Chemical Analysis Report

NE-DIST-2021-03-11-01

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

Event Description: **Bmap 1 SMP 2021**
Request ID: **RQ-2021-03-01-20**
Customer: **NE-DIST**
Project ID: **SMP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 01-APR-2021 14:26

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: Butcher Pen Cr @ Confederate PT Road **Collection Date/Time: 03/10/2021 10:05**

Field ID: 20030082 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2230712	EPA 180.1 Rev. 2.0	Turbidity	9.3		NTU	P394840	
	EPA 300.0 Rev. 2.1	Chloride	93		mg Cl/L	P394952	
		Sulfate	33		mg SO4/L	P394956	
	SM 2120 B-2011	Color (true)	70		PCU	P394851	
	SM 2320 B-2011	Total Alkalinity	90		mg CaCO3/L	P395080	
	SM 2540 C-2011	TDS	282	A	mg/L	P395367	
	SM 2540 D-2011	TSS	8	I A	mg/L	P395373	
	SM 4500 F-C-2011	Fluoride	0.11		mg F/L	P395083	
2230713	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P394935	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P395142	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.17		mg N/L	P394966	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P394990	
	SM 5310 B-2011	Organic Carbon	11		mg C/L	P395275	
2230714	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.033		mg P/L	P394810	

Ref. Method and Comment:
SM 2120 B-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Craig CR 100m Down From Footbridge in Park **Collection Date/Time: 03/10/2021 11:35**

Field ID: 20030958 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2230709	EPA 180.1 Rev. 2.0	Turbidity	6.4	A	NTU	P394840	
	EPA 300.0 Rev. 2.1	Bromide	2.0		mg Br/L	P394959	
	SM 2320 B-2011	Total Alkalinity	141		mg CaCO3/L	P395080	
	SM 2540 D-2011	TSS	2	I	mg/L	P395374	
	SM 4500 F-C-2011	Fluoride	0.20		mg F/L	P395083	
2230710	EPA 350.1 Rev. 2.0	Ammonia-N	0.13		mg N/L	P395249	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.74		mg N/L	P395203	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.42		mg N/L	P395018	
	EPA 365.1 Rev. 2.0	Total-P	0.087		mg P/L	P394991	
	SM 5310 B-2011	Organic Carbon	11		mg C/L	P395275	
2230711	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.030		mg P/L	P394811	
2230717	EPA 200.7 Rev. 4.4	Calcium	77.4		mg/L	P394985	
		Iron	1.37E+03		ug/L	P394985	
		Magnesium	48.2		mg/L	P394985	
		Manganese	56.9		ug/L	P394985	
		Zinc	13	I	ug/L	P394985	
	EPA 200.8 Rev. 5.4	Aluminum	61		ug/L	P394985	
		Antimony	0.23		ug/L	P394985	
		Arsenic	1.25		ug/L	P394985	
		Beryllium	0.025	I	ug/L	P394985	
		Cadmium	0.020	U	ug/L	P394985	
		Chromium	0.43	I	ug/L	P394985	
		Copper	1.66		ug/L	P394985	
		Lead	0.67		ug/L	P394985	
		Nickel	0.71	I	ug/L	P394985	
		Selenium	0.22	I	ug/L	P394985	
		Silver	0.010	U	ug/L	P394985	
		Thallium	0.10	U	ug/L	P394985	

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: Butcher Pen CR at Wesconnett **Collection Date/Time: 03/10/2021 09:45**

