Chemical Analysis Report

NW-DIST-2019-02-26-01

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

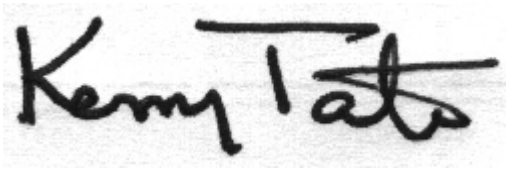
Event Description: **SHOAL RIVER**
Request ID: **RQ-2019-02-25-10**
Customer: **NW-DIST**
Project ID: **SMP**

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 18-MAR-2019 10:54



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: Yellow River below Nichols Creek Confluence **Collection Date/Time: 02/25/2019 10:35**

Field ID: G4NW0270 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2065194	EPA 180.1 Rev. 2.0	Turbidity	12	A	NTU	P359530	
	EPA 300.0 Rev. 2.1	Chloride	3.5		mg Cl/L	P360201	
		Sulfate	0.99		mg SO4/L	P360206	
	SM 2120 B	Color (true)	53	A	PCU	P359540	
	SM 2320 B-97	Total Alkalinity	10		mg CaCO3/L	P359772	
	SM 2540 C-97	TDS	39		mg/L	P359869	
	SM 2540 D-97	TSS	10		mg/L	P359832	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P359775	
2065195	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P359687	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.35		mg N/L	P359604	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.21		mg N/L	P359732	
	EPA 365.1 Rev. 2.0	Total-P	0.026		mg P/L	P359599	
	SM 5310 B-00	Organic Carbon	3.2		mg C/L	P359747	
2065196	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P359543	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Yellow River below Trammel Creek **Collection Date/Time: 02/25/2019 11:55**

Field ID: G4NW0311 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2065188	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P359530	
	EPA 300.0 Rev. 2.1	Chloride	3.9		mg Cl/L	P360201	
		Sulfate	0.99		mg SO4/L	P360206	
	SM 2120 B	Color (true)	49		PCU	P359540	
	SM 2320 B-97	Total Alkalinity	18		mg CaCO3/L	P359772	
	SM 2540 C-97	TDS	46		mg/L	P359869	
	SM 2540 D-97	TSS	15		mg/L	P359832	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P359775	
2065190	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P359687	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P359604	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.24		mg N/L	P359732	
	EPA 365.1 Rev. 2.0	Total-P	0.031		mg P/L	P359599	
	SM 5310 B-00	Organic Carbon	3.7		mg C/L	P359747	
2065192	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P359543	
2065204	EPA 200.7 Rev. 4.4	Barium	16.8		ug/L	P359631	
		Calcium	7.28		mg/L	P359631	
		Iron	1.13E+03		ug/L	P359631	
		Magnesium	1.61		mg/L	P359631	
		Potassium	0.67	I	mg/L	P359631	
		Sodium	2.5		mg/L	P359631	
		Zinc	5.0	U	ug/L	P359631	
	EPA 200.8 Rev. 5.4	Aluminum	347		ug/L	P359631	
		Antimony	0.050	U	ug/L	P359631	
		Arsenic	0.58		ug/L	P359631	
		Boron**	9.5		ug/L	P359631	
		Cadmium	0.020	U	ug/L	P359631	
		Chromium	2.6		ug/L	P359631	
		Copper	0.40	U	ug/L	P359631	
		Lead	0.40		ug/L	P359631	
		Nickel	3.6		ug/L	P359631	
		Selenium	0.20	U	ug/L	P359631	MS
		Silver	0.010	U	ug/L	P359631	
		Thallium	0.10	U	ug/L	P359631	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Shoal River below Juniper Creek **Collection Date/Time: 02/25/2019 12:40**

