Chemical Analysis Report

NE-DIST-2021-02-09-01

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

Event Description: **Nassau North Boat 2021**
Request ID: **RQ-2021-02-01-49**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Suite 100
Jacksonville, FL 32256
Attn: Jeremy Parrish

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, Chemist Administrator

Date Certified: 02-MAR-2021 12:22

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: Plummer Creek @ Second Island **Collection Date/Time: 02/08/2021 10:40**

Field ID: G4NE0301 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2224351	EPA 180.1 Rev. 2.0	Turbidity	6.7	A	NTU	P393569	
	EPA 300.0 Rev. 2.1	Bromide	0.27		mg Br/L	P394011	
	SM 2320 B-2011	Total Alkalinity	35		mg CaCO3/L	P393648	
	SM 2540 D-2011	TSS	15	A	mg/L	P393815	
	SM 4500 F-C-2011	Fluoride	0.072	I	mg F/L	P393650	
2224352	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P393915	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.95		mg N/L	P393835	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P393703	
	EPA 365.1 Rev. 2.0	Total-P	0.078		mg P/L	P393716	
	SM 5310 B-2011	Organic Carbon	23		mg C/L	P393932	
2224353	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.037		mg P/L	P393559	

Ref. Method and Comment:
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Smr 3.2 Mi S Tracy Rd **Collection Date/Time: 02/08/2021 12:20**

Field ID: 19010157 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2224365	EPA 200.7 Rev. 4.4	Barium	16.0		ug/L	P393556	
		Calcium	4.10		mg/L	P393556	
		Iron	700		ug/L	P393556	
		Magnesium	1.55		mg/L	P393556	
		Manganese	15.3		ug/L	P393556	
		Potassium	0.65	I	mg/L	P393556	
		Sodium	6.0		mg/L	P393556	
		Zinc	5.7	I	ug/L	P393556	
	EPA 200.8 Rev. 5.4	Aluminum	511		ug/L	P393556	
		Antimony	0.050	U	ug/L	P393556	
		Arsenic	0.33		ug/L	P393556	
		Beryllium	0.035	I	ug/L	P393556	
		Boron**	15.0		ug/L	P393556	
		Cadmium	0.020	U	ug/L	P393556	
		Chromium	0.69	I	ug/L	P393556	
		Copper	0.49	I	ug/L	P393556	
		Lead	0.54		ug/L	P393556	
		Nickel	0.51	I	ug/L	P393556	
		Selenium	0.20	U	ug/L	P393556	
		Silver	0.010	U	ug/L	P393556	
		Thallium	0.10	U	ug/L	P393556	
	SM 2340B	Hardness	16.6		mg/L	P393556	

Ref. Method and Comment:
EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 02/25/2021.

Sample Location: Smr 0.3 Mi S Tracy Rd **Collection Date/Time: 02/08/2021 12:35**

Field ID: 19010156 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2224354	EPA 180.1 Rev. 2.0	Turbidity	4.7		NTU	P393569	
	EPA 300.0 Rev. 2.1	Chloride	12		mg Cl/L	P393739	
		Sulfate	1.5		mg SO4/L	P393741	
	SM 2120 B-2011	Color (true)	240		PCU	P393563	
	SM 2320 B-2011	Total Alkalinity	2.0	I	mg CaCO3/L	P393787	
	SM 2540 C-2011	TDS	73		mg/L	P393821	
	SM 2540 D-2011	TSS	3	I	mg/L	P393814	
	SM 4500 F-C-2011	Fluoride	0.037	I	mg F/L	P393651	
2224355	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P393915	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.64		mg N/L	P393835	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.040		mg N/L	P393703	
	EPA 365.1 Rev. 2.0	Total-P	0.026		mg P/L	P393716	
	SM 5310 B-2011	Organic Carbon	24		mg C/L	P393932	
2224356	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.012		mg P/L	P393559	
2224364	EPA 200.7 Rev. 4.4	Barium	16.5		ug/L	P393556	
		Calcium	4.14		mg/L	P393556	
		Iron	660		ug/L	P393556	
		Magnesium	1.57		mg/L	P393556	
		Manganese	15.4		ug/L	P393556	
		Potassium	0.59	I	mg/L	P393556	
		Sodium	6.2		mg/L	P393556	
		Zinc	5.0	U	ug/L	P393556	
	EPA 200.8 Rev. 5.4	Aluminum	473		ug/L	P393556	
		Antimony	0.050	U	ug/L	P393556	
		Arsenic	0.33		ug/L	P393556	
		Beryllium	0.032	I	ug/L	P393556	
		Boron**	17.5		ug/L	P393556	
		Cadmium	0.020	U	ug/L	P393556	
		Chromium	0.65	I	ug/L	P393556	
		Copper	0.40	U	ug/L	P393556	
		Lead	0.48		ug/L	P393556	
		Nickel	0.50	U	ug/L	P393556	
		Selenium	0.20	U	ug/L	P393556	
		Silver	0.010	U	ug/L	P393556	
		Thallium	0.10	U	ug/L	P393556	
	SM 2340B	Hardness	16.8		mg/L	P393556	