Field ID: 20030760 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2230718	EPA 200.7 Rev. 4.4	Barium	34.6		ug/L	P394985	
		Calcium	49.6		mg/L	P394985	
		Iron	1.64E+03		ug/L	P394985	
		Magnesium	5.98		mg/L	P394985	
		Manganese	43.7		ug/L	P394985	
		Potassium	1.8		mg/L	P394985	
		Sodium	17.4		mg/L	P394985	
		Zinc	19	I	ug/L	P394985	
	EPA 200.8 Rev. 5.4	Aluminum	122		ug/L	P394985	
		Antimony	0.14	I	ug/L	P394985	
		Arsenic	0.81		ug/L	P394985	
		Beryllium	0.025	I	ug/L	P394985	
		Boron**	33.7		ug/L	P394985	
		Cadmium	0.020	U	ug/L	P394985	
		Chromium	0.73	I	ug/L	P394985	
		Copper	0.95		ug/L	P394985	
		Lead	0.46		ug/L	P394985	
		Nickel	0.74	I	ug/L	P394985	
		Selenium	0.23	I	ug/L	P394985	
		Silver	0.010	U	ug/L	P394985	
		Thallium	0.10	U	ug/L	P394985	
	SM 2340B	Hardness	148		mg/L	P394985	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P394840

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P394985

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: P394985

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: P394952

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394956

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394959

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: P394935

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395249

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395142

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395203

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394966

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395018

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394990

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394991

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394810

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394811

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

Reference Method: SM 2120 B-2011
Batch ID: P394851

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P395080

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

Reference Method: SM 2540 C-2011
Batch ID: P395367

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P395373

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P395374

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P395083

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P395275

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: P394985

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	95.5		P	85 - 115
Calcium	105		P	85 - 115
Iron	103		P	85 - 115
Magnesium	103		P	85 - 115
Manganese	98.5		P	85 - 115
Potassium	101		P	85 - 115
Sodium	105		P	85 - 115
Zinc	92.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P394985

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.3		P	85 - 115
Antimony	105		P	85 - 115
Arsenic	102		P	85 - 115
Beryllium	97.5		P	85 - 115
Boron	97.5		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	98.2		P	85 - 115
Copper	98.9		P	85 - 115
Lead	103		P	85 - 115
Nickel	97.7		P	85 - 115
Selenium	101		P	85 - 115
Silver	101		P	85 - 115
Thallium	108		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394952

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394956

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394959

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394935

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395249

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395142

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395203

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394966

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395018

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394990

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394991

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394810

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394811

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 2120 B-2011
Batch ID: P394851

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

Reference Method: SM 2320 B-2011
Batch ID: P395080

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

Reference Method: SM 4500 F-C-2011
Batch ID: P395083

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.2		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P395275

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P394985

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230678	Barium	101		P	80 - 120
2230678	Calcium	106		P	80 - 120
2230678	Iron	107		P	80 - 120
2230678	Magnesium	105		P	80 - 120
2230678	Manganese	104		P	80 - 120
2230678	Potassium	106		P	80 - 120
2230678	Sodium	108		P	80 - 120
2230678	Zinc	96.6		P	80 - 120
2231042	Barium	102	102	P/P	80 - 120
2231042	Calcium	105		P	80 - 120
2231042	Iron	110	108	P/P	80 - 120
2231042	Magnesium	110	108	P/P	80 - 120
2231042	Manganese	105	104	P/P	80 - 120
2231042	Potassium	108	107	P/P	80 - 120
2231042	Sodium	104		P	80 - 120
2231042	Zinc	99.4	99.2	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P394985

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230678	Aluminum	93.4		P	80 - 120
2230678	Antimony	105		P	80 - 120
2230678	Arsenic	102		P	80 - 120
2230678	Beryllium	93.7		P	80 - 120
2230678	Boron	95.1		P	80 - 120
2230678	Cadmium	104		P	80 - 120
2230678	Chromium	97.1		P	80 - 120
2230678	Copper	93.5		P	80 - 120
2230678	Lead	101		P	80 - 120
2230678	Nickel	95.3		P	80 - 120
2230678	Selenium	98.0		P	80 - 120
2230678	Silver	100		P	80 - 120
2230678	Thallium	108		P	80 - 120
2231042	Aluminum	97.7	98.0	P/P	80 - 120
2231042	Antimony	104	105	P/P	80 - 120
2231042	Arsenic	104	104	P/P	80 - 120
2231042	Beryllium	94.7	97.6	P/P	80 - 120
2231042	Boron	95.8	96.5	P/P	80 - 120
2231042	Cadmium	102	103	P/P	80 - 120
2231042	Chromium	97.5	98.4	P/P	80 - 120
2231042	Copper	100	100	P/P	80 - 120
2231042	Lead	102	103	P/P	80 - 120
2231042	Nickel	98.3	99.0	P/P	80 - 120
2231042	Selenium	101	99.9	P/P	80 - 120
2231042	Silver	98.2	100	P/P	80 - 120
2231042	Thallium	107	109	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394952