Field ID: G4NW0024 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2065189	EPA 180.1 Rev. 2.0	Turbidity	4.8		NTU	P359530	
	EPA 300.0 Rev. 2.1	Chloride	3.2		mg Cl/L	P360201	
		Sulfate	1.1		mg SO4/L	P360206	
	SM 2120 B	Color (true)	48		PCU	P359540	
	SM 2320 B-97	Total Alkalinity	3.7		mg CaCO3/L	P359772	
	SM 2540 C-97	TDS	21	I	mg/L	P359869	
	SM 2540 D-97	TSS	10		mg/L	P359832	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P359775	
2065191	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P359687	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.25		mg N/L	P359604	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.27		mg N/L	P359732	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P359599	
	SM 5310 B-00	Organic Carbon	3.3		mg C/L	P359747	
2065193	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P359543	
2065205	EPA 200.7 Rev. 4.4	Barium	14.5		ug/L	P359631	
		Calcium	1.81		mg/L	P359631	
		Iron	470		ug/L	P359631	
		Magnesium	0.86		mg/L	P359631	
		Potassium	0.48	I	mg/L	P359631	
		Sodium	1.8	I	mg/L	P359631	
		Zinc	5.0	U	ug/L	P359631	
	EPA 200.8 Rev. 5.4	Aluminum	234		ug/L	P359631	
		Antimony	0.050	U	ug/L	P359631	
		Arsenic	0.28		ug/L	P359631	
		Boron**	8.8		ug/L	P359631	
		Cadmium	0.020	U	ug/L	P359631	
		Chromium	0.40	U	ug/L	P359631	
		Copper	0.40	U	ug/L	P359631	
		Lead	0.32	I	ug/L	P359631	
		Nickel	0.50	U	ug/L	P359631	
		Selenium	0.20	U	ug/L	P359631	MS
		Silver	0.010	U	ug/L	P359631	
		Thallium	0.10	U	ug/L	P359631	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Shoal River below Titi Creek **Collection Date/Time: 02/25/2019 13:10**

Field ID: G4NW0410 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2065185	EPA 180.1 Rev. 2.0	Turbidity	5.9		NTU	P359530	
	EPA 300.0 Rev. 2.1	Chloride	3.2		mg Cl/L	P360201	
		Sulfate	1.1		mg SO4/L	P360206	
	SM 2120 B	Color (true)	48		PCU	P359540	
	SM 2320 B-97	Total Alkalinity	3.5		mg CaCO3/L	P359772	
	SM 2540 C-97	TDS	27		mg/L	P359869	
	SM 2540 D-97	TSS	8	I	mg/L	P359832	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P359775	
2065186	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P359687	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26		mg N/L	P359604	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.28		mg N/L	P359732	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P359599	
	SM 5310 B-00	Organic Carbon	3.5		mg C/L	P359747	
2065187	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P359543	
2065203	EPA 200.7 Rev. 4.4	Barium	14.4		ug/L	P359631	
		Calcium	1.82		mg/L	P359631	
		Iron	510		ug/L	P359631	
		Magnesium	0.89		mg/L	P359631	
		Potassium	0.52	I	mg/L	P359631	
		Sodium	1.8	I	mg/L	P359631	
		Zinc	5.0	U	ug/L	P359631	
	EPA 200.8 Rev. 5.4	Aluminum	262		ug/L	P359631	
		Antimony	0.050	U	ug/L	P359631	
		Arsenic	0.29		ug/L	P359631	
		Boron**	8.8		ug/L	P359631	
		Cadmium	0.020	U	ug/L	P359631	
		Chromium	0.40	U	ug/L	P359631	
		Copper	0.40	U	ug/L	P359631	
		Lead	0.31	I	ug/L	P359631	
		Nickel	0.50	U	ug/L	P359631	
		Selenium	0.20	U	ug/L	P359631	MS
		Silver	0.010	U	ug/L	P359631	
		Thallium	0.10	U	ug/L	P359631	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: 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: P359530

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P359631

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
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: P359631

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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: P360201