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: P393569

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393556

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: P393556

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: P393739

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393741

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394011

Component	Result	Code	Units
Bromide	0.013	U	mg Br/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393915

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393835

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393703

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393716

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393559

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

Reference Method: SM 2120 B-2011
Batch ID: P393563

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P393648

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

Reference Method: SM 2320 B-2011
Batch ID: P393787

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

Reference Method: SM 2540 C-2011
Batch ID: P393821

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P393814

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P393815

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P393650

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-2011
Batch ID: P393651

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P393932

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: P393556

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	97.3		P	85 - 115
Calcium	99.2		P	85 - 115
Iron	101		P	85 - 115
Magnesium	102		P	85 - 115
Manganese	98.3		P	85 - 115
Potassium	97.3		P	85 - 115
Sodium	98.3		P	85 - 115
Zinc	95.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P393556

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	101		P	85 - 115
Beryllium	95.3		P	85 - 115
Boron	99.8		P	85 - 115
Cadmium	96.5		P	85 - 115
Chromium	95.6		P	85 - 115
Copper	97.1		P	85 - 115
Lead	103		P	85 - 115
Nickel	97.4		P	85 - 115
Selenium	99.6		P	85 - 115
Silver	113		P	85 - 115
Thallium	95.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393739

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: P393741

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394011

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Bromide	99.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393915

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393835

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393703

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393716

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: P393559

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

Reference Method: SM 2120 B-2011
Batch ID: P393563

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.1		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P393648

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.8		P	93 - 104

Reference Method: SM 2320 B-2011
Batch ID: P393787

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	96.5		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P393650

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.3		P	90 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P393651

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.8		P	90 - 106

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P393932

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393556

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224038	Barium	100		P	80 - 120
2224038	Calcium	97.3		P	80 - 120
2224038	Iron	104		P	80 - 120
2224038	Magnesium	97.4		P	80 - 120
2224038	Manganese	102		P	80 - 120
2224038	Potassium	98.0		P	80 - 120
2224038	Sodium	99.7		P	80 - 120
2224038	Zinc	99.5		P	80 - 120
2224365	Barium	102	99.9	P/P	80 - 120
2224365	Calcium	100		P	80 - 120
2224365	Iron	103	102	P/P	80 - 120
2224365	Magnesium	104	104	P/P	80 - 120
2224365	Manganese	102	100	P/P	80 - 120
2224365	Potassium	97.3	97.6	P/P	80 - 120
2224365	Sodium	99.0		P	80 - 120
2224365	Zinc	100	98.6	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P393556

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224038	Aluminum	102		P	80 - 120
2224038	Antimony	99.7		P	80 - 120
2224038	Arsenic	99.6		P	80 - 120
2224038	Beryllium	90.3		P	80 - 120
2224038	Boron	103		P	80 - 120
2224038	Cadmium	96.4		P	80 - 120
2224038	Chromium	95.4		P	80 - 120
2224038	Copper	92.9		P	80 - 120
2224038	Lead	102		P	80 - 120
2224038	Nickel	93.0		P	80 - 120
2224038	Selenium	96.3		P	80 - 120
2224038	Silver	112		P	80 - 120
2224038	Thallium	96.0		P	80 - 120
2224365	Aluminum	104	96.4	P/P	80 - 120
2224365	Antimony	98.1	94.5	P/P	80 - 120
2224365	Arsenic	101	97.2	P/P	80 - 120
2224365	Beryllium	89.7	89.0	P/P	80 - 120
2224365	Boron	103	100	P/P	80 - 120
2224365	Cadmium	97.2	93.2	P/P	80 - 120
2224365	Chromium	95.3	91.8	P/P	80 - 120
2224365	Copper	97.8	93.9	P/P	80 - 120
2224365	Lead	104	99.6	P/P	80 - 120
2224365	Nickel	95.6	91.7	P/P	80 - 120
2224365	Selenium	97.3	95.5	P/P	80 - 120
2224365	Silver	112	112	P/P	80 - 120
2224365	Thallium	101	96.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393739