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: P394952

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230422	Chloride	104		P	90 - 110
2230665	Chloride	103		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394956

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230422	Sulfate	102		P	90 - 110
2230665	Sulfate	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394959

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230509	Bromide	96.7	95.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394935

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230408	Ammonia-N	95.4	97.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395249

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230846	Ammonia-N	104	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395142

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230713	Kjeldahl Nitrogen	109	96.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395203

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230710	Kjeldahl Nitrogen	107	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394966

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230705	NO2NO3-N	99.0	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395018

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230723	NO2NO3-N	104	103	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394990

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230668	Total-P	108	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394991

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230453	Total-P	99.5	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394810

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230958	O-Phosphate-P	96.1	97.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394811

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230960	O-Phosphate-P	98.8	97.4	P/P	90 - 110

Reference Method: SM 5310 B-2011
Batch ID: P395275

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230760	Organic Carbon	94.7	95.1	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P394840

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230709	Turbidity	2.83	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P394985

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231042	Barium	0.479	Spike	P	0 - 20
2231042	Calcium	2.13	Spike	P	0 - 20
2231042	Iron	1.58	Spike	P	0 - 20
2231042	Magnesium	1.78	Spike	P	0 - 20
2231042	Manganese	0.744	Spike	P	0 - 20
2231042	Potassium	0.930	Spike	P	0 - 20
2231042	Sodium	1.60	Spike	P	0 - 20
2231042	Zinc	0.255	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P394985

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231042	Aluminum	0.278	Spike	P	0 - 20
2231042	Antimony	0.660	Spike	P	0 - 20
2231042	Arsenic	0.152	Spike	P	0 - 20
2231042	Beryllium	2.93	Spike	P	0 - 20
2231042	Boron	0.610	Spike	P	0 - 20
2231042	Cadmium	0.522	Spike	P	0 - 20
2231042	Chromium	0.901	Spike	P	0 - 20
2231042	Copper	0.109	Spike	P	0 - 20
2231042	Lead	0.553	Spike	P	0 - 20
2231042	Nickel	0.748	Spike	P	0 - 20
2231042	Selenium	1.45	Spike	P	0 - 20
2231042	Silver	2.04	Spike	P	0 - 20
2231042	Thallium	1.20	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394952

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230665	Chloride	0.182	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394956

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230665	Sulfate	1.26	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P394959

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230509	Bromide	1.10	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394935

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230408	Ammonia-N	1.89	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395249

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230846	Ammonia-N	1.71	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395142

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230713	Kjeldahl Nitrogen	6.41	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395203

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230710	Kjeldahl Nitrogen	4.91	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394966

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230705	NO2NO3-N	0.506	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395018

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230723	NO2NO3-N	0.810	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394990

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230668	Total-P	0.921	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394991

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230453	Total-P	0.528	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394810

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230958	O-Phosphate-P	0.962	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394811

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230960	O-Phosphate-P	1.07	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P395080

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231046	Total Alkalinity	0.470	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P395367

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230712	TDS	4.60	Sample	P	0 - 10

Reference Method: SM 2540 D-2011
Batch ID: P395374

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231115	TSS	8.96	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P395083

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231046	Fluoride	0.0	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P395275

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230760	Organic Carbon	0.285	Spike	P	0 - 20

Quality Assurance Report
Precision

* 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: A103980
Included Lab Sample IDs: 2230709

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A104013
Included Lab Sample IDs: 2230711, 2230714

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A104019
Included Lab Sample IDs: 2230709, 2230712

