P	85 - 115
Copper	93.6		P	85 - 115
Lead	96.9		P	85 - 115
Nickel	92.6		P	85 - 115
Selenium	96.9		P	85 - 115
Silver	100		P	85 - 115
Thallium	95.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393613

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393616

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

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393633

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

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393780

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393781

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393722

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393531

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: P393627

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393628

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393439

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.1		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P393449

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.5		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P393639

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P393645

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.6		P	90 - 106

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P393623

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P393508

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223662	Barium	102		P	80 - 120
2223662	Calcium	107		P	80 - 120
2223662	Iron	105		P	80 - 120
2223662	Magnesium	107		P	80 - 120
2223662	Manganese	103		P	80 - 120
2223662	Potassium	105		P	80 - 120
2223662	Sodium	104		P	80 - 120
2223662	Zinc	99.6		P	80 - 120
2223704	Barium	102	101	P/P	80 - 120
2223704	Calcium	112	109	P/P	80 - 120
2223704	Iron	109	106	P/P	80 - 120
2223704	Magnesium	111	107	P/P	80 - 120
2223704	Manganese	103	103	P/P	80 - 120
2223704	Potassium	101	99.9	P/P	80 - 120
2223704	Sodium	104	102	P/P	80 - 120
2223704	Zinc	100	99.4	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P393508

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223662	Aluminum	93.8		P	80 - 120
2223662	Antimony	102		P	80 - 120
2223662	Arsenic	93.2		P	80 - 120
2223662	Beryllium	85.3		P	80 - 120
2223662	Boron	94.4		P	80 - 120
2223662	Cadmium	91.1		P	80 - 120
2223662	Chromium	89.5		P	80 - 120
2223662	Copper	91.9		P	80 - 120
2223662	Lead	96.8		P	80 - 120
2223662	Nickel	90.2		P	80 - 120
2223662	Selenium	93.1		P	80 - 120
2223662	Silver	98.2		P	80 - 120
2223662	Thallium	95.1		P	80 - 120
2223704	Aluminum	94.3	99.1	P/P	80 - 120
2223704	Antimony	99.8	103	P/P	80 - 120
2223704	Arsenic	92.1	95.5	P/P	80 - 120
2223704	Beryllium	86.0	86.4	P/P	80 - 120
2223704	Boron	93.7	99.9	P/P	80 - 120
2223704	Cadmium	90.7	92.8	P/P	80 - 120
2223704	Chromium	88.3	92.8	P/P	80 - 120
2223704	Copper	90.3	94.1	P/P	80 - 120
2223704	Lead	95.0	98.6	P/P	80 - 120
2223704	Nickel	89.3	93.6	P/P	80 - 120
2223704	Selenium	90.9	94.5	P/P	80 - 120
2223704	Silver	99.5	101	P/P	80 - 120
2223704	Thallium	93.7	98.1	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393613

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393613

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223595	Chloride	100		P	90 - 110
2223669	Chloride	98.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393616

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223595	Sulfate	101		P	90 - 110
2223669	Sulfate	97.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393633

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223643	Ammonia-N	103	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223701	Ammonia-N	98.7	98.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393781

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224056	Ammonia-N	98.3	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393722

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223683	Kjeldahl Nitrogen	105	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393531

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223646	NO2NO3-N	98.9	98.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393627

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223650	Total-P	109	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393628

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223736	Total-P	108	107	P/P	90 - 110

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393439

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223644	O-Phosphate-P	98.4	97.0	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P393645

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223691	Fluoride	98.0	96.5	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P393623

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2223701	Organic Carbon	97.8	97.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P393511

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223648	Turbidity	3.73	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P393508

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223704	Barium	0.826	Spike	P	0 - 20
2223704	Calcium	2.55	Spike	P	0 - 20
2223704	Iron	3.05	Spike	P	0 - 20
2223704	Magnesium	3.01	Spike	P	0 - 20
2223704	Manganese	0.677	Spike	P	0 - 20
2223704	Potassium	1.39	Spike	P	0 - 20
2223704	Sodium	1.26	Spike	P	0 - 20
2223704	Zinc	0.944	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P393508

