

Chemical Analysis Report

NW-DIST-2018-10-31-01

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

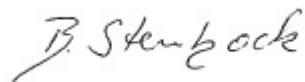
Event Description: **Escambia River Run**
Request ID: **RQ-2018-10-29-13**
Customer: **NW-DIST**
Project ID: **SMP**

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

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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 21-NOV-2018 13:00



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 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: ESCAMBIA RIVER UPSTREAM OF MITCHELL CREEK

Collection Date/Time: 10/30/2018 11:00

Field ID: G4NW0404

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2037861	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P354006	
	EPA 300.0 Rev. 2.1	Chloride	7.6		mg Cl/L	P354899	MS
		Sulfate	11		mg SO4/L	P354902	
	SM 2120 B	Color (true)	57		PCU	P354079	
	SM 2320 B-97	Total Alkalinity	32		mg CaCO3/L	P354357	
	SM 2540 C-97	TDS	77		mg/L	P354574	
	SM 2540 D-97	TSS	8	I	mg/L	P354497	
	SM 4500 F-C-97	Fluoride	0.037	I	mg F/L	P354363	
2037863	EPA 350.1 Rev. 2.0	Ammonia-N	0.074		mg N/L	P354507	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.33		mg N/L	P354290	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.34		mg N/L	P354294	
	EPA 365.1 Rev. 2.0	Total-P	0.049		mg P/L	P354186	
	SM 5310 B-00	Organic Carbon	4.4		mg C/L	P354254	
2037865	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.012		mg P/L	P354009	
2037876	EPA 200.7 Rev. 4.4	Calcium	12.0		mg/L	P354217	
		Iron	1.56E+03		ug/L	P354217	
		Magnesium	1.45		mg/L	P354217	
		Potassium	1.4		mg/L	P354217	
		Sodium	9.9		mg/L	P354217	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P354217	
		Arsenic	0.73		ug/L	P354217	
		Cadmium	0.020	U	ug/L	P354217	
		Chromium	0.87	I	ug/L	P354217	
		Copper	0.32	I	ug/L	P354217	
		Lead	0.34		ug/L	P354217	
		Nickel	0.64	I	ug/L	P354217	
		Silver	0.010	U	ug/L	P354217	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: ESCAMBIA RIVER DOWNSTREAM OF COTTON LAKE **Collection Date/Time: 10/30/2018 11:50**

Field ID: G4NW0403

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2037862	EPA 180.1 Rev. 2.0	Turbidity	11	A	NTU	P354006	
	EPA 300.0 Rev. 2.1	Chloride	7.5	A	mg Cl/L	P354900	
		Sulfate	10	A	mg SO4/L	P354903	
		Color (true)	53		PCU	P354079	
	SM 2320 B-97	Total Alkalinity	31		mg CaCO3/L	P354357	
	SM 2540 C-97	TDS	74		mg/L	P354574	
	SM 2540 D-97	TSS	10		mg/L	P354497	
	SM 4500 F-C-97	Fluoride	0.037	I	mg F/L	P354363	
2037864	EPA 350.1 Rev. 2.0	Ammonia-N	0.066		mg N/L	P354507	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.31		mg N/L	P354290	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P354294	
	EPA 365.1 Rev. 2.0	Total-P	0.050		mg P/L	P354186	
	SM 5310 B-00	Organic Carbon	4.3		mg C/L	P354254	
2037866	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.024		mg P/L	P354009	
2037877	EPA 200.7 Rev. 4.4	Calcium	11.6		mg/L	P354217	
		Iron	1.40E+03		ug/L	P354217	
		Magnesium	1.47		mg/L	P354217	
		Potassium	1.4		mg/L	P354217	
		Sodium	9.7		mg/L	P354217	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P354217	
		Arsenic	0.67		ug/L	P354217	
		Cadmium	0.020	U	ug/L	P354217	
		Chromium	0.57	I	ug/L	P354217	
		Copper	0.29	I	ug/L	P354217	
		Lead	0.29		ug/L	P354217	
		Nickel	0.58	I	ug/L	P354217	
		Silver	0.010	U	ug/L	P354217	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: ESCAMBIA RIVER UPSTREAM GULF POWER DISCHARGE **Collection Date/Time: 10/30/2018 13:15**

