

Chemical Analysis Report

SO-DIST-2018-01-25-01

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

Event Description: **Caloosahatchee Long-Term**

Request ID: **RQ-2018-01-15-27**

Customer: **SO-DIST**

Project ID: **BMAP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave/ Suite 364
Fort Myers, FL 33901
Attn: John Barrington

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Certified by: Colin Wright, Program Administrator

Date Certified: 14-FEB-2018 11:15

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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: CaloosaRvr @ USGS-Punta Blanca

Collection Date/Time: 01/24/2018 09:32

Field ID: SD012418-1

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1961885	SM 2320 B-97	Total Alkalinity	116		mg CaCO3/L	P339304	
	SM 2540 D-97	TSS	4	I	mg/L	P339067	
	SM 4500 F-C-97	Fluoride	0.94		mg F/L	P339308	
1961889	SM 5310 B-00 dissolved	Organic Carbon	7.2		mg C/L	P339207	
1961893	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P339041	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.42		mg N/L	P338828	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.006	I	mg N/L	P338857	
	EPA 365.1 Rev. 2.0	Total-P	0.041		mg P/L	P338959	
	SM 5310 B-00	Organic Carbon	7.4		mg C/L	P339207	
1961897	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.027		mg P/L	P338840	
1961909	EPA 200.7 Rev. 4.4	Iron	90	U	ug/L	P339023	
	EPA 200.8 Rev. 5.4	Arsenic	2.39		ug/L	P339023	
		Cadmium	0.060	U	ug/L	P339023	
		Chromium	1.2	U	ug/L	P339023	
		Copper	0.96	I	ug/L	P339023	
		Lead	0.50	U	ug/L	P339023	
		Nickel	0.60	U	ug/L	P339023	
		Silver	0.030	U	ug/L	P339023	
		Zinc	3.0	U	ug/L	P339023	

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: CaloosaRvr @ USGS-Shell Point

Collection Date/Time: 01/24/2018 10:05

Field ID: SD012418-2

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1961886	SM 2320 B-97	Total Alkalinity	117		mg CaCO3/L	P339304	
	SM 2540 D-97	TSS	3	U	mg/L	P339067	
	SM 4500 F-C-97	Fluoride	0.86		mg F/L	P339308	
1961890	SM 5310 B-00 dissolved	Organic Carbon	9.2		mg C/L	P339207	
1961894	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P339041	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.56		mg N/L	P338828	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P338857	
	EPA 365.1 Rev. 2.0	Total-P	0.041		mg P/L	P338959	
	SM 5310 B-00	Organic Carbon	9.2		mg C/L	P339207	
1961898	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.021		mg P/L	P338840	
1961910	EPA 200.7 Rev. 4.4	Iron	90	U	ug/L	P339023	
	EPA 200.8 Rev. 5.4	Arsenic	2.16		ug/L	P339023	
		Cadmium	0.060	U	ug/L	P339023	
		Chromium	1.2	U	ug/L	P339023	
		Copper	0.98	I	ug/L	P339023	
		Lead	0.50	U	ug/L	P339023	
		Nickel	0.60	U	ug/L	P339023	
		Silver	0.030	U	ug/L	P339023	

Field ID: SD012418-2

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1961910	EPA 200.8 Rev. 5.4	Zinc	3.0	U	ug/L	P339023	

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: CaloosaRvr @ Marker #76

Collection Date/Time: 01/24/2018 10:41

Field ID: SD012418-3

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1961887	SM 2320 B-97	Total Alkalinity	114		mg CaCO3/L	P339304	
	SM 2540 D-97	TSS	3	IA	mg/L	P339067	
	SM 4500 F-C-97	Fluoride	0.75		mg F/L	P339308	
1961891	SM 5310 B-00 dissolved	Organic Carbon	10		mg C/L	P339207	
1961895	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P339041	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.65		mg N/L	P338828	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P338858	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P338959	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P339207	
1961899	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.021		mg P/L	P338840	
1961911	EPA 200.7 Rev. 4.4	Iron	90	U	ug/L	P339023	
	EPA 200.8 Rev. 5.4	Arsenic	2.13		ug/L	P339023	
		Cadmium	0.060	U	ug/L	P339023	
		Chromium	1.2	U	ug/L	P339023	
		Copper	1.1	I	ug/L	P339023	
		Lead	0.25	U	ug/L	P339023	
		Nickel	0.60	U	ug/L	P339023	
		Silver	0.030	U	ug/L	P339023	
		Zinc	3.0	U	ug/L	P339023	

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: CaloosaRvr @ Marker #52

Collection Date/Time: 01/24/2018 11:25

Field ID: SD012418-4

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1961888	SM 2320 B-97	Total Alkalinity	114	A	mg CaCO3/L	P339304	
	SM 2540 D-97	TSS	6	I	mg/L	P339063	
	SM 4500 F-C-97	Fluoride	0.39		mg F/L	P339308	
1961892	SM 5310 B-00 dissolved	Organic Carbon	13		mg C/L	P339208	
1961896	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P339041	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.81		mg N/L	P338828	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.093		mg N/L	P338858	
	EPA 365.1 Rev. 2.0	Total-P	0.084		mg P/L	P338959	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P339208	
1961900	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.045		mg P/L	P338840	
1961912	EPA 200.7 Rev. 4.4	Iron	160	I	ug/L	P339023	
	EPA 200.8 Rev. 5.4	Arsenic	1.86		ug/L	P339023	

Field ID: SD012418-4

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1961912	EPA 200.8 Rev. 5.4	Cadmium	0.060	U	ug/L	P339023	
		Chromium	1.2	U	ug/L	P339023	
		Copper	1.4	I	ug/L	P339023	
		Lead	0.15	U	ug/L	P339023	
		Nickel	0.93	I	ug/L	P339023	
		Silver	0.030	U	ug/L	P339023	
		Zinc	3.0	U	ug/L	P339023	

