

Chemical Analysis Report

SE-DIST-2021-03-16-01

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

Event Description: **SMP - Okeechobee Bacteria**
Request ID: **RQ-2021-03-01-65**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Drew Liddick

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 05-APR-2021 12:40



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: Gore Branch @ 724

Collection Date/Time: 03/15/2021 12:30

Field ID: G4SE0130

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2231710	EPA 180.1 Rev. 2.0	Turbidity	4.4		NTU	P395036	
	EPA 300.0 Rev. 2.1	Chloride	110		mg Cl/L	P395298	
		Sulfate	65		mg SO4/L	P395302	
	SM 2120 B-2011	Color (true)	77		PCU	P395051	
	SM 2320 B-2011	Total Alkalinity	114		mg CaCO3/L	P395226	
	SM 2540 C-2011	TDS	468	A	mg/L	P395593	
	SM 2540 D-2011	TSS	4	IA	mg/L	P395601	
	SM 4500 F-C-2011	Fluoride	0.20		mg F/L	P395232	
2231712	EPA 350.1 Rev. 2.0	Ammonia-N	0.080		mg N/L	P395261	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.95		mg N/L	P395343	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.15		mg N/L	P395078	
	EPA 365.1 Rev. 2.0	Total-P	0.088		mg P/L	P395212	
	SM 5310 B-2011	Organic Carbon	16		mg C/L	P395520	
2231714	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.055		mg P/L	P395044	

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: Oak Creek @ 68

Collection Date/Time: 03/15/2021 13:40

Field ID: G4SE0080

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2231707	EPA 180.1 Rev. 2.0	Turbidity	6.0	A	NTU	P395036	
	EPA 300.0 Rev. 2.1	Chloride	29		mg Cl/L	P395298	
		Sulfate	14		mg SO4/L	P395302	
	SM 2120 B-2011	Color (true)	96		PCU	P395051	
	SM 2320 B-2011	Total Alkalinity	25		mg CaCO3/L	P395226	
	SM 2540 C-2011	TDS	135	A	mg/L	P395591	
	SM 2540 D-2011	TSS	9	IA	mg/L	P395599	
	SM 4500 F-C-2011	Fluoride	0.12		mg F/L	P395232	
2231708	EPA 350.1 Rev. 2.0	Ammonia-N	0.22		mg N/L	P395261	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P395343	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.23		mg N/L	P395078	
	EPA 365.1 Rev. 2.0	Total-P	0.24		mg P/L	P395212	
	SM 5310 B-2011	Organic Carbon	15		mg C/L	P395520	
2231709	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P395044	
2231725	EPA 200.7 Rev. 4.4	Barium	24.0		ug/L	P395098	
		Calcium	15.9		mg/L	P395098	
		Iron	1.48E+03		ug/L	P395098	
		Magnesium	3.49		mg/L	P395098	
		Manganese	38.0		ug/L	P395098	
		Potassium	4.0		mg/L	P395098	
		Sodium	14.5		mg/L	P395098	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P395098	
		Aluminum	211		ug/L	P395098	
		Antimony	0.050	U	ug/L	P395098	
		Arsenic	0.76		ug/L	P395098	
		Beryllium	0.024	I	ug/L	P395098	
		Boron**	27.8		ug/L	P395098	
		Cadmium	0.020	U	ug/L	P395098	
		Chromium	0.83	I	ug/L	P395098	
		Copper	0.57	I	ug/L	P395098	
		Lead	0.35	I	ug/L	P395098	
		Nickel	0.50	U	ug/L	P395098	
		Selenium	0.20	U	ug/L	P395098	
		Silver	0.010	U	ug/L	P395098	
		Thallium	0.10	U	ug/L	P395098	
		Hardness	54.1		mg/L	P395098	

Ref. Method and Comment:

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

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for potassium and sodium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: S-153 Unnamed Creek @ 710