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	101	P/P	95 - 105

Reference Method: SM 2120 B-2011
Run ID: A104022
Included Lab Sample IDs: 2230712

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104048
Included Lab Sample IDs: 2230713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.9	100	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A104057
Included Lab Sample IDs: 2230712

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104062
Included Lab Sample IDs: 2230713

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104081
Included Lab Sample IDs: 2230710

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-2011
Run ID: A104103
Included Lab Sample IDs: 2230709, 2230712

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	98.5	P/P	90 - 110
Total Alkalinity	97.8	102	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A104103
Included Lab Sample IDs: 2230709, 2230712

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104104
Included Lab Sample IDs: 2230713

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104108
Included Lab Sample IDs: 2230710

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A104118
Included Lab Sample IDs: 2230717, 2230718

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	101	P/P	90 - 110
Antimony	101	101	P/P	90 - 110
Arsenic	101	102	P/P	90 - 110
Beryllium	99.6	100	P/P	90 - 110
Cadmium	101	102	P/P	90 - 110
Chromium	103	100	P/P	90 - 110
Copper	96.0	96.8	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Nickel	99.5	99.1	P/P	90 - 110
Selenium	100	101	P/P	90 - 110
Silver	98.3	98.9	P/P	90 - 110
Thallium	105	105	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A104145
Included Lab Sample IDs: 2230718

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	92.6	92.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104179
Included Lab Sample IDs: 2230710

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.1	97.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A104186
Included Lab Sample IDs: 2230717, 2230718

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	99.6	P/P	90 - 110
Calcium	103	103	P/P	90 - 110
Iron	106	105	P/P	90 - 110
Magnesium	103	103	P/P	90 - 110
Manganese	102	102	P/P	90 - 110
Potassium	105	106	P/P	90 - 110
Sodium	103	103	P/P	90 - 110
Zinc	101	99.7	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A104189
Included Lab Sample IDs: 2230710, 2230713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.4	95.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104201
Included Lab Sample IDs: 2230713

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.7	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104250
Included Lab Sample IDs: 2230710

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	106	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						2.83	
EPA 200.7 Rev. 4.4	Barium	95.5	101	102	102			0.479
	Calcium	105	106	105				2.13
	Iron	103	107	110	108			1.58
	Magnesium	103	105	110	108			1.78
	Manganese	98.5	104	105	104			0.744
	Potassium	101	106	108	107			0.930
	Sodium	105	108	104				1.60
	Zinc	92.7	96.6	99.4	99.2			0.255
EPA 200.8 Rev. 5.4	Aluminum	98.3	97.7	98.0	93.4			0.278
	Antimony	105	104	105	105			0.660
	Arsenic	102	104	104	102			0.152
	Beryllium	97.5	94.7	97.6	93.7			2.93
	Boron	97.5	95.8	96.5	95.1			0.610
	Cadmium	103	102	103	104			0.522
	Chromium	98.2	97.5	98.4	97.1			0.901
	Copper	98.9	100	100	93.5			0.109
	Lead	103	102	103	101			0.553
	Nickel	97.7	98.3	99.0	95.3			0.748
	Selenium	101	101	99.9	98.0			1.45
	Silver	101	98.2	100	100			2.04
	Thallium	108	107	109	108			1.20
EPA 300.0 Rev. 2.1	Bromide	98.0	96.7	95.5				1.10
	Chloride	104	103	104			0.182	
	Sulfate	103	100	102			1.26	
EPA 350.1 Rev. 2.0	Ammonia-N	101	95.4	97.4				1.89
	Ammonia-N	98.6	104	106				1.71
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	109	96.6				6.41
	Kjeldahl Nitrogen	107	107	101				4.91
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	99.0	98.5				0.506
	NO2NO3-N	99.5	104	103				0.810
EPA 365.1 Rev. 2.0	Total-P	108	108	109				0.921
	Total-P	108	99.5	100				0.528
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.2	96.1	97.4				0.962
	O-Phosphate-P	100	98.8	97.4				1.07
SM 2120 B-2011	Color (true)	101						
SM 2320 B-2011	Total Alkalinity	101					0.470	
SM 2540 C-2011	TDS						4.60	
SM 2540 D-2011	TSS						8.96	
SM 4500 F-C-2011	Fluoride	98.2						0.0
SM 5310 B-2011	Organic Carbon	94.2	94.7	95.1				0.285

