Chemical Analysis Report

NW-DIST-2018-02-09-01

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-2018-02-05-28**
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

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 02-MAR-2018 13:56

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 **Collection Date/Time: 02/08/2018 11:00**

Field ID: G4NW0404 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1966258	EPA 180.1 Rev. 2.0	Turbidity	13	A	NTU	P339666	
	EPA 300.0 Rev. 2.1	Chloride	7.2	A	mg Cl/L	P340129	
		Sulfate	5.8	A	mg SO4/L	P340134	
	SM 2120 B	Color (true)	51	A	PCU	P339671	
	SM 2320 B-97	Total Alkalinity	23		mg CaCO3/L	P340307	
	SM 2540 C-97	TDS	57		mg/L	P339831	
	SM 2540 D-97	TSS	18		mg/L	P339798	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P340309	
1966260	EPA 350.1 Rev. 2.0	Ammonia-N	0.056		mg N/L	P340314	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26		mg N/L	P339710	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.27		mg N/L	P340237	
	EPA 365.1 Rev. 2.0	Total-P	0.043		mg P/L	P340339	
	SM 5310 B-00	Organic Carbon	3.8		mg C/L	P340161	
1966262	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.014		mg P/L	P339667	
1966273	EPA 200.7 Rev. 4.4	Calcium	9.44		mg/L	P339849	
		Iron	1.60E+03		ug/L	P339849	
		Magnesium	1.23		mg/L	P339849	
		Potassium	0.88	I	mg/L	P339849	
		Sodium	6.5		mg/L	P339849	
		Zinc	5.0	U	ug/L	P339849	
	EPA 200.8 Rev. 5.4	Arsenic	0.59		ug/L	P339849	
		Cadmium	0.020	U	ug/L	P339849	
		Chromium	1.2	I	ug/L	P339849	
		Copper	0.83		ug/L	P339849	
		Lead	0.55		ug/L	P339849	
		Nickel	0.97		ug/L	P339849	
		Silver	0.010	U	ug/L	P339849	

Sample Location: ESCAMBIA RIVER DOWNSTREAM **Collection Date/Time: 02/08/2018 11:45**

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1966259	EPA 180.1 Rev. 2.0	Turbidity	10		NTU	P339666	
	EPA 300.0 Rev. 2.1	Chloride	6.1		mg Cl/L	P340129	
		Sulfate	6.3		mg SO4/L	P340134	
	SM 2120 B	Color (true)	42		PCU	P339671	
	SM 2320 B-97	Total Alkalinity	25		mg CaCO3/L	P340307	
	SM 2540 C-97	TDS	51		mg/L	P339832	
	SM 2540 D-97	TSS	10		mg/L	P339799	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P340309	
1966261	EPA 350.1 Rev. 2.0	Ammonia-N	0.049		mg N/L	P340314	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.28		mg N/L	P339710	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.28		mg N/L	P340237	
	EPA 365.1 Rev. 2.0	Total-P	0.039		mg P/L	P340339	

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1966261	SM 5310 B-00	Organic Carbon	3.1		mg C/L	P340161	
1966263	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.015		mg P/L	P339668	
1966274	EPA 200.7 Rev. 4.4	Calcium	10.2		mg/L	P339849	
		Iron	1.38E+03		ug/L	P339849	
		Magnesium	1.25		mg/L	P339849	
		Potassium	0.86	I	mg/L	P339849	
		Sodium	5.9		mg/L	P339849	
		Zinc	5.0	U	ug/L	P339849	
	EPA 200.8 Rev. 5.4	Arsenic	0.54		ug/L	P339849	
		Cadmium	0.020	U	ug/L	P339849	
		Chromium	1.2	I	ug/L	P339849	
		Copper	0.50	I	ug/L	P339849	
		Lead	0.41		ug/L	P339849	
		Nickel	0.84		ug/L	P339849	
		Silver	0.010	U	ug/L	P339849	

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

Sample Location: ESCAMBIA RIVER UPSTREAM **Collection Date/Time: 02/08/2018 12:55**