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393739

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224354	Chloride	101		P	90 - 110
2224402	Chloride	99.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393741

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224354	Sulfate	101		P	90 - 110
2224402	Sulfate	98.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394011

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224351	Bromide	95.5	96.8	P/P	90 - 110
2225313	Bromide	97.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393915

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224373	Ammonia-N	94.4	97.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393835

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224373	Kjeldahl Nitrogen	102	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393703

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224303	NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393716

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224303	Total-P	101	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393559

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224163	O-Phosphate-P	95.9	97.7	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P393651

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224396	Fluoride	97.5	97.5	P/P	94 - 107

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P393932

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224352	Organic Carbon	99.4		P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P393569

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224351	Turbidity	0.149	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393556

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224365	Barium	1.67	Spike	P	0 - 20
2224365	Calcium	0.175	Spike	P	0 - 20
2224365	Iron	0.271	Spike	P	0 - 20
2224365	Magnesium	0.0693	Spike	P	0 - 20
2224365	Manganese	1.80	Spike	P	0 - 20
2224365	Potassium	0.226	Spike	P	0 - 20
2224365	Sodium	0.503	Spike	P	0 - 20
2224365	Zinc	1.63	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P393556

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224365	Aluminum	4.43	Spike	P	0 - 20
2224365	Antimony	3.77	Spike	P	0 - 20
2224365	Arsenic	3.92	Spike	P	0 - 20
2224365	Beryllium	0.741	Spike	P	0 - 20
2224365	Boron	2.12	Spike	P	0 - 20
2224365	Cadmium	4.23	Spike	P	0 - 20
2224365	Chromium	3.62	Spike	P	0 - 20
2224365	Copper	4.02	Spike	P	0 - 20
2224365	Lead	4.54	Spike	P	0 - 20
2224365	Nickel	4.09	Spike	P	0 - 20
2224365	Selenium	1.87	Spike	P	0 - 20
2224365	Silver	0.326	Spike	P	0 - 20
2224365	Thallium	3.89	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393739

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224402	Chloride	0.398	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393741

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224402	Sulfate	1.65	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394011

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224351	Bromide	0.855	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393915

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224373	Ammonia-N	2.74	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393835

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224373	Kjeldahl Nitrogen	1.05	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393703

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224303	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224303	Total-P	1.81	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393559

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224163	O-Phosphate-P	1.71	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P393563

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224372	Color (true)	1.59	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P393648

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224302	Total Alkalinity	0.737	Sample	P	0 - 8.1

Quality Assurance Report
Precision

Reference Method: SM 2320 B-2011
Batch ID: P393787

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224892	Total Alkalinity	1.49	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P393821

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224396	TDS	1.36	Sample	P	0 - 10

Reference Method: SM 2540 D-2011
Batch ID: P393815

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224351	TSS	5.41	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P393650

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224302	Fluoride	0.494	Spike	P	0 - 2.8

Reference Method: SM 4500 F-C-2011
Batch ID: P393651

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224396	Fluoride	0.0	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P393932

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224352	Organic Carbon	0.474	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A103481
Included Lab Sample IDs: 2224354

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.7	99.6	P/P	90 - 110
Sulfate	99.0	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A103496
Included Lab Sample IDs: 2224353, 2224356

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.5	98.4	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A103498
Included Lab Sample IDs: 2224354

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.3	101	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A103499
Included Lab Sample IDs: 2224351, 2224354

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A103530
Included Lab Sample IDs: 2224364, 2224365

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	99.2	P/P	90 - 110
Calcium	96.5	95.7	P/P	90 - 110
Iron	98.1	97.0	P/P	90 - 110
Magnesium	98.3	96.7	P/P	90 - 110
Manganese	102	101	P/P	90 - 110
Potassium	97.6	96.2	P/P	90 - 110
Sodium	96.9	96.3	P/P	90 - 110
Zinc	102	100	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A103534
Included Lab Sample IDs: 2224351