Collection Date/Time: 03/15/2021 15:30

Field ID: G4SE0137

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2231711	EPA 180.1 Rev. 2.0	Turbidity	14		NTU	P395036	
	EPA 300.0 Rev. 2.1	Chloride	390		mg Cl/L	P395298	
		Sulfate	140		mg SO4/L	P395302	
	SM 2120 B-2011	Color (true)	140		PCU	P395051	
	SM 2320 B-2011	Total Alkalinity	113		mg CaCO3/L	P395226	
	SM 2540 C-2011	TDS	962		mg/L	P395591	
	SM 2540 D-2011	TSS	26		mg/L	P395599	
	SM 4500 F-C-2011	Fluoride	0.62		mg F/L	P395232	
2231713	EPA 350.1 Rev. 2.0	Ammonia-N	0.45		mg N/L	P395261	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P395343	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.066		mg N/L	P395078	
	EPA 365.1 Rev. 2.0	Total-P	0.32		mg P/L	P395212	
	SM 5310 B-2011	Organic Carbon	19		mg C/L	P395520	
2231715	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.20		mg P/L	P395044	

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: P395036

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P395098

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: P395098

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: P395298

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395302

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395261

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395343

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395078

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395212

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395044

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

Reference Method: SM 2120 B-2011
Batch ID: P395051

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P395226

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

Reference Method: SM 2540 C-2011
Batch ID: P395591

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-2011
Batch ID: P395593

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P395599

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P395601

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P395232

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P395520

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: P395098

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	95.2		P	85 - 115
Calcium	101		P	85 - 115
Iron	100		P	85 - 115
Magnesium	98.1		P	85 - 115
Manganese	96.8		P	85 - 115
Potassium	97.6		P	85 - 115
Sodium	98.9		P	85 - 115
Zinc	92.6		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P395098

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.2		P	85 - 115
Antimony	99.6		P	85 - 115
Arsenic	99.4		P	85 - 115
Beryllium	91.7		P	85 - 115
Boron	96.2		P	85 - 115
Cadmium	98.1		P	85 - 115
Chromium	97.0		P	85 - 115
Copper	99.7		P	85 - 115
Lead	105		P	85 - 115
Nickel	98.1		P	85 - 115
Selenium	98.4		P	85 - 115
Silver	105		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395298

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395302

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	97.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395261

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: P395343

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395078

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395212

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395044

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

Reference Method: SM 2120 B-2011
Batch ID: P395051

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	103		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P395226

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

Reference Method: SM 4500 F-C-2011
Batch ID: P395232

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P395520

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: P395098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231676	Barium	99.5		P	80 - 120
2231676	Calcium	90.3		P	80 - 120
2231676	Iron	107		P	80 - 120
2231676	Magnesium	87.0		P	80 - 120
2231676	Manganese	101		P	80 - 120
2231676	Zinc	101		P	80 - 120
2232092	Barium	99.4	103	P/P	80 - 120
2232092	Calcium	105	107	P/P	80 - 120
2232092	Iron	105	107	P/P	80 - 120
2232092	Magnesium	103	105	P/P	80 - 120
2232092	Manganese	99.7	103	P/P	80 - 120
2232092	Potassium	104	106	P/P	80 - 120
2232092	Sodium	103	106	P/P	80 - 120
2232092	Zinc	98.0	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P395098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231676	Aluminum	97.2		P	80 - 120
2231676	Antimony	105		P	80 - 120
2231676	Arsenic	106		P	80 - 120
2231676	Beryllium	87.1		P	80 - 120
2231676	Boron	99.5		P	80 - 120
2231676	Cadmium	101		P	80 - 120
2231676	Chromium	98.6		P	80 - 120
2231676	Copper	98.3		P	80 - 120
2231676	Lead	108		P	80 - 120
2231676	Nickel	93.9		P	80 - 120
2231676	Selenium	99.2		P	80 - 120
2231676	Silver	99.4		P	80 - 120
2231676	Thallium	104		P	80 - 120
2232092	Aluminum	90.8	94.0	P/P	80 - 120
2232092	Antimony	99.3	99.7	P/P	80 - 120
2232092	Arsenic	97.1	99.2	P/P	80 - 120
2232092	Beryllium	92.3	94.4	P/P	80 - 120
2232092	Boron	94.5	96.8	P/P	80 - 120
2232092	Cadmium	99.1	97.8	P/P	80 - 120
2232092	Chromium	95.9	97.2	P/P	80 - 120
2232092	Copper	98.8	99.1	P/P	80 - 120
2232092	Lead	105	106	P/P	80 - 120
2232092	Nickel	96.8	97.1	P/P	80 - 120
2232092	Selenium	94.5	96.6	P/P	80 - 120
2232092	Silver	105	105	P/P	80 - 120
2232092	Thallium	103	105	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P395298