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360206

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359687

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359604

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P359732

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P359599

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P359543

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

Reference Method: SM 2120 B
Batch ID: P359540

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P359772

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

Reference Method: SM 2540 C-97
Batch ID: P359869

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P359832

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P359775

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P359747

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: P359631

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	104		P	85 - 115
Calcium	103		P	85 - 115
Iron	107		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	110		P	85 - 115
Sodium	111		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P359631

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	108		P	85 - 115
Boron	107		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	105		P	85 - 115
Copper	108		P	85 - 115
Lead	105		P	85 - 115
Nickel	105		P	85 - 115
Selenium	103		P	85 - 115
Silver	101		P	85 - 115
Thallium	106		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360201

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360206

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359687

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359604

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P359732

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P359599

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P359543

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.9		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P359540

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.1		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P359772

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

Reference Method: SM 4500 F-C-97
Batch ID: P359775

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.6		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P359747

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P359631

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065279	Barium	101		P	80 - 120
2065279	Calcium	101		P	80 - 120
2065279	Iron	105		P	80 - 120
2065279	Magnesium	101		P	80 - 120
2065279	Potassium	104		P	80 - 120
2065279	Sodium	101		P	80 - 120
2065279	Zinc	102		P	80 - 120
2065351	Barium	100	101	P/P	80 - 120
2065351	Calcium	101		P	80 - 120
2065351	Iron	105	105	P/P	80 - 120
2065351	Magnesium	99.7		P	80 - 120
2065351	Potassium	106	106	P/P	80 - 120
2065351	Sodium	104	106	P/P	80 - 120
2065351	Zinc	99.3	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P359631

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065279	Aluminum	100		P	80 - 120
2065279	Antimony	103		P	80 - 120
2065279	Arsenic	108		P	80 - 120
2065279	Boron	105		P	80 - 120
2065279	Cadmium	106		P	80 - 120
2065279	Chromium	102		P	80 - 120
2065279	Copper	106		P	80 - 120
2065279	Lead	104		P	80 - 120
2065279	Nickel	102		P	80 - 120
2065279	Selenium	54.6		F	80 - 120
2065279	Silver	101		P	80 - 120
2065279	Thallium	106		P	80 - 120
2065351	Aluminum	101	102	P/P	80 - 120
2065351	Antimony	103	103	P/P	80 - 120
2065351	Arsenic	108	108	P/P	80 - 120
2065351	Boron	105	105	P/P	80 - 120
2065351	Cadmium	104	106	P/P	80 - 120
2065351	Chromium	104	105	P/P	80 - 120
2065351	Copper	105	105	P/P	80 - 120
2065351	Lead	105	105	P/P	80 - 120
2065351	Nickel	104	104	P/P	80 - 120
2065351	Selenium	102	103	P/P	80 - 120
2065351	Silver	103	103	P/P	80 - 120
2065351	Thallium	106	107	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360201

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2064842	Chloride	101	99.9	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360206

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2064842	Sulfate	100	98.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359687

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065186	Ammonia-N	102	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P359732

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2064846	NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P359599

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065190	Total-P	99.3	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P359543

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065193	O-Phosphate-P	98.4	99.0	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P359775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2065341	Fluoride	95.6	95.6	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P359747

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2064844	Organic Carbon	97.3	96.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P359530

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065194	Turbidity	8.00	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P359631

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065351	Barium	0.609	Spike	P	0 - 20
2065351	Calcium	2.29	Spike	P	0 - 20
2065351	Iron	0.503	Spike	P	0 - 20
2065351	Magnesium	2.53	Spike	P	0 - 20
2065351	Potassium	0.429	Spike	P	0 - 20
2065351	Sodium	1.40	Spike	P	0 - 20
2065351	Zinc	0.654	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P359631

