

Chemical Analysis Report

NW-DIST-2021-06-04-02

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

Event Description: **Bay Walton County Run**
Request ID: **RQ-2021-05-10-30**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 Government Center
Suite 208
Pensacola, FL 32502-5794
Attn: Cheryl Bunch

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 28-JUN-2021 13:57

A handwritten signature in black ink, appearing to read "Liang Lin", is shown on a light-colored background.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical 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: Log Creek Upstream of Highway 20

Collection Date/Time: 06/03/2021 10:30

Field ID: G3NW0454

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2252171	EPA 180.1 Rev. 2.0	Turbidity	1.8		NTU	P399252	
	EPA 300.0 Rev. 2.1	Chloride	2.5		mg Cl/L	P399542	
		Sulfate	0.72		mg SO4/L	P399544	
	SM 2120 B-2011	Color (true)	90		PCU	P399263	
	SM 2320 B-2011	Total Alkalinity	2.1	I	mg CaCO3/L	P399444	
	SM 2540 C-2011	TDS	24	I	mg/L	P399752	
	SM 2540 D-2011	TSS	2	I	mg/L	P399649	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P399446	
2252172	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P399515	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.36		mg N/L	P399565	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P399290	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P399299	
	SM 5310 B-2011	Organic Carbon	6.9		mg C/L	P399667	
2252173	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P399266	
2252185	EPA 200.7 Rev. 4.4	Barium	4.0		ug/L	P399464	
		Calcium	1.71		mg/L	P399464	
		Iron	210		ug/L	P399464	
		Magnesium	0.38		mg/L	P399464	
		Manganese	8.1		ug/L	P399464	
		Potassium	0.30	U	mg/L	P399464	
		Sodium	1.5	I	mg/L	P399464	
		Zinc	5.0	U	ug/L	P399464	
	EPA 200.8 Rev. 5.4	Aluminum	110		ug/L	P399464	
		Antimony	0.050	U	ug/L	P399464	
		Arsenic	0.24		ug/L	P399464	
		Beryllium	0.014	I	ug/L	P399464	
		Boron**	8.8		ug/L	P399464	
		Cadmium	0.020	U	ug/L	P399464	
		Chromium	0.40	U	ug/L	P399464	
		Copper	0.40	U	ug/L	P399464	
		Lead	0.20	U	ug/L	P399464	
		Nickel	0.50	U	ug/L	P399464	
		Selenium	0.20	U	ug/L	P399464	
		Silver	0.010	U	ug/L	P399464	
		Thallium	0.10	U	ug/L	P399464	
	SM 2340B	Hardness	5.8		mg/L	P399464	

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: Lafayette Creek

Collection Date/Time: 06/03/2021 11:45

Field ID: G3NW0455

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2252186	EPA 200.7 Rev. 4.4	Barium	6.2		ug/L	P399464	
		Calcium	1.61		mg/L	P399464	
		Iron	180		ug/L	P399464	
		Magnesium	0.50		mg/L	P399464	
		Manganese	4.1		ug/L	P399464	
		Potassium	0.47	I	mg/L	P399464	
		Sodium	3.4		mg/L	P399464	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P399464	
		Aluminum	111		ug/L	P399464	
		Antimony	0.050	U	ug/L	P399464	
		Arsenic	0.17	I	ug/L	P399464	
		Beryllium	0.013	I	ug/L	P399464	
		Boron**	11.4		ug/L	P399464	
		Cadmium	0.020	U	ug/L	P399464	
		Chromium	0.40	U	ug/L	P399464	
		Copper	0.40	U	ug/L	P399464	
		Lead	0.20	U	ug/L	P399464	
		Nickel	0.50	U	ug/L	P399464	
		Selenium	0.20	U	ug/L	P399464	
		Silver	0.010	U	ug/L	P399464	
		Thallium	0.10	U	ug/L	P399464	
	SM 2340B	Hardness	6.1		mg/L	P399464	