Field ID: G4NW0264 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1966264	EPA 180.1 Rev. 2.0	Turbidity	8.7		NTU	P339666	
	EPA 300.0 Rev. 2.1	Chloride	230		mg Cl/L	P340129	
		Sulfate	37		mg SO4/L	P340134	
	SM 2120 B	Color (true)	38		PCU	P339671	
	SM 2320 B-97	Total Alkalinity	24		mg CaCO3/L	P340307	
	SM 2540 C-97	TDS	442	A	mg/L	P339832	
	SM 2540 D-97	TSS	5	IA	mg/L	P339799	
	SM 4500 F-C-97	Fluoride	0.045	I	mg F/L	P340309	
1966265	EPA 350.1 Rev. 2.0	Ammonia-N	0.029		mg N/L	P340314	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26		mg N/L	P339710	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.28		mg N/L	P340237	
	EPA 365.1 Rev. 2.0	Total-P	0.028		mg P/L	P340339	
	SM 5310 B-00	Organic Carbon	3.1		mg C/L	P340161	
1966266	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.008	I	mg P/L	P339668	

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P339666

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339849

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: P339849

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: P340129

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340134

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340314

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339710

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340237

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340339

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339667

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339668

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

Reference Method: SM 2120 B
Batch ID: P339671

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P340307

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

Reference Method: SM 2540 C-97
Batch ID: P339831

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P339832

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P339798

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P339799

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P340309

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P340161

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: P339849

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	104		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	104		P	85 - 115
Sodium	107		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339849

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	102		P	85 - 115
Cadmium	99.1		P	85 - 115
Chromium	98.3		P	85 - 115
Copper	101		P	85 - 115
Lead	101		P	85 - 115
Nickel	103		P	85 - 115
Silver	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340129

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340134

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340314

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339710

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340237

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340339

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: P339667

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339668

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

Reference Method: SM 2320 B-97
Batch ID: P340307

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.7		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P340309

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.4		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P340161

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339849

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339849

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966085	Calcium	104		P	80 - 120
1966085	Iron	104		P	80 - 120
1966085	Magnesium	105		P	80 - 120
1966085	Potassium	101		P	80 - 120
1966085	Sodium	102		P	80 - 120
1966085	Zinc	100		P	80 - 120
1966406	Calcium	102		P	80 - 120
1966406	Iron	103		P	80 - 120
1966406	Magnesium	101		P	80 - 120
1966406	Potassium	108	109	P/P	80 - 120
1966406	Sodium	100	105	P/P	80 - 120
1966406	Zinc	97.2	98.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339849

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966085	Arsenic	104		P	80 - 120
1966085	Cadmium	101		P	80 - 120
1966085	Chromium	101		P	80 - 120
1966085	Copper	99.1		P	80 - 120
1966085	Lead	104		P	80 - 120
1966085	Nickel	101		P	80 - 120
1966085	Silver	105		P	80 - 120
1966406	Arsenic	105	103	P/P	80 - 120
1966406	Cadmium	100	99.6	P/P	80 - 120
1966406	Chromium	99.0	96.7	P/P	80 - 120
1966406	Copper	98.6	97.0	P/P	80 - 120
1966406	Lead	104	101	P/P	80 - 120
1966406	Nickel	102	100	P/P	80 - 120
1966406	Silver	105	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340129

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966258	Chloride	105		P	90 - 110
1966259	Chloride	104		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340134

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966258	Sulfate	106		P	90 - 110
1966259	Sulfate	105		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340314

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966232	Ammonia-N	97.1	98.1	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339710

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966231	Kjeldahl Nitrogen	103	96.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340237

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966198	NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340339

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966301	Total-P	96.1	92.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339667

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966234	O-Phosphate-P	95.7	96.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966266	O-Phosphate-P	96.3	96.3	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P340309

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1966399	Fluoride	102	97.4	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P340161

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1965817	Organic Carbon	109		P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P339666

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966258	Turbidity	3.75	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339849