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223704	Aluminum	4.44	Spike	P	0 - 20
2223704	Antimony	3.39	Spike	P	0 - 20
2223704	Arsenic	3.63	Spike	P	0 - 20
2223704	Beryllium	0.422	Spike	P	0 - 20
2223704	Boron	5.76	Spike	P	0 - 20
2223704	Cadmium	2.28	Spike	P	0 - 20
2223704	Chromium	4.98	Spike	P	0 - 20
2223704	Copper	4.20	Spike	P	0 - 20
2223704	Lead	3.67	Spike	P	0 - 20
2223704	Nickel	4.68	Spike	P	0 - 20
2223704	Selenium	3.92	Spike	P	0 - 20
2223704	Silver	1.09	Spike	P	0 - 20
2223704	Thallium	4.62	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393613

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223595	Chloride	0.277	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393616

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223595	Sulfate	0.776	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393633

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223643	Ammonia-N	0.323	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393780

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223701	Ammonia-N	0.191	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393781

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224056	Ammonia-N	1.48	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P393722

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223683	Kjeldahl Nitrogen	2.29	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P393531

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223646	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P393627

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223650	Total-P	0.744	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P393628

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223736	Total-P	0.608	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P393439

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223644	O-Phosphate-P	1.43	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B-2011
Batch ID: P393449

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223693	Color (true)	2.48	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P393639

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223691	Total Alkalinity	1.65	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P393819

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223669	TDS	3.90	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P393645

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223691	Fluoride	0.953	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P393623

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2223701	Organic Carbon	0.211	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: A103446

Included Lab Sample IDs: 2223697, 2223698, 2223699, 2223702

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	98.7	P/P	90 - 110
O-Phosphate-P	98.7	98.7	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A103451

Included Lab Sample IDs: 2223691, 2223692, 2223693, 2223700

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.7	100	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A103477

Included Lab Sample IDs: 2223691, 2223692, 2223693, 2223700

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	101	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A103481

Included Lab Sample IDs: 2223691, 2223692, 2223693, 2223700

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.6	99.7	P/P	90 - 110
Sulfate	99.5	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A103486

Included Lab Sample IDs: 2223694, 2223695, 2223696, 2223701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	98.5	P/P	90 - 110
NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A103504

Included Lab Sample IDs: 2223728

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.4	98.8	P/P	90 - 110
Calcium	101	101	P/P	90 - 110
Iron	100	101	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Manganese	102	101	P/P	90 - 110
Potassium	99.2	99.7	P/P	90 - 110
Sodium	99.8	100	P/P	90 - 110
Zinc	102	99.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-2011

Run ID: A103526

Included Lab Sample IDs: 2223694, 2223695, 2223696, 2223701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.8	99.4	P/P	90 - 110
Organic Carbon	99.8	98.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A103528

Included Lab Sample IDs: 2223694, 2223695

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

Reference Method: SM 2320 B-2011

Run ID: A103529

Included Lab Sample IDs: 2223691, 2223692, 2223693, 2223700

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	106	96.7	P/P	90 - 110
Total Alkalinity	96.7	95.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A103529

Included Lab Sample IDs: 2223691, 2223692, 2223693, 2223700

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.5	P/P	90 - 110
Fluoride	99.5	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A103540

Included Lab Sample IDs: 2223694, 2223695, 2223696, 2223701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.8	98.0	P/P	90 - 110
Total-P	98.0	97.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A103591

Included Lab Sample IDs: 2223694, 2223695, 2223696, 2223701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.0	98.3	P/P	90 - 110
Kjeldahl Nitrogen	98.3	99.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A103593

Included Lab Sample IDs: 2223696, 2223701

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A103616

Included Lab Sample IDs: 2223728

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.4	98.4	P/P	90 - 110
Antimony	101	100	P/P	90 - 110
Arsenic	96.8	94.8	P/P	90 - 110
Beryllium	92.0	92.8	P/P	90 - 110
Boron	99.8	98.4	P/P	90 - 110
Cadmium	96.4	95.9	P/P	90 - 110
Chromium	92.6	92.9	P/P	90 - 110
Copper	93.4	93.7	P/P	90 - 110
Lead	97.5	96.9	P/P	90 - 110
Nickel	93.0	93.3	P/P	90 - 110
Selenium	97.6	95.8	P/P	90 - 110
Thallium	101	99.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A103639