Field ID: G4NW0264

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2037867	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P354006	
	EPA 300.0 Rev. 2.1	Chloride	410		mg Cl/L	P354900	
		Sulfate	70		mg SO4/L	P354903	
	SM 2120 B	Color (true)	39	A	PCU	P354079	
	SM 2320 B-97	Total Alkalinity	29		mg CaCO3/L	P354357	
	SM 2540 C-97	TDS	833		mg/L	P354575	
	SM 2540 D-97	TSS	6	I	mg/L	P354498	
	SM 4500 F-C-97	Fluoride	0.059	I	mg F/L	P354363	
2037868	EPA 350.1 Rev. 2.0	Ammonia-N	0.045		mg N/L	P354507	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.30		mg N/L	P354290	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.34		mg N/L	P354294	
	EPA 365.1 Rev. 2.0	Total-P	0.036		mg P/L	P354186	
	SM 5310 B-00	Organic Carbon	4.6		mg C/L	P354254	
2037869	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.012		mg P/L	P354009	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P354006

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P354217

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/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: P354217

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354899

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354900

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354902

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354903

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354507

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P354290

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P354294

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P354186

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P354009

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

Reference Method: SM 2120 B
Batch ID: P354079

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P354357

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

Reference Method: SM 2540 C-97
Batch ID: P354574

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P354575

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P354497

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P354498

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P354363

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P354254

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: P354217

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	108		P	85 - 115
Iron	108		P	85 - 115
Magnesium	113		P	85 - 115
Potassium	109		P	85 - 115
Sodium	112		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P354217

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	105		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	101		P	85 - 115
Copper	102		P	85 - 115
Lead	99.4		P	85 - 115
Nickel	102		P	85 - 115
Silver	96.4		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354899

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354900

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354902

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354903

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354507

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P354290

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P354294

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P354186

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P354009

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

Reference Method: SM 2120 B
Batch ID: P354079

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.8		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P354357

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P354363

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	101		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P354254

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P354217

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037787	Calcium	109		P	80 - 120
2037787	Iron	110		P	80 - 120
2037787	Magnesium	111		P	80 - 120
2037787	Potassium	112		P	80 - 120
2037787	Sodium	110		P	80 - 120
2037787	Zinc	107		P	80 - 120
2037931	Calcium	110		P	80 - 120
2037931	Iron	106		P	80 - 120
2037931	Magnesium	114	114	P/P	80 - 120
2037931	Potassium	117	116	P/P	80 - 120
2037931	Sodium	111	112	P/P	80 - 120
2037931	Zinc	105	106	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P354217

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037787	Arsenic	103		P	80 - 120
2037787	Cadmium	101		P	80 - 120
2037787	Chromium	103		P	80 - 120
2037787	Copper	100		P	80 - 120
2037787	Lead	98.5		P	80 - 120
2037787	Nickel	100		P	80 - 120
2037787	Silver	94.0		P	80 - 120
2037931	Arsenic	104	103	P/P	80 - 120
2037931	Cadmium	105	104	P/P	80 - 120
2037931	Chromium	102	102	P/P	80 - 120
2037931	Copper	99.7	99.4	P/P	80 - 120
2037931	Lead	99.2	98.5	P/P	80 - 120
2037931	Nickel	100	99.7	P/P	80 - 120
2037931	Silver	97.6	97.6	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354899

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037278	Chloride	90.0		P	90 - 110
2037582	Chloride	86.0		F	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354900

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037862	Chloride	101		P	90 - 110
2037914	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354902

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037278	Sulfate	95.9		P	90 - 110
2037582	Sulfate	90.6		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354903

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037862	Sulfate	97.0		P	90 - 110
2037914	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354507

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037917	Ammonia-N	99.6	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P354290

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037864	Kjeldahl Nitrogen	104	99.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P354294

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037803	NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P354186

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037863	Total-P	101	99.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P354009

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037865	O-Phosphate-P	98.9	98.0	P/P	90 - 110

Reference Method: SM 5310 B-00
Batch ID: P354254

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2037802	Organic Carbon	100		P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P354006

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037862	Turbidity	0.913	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P354217

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037931	Calcium	0.493	Spike	P	0 - 20
2037931	Iron	0.557	Spike	P	0 - 20
2037931	Magnesium	0.406	Spike	P	0 - 20
2037931	Potassium	0.861	Spike	P	0 - 20
2037931	Sodium	0.488	Spike	P	0 - 20
2037931	Zinc	0.619	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P354217

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037931	Arsenic	0.157	Spike	P	0 - 20
2037931	Cadmium	0.945	Spike	P	0 - 20
2037931	Chromium	0.536	Spike	P	0 - 20
2037931	Copper	0.317	Spike	P	0 - 20
2037931	Lead	0.663	Spike	P	0 - 20
2037931	Nickel	0.395	Spike	P	0 - 20
2037931	Silver	0.0233	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354899