Sample Location: Little Black Creek upstream of Black Creek

Collection Date/Time: 06/03/2021 11:00

Field ID: G3NW0200

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2252174	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P399252	
	EPA 300.0 Rev. 2.1	Chloride	3.0		mg Cl/L	P399542	
		Sulfate	0.67		mg SO4/L	P399544	
	SM 2120 B-2011	Color (true)	50	A	PCU	P399263	
	SM 2320 B-2011	Total Alkalinity	0.85	I	mg CaCO3/L	P399444	
	SM 2540 C-2011	TDS	17	I	mg/L	P399752	
	SM 2540 D-2011	TSS	3	I	mg/L	P399649	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P399446	
2252175	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P399518	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.21		mg N/L	P399565	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.044		mg N/L	P399291	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P399299	
	SM 5310 B-2011	Organic Carbon	3.0		mg C/L	P399667	
2252176	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P399266	

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: P399252

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P399464

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: P399464

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: P399542

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399544

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399515

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: P399518

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399290

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399299

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399266

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

Reference Method: SM 2120 B-2011
Batch ID: P399263

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P399444

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

Reference Method: SM 2540 C-2011
Batch ID: P399752

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P399649

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P399446

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P399667

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: P399464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	92.8		P	85 - 115
Calcium	101		P	85 - 115
Iron	99.5		P	85 - 115
Magnesium	102		P	85 - 115
Manganese	94.9		P	85 - 115
Potassium	95.4		P	85 - 115
Sodium	98.7		P	85 - 115
Zinc	88.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P399464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.1		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	98.7		P	85 - 115
Beryllium	88.9		P	85 - 115
Boron	104		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	96.5		P	85 - 115
Copper	96.2		P	85 - 115
Lead	109		P	85 - 115
Nickel	95.8		P	85 - 115
Selenium	98.7		P	85 - 115
Silver	103		P	85 - 115
Thallium	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399542

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399544

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399515

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399518

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399290

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399299

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399266

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

Reference Method: SM 2120 B-2011
Batch ID: P399263

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P399444

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.1		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P399446

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.3		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P399667

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: P399464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252169	Barium	95.7	96.1	P/P	80 - 120
2252169	Calcium	103	104	P/P	80 - 120
2252169	Iron	102	104	P/P	80 - 120
2252169	Magnesium	105	106	P/P	80 - 120
2252169	Manganese	97.7	97.9	P/P	80 - 120
2252169	Potassium	102	103	P/P	80 - 120
2252169	Sodium	101	102	P/P	80 - 120
2252169	Zinc	90.3	90.2	P/P	80 - 120
2252559	Barium	94.7		P	80 - 120
2252559	Calcium	108		P	80 - 120
2252559	Iron	106		P	80 - 120
2252559	Magnesium	109		P	80 - 120
2252559	Manganese	96.3		P	80 - 120
2252559	Potassium	99.8		P	80 - 120
2252559	Sodium	103		P	80 - 120
2252559	Zinc	90.6		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P399464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252169	Aluminum	94.7	95.5	P/P	80 - 120
2252169	Antimony	99.1	99.1	P/P	80 - 120
2252169	Arsenic	97.7	98.7	P/P	80 - 120
2252169	Beryllium	89.0	90.6	P/P	80 - 120
2252169	Boron	99.3	102	P/P	80 - 120
2252169	Cadmium	101	99.0	P/P	80 - 120
2252169	Chromium	97.0	97.0	P/P	80 - 120
2252169	Copper	97.6	97.5	P/P	80 - 120
2252169	Lead	109	109	P/P	80 - 120
2252169	Nickel	93.9	95.0	P/P	80 - 120
2252169	Selenium	97.0	97.4	P/P	80 - 120
2252169	Silver	101	95.6	P/P	80 - 120
2252169	Thallium	101	102	P/P	80 - 120
2252559	Aluminum	95.3		P	80 - 120
2252559	Antimony	99.5		P	80 - 120
2252559	Arsenic	99.1		P	80 - 120
2252559	Beryllium	93.3		P	80 - 120
2252559	Boron	100		P	80 - 120
2252559	Cadmium	99.8		P	80 - 120
2252559	Chromium	97.1		P	80 - 120
2252559	Copper	96.0		P	80 - 120
2252559	Lead	108		P	80 - 120
2252559	Nickel	94.7		P	80 - 120
2252559	Selenium	98.2		P	80 - 120
2252559	Silver	99.6		P	80 - 120
2252559	Thallium	102		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399542