Included Lab Sample IDs: 2223728

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

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					3.73	
EPA 200.7 Rev. 4.4	Barium	96.8	102	102	101		0.826
	Calcium	105	107	112	109		2.55
	Iron	104	105	109	106		3.05
	Magnesium	105	107	111	107		3.01
	Manganese	98.6	103	103	103		0.677
	Potassium	98.9	105	101	99.9		1.39
	Sodium	103	104	104	102		1.26
	Zinc	93.7	99.6	100	99.4		0.944
EPA 200.8 Rev. 5.4	Aluminum	97.0	94.3	99.1	93.8		4.44
	Antimony	104	99.8	103	102		3.39
	Arsenic	96.7	92.1	95.5	93.2		3.63
	Beryllium	89.3	86.0	86.4	85.3		0.422
	Boron	96.8	93.7	99.9	94.4		5.76
	Cadmium	93.7	90.7	92.8	91.1		2.28
	Chromium	92.6	88.3	92.8	89.5		4.98
	Copper	93.6	94.1	91.9	90.3		4.20
	Lead	96.9	95.0	98.6	96.8		3.67
	Nickel	92.6	89.3	93.6	90.2		4.68
	Selenium	96.9	90.9	94.5	93.1		3.92
	Silver	100	99.5	101	98.2		1.09
	Thallium	95.9	93.7	98.1	95.1		4.62
EPA 300.0 Rev. 2.1	Chloride	101	100	98.0		0.277	
	Sulfate	100	101	97.3		0.776	
EPA 350.1 Rev. 2.0	Ammonia-N	102	103	102			0.323
	Ammonia-N	99.6	98.7	98.5			0.191
	Ammonia-N	100	98.3	101			1.48
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.2	105	107			2.29
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	98.9	98.9			0.0
EPA 365.1 Rev. 2.0	Total-P	107	109	108			0.744
	Total-P	106	108	107			0.608
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.1	98.4	97.0			1.43
SM 2120 B-2011	Color (true)	97.5				2.48	
SM 2320 B-2011	Total Alkalinity	101				1.65	
SM 2540 C-2011	TDS					3.90	
SM 4500 F-C-2011	Fluoride	97.6	98.0	96.5			0.953
SM 5310 B-2011	Organic Carbon	97.6	97.8	97.6			0.211

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2223691, 2223692, 2223693, 2223700
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2223728
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2223728
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2223691, 2223692, 2223693, 2223700
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2223691, 2223692, 2223693, 2223700
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2223694, 2223695, 2223696, 2223701
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2223694, 2223695, 2223696, 2223701
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2223694, 2223695, 2223696, 2223701
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2223694, 2223695, 2223696, 2223701

Reference Method Descriptions

Method	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2223697, 2223698, 2223699, 2223702
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2223691, 2223692, 2223693, 2223700
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2223691, 2223692, 2223693, 2223700
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2223728
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2223691, 2223692, 2223693, 2223700
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2223691, 2223692, 2223693, 2223700
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2223691, 2223692, 2223693, 2223700
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2223694, 2223695, 2223696, 2223701