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	95.0	95.8	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A103534
Included Lab Sample IDs: 2224351, 2224354

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A103559
Included Lab Sample IDs: 2224352, 2224355

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A103587
Included Lab Sample IDs: 2224352

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.1	98.4	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A103594
Included Lab Sample IDs: 2224354

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	94.1	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A103604
Included Lab Sample IDs: 2224355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.0	97.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A103638
Included Lab Sample IDs: 2224352, 2224355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.3	98.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A103645
Included Lab Sample IDs: 2224352, 2224355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.3	94.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A103651
Included Lab Sample IDs: 2224351

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A103655
Included Lab Sample IDs: 2224352, 2224355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.9	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A103671
Included Lab Sample IDs: 2224364, 2224365

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.7	99.0	P/P	90 - 110
Aluminum	99.5	98.5	P/P	90 - 110
Antimony	94.8	94.2	P/P	90 - 110
Antimony	95.0	94.7	P/P	90 - 110
Arsenic	98.2	97.0	P/P	90 - 110
Arsenic	100	97.9	P/P	90 - 110
Beryllium	94.9	94.2	P/P	90 - 110
Beryllium	96.7	94.9	P/P	90 - 110
Boron	104	99.2	P/P	90 - 110
Boron	94.9	100	P/P	90 - 110
Cadmium	97.9	97.5	P/P	90 - 110
Cadmium	99.1	98.0	P/P	90 - 110
Chromium	95.2	94.9	P/P	90 - 110
Chromium	96.1	95.5	P/P	90 - 110
Copper	94.9	94.1	P/P	90 - 110
Copper	97.6	95.8	P/P	90 - 110
Lead	104	104	P/P	90 - 110
Lead	105	105	P/P	90 - 110
Nickel	95.6	95.1	P/P	90 - 110
Nickel	97.6	96.6	P/P	90 - 110
Selenium	98.0	97.8	P/P	90 - 110
Selenium	99.2	97.8	P/P	90 - 110
Thallium	101	99.2	P/P	90 - 110
Thallium	98.2	98.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A103714
Included Lab Sample IDs: 2224364, 2224365

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	106	107	P/P	90 - 110
Silver	107	108	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.149	
EPA 200.7 Rev. 4.4	Barium	97.3	100	102	99.9			1.67
	Calcium	99.2	97.3	100				0.175
	Iron	101	104	103	102			0.271
	Magnesium	102	97.4	104	104			0.0693
	Manganese	98.3	102	102	100			1.80
	Potassium	97.3	98.0	97.3	97.6			0.226
	Sodium	98.3	99.7	99.0				0.503
	Zinc	95.4	99.5	100	98.6			1.63
EPA 200.8 Rev. 5.4	Aluminum	102	104	96.4	102			4.43
	Antimony	100	98.1	94.5	99.7			3.77
	Arsenic	101	101	97.2	99.6			3.92
	Beryllium	95.3	89.7	89.0	90.3			0.741
	Boron	99.8	103	100	103			2.12
	Cadmium	96.5	97.2	93.2	96.4			4.23
	Chromium	95.6	95.3	91.8	95.4			3.62
	Copper	97.1	97.8	93.9	92.9			4.02
	Lead	103	104	99.6	102			4.54
	Nickel	97.4	95.6	91.7	93.0			4.09
	Selenium	99.6	97.3	95.5	96.3			1.87
	Silver	113	112	112	112			0.326
	Thallium	95.8	101	96.9	96.0			3.89
EPA 300.0 Rev. 2.1	Bromide	99.3	95.5	96.8	97.9			0.855
	Chloride	98.8	99.3	101			0.398	
	Sulfate	99.6	98.5	101			1.65	
EPA 350.1 Rev. 2.0	Ammonia-N	96.8	94.4	97.6				2.74
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	102	101				1.05
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	99.5	99.5				0.0
EPA 365.1 Rev. 2.0	Total-P	104	101	103				1.81
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	95.9	97.7				1.71
SM 2120 B-2011	Color (true)	98.1					1.59	
SM 2320 B-2011	Total Alkalinity	97.8					0.737	
	Total Alkalinity	96.5					1.49	
SM 2540 C-2011	TDS						1.36	
SM 2540 D-2011	TSS						5.41	
SM 4500 F-C-2011	Fluoride	98.3						0.494
	Fluoride	98.8	97.5	97.5				0.0
SM 5310 B-2011	Organic Carbon	94.8	99.4					0.474