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: P399542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252088	Chloride	95.0		P	90 - 110
2252359	Chloride	93.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399544

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252088	Sulfate	97.4		P	90 - 110
2252359	Sulfate	91.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399515

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252172	Ammonia-N	94.4	96.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399518

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252175	Ammonia-N	95.0	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252070	Kjeldahl Nitrogen	104	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399290

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251979	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252175	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399299

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251998	Total-P	105	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399266

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252144	O-Phosphate-P	99.0	100	P/P	90 - 110

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P399446

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252373	Fluoride	99.8	98.0	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P399667

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252091	Organic Carbon	97.2	96.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P399252

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252288	Turbidity	5.15	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P399464

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252169	Barium	0.449	Spike	P	0 - 20
2252169	Calcium	1.03	Spike	P	0 - 20
2252169	Iron	1.78	Spike	P	0 - 20
2252169	Magnesium	1.61	Spike	P	0 - 20
2252169	Manganese	0.182	Spike	P	0 - 20
2252169	Potassium	1.52	Spike	P	0 - 20
2252169	Sodium	0.747	Spike	P	0 - 20
2252169	Zinc	0.127	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P399464

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252169	Aluminum	0.734	Spike	P	0 - 20
2252169	Antimony	0.0399	Spike	P	0 - 20
2252169	Arsenic	1.06	Spike	P	0 - 20
2252169	Beryllium	1.72	Spike	P	0 - 20
2252169	Boron	2.27	Spike	P	0 - 20
2252169	Cadmium	2.33	Spike	P	0 - 20
2252169	Chromium	0.0354	Spike	P	0 - 20
2252169	Copper	0.0715	Spike	P	0 - 20
2252169	Lead	0.762	Spike	P	0 - 20
2252169	Nickel	1.17	Spike	P	0 - 20
2252169	Selenium	0.462	Spike	P	0 - 20
2252169	Silver	5.07	Spike	P	0 - 20
2252169	Thallium	1.92	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399542

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252359	Chloride	0.0536	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399544

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252359	Sulfate	0.531	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252172	Ammonia-N	1.82	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399518

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252175	Ammonia-N	5.55	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252070	Kjeldahl Nitrogen	1.61	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399290

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251979	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252175	NO2NO3-N	0.407	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399299

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251998	Total-P	1.98	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399266

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252144	O-Phosphate-P	1.40	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P399263

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252174	Color (true)	0.0620	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-2011
Batch ID: P399444

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252373	Total Alkalinity	0.0928	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P399752

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252376	TDS	0.769	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P399446

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252373	Fluoride	1.40	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P399667

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252091	Organic Carbon	0.841	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A105885

Included Lab Sample IDs: 2252171, 2252174

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	99.0	P/P	95 - 105

Reference Method: SM 2120 B-2011

Run ID: A105890

Included Lab Sample IDs: 2252171, 2252174

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.6	101	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A105891

Included Lab Sample IDs: 2252173, 2252176

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A105912

Included Lab Sample IDs: 2252172, 2252175

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A105956

Included Lab Sample IDs: 2252171, 2252174

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.5	99.8	P/P	90 - 110
Sulfate	99.2	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A105964

Included Lab Sample IDs: 2252172, 2252175

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.0	99.8	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A105969

Included Lab Sample IDs: 2252171, 2252174

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.6	95.8	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A105969