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	02/05/2021			02/05/2021 16:02	Blanca Fach	2223691, 2223692, 2223693, 2223700
EPA 200.7 Rev. 4.4	02/05/2021	02/08/2021 16:30	Elliott D. Healy	02/09/2021 17:37	Betina Topolski	2223728
EPA 200.8 Rev. 5.4	02/05/2021	02/08/2021 16:30	Elliott D. Healy	02/16/2021 16:06	Alexander Thompson	2223728
	02/05/2021	02/08/2021 16:30	Elliott D. Healy	02/17/2021 16:22	Alexander Thompson	2223728
EPA 300.0 Rev. 2.1	02/05/2021			02/09/2021 23:56	Lipi Saha	2223691
	02/05/2021			02/10/2021 00:08	Lipi Saha	2223692
	02/05/2021			02/10/2021 00:20	Lipi Saha	2223693
	02/05/2021			02/10/2021 00:32	Lipi Saha	2223700
EPA 350.1 Rev. 2.0	02/05/2021			02/10/2021 18:33	Ping Hua	2223694
	02/05/2021			02/10/2021 18:34	Ping Hua	2223695
	02/05/2021			02/15/2021 16:58	Ping Hua	2223701
	02/05/2021			02/15/2021 17:18	Ping Hua	2223696
EPA 351.2 Rev. 2.0	02/05/2021	02/12/2021 12:30	Yen Ta	02/15/2021 15:58	Julia Storbeck	2223694
	02/05/2021	02/12/2021 12:30	Yen Ta	02/15/2021 16:03	Julia Storbeck	2223695
	02/05/2021	02/12/2021 12:30	Yen Ta	02/15/2021 16:05	Julia Storbeck	2223696
	02/05/2021	02/12/2021 12:30	Yen Ta	02/15/2021 16:07	Julia Storbeck	2223701
EPA 353.2 Rev. 2.0	02/05/2021			02/09/2021 09:45	Beverly Y. Sanders	2223701
	02/05/2021			02/09/2021 10:47	Beverly Y. Sanders	2223694
	02/05/2021			02/09/2021 10:49	Beverly Y. Sanders	2223695
	02/05/2021			02/09/2021 10:50	Beverly Y. Sanders	2223696
EPA 365.1 Rev. 2.0	02/05/2021	02/10/2021 17:47	Madeline Gruver	02/11/2021 15:32	Shengyu Wang	2223694
	02/05/2021	02/10/2021 17:47	Madeline Gruver	02/11/2021 15:33	Shengyu Wang	2223695
	02/05/2021	02/10/2021 17:47	Madeline Gruver	02/11/2021 15:42	Shengyu Wang	2223696
	02/05/2021	02/10/2021 17:47	Madeline Gruver	02/11/2021 15:43	Shengyu Wang	2223701
EPA 365.1 Rev. 2.0 dissolved	02/05/2021			02/05/2021 15:14	Virginia P. Brown	2223697
	02/05/2021			02/05/2021 15:19	Virginia P. Brown	2223698
	02/05/2021			02/05/2021 15:20	Virginia P. Brown	2223699
	02/05/2021			02/05/2021 15:21	Virginia P. Brown	2223702
SM 2120 B-2011	02/05/2021			02/05/2021 17:22	Madeline Gruver	2223691
	02/05/2021			02/05/2021 17:23	Madeline Gruver	2223692
	02/05/2021			02/05/2021 17:24	Madeline Gruver	2223693
	02/05/2021			02/05/2021 17:25	Madeline Gruver	2223700
SM 2320 B-2011	02/05/2021			02/09/2021 10:47	Dale L. Simmons	2223691
	02/05/2021			02/09/2021 14:40	Dale L. Simmons	2223692
	02/05/2021			02/09/2021 14:52	Dale L. Simmons	2223693
	02/05/2021			02/09/2021 15:04	Dale L. Simmons	2223700
SM 2340B	02/05/2021			02/09/2021 17:37	Betina Topolski	2223728
SM 2540 C-2011	02/05/2021			02/10/2021 14:52	Yijie Li	2223691, 2223692, 2223693, 2223700
SM 2540 D-2011	02/05/2021			02/10/2021 14:52	Yijie Li	2223691, 2223692, 2223693, 2223700
SM 4500 F-C-2011	02/05/2021			02/09/2021 10:39	Dale L. Simmons	2223691

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 4500 F-C-2011	02/05/2021			02/09/2021 14:40	Dale L. Simmons	2223692
	02/05/2021			02/09/2021 14:52	Dale L. Simmons	2223693
	02/05/2021			02/09/2021 15:04	Dale L. Simmons	2223700
SM 5310 B-2011	02/05/2021			02/09/2021 03:12	Madeline Gruver	2223701
	02/05/2021			02/09/2021 07:48	Madeline Gruver	2223694
	02/05/2021			02/09/2021 08:03	Madeline Gruver	2223695
	02/05/2021			02/09/2021 08:15	Madeline Gruver	2223696