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966406	Calcium	0.314	Spike	P	0 - 20
1966406	Iron	2.27	Spike	P	0 - 20
1966406	Magnesium	1.20	Spike	P	0 - 20
1966406	Potassium	1.49	Spike	P	0 - 20
1966406	Sodium	2.64	Spike	P	0 - 20
1966406	Zinc	1.64	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339849

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966406	Arsenic	1.89	Spike	P	0 - 20
1966406	Cadmium	0.890	Spike	P	0 - 20
1966406	Chromium	2.34	Spike	P	0 - 20
1966406	Copper	1.64	Spike	P	0 - 20
1966406	Lead	2.97	Spike	P	0 - 20
1966406	Nickel	1.58	Spike	P	0 - 20
1966406	Silver	2.07	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340129

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966258	Chloride	0.354	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P340134

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966258	Sulfate	0.282	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P340314

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966232	Ammonia-N	0.839	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P339710

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966231	Kjeldahl Nitrogen	3.67	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P340237

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966198	NO2NO3-N	0.402	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P340339

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966301	Total-P	2.45	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339667

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966234	O-Phosphate-P	0.417	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P339668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966266	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P339671

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966258	Color (true)	2.36	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P340307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966399	Total Alkalinity	0.158	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P339831

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966181	TDS	4.40	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P339832

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966264	TDS	2.94	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 2540 D-97
Batch ID: P339798

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966181	TSS	5.26	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P340309

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1966399	Fluoride	2.41	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P340161

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1965817	Organic Carbon	0.460	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 365.1 Rev. 2.0 dissolved
Run ID: A81961
Included Lab Sample IDs: 1966262, 1966263, 1966266

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	100	P/P	90 - 110
O-Phosphate-P	98.5	100	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A81962
Included Lab Sample IDs: 1966258, 1966259, 1966264

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	100	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A81963
Included Lab Sample IDs: 1966258, 1966259, 1966264

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.8	98.6	P/P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A82003
Included Lab Sample IDs: 1966258, 1966259, 1966264

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	105	106	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A82003
Included Lab Sample IDs: 1966258, 1966259, 1966264

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	108	105	P/P	90 - 110
Sulfate	103	107	P/P	90 - 110
Sulfate	107	103	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A82065
Included Lab Sample IDs: 1966273, 1966274

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.4	102	P/P	90 - 110
Cadmium	95.8	97.3	P/P	90 - 110
Chromium	97.1	96.4	P/P	90 - 110
Copper	99.4	101	P/P	90 - 110
Lead	97.8	98.1	P/P	90 - 110
Nickel	99.6	101	P/P	90 - 110
Silver	95.0	97.3	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A82069
Included Lab Sample IDs: 1966273, 1966274

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	100	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	99.8	100	P/P	90 - 110
Sodium	100	99.0	P/P	90 - 110
Zinc	101	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A82075
Included Lab Sample IDs: 1966260, 1966261, 1966265

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	103	P/P	90 - 110
Kjeldahl Nitrogen	103	98.0	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A82131
Included Lab Sample IDs: 1966260, 1966261, 1966265

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.8	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A82148
Included Lab Sample IDs: 1966260, 1966261, 1966265

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A82180
Included Lab Sample IDs: 1966260, 1966261, 1966265

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

Reference Method: SM 2320 B-97
Run ID: A82186
Included Lab Sample IDs: 1966258, 1966259, 1966264

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.1	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A82186
Included Lab Sample IDs: 1966258, 1966259, 1966264

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	97.6	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A82227
Included Lab Sample IDs: 1966260, 1966261, 1966265

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	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						3.75	
EPA 200.7 Rev. 4.4	Calcium	103	104	102				0.314
	Iron	104	104	103				2.27
	Magnesium	103	105	101				1.20
	Potassium	104	101	108	109			1.49
	Sodium	107	102	100	105			2.64
	Zinc	101	100	97.2	98.8			1.64
EPA 200.8 Rev. 5.4	Arsenic	102	104	105	103			1.89
	Cadmium	99.1	101	100	99.6			0.890
	Chromium	98.3	101	99.0	96.7			2.34
	Copper	101	99.1	98.6	97.0			1.64
	Lead	101	104	104	101			2.97
	Nickel	103	101	102	100			1.58
	Silver	104	105	105	103			2.07
EPA 300.0 Rev. 2.1	Chloride	104	105	104			0.354	
	Sulfate	104	106	105			0.282	
EPA 350.1 Rev. 2.0	Ammonia-N	103	97.1	98.1				0.839
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.8	103	96.4				3.67