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065351	Aluminum	0.688	Spike	P	0 - 20
2065351	Antimony	0.322	Spike	P	0 - 20
2065351	Arsenic	0.424	Spike	P	0 - 20
2065351	Boron	0.191	Spike	P	0 - 20
2065351	Cadmium	1.19	Spike	P	0 - 20
2065351	Chromium	0.810	Spike	P	0 - 20
2065351	Copper	0.254	Spike	P	0 - 20
2065351	Lead	0.281	Spike	P	0 - 20
2065351	Nickel	0.717	Spike	P	0 - 20
2065351	Selenium	1.42	Spike	P	0 - 20
2065351	Silver	0.165	Spike	P	0 - 20
2065351	Thallium	1.02	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360201

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2064842	Chloride	0.729	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360206

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2064842	Sulfate	1.58	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P359687

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065186	Ammonia-N	0.613	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P359604

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2064859	Kjeldahl Nitrogen	0.848	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P359732

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2064846	NO2NO3-N	0.957	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P359599

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065190	Total-P	3.04	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P359543

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065193	O-Phosphate-P	0.608	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P359540

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065194	Color (true)	2.95	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P359772

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065341	Total Alkalinity	0.0152	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P359869

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065263	TDS	3.31	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P359775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2065341	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P359747

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2064844	Organic Carbon	0.384	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: A89660
Included Lab Sample IDs: 2065185, 2065188, 2065189, 2065194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	100	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A89662
Included Lab Sample IDs: 2065185, 2065188, 2065189, 2065194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.7	99.4	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A89663
Included Lab Sample IDs: 2065187, 2065192, 2065193, 2065196

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	98.3	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A89722
Included Lab Sample IDs: 2065186, 2065190, 2065191, 2065195

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A89725
Included Lab Sample IDs: 2065186, 2065190, 2065191, 2065195

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A89727
Included Lab Sample IDs: 2065186, 2065190, 2065191, 2065195

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A89732
Included Lab Sample IDs: 2065203, 2065204, 2065205

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	99.8	P/P	95 - 105
Calcium	99.6	101	P/P	95 - 105
Iron	99.4	98.8	P/P	95 - 105
Magnesium	101	99.4	P/P	95 - 105
Potassium	99.1	100	P/P	95 - 105
Sodium	98.3	101	P/P	95 - 105
Zinc	101	99.3	P/P	95 - 105

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A89733
Included Lab Sample IDs: 2065186, 2065190, 2065191, 2065195

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	103	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A89740
Included Lab Sample IDs: 2065186, 2065190, 2065191, 2065195

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.5	94.9	P/P	90 - 110
Organic Carbon	94.9	94.3	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A89746
Included Lab Sample IDs: 2065185, 2065188, 2065189, 2065194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	99.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A89746
Included Lab Sample IDs: 2065185, 2065188, 2065189, 2065194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.6	99.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A89761
Included Lab Sample IDs: 2065203, 2065204, 2065205

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	97.6	P/P	90 - 110
Aluminum	100	100	P/P	90 - 110
Antimony	96.7	96.7	P/P	90 - 110
Antimony	97.2	96.7	P/P	90 - 110
Arsenic	101	99.9	P/P	90 - 110
Arsenic	101	101	P/P	90 - 110
Boron	100	99.7	P/P	90 - 110
Boron	99.7	101	P/P	90 - 110
Cadmium	97.2	96.6	P/P	90 - 110
Cadmium	97.6	97.2	P/P	90 - 110
Chromium	100	100	P/P	90 - 110
Chromium	101	100	P/P	90 - 110
Copper	104	104	P/P	90 - 110
Copper	105	104	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Lead	102	101	P/P	90 - 110
Nickel	101	100	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Selenium	98.1	97.2	P/P	90 - 110
Selenium	99.1	98.1	P/P	90 - 110
Silver	95.7	95.6	P/P	90 - 110
Silver	96.4	95.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A89761
Included Lab Sample IDs: 2065203, 2065204, 2065205

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Thallium	99.6	100	P/P	90 - 110
Thallium	99.8	99.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A89885
Included Lab Sample IDs: 2065185, 2065188, 2065189, 2065194