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231575	Chloride	101		P	90 - 110
2231693	Chloride	100		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P395302

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231575	Sulfate	97.3		P	90 - 110
2231693	Sulfate	97.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395261

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231665	Ammonia-N	96.8	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395343

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231665	Kjeldahl Nitrogen	99.2	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395078

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231665	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395212

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231696	Total-P	105	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231698	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P395232

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231841	Fluoride	99.4	99.4	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P395520

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231897	Organic Carbon	94.3	95.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P395036

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231707	Turbidity	4.47	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P395098

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2232092	Barium	3.82	Spike	P	0 - 20
2232092	Calcium	1.87	Spike	P	0 - 20
2232092	Iron	2.29	Spike	P	0 - 20
2232092	Magnesium	2.18	Spike	P	0 - 20
2232092	Manganese	3.34	Spike	P	0 - 20
2232092	Potassium	2.20	Spike	P	0 - 20
2232092	Sodium	1.84	Spike	P	0 - 20
2232092	Zinc	3.88	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P395098

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2232092	Aluminum	3.17	Spike	P	0 - 20
2232092	Antimony	0.398	Spike	P	0 - 20
2232092	Arsenic	2.08	Spike	P	0 - 20
2232092	Beryllium	2.20	Spike	P	0 - 20
2232092	Boron	2.18	Spike	P	0 - 20
2232092	Cadmium	1.39	Spike	P	0 - 20
2232092	Chromium	1.35	Spike	P	0 - 20
2232092	Copper	0.344	Spike	P	0 - 20
2232092	Lead	0.506	Spike	P	0 - 20
2232092	Nickel	0.309	Spike	P	0 - 20
2232092	Selenium	2.12	Spike	P	0 - 20
2232092	Silver	0.442	Spike	P	0 - 20
2232092	Thallium	2.07	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P395298

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231575	Chloride	0.468	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P395302

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231575	Sulfate	0.723	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P395261

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231665	Ammonia-N	1.87	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P395343

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231665	Kjeldahl Nitrogen	4.10	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P395078

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231665	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P395212

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231696	Total-P	1.44	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P395044

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231698	O-Phosphate-P	1.39	Spike	P	0 - 20

Reference Method: SM 2120 B-2011

Batch ID: P395051

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231732	Color (true)	0.0267	Sample	P	0 - 20

Reference Method: SM 2320 B-2011

Batch ID: P395226

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231841	Total Alkalinity	0.340	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011

Batch ID: P395591

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231707	TDS	4.44	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 2540 C-2011
Batch ID: P395593

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231710	TDS	2.78	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P395232

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231841	Fluoride	0.0	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P395520

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231897	Organic Carbon	0.927	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: A104090

Included Lab Sample IDs: 2231707, 2231710, 2231711

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	101	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A104091

Included Lab Sample IDs: 2231709, 2231714, 2231715

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.1	99.2	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A104092

Included Lab Sample IDs: 2231707, 2231710, 2231711

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	104	P/P	90 - 115

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A104102

Included Lab Sample IDs: 2231708, 2231712, 2231713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	97.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A104153

Included Lab Sample IDs: 2231707, 2231710, 2231711

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

Reference Method: SM 2320 B-2011

Run ID: A104172

Included Lab Sample IDs: 2231707, 2231710, 2231711

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.6	96.9	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A104172

Included Lab Sample IDs: 2231707, 2231710, 2231711

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	104	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A104182

Included Lab Sample IDs: 2231708, 2231712, 2231713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	99.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A104188