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104				0.402
EPA 365.1 Rev. 2.0	Total-P	101	96.1	92.0			2.45
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.4	95.7	96.1			0.417
	O-Phosphate-P	102	96.3	96.3			0.0
SM 2120 B	Color (true)					2.36	
SM 2320 B-97	Total Alkalinity	99.7				0.158	
SM 2540 C-97	TDS					4.40	
	TDS					2.94	
SM 2540 D-97	TSS					5.26	
SM 4500 F-C-97	Fluoride	94.4	102	97.4			2.41
SM 5310 B-00	Organic Carbon	100	109				0.460

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1966258, 1966259, 1966264
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1966273, 1966274
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1966273, 1966274
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1966258, 1966259, 1966264
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1966258, 1966259, 1966264
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1966260, 1966261, 1966265
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1966260, 1966261, 1966265
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1966260, 1966261, 1966265
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1966260, 1966261, 1966265
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1966262, 1966263, 1966266
SM 2120 B / E31780	True Color measured at 450 nm	1966258, 1966259, 1966264
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1966258, 1966259, 1966264
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1966258, 1966259, 1966264
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1966258, 1966259, 1966264
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1966258, 1966259, 1966264
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1966260, 1966261, 1966265

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	02/09/2018			02/09/2018 13:52	Tanya Welborn	1966258, 1966259, 1966264
EPA 200.7 Rev. 4.4	02/09/2018	02/13/2018	Elliott D. Healy	02/14/2018	Betina Topolski	1966273, 1966274
EPA 200.8 Rev. 5.4	02/09/2018	02/13/2018	Elliott D. Healy	02/14/2018	Nadine Brooks	1966273, 1966274
EPA 300.0 Rev. 2.1	02/09/2018			02/16/2018	Julia Storbeck	1966258, 1966259, 1966264
EPA 350.1 Rev. 2.0	02/09/2018			02/20/2018	Ping Hua	1966260, 1966261, 1966265
EPA 351.2 Rev. 2.0	02/09/2018	02/12/2018	Adrian Shelby	02/15/2018	Joseph Suarez	1966260, 1966261, 1966265
EPA 353.2 Rev. 2.0	02/09/2018			02/19/2018	Lauren Bottorf	1966260, 1966261, 1966265
EPA 365.1 Rev. 2.0	02/09/2018	02/21/2018	Sima Feizi	02/22/2018	Lipi Saha	1966260, 1966261, 1966265
EPA 365.1 Rev. 2.0 dissolved	02/09/2018			02/09/2018 15:15	Megan Treadwell	1966266
	02/09/2018			02/09/2018 15:25	Megan Treadwell	1966262
	02/09/2018			02/09/2018 15:26	Megan Treadwell	1966263
SM 2120 B	02/09/2018			02/09/2018 15:05	Tanya Welborn	1966258
	02/09/2018			02/09/2018 15:06	Tanya Welborn	1966259
	02/09/2018			02/09/2018 15:07	Tanya Welborn	1966264
SM 2320 B-97	02/09/2018			02/20/2018	Lauren Bottorf	1966258, 1966259, 1966264
SM 2540 C-97	02/09/2018			02/11/2018	Yijie Li	1966258, 1966259, 1966264
SM 2540 D-97	02/09/2018			02/11/2018	Yijie Li	1966258, 1966259, 1966264
SM 4500 F-C-97	02/09/2018			02/20/2018	Lauren Bottorf	1966258, 1966259, 1966264
SM 5310 B-00	02/09/2018			02/17/2018	Megan Treadwell	1966260, 1966261, 1966265