Included Lab Sample IDs: 2252171, 2252174

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A105993

Included Lab Sample IDs: 2252172, 2252175

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.0	96.5	P/P	90 - 110
Ammonia-N	98.3	97.1	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106030

Included Lab Sample IDs: 2252185, 2252186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	97.0	P/P	95 - 105
Calcium	101	101	P/P	95 - 105
Iron	101	102	P/P	95 - 105
Magnesium	101	101	P/P	95 - 105
Manganese	101	98.9	P/P	95 - 105
Potassium	98.9	98.4	P/P	95 - 105
Sodium	98.9	98.7	P/P	95 - 105
Zinc	99.2	93.9	P/P	95 - 105

Reference Method: SM 5310 B-2011

Run ID: A106059

Included Lab Sample IDs: 2252172, 2252175

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	96.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A106075

Included Lab Sample IDs: 2252172, 2252175

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106124

Included Lab Sample IDs: 2252185, 2252186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.7	97.8	P/P	90 - 110
Antimony	99.1	99.7	P/P	90 - 110
Arsenic	98.7	98.8	P/P	90 - 110
Beryllium	96.2	96.2	P/P	90 - 110
Boron	103	102	P/P	90 - 110
Cadmium	98.3	98.8	P/P	90 - 110
Chromium	96.2	96.3	P/P	90 - 110
Copper	94.5	94.1	P/P	90 - 110
Lead	109	109	P/P	90 - 110
Nickel	94.7	94.5	P/P	90 - 110
Selenium	101	102	P/P	90 - 110
Thallium	93.6	93.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106154

Included Lab Sample IDs: 2252185, 2252186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	98.8	99.0	P/P	90 - 110

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

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

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					5.15	
EPA 200.7 Rev. 4.4	Barium	92.8		95.7	96.1	94.7	0.449
	Calcium	101		103	104	108	1.03
	Iron	99.5		102	104	106	1.78
	Magnesium	102		105	106	109	1.61
	Manganese	94.9		97.7	97.9	96.3	0.182
	Potassium	95.4		102	103	99.8	1.52
	Sodium	98.7		101	102	103	0.747
	Zinc	88.0		90.3	90.2	90.6	0.127
EPA 200.8 Rev. 5.4	Aluminum	96.1		94.7	95.5	95.3	0.734
	Antimony	100		99.1	99.1	99.5	0.0399
	Arsenic	98.7		97.7	98.7	99.1	1.06
	Beryllium	88.9		89.0	90.6	93.3	1.72
	Boron	104		99.3	102	100	2.27
	Cadmium	103		101	99.0	99.8	2.33
	Chromium	96.5		97.0	97.0	97.1	0.0354
	Copper	96.2		97.6	97.5	96.0	0.0715
	Lead	109		109	109	108	0.762
	Nickel	95.8		93.9	95.0	94.7	1.17
	Selenium	98.7		97.0	97.4	98.2	0.462
	Silver	103		101	95.6	99.6	5.07
	Thallium	101		101	102	102	1.92
EPA 300.0 Rev. 2.1	Chloride	98.8		93.3	95.0		
	Sulfate	98.1		91.3	97.4		
EPA 350.1 Rev. 2.0	Ammonia-N	99.0		94.4	96.4		1.82
	Ammonia-N	97.4		95.0	101		5.55
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.6		104	106		1.61
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102		100	100		0.0
	NO ₂ NO ₃ -N	101		101	101		0.407
EPA 365.1 Rev. 2.0	Total-P	102		105	107		1.98
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101		99.0	100		1.40
SM 2120 B-2011	Color (true)	101				0.0620	
SM 2320 B-2011	Total Alkalinity	98.1				0.0928	
SM 2540 C-2011	TDS					0.769	
SM 4500 F-C-2011	Fluoride	99.3		99.8	98.0		1.40
SM 5310 B-2011	Organic Carbon	95.0		97.2	96.0		0.841