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Chloride	101	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110
Sulfate	101	101	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						8.00	
EPA 200.7 Rev. 4.4	Barium	104	101	100	101			0.609
	Calcium	103	101	101				2.29
	Iron	107	105	105	105			0.503
	Magnesium	102	101	99.7				2.53
	Potassium	110	104	106	106			0.429
	Sodium	111	101	104	106			1.40
	Zinc	103	102	99.3	100			0.654
EPA 200.8 Rev. 5.4	Aluminum	103	100	101	102			0.688
	Antimony	102	103	103	103			0.322
	Arsenic	108	108	108	108			0.424
	Boron	107	105	105	105			0.191
	Cadmium	104	106	104	106			1.19
	Chromium	105	102	104	105			0.810
	Copper	108	106	105	105			0.254
	Lead	105	104	105	105			0.281
	Nickel	105	102	104	104			0.717
	Selenium	103	54.6	102	103			1.42
	Silver	101	101	103	103			0.165
	Thallium	106	106	106	107			1.02
EPA 300.0 Rev. 2.1	Chloride	101	101	99.9				0.729
	Sulfate	101	100	98.8				1.58
EPA 350.1 Rev. 2.0	Ammonia-N	101	102	101				0.613
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105						0.848
EPA 353.2 Rev. 2.0	NO2NO3-N	100	102	101				0.957
EPA 365.1 Rev. 2.0	Total-P	101	99.3	103				3.04
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.9	98.4	99.0				0.608
SM 2120 B	Color (true)	99.1					2.95	
SM 2320 B-97	Total Alkalinity	101					0.0152	
SM 2540 C-97	TDS						3.31	
SM 4500 F-C-97	Fluoride	95.6	95.6	95.6				0.0
SM 5310 B-00	Organic Carbon	96.8	97.3	96.9				0.384

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2065185, 2065188, 2065189, 2065194
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2065203, 2065204, 2065205
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2065203, 2065204, 2065205
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2065185, 2065188, 2065189, 2065194
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2065185, 2065188, 2065189, 2065194
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2065186, 2065190, 2065191, 2065195
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2065186, 2065190, 2065191, 2065195
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2065186, 2065190, 2065191, 2065195
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2065186, 2065190, 2065191, 2065195

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2065187, 2065192, 2065193, 2065196
SM 2120 B / E31780	True Color measured at 450 nm	2065185, 2065188, 2065189, 2065194
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2065185, 2065188, 2065189, 2065194
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2065185, 2065188, 2065189, 2065194
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2065185, 2065188, 2065189, 2065194
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2065185, 2065188, 2065189, 2065194
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2065186, 2065190, 2065191, 2065195