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2224351, 2224354
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2224364, 2224365
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2224364, 2224365
EPA 300.0 Rev. 2.1	Bromide in aqueous matrices	2224351
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2224354
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2224354
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2224352, 2224355
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2224352, 2224355
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2224352, 2224355

Reference Method Descriptions

Method	Description	Associated Samples
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2224352, 2224355
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2224353, 2224356
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2224354
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2224351, 2224354
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2224364, 2224365
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2224354
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2224351, 2224354
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2224351, 2224354
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2224352, 2224355

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	02/09/2021			02/09/2021 14:44	Yen Ta	2224351, 2224354
EPA 200.7 Rev. 4.4	02/09/2021	02/09/2021 16:11	Elliott D. Healy	02/10/2021 17:55	Betina Topolski	2224364
	02/09/2021	02/09/2021 16:11	Elliott D. Healy	02/10/2021 18:03	Betina Topolski	2224365
EPA 200.8 Rev. 5.4	02/09/2021	02/09/2021 16:11	Elliott D. Healy	02/18/2021 15:27	Alexander Thompson	2224365
	02/09/2021	02/09/2021 16:11	Elliott D. Healy	02/18/2021 18:03	Alexander Thompson	2224364
	02/09/2021	02/09/2021 16:11	Elliott D. Healy	02/19/2021 14:27	Alexander Thompson	2224365
	02/09/2021	02/09/2021 16:11	Elliott D. Healy	02/19/2021 15:55	Alexander Thompson	2224364
EPA 300.0 Rev. 2.1	02/09/2021			02/11/2021 21:31	Lipi Saha	2224354
	02/09/2021			02/18/2021 15:45	Lipi Saha	2224351
EPA 350.1 Rev. 2.0	02/09/2021			02/17/2021 16:28	Ping Hua	2224352
	02/09/2021			02/17/2021 16:29	Ping Hua	2224355
EPA 351.2 Rev. 2.0	02/09/2021	02/16/2021 12:31	Yen Ta	02/17/2021 12:46	Julia Storbeck	2224352
	02/09/2021	02/16/2021 12:31	Yen Ta	02/17/2021 12:47	Julia Storbeck	2224355
EPA 353.2 Rev. 2.0	02/09/2021			02/12/2021 10:37	Beverly Y. Sanders	2224352
	02/09/2021			02/12/2021 10:38	Beverly Y. Sanders	2224355
EPA 365.1 Rev. 2.0	02/09/2021	02/12/2021 14:20	Lipi Saha	02/15/2021 14:06	Shengyu Wang	2224352
	02/09/2021	02/12/2021 14:20	Lipi Saha	02/16/2021 11:52	Shengyu Wang	2224355
EPA 365.1 Rev. 2.0 dissolved	02/09/2021			02/09/2021 15:25	Blanca Fach	2224353, 2224356
SM 2120 B-2011	02/09/2021			02/09/2021 16:06	Benjamin T. Nordmann	2224354
SM 2320 B-2011	02/09/2021			02/10/2021 21:51	Dale L. Simmons	2224351
	02/09/2021			02/12/2021 22:53	Dale L. Simmons	2224354
SM 2340B	02/09/2021			02/10/2021 17:55	Betina Topolski	2224364
	02/09/2021			02/10/2021 18:03	Betina Topolski	2224365
SM 2540 C-2011	02/09/2021			02/10/2021 14:52	Yijie Li	2224354
SM 2540 D-2011	02/09/2021			02/10/2021 14:52	Yijie Li	2224351, 2224354
SM 4500 F-C-2011	02/09/2021			02/10/2021 21:51	Dale L. Simmons	2224351
	02/09/2021			02/10/2021 23:08	Dale L. Simmons	2224354
SM 5310 B-2011	02/09/2021			02/16/2021 16:32	Touraj Touran	2224352
	02/09/2021			02/16/2021 17:26	Touraj Touran	2224355