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037278	Chloride	3.44	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354900

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037862	Chloride	0.445	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P354903

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037862	Sulfate	0.128	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P354507

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037917	Ammonia-N	1.12	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P354290

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037864	Kjeldahl Nitrogen	3.60	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P354294

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037803	NO2NO3-N	0.717	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P354186

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037863	Total-P	0.671	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P354009

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037865	O-Phosphate-P	0.814	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P354079

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037867	Color (true)	5.63	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P354357

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037675	Total Alkalinity	0.756	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P354574

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037800	TDS	6.15	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P354575

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2038050	TDS	2.76	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P354363

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037675	Fluoride	0.469	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P354254

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2037802	Organic Carbon	0.710	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A87427

Included Lab Sample IDs: 2037861, 2037862, 2037867

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A87428

Included Lab Sample IDs: 2037865, 2037866, 2037869

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.4	96.8	P/P	90 - 110
O-Phosphate-P	99.6	100	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A87462

Included Lab Sample IDs: 2037861, 2037862, 2037867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.0	102	P/P	85 - 115

Reference Method: SM 5310 B-00

Run ID: A87546

Included Lab Sample IDs: 2037863, 2037864, 2037868

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.0	96.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A87560

Included Lab Sample IDs: 2037863, 2037864, 2037868

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A87578

Included Lab Sample IDs: 2037863, 2037864, 2037868

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	98.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A87579

Included Lab Sample IDs: 2037876, 2037877

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	106	100	P/P	90 - 110
Iron	105	100	P/P	90 - 110
Magnesium	106	101	P/P	90 - 110
Potassium	105	98.8	P/P	90 - 110
Sodium	109	99.6	P/P	90 - 110
Zinc	106	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 2320 B-97

Run ID: A87599

Included Lab Sample IDs: 2037861, 2037862, 2037867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A87599

Included Lab Sample IDs: 2037861, 2037862, 2037867

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A87623

Included Lab Sample IDs: 2037876, 2037877

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	102	102	P/P	90 - 110
Cadmium	99.9	101	P/P	90 - 110
Chromium	101	100	P/P	90 - 110
Copper	100	101	P/P	90 - 110
Lead	100	100	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Silver	94.1	94.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A87636

Included Lab Sample IDs: 2037863, 2037864, 2037868

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A87674

Included Lab Sample IDs: 2037863, 2037864, 2037868

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A87809

Included Lab Sample IDs: 2037861, 2037862, 2037867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	104	P/P	90 - 110
Chloride	103	102	P/P	90 - 110
Chloride	98.0	102	P/P	90 - 110
Sulfate	100	102	P/P	90 - 110
Sulfate	101	100	P/P	90 - 110
Sulfate	95.9	100	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			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.913	
EPA 200.7 Rev. 4.4	Calcium	108	109	110				0.493
	Iron	108	110	106				0.557
	Magnesium	113	111	114	114			0.406
	Potassium	109	112	117	116			0.861
	Sodium	112	110	111	112			0.488
	Zinc	105	107	105	106			0.619
EPA 200.8 Rev. 5.4	Arsenic	105	103	104	103			0.157
	Cadmium	102	101	105	104			0.945
	Chromium	101	103	102	102			0.536
	Copper	102	100	99.7	99.4			0.317
	Lead	99.4	98.5	99.2	98.5			0.663
	Nickel	102	100	100	99.7			0.395
	Silver	96.4	94.0	97.6	97.6			0.0233
EPA 300.0 Rev. 2.1	Chloride	104	90.0	86.0			3.44	
	Chloride	103	101	102			0.445	
	Sulfate	101	95.9	90.6				
	Sulfate	99.5	97.0	100			0.128	
EPA 350.1 Rev. 2.0	Ammonia-N	97.1	99.6	101				1.12
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	104	99.4				3.60
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	104					0.717
EPA 365.1 Rev. 2.0	Total-P	102	101	99.9				0.671
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	98.9	98.0				0.814
SM 2120 B	Color (true)	97.8					5.63	
SM 2320 B-97	Total Alkalinity	101					0.756	
SM 2540 C-97	TDS						6.15	
	TDS						2.76	
SM 4500 F-C-97	Fluoride	101						0.469
SM 5310 B-00	Organic Carbon	98.2	100					0.710