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2252171, 2252174
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2252185, 2252186
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2252185, 2252186
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2252171, 2252174
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2252171, 2252174
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2252172, 2252175
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2252172, 2252175
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2252172, 2252175
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2252172, 2252175
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2252173, 2252176

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2252171, 2252174
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2252171, 2252174
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2252185, 2252186
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2252171, 2252174
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2252171, 2252174
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2252171, 2252174
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2252172, 2252175

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	06/04/2021			06/04/2021 15:02	Yen Ta	2252171, 2252174
EPA 200.7 Rev. 4.4	06/04/2021	06/09/2021 17:35	Elliott D. Healy	06/11/2021 11:33	Betina Topolski	2252185
	06/04/2021	06/09/2021 17:35	Elliott D. Healy	06/11/2021 11:39	Betina Topolski	2252186
EPA 200.8 Rev. 5.4	06/04/2021	06/09/2021 17:35	Elliott D. Healy	06/16/2021 19:13	Alexander Thompson	2252185
	06/04/2021	06/09/2021 17:35	Elliott D. Healy	06/16/2021 19:22	Alexander Thompson	2252186
	06/04/2021	06/09/2021 17:35	Elliott D. Healy	06/17/2021 15:17	Alexander Thompson	2252185
	06/04/2021	06/09/2021 17:35	Elliott D. Healy	06/17/2021 15:23	Alexander Thompson	2252186
EPA 300.0 Rev. 2.1	06/04/2021			06/10/2021 18:26	Lipi Saha	2252171
	06/04/2021			06/10/2021 18:38	Lipi Saha	2252174
EPA 350.1 Rev. 2.0	06/04/2021			06/10/2021 12:33	Roberta Tatti	2252172
	06/04/2021			06/10/2021 13:49	Roberta Tatti	2252175
EPA 351.2 Rev. 2.0	06/04/2021	06/11/2021 14:03	Benjamin T. Nordmann	06/14/2021 14:48	Virginia P. Brown	2252172
	06/04/2021	06/11/2021 14:03	Benjamin T. Nordmann	06/14/2021 14:49	Virginia P. Brown	2252175
EPA 353.2 Rev. 2.0	06/04/2021			06/07/2021 10:43	Beverly Y. Sanders	2252172
	06/04/2021			06/07/2021 10:50	Beverly Y. Sanders	2252175
EPA 365.1 Rev. 2.0	06/04/2021	06/07/2021 13:53	Yen Ta	06/09/2021 11:25	Shengyu Ding	2252172, 2252175
EPA 365.1 Rev. 2.0 dissolved	06/04/2021			06/04/2021 16:49	Ping Hua	2252173
	06/04/2021			06/04/2021 16:50	Ping Hua	2252176
SM 2120 B-2011	06/04/2021			06/04/2021 16:41	Madeline Gruver	2252171
	06/04/2021			06/04/2021 16:42	Madeline Gruver	2252174
SM 2320 B-2011	06/04/2021			06/08/2021 18:05	Dale L. Simmons	2252171
	06/04/2021			06/08/2021 18:14	Dale L. Simmons	2252174
SM 2340B	06/04/2021			06/11/2021 11:33	Betina Topolski	2252185
	06/04/2021			06/11/2021 11:39	Betina Topolski	2252186
SM 2540 C-2011	06/04/2021			06/08/2021 14:56	Yijie Li	2252171, 2252174
SM 2540 D-2011	06/04/2021			06/08/2021 14:56	Yijie Li	2252171, 2252174
SM 4500 F-C-2011	06/04/2021			06/08/2021 18:05	Dale L. Simmons	2252171
	06/04/2021			06/08/2021 18:14	Dale L. Simmons	2252174
SM 5310 B-2011	06/04/2021			06/10/2021 01:38	Madeline Gruver	2252172
	06/04/2021			06/10/2021 01:47	Madeline Gruver	2252175