Included Lab Sample IDs: 2231725

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.6	98.3	P/P	90 - 110
Antimony	97.7	98.7	P/P	90 - 110
Arsenic	100	98.9	P/P	90 - 110
Beryllium	98.4	94.3	P/P	90 - 110
Boron	96.6	109	P/P	90 - 110
Cadmium	98.6	99.8	P/P	90 - 110
Chromium	97.4	95.6	P/P	90 - 110
Copper	99.3	96.8	P/P	90 - 110
Lead	106	108	P/P	90 - 110
Nickel	99.3	96.6	P/P	90 - 110
Selenium	99.7	98.9	P/P	90 - 110
Silver	101	101	P/P	90 - 110
Thallium	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A104194

Included Lab Sample IDs: 2231708, 2231712, 2231713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	104	P/P	90 - 110
Total-P	104	103	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A104231

Included Lab Sample IDs: 2231725

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	97.9	98.4	P/P	90 - 110
Calcium	100	102	P/P	90 - 110
Iron	102	104	P/P	90 - 110
Magnesium	97.9	99.6	P/P	90 - 110
Manganese	101	101	P/P	90 - 110
Potassium	102	104	P/P	90 - 110
Sodium	98.6	100	P/P	90 - 110
Zinc	99.6	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A104279

Included Lab Sample IDs: 2231708, 2231712, 2231713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.7	95.2	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A104292

Included Lab Sample IDs: 2231708, 2231712, 2231713

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

Quality Assurance Report

Calibration Verification

* 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					4.47	
EPA 200.7 Rev. 4.4	Barium	95.2	99.5	99.4	103		3.82
	Calcium	101	90.3	105	107		1.87
	Iron	100	107	105	107		2.29
	Magnesium	98.1	87.0	103	105		2.18
	Manganese	96.8	101	99.7	103		3.34
	Potassium	97.6	104	106			2.20
	Sodium	98.9	103	106			1.84
	Zinc	92.6	101	98.0	102		3.88
EPA 200.8 Rev. 5.4	Aluminum	96.2	90.8	94.0	97.2		3.17
	Antimony	99.6	99.3	99.7	105		0.398
	Arsenic	99.4	97.1	99.2	106		2.08
	Beryllium	91.7	92.3	94.4	87.1		2.20
	Boron	96.2	94.5	96.8	99.5		2.18
	Cadmium	98.1	99.1	97.8	101		1.39
	Chromium	97.0	95.9	97.2	98.6		1.35
	Copper	99.7	98.8	99.1	98.3		0.344
	Lead	105	105	106	108		0.506
	Nickel	98.1	96.8	97.1	93.9		0.309
	Selenium	98.4	94.5	96.6	99.2		2.12
	Silver	105	105	105	99.4		0.442
	Thallium	102	103	105	104		2.07
EPA 300.0 Rev. 2.1	Chloride	99.9	101	100		0.468	
	Sulfate	97.6	97.3	97.5		0.723	
EPA 350.1 Rev. 2.0	Ammonia-N	100	96.8	98.8			1.87
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	99.2	105			4.10
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	104	104	104			0.0
EPA 365.1 Rev. 2.0	Total-P	104	105	107			1.44
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	100	101			1.39
SM 2120 B-2011	Color (true)	103				0.0267	
SM 2320 B-2011	Total Alkalinity	101				0.340	
SM 2540 C-2011	TDS					4.44	
	TDS					2.78	
SM 4500 F-C-2011	Fluoride	102	99.4	99.4			0.0
SM 5310 B-2011	Organic Carbon	95.0	94.3	95.5			0.927

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2231707, 2231710, 2231711
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2231725
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2231725
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2231707, 2231710, 2231711
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2231707, 2231710, 2231711
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2231708, 2231712, 2231713
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2231708, 2231712, 2231713
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2231708, 2231712, 2231713
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2231708, 2231712, 2231713
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2231709, 2231714, 2231715
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2231707, 2231710, 2231711