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	02/26/2019			02/26/2019 15:15	Adrian Shelby	2065185, 2065188, 2065189, 2065194
EPA 200.7 Rev. 4.4	02/26/2019	02/27/2019 16:15	Elliott D. Healy	02/28/2019 15:31	Betina Topolski	2065203
	02/26/2019	02/27/2019 16:15	Elliott D. Healy	02/28/2019 15:34	Betina Topolski	2065204
	02/26/2019	02/27/2019 16:15	Elliott D. Healy	02/28/2019 15:39	Betina Topolski	2065205
EPA 200.8 Rev. 5.4	02/26/2019	02/27/2019 16:15	Elliott D. Healy	03/01/2019 17:06	Allison Taylor	2065203
	02/26/2019	02/27/2019 16:15	Elliott D. Healy	03/01/2019 17:44	Allison Taylor	2065204
	02/26/2019	02/27/2019 16:15	Elliott D. Healy	03/01/2019 17:54	Allison Taylor	2065205
EPA 300.0 Rev. 2.1	02/26/2019			03/08/2019 20:49	Lipi Saha	2065185
	02/26/2019			03/08/2019 21:34	Lipi Saha	2065188
	02/26/2019			03/08/2019 21:48	Lipi Saha	2065189
	02/26/2019			03/08/2019 22:03	Lipi Saha	2065194
EPA 350.1 Rev. 2.0	02/26/2019			02/28/2019 10:36	Ping Hua	2065186
	02/26/2019			02/28/2019 10:43	Ping Hua	2065190
	02/26/2019			02/28/2019 10:45	Ping Hua	2065191
	02/26/2019			02/28/2019 10:46	Ping Hua	2065195
EPA 351.2 Rev. 2.0	02/26/2019	02/27/2019 11:45	Adrian Shelby	02/28/2019 14:15	Joseph Suarez	2065186
	02/26/2019	02/27/2019 11:45	Adrian Shelby	02/28/2019 14:17	Joseph Suarez	2065190
	02/26/2019	02/27/2019 11:45	Adrian Shelby	02/28/2019 14:18	Joseph Suarez	2065191
	02/26/2019	02/27/2019 11:45	Adrian Shelby	02/28/2019 14:20	Joseph Suarez	2065195
EPA 353.2 Rev. 2.0	02/26/2019			02/28/2019 10:42	Beverly Y. Sanders	2065186
	02/26/2019			02/28/2019 10:43	Beverly Y. Sanders	2065190
	02/26/2019			02/28/2019 10:45	Beverly Y. Sanders	2065191
	02/26/2019			02/28/2019 10:46	Beverly Y. Sanders	2065195
EPA 365.1 Rev. 2.0	02/26/2019	02/27/2019 12:40	Sima Feizi	02/28/2019 14:45	Rosalyn Ballman	2065186
	02/26/2019	02/27/2019 12:40	Sima Feizi	02/28/2019 14:46	Rosalyn Ballman	2065190
	02/26/2019	02/27/2019 12:40	Sima Feizi	02/28/2019 14:47	Rosalyn Ballman	2065191
	02/26/2019	02/27/2019 12:40	Sima Feizi	02/28/2019 14:48	Rosalyn Ballman	2065195
EPA 365.1 Rev. 2.0 dissolved	02/26/2019			02/26/2019 15:10	Jhamieka S. Greenwood	2065193
	02/26/2019			02/26/2019 15:12	Jhamieka S. Greenwood	2065187
	02/26/2019			02/26/2019 15:13	Jhamieka S. Greenwood	2065192
	02/26/2019			02/26/2019 15:14	Jhamieka S. Greenwood	2065196
SM 2120 B	02/26/2019			02/26/2019 15:16	Chelsea Hernandez	2065185
	02/26/2019			02/26/2019 15:17	Chelsea Hernandez	2065188
	02/26/2019			02/26/2019 15:18	Chelsea Hernandez	2065189
	02/26/2019			02/26/2019 15:19	Chelsea Hernandez	2065194
SM 2320 B-97	02/26/2019			02/28/2019 20:34	Dale L. Simmons	2065185
	02/26/2019			02/28/2019 20:46	Dale L. Simmons	2065188
	02/26/2019			02/28/2019 20:59	Dale L. Simmons	2065189
	02/26/2019			02/28/2019 21:11	Dale L. Simmons	2065194
SM 2540 C-97	02/26/2019			02/27/2019 14:29	Yijie Li	2065185, 2065188, 2065189, 2065194

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 2540 D-97	02/26/2019			02/27/2019 14:29	Yijie Li	2065185, 2065188, 2065189, 2065194
SM 4500 F-C-97	02/26/2019			02/28/2019 20:34	Dale L. Simmons	2065185
	02/26/2019			02/28/2019 20:46	Dale L. Simmons	2065188
	02/26/2019			02/28/2019 20:59	Dale L. Simmons	2065189
	02/26/2019			02/28/2019 21:11	Dale L. Simmons	2065194
SM 5310 B-00	02/26/2019			03/01/2019 02:53	Chelsea Hernandez	2065186
	02/26/2019			03/01/2019 03:36	Chelsea Hernandez	2065190
	02/26/2019			03/01/2019 03:49	Chelsea Hernandez	2065191
	02/26/2019			03/01/2019 04:04	Chelsea Hernandez	2065195