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2230709, 2230712
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2230717, 2230718
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2230717, 2230718
EPA 300.0 Rev. 2.1	Bromide in aqueous matrices	2230709
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2230712
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2230712

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2230710, 2230713
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2230710, 2230713
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2230710, 2230713
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2230710, 2230713
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2230711, 2230714
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2230712
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2230709, 2230712
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2230718
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2230712
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2230709, 2230712
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2230709, 2230712
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2230710, 2230713

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	03/11/2021			03/11/2021 16:33	Yen Ta	2230709, 2230712
EPA 200.7 Rev. 4.4	03/11/2021	03/15/2021 16:40	Elliott D. Healy	03/19/2021 16:17	Josef B Mick	2230717
	03/11/2021	03/15/2021 16:40	Elliott D. Healy	03/19/2021 16:33	Josef B Mick	2230718
EPA 200.8 Rev. 5.4	03/11/2021	03/15/2021 16:40	Elliott D. Healy	03/17/2021 20:04	Alexander Thompson	2230717
	03/11/2021	03/15/2021 16:40	Elliott D. Healy	03/17/2021 20:14	Alexander Thompson	2230718
	03/11/2021	03/15/2021 16:40	Elliott D. Healy	03/18/2021 14:42	Alexander Thompson	2230718
EPA 300.0 Rev. 2.1	03/11/2021			03/12/2021 15:55	Lipi Saha	2230709
	03/11/2021			03/13/2021 07:43	Lipi Saha	2230712
EPA 350.1 Rev. 2.0	03/11/2021			03/14/2021 11:58	Ping Hua	2230713
	03/11/2021			03/20/2021 13:11	Ping Hua	2230710
EPA 351.2 Rev. 2.0	03/11/2021	03/18/2021 12:47	Benjamin T. Nordmann	03/22/2021 15:16	Julia Storbeck	2230713
	03/11/2021	03/19/2021 12:22	Benjamin T. Nordmann	03/23/2021 20:51	Julia Storbeck	2230710
EPA 353.2 Rev. 2.0	03/11/2021			03/15/2021 10:03	Beverly Y. Sanders	2230713
	03/11/2021			03/16/2021 09:19	Beverly Y. Sanders	2230710
EPA 365.1 Rev. 2.0	03/11/2021	03/15/2021 13:12	Yen Ta	03/17/2021 12:04	Shengyu Ding	2230713
	03/11/2021	03/15/2021 13:12	Yen Ta	03/17/2021 14:30	Shengyu Ding	2230710
EPA 365.1 Rev. 2.0 dissolved	03/11/2021			03/11/2021 13:50	Patrick M. Roche	2230714
	03/11/2021			03/11/2021 13:54	Patrick M. Roche	2230711
SM 2120 B-2011	03/11/2021			03/11/2021 16:05	Benjamin T. Nordmann	2230712
SM 2320 B-2011	03/11/2021			03/16/2021 23:40	Dale L. Simmons	2230712
	03/11/2021			03/17/2021 01:11	Dale L. Simmons	2230709
SM 2340B	03/11/2021			03/19/2021 16:33	Josef B Mick	2230718
SM 2540 C-2011	03/11/2021			03/15/2021 15:01	Yijie Li	2230712
SM 2540 D-2011	03/11/2021			03/15/2021 15:01	Yijie Li	2230709, 2230712
SM 4500 F-C-2011	03/11/2021			03/16/2021 23:40	Dale L. Simmons	2230712
	03/11/2021			03/17/2021 01:11	Dale L. Simmons	2230709
SM 5310 B-2011	03/11/2021			03/20/2021 03:19	Madeline Gruver	2230710
	03/11/2021			03/20/2021 03:30	Madeline Gruver	2230713