Reference Method Descriptions

Method	Description	Associated Samples
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2231707, 2231710, 2231711
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2231725
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2231707, 2231710, 2231711
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2231707, 2231710, 2231711
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2231707, 2231710, 2231711
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2231708, 2231712, 2231713

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	03/16/2021			03/16/2021 16:11	Yen Ta	2231707, 2231710, 2231711
EPA 200.7 Rev. 4.4	03/16/2021	03/17/2021 16:35	Elliott D. Healy	03/23/2021 14:19	Betina Topolski	2231725
EPA 200.8 Rev. 5.4	03/16/2021	03/17/2021 16:35	Elliott D. Healy	03/19/2021 17:55	McKinley C Carter	2231725
EPA 300.0 Rev. 2.1	03/16/2021			03/19/2021 22:59	Lipi Saha	2231707
	03/16/2021			03/19/2021 23:11	Lipi Saha	2231710
	03/16/2021			03/19/2021 23:24	Lipi Saha	2231711
EPA 350.1 Rev. 2.0	03/16/2021			03/21/2021 15:26	Ping Hua	2231713
	03/16/2021			03/21/2021 15:30	Ping Hua	2231708
	03/16/2021			03/21/2021 15:31	Ping Hua	2231712
EPA 351.2 Rev. 2.0	03/16/2021	03/23/2021 13:04	Benjamin T. Nordmann	03/24/2021 20:20	Julia Storbeck	2231708
	03/16/2021	03/23/2021 13:04	Benjamin T. Nordmann	03/24/2021 20:22	Julia Storbeck	2231712
	03/16/2021	03/23/2021 13:04	Benjamin T. Nordmann	03/24/2021 20:23	Julia Storbeck	2231713
EPA 353.2 Rev. 2.0	03/16/2021			03/17/2021 10:45	Beverly Y. Sanders	2231708
	03/16/2021			03/17/2021 10:46	Beverly Y. Sanders	2231712
	03/16/2021			03/17/2021 10:47	Beverly Y. Sanders	2231713
EPA 365.1 Rev. 2.0	03/16/2021	03/19/2021 12:46	Yen Ta	03/22/2021 12:10	Shengyu Ding	2231708
	03/16/2021	03/19/2021 12:46	Yen Ta	03/22/2021 12:13	Shengyu Ding	2231712
	03/16/2021	03/19/2021 12:46	Yen Ta	03/22/2021 12:14	Shengyu Ding	2231713
EPA 365.1 Rev. 2.0 dissolved	03/16/2021			03/16/2021 15:38	Patrick M. Roche	2231709
	03/16/2021			03/16/2021 15:39	Patrick M. Roche	2231714
	03/16/2021			03/16/2021 15:40	Patrick M. Roche	2231715
SM 2120 B-2011	03/16/2021			03/16/2021 18:42	Benjamin T. Nordmann	2231707
	03/16/2021			03/16/2021 18:43	Benjamin T. Nordmann	2231710, 2231711
SM 2320 B-2011	03/16/2021			03/19/2021 03:29	Dale L. Simmons	2231707
	03/16/2021			03/19/2021 03:44	Dale L. Simmons	2231710
	03/16/2021			03/19/2021 03:59	Dale L. Simmons	2231711
SM 2340B	03/16/2021			03/23/2021 14:19	Betina Topolski	2231725
SM 2540 C-2011	03/16/2021			03/19/2021 15:21	Yijie Li	2231707, 2231710, 2231711
SM 2540 D-2011	03/16/2021			03/19/2021 15:21	Yijie Li	2231707, 2231710, 2231711
SM 4500 F-C-2011	03/16/2021			03/19/2021 03:29	Dale L. Simmons	2231707
	03/16/2021			03/19/2021 03:44	Dale L. Simmons	2231710
	03/16/2021			03/19/2021 03:59	Dale L. Simmons	2231711
SM 5310 B-2011	03/16/2021			03/26/2021 05:03	Madeline Gruver	2231708
	03/16/2021			03/26/2021 05:14	Madeline Gruver	2231712
	03/16/2021			03/26/2021 05:25	Madeline Gruver	2231713