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2037861, 2037862, 2037867
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2037876, 2037877
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2037876, 2037877
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2037861, 2037862, 2037867
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2037861, 2037862, 2037867
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2037863, 2037864, 2037868
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2037863, 2037864, 2037868
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2037863, 2037864, 2037868
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2037863, 2037864, 2037868
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2037865, 2037866, 2037869
SM 2120 B / E31780	True Color measured at 450 nm	2037861, 2037862, 2037867
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2037861, 2037862, 2037867

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2037861, 2037862, 2037867
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2037861, 2037862, 2037867
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2037861, 2037862, 2037867
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2037863, 2037864, 2037868

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	10/31/2018			10/31/2018 15:58	Megan Treadwell	2037861, 2037862, 2037867
EPA 200.7 Rev. 4.4	10/31/2018	11/05/2018 14:50	Elliott D. Healy	11/06/2018 16:28	Betina Topolski	2037876
	10/31/2018	11/05/2018 14:50	Elliott D. Healy	11/06/2018 16:35	Betina Topolski	2037877
EPA 200.8 Rev. 5.4	10/31/2018	11/05/2018 14:50	Elliott D. Healy	11/07/2018 17:36	Allison Taylor	2037876
	10/31/2018	11/05/2018 14:50	Elliott D. Healy	11/07/2018 17:46	Allison Taylor	2037877
EPA 300.0 Rev. 2.1	10/31/2018			11/16/2018 02:47	Lipi Saha	2037861
	10/31/2018			11/16/2018 05:36	Lipi Saha	2037862
	10/31/2018			11/16/2018 08:37	Lipi Saha	2037867
EPA 350.1 Rev. 2.0	10/31/2018			11/08/2018 11:30	Ping Hua	2037863
	10/31/2018			11/08/2018 11:49	Ping Hua	2037868
	10/31/2018			11/08/2018 14:43	Ping Hua	2037864
EPA 351.2 Rev. 2.0	10/31/2018	11/06/2018 12:30	Adrian Shelby	11/08/2018 10:25	Joseph Suarez	2037863
	10/31/2018	11/06/2018 12:30	Adrian Shelby	11/08/2018 10:26	Joseph Suarez	2037864
	10/31/2018	11/06/2018 12:30	Adrian Shelby	11/08/2018 10:31	Joseph Suarez	2037868
EPA 353.2 Rev. 2.0	10/31/2018			11/06/2018 12:11	Lauren Bottorf	2037863
	10/31/2018			11/06/2018 12:12	Lauren Bottorf	2037864
	10/31/2018			11/06/2018 12:13	Lauren Bottorf	2037868
EPA 365.1 Rev. 2.0	10/31/2018	11/05/2018 11:55	Sima Feizi	11/06/2018 16:18	Beverly Y. Sanders	2037863
	10/31/2018	11/05/2018 11:55	Sima Feizi	11/06/2018 16:19	Beverly Y. Sanders	2037864
	10/31/2018	11/05/2018 11:55	Sima Feizi	11/06/2018 16:20	Beverly Y. Sanders	2037868
EPA 365.1 Rev. 2.0 dissolved	10/31/2018			10/31/2018 15:43	Julia Storbeck	2037865
	10/31/2018			10/31/2018 16:21	Julia Storbeck	2037866
	10/31/2018			10/31/2018 16:22	Julia Storbeck	2037869
SM 2120 B	10/31/2018			10/31/2018 15:42	Chelsea Hernandez	2037861
	10/31/2018			10/31/2018 15:43	Chelsea Hernandez	2037862
	10/31/2018			10/31/2018 15:44	Chelsea Hernandez	2037867
SM 2320 B-97	10/31/2018			11/07/2018 05:29	Dale L. Simmons	2037861
	10/31/2018			11/07/2018 05:40	Dale L. Simmons	2037862
	10/31/2018			11/07/2018 05:50	Dale L. Simmons	2037867
SM 2540 C-97	10/31/2018			11/02/2018 16:03	Yijie Li	2037861, 2037862, 2037867
SM 2540 D-97	10/31/2018			11/02/2018 16:03	Yijie Li	2037861, 2037862, 2037867
SM 4500 F-C-97	10/31/2018			11/07/2018 05:29	Dale L. Simmons	2037861
	10/31/2018			11/07/2018 05:40	Dale L. Simmons	2037862
	10/31/2018			11/07/2018 05:50	Dale L. Simmons	2037867
SM 5310 B-00	10/31/2018			11/06/2018 04:43	Megan Treadwell	2037863
	10/31/2018			11/06/2018 04:55	Megan Treadwell	2037864
	10/31/2018			11/06/2018 05:08	Megan Treadwell	2037868