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 200.7 Rev. 4.4
Batch ID: P339023

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339023

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
Zinc	1.0	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P339041

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P338828

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338857

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338858

Component	Result	Code	Units
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Quality Assurance Report Method Blank Results

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338858

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P338959

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338840

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

Reference Method: SM 2320 B-97
Batch ID: P339304

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

Reference Method: SM 2540 D-97
Batch ID: P339063

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P339067

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P339308

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P339207

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-00
Batch ID: P339208

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report Method Blank Results

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339207

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339208

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: P339023

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339023

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	103		P	85 - 115
Copper	97.7		P	85 - 115
Lead	103		P	85 - 115
Nickel	99.6		P	85 - 115
Silver	97.3		P	85 - 115
Zinc	98.0		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P339041

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P338828

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338857

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338858

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: P338959

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338840

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

Reference Method: SM 2320 B-97
Batch ID: P339304

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.3		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P339308

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.6		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P339207

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

Reference Method: SM 5310 B-00
Batch ID: P339208

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	92.8		P	85 - 115

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339207

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

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339208

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	92.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339023

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961911	Iron	102	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339023

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961911	Arsenic	103	108	P/P	70 - 130
1961911	Cadmium	88.7	94.1	P/P	70 - 130
1961911	Chromium	85.9	88.1	P/P	70 - 130
1961911	Copper	90.4	95.4	P/P	70 - 130
1961911	Lead	113	111	P/P	70 - 130
1961911	Nickel	96.8	102	P/P	70 - 130
1961911	Silver	84.2	89.4	P/P	70 - 130
1961911	Zinc	82.1	86.4	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P339041

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961893	Ammonia-N	106	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P338828

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961953	Kjeldahl Nitrogen	95.5	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338857

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961659	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338858

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961895	NO2NO3-N	98.5	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P338959

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961689	Total-P	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338840

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961897	O-Phosphate-P	95.9	96.2	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P339308

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961888	Fluoride	96.5	97.9	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P339207

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961691	Organic Carbon	93.3	94.7	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P339208

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961853	Organic Carbon	96.3	93.3	P/P	85 - 115

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339207

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961691	Organic Carbon	93.3	94.7	P/P	85 - 115

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339208

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1961853	Organic Carbon	96.3	93.3	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P339023

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961911	Iron	0.709	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P339023

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961911	Arsenic	5.23	Spike	P	0 - 20
1961911	Cadmium	5.92	Spike	P	0 - 20
1961911	Chromium	2.54	Spike	P	0 - 20
1961911	Copper	5.13	Spike	P	0 - 20
1961911	Lead	1.07	Spike	P	0 - 20
1961911	Nickel	5.60	Spike	P	0 - 20
1961911	Silver	6.05	Spike	P	0 - 20
1961911	Zinc	5.05	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P339041

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961893	Ammonia-N	0.733	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P338828

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961953	Kjeldahl Nitrogen	2.17	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338857

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961659	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P338858

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961895	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P338959

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961689	Total-P	0.224	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P338840

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961897	O-Phosphate-P	0.244	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P339304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961888	Total Alkalinity	0.363	Sample	P	0 - 4.8

Reference Method: SM 4500 F-C-97
Batch ID: P339308

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961888	Fluoride	0.993	Spike	P	0 - 3.0

Quality Assurance Report Precision

Reference Method: SM 5310 B-00
Batch ID: P339207

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961691	Organic Carbon	1.19	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P339208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961853	Organic Carbon	2.38	Spike	P	0 - 20

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339207

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961691	Organic Carbon	1.19	Spike	P	0 - 20

Reference Method: SM 5310 B-00 dissolved
Batch ID: P339208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1961853	Organic Carbon	2.38	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: A81660
Included Lab Sample IDs: 1961897, 1961898, 1961899, 1961900

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.7	P/P	90 - 110
O-Phosphate-P	99.6	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A81666
Included Lab Sample IDs: 1961893, 1961894, 1961895, 1961896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110
NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A81718
Included Lab Sample IDs: 1961893, 1961894, 1961895, 1961896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A81718

Included Lab Sample IDs: 1961893, 1961894, 1961895, 1961896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A81740

Included Lab Sample IDs: 1961893, 1961894, 1961895, 1961896

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A81742

Included Lab Sample IDs: 1961893, 1961894, 1961895, 1961896

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A81771

Included Lab Sample IDs: 1961909, 1961910, 1961911, 1961912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	98.8	97.1	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A81806

Included Lab Sample IDs: 1961893, 1961894, 1961895

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	94.6	P/P	90 - 110

Reference Method: SM 5310 B-00 dissolved

Run ID: A81806

Included Lab Sample IDs: 1961889, 1961890, 1961891

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	94.6	P/P	90 - 110
Organic Carbon	97.5	96.6	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A81810

Included Lab Sample IDs: 1961896

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.9	97.0	P/P	90 - 110

Reference Method: SM 5310 B-00 dissolved

Run ID: A81810

Included Lab Sample IDs: 1961892

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00 dissolved

Run ID: A81810

Included Lab Sample IDs: 1961892

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.9	97.0	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A81839

Included Lab Sample IDs: 1961885, 1961886, 1961887, 1961888

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.5	98.7	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A81839

Included Lab Sample IDs: 1961885, 1961886, 1961887, 1961888

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	101	P/P	90 - 110
Fluoride	99.5	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A81882

Included Lab Sample IDs: 1961909, 1961910, 1961911, 1961912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.1	99.0	P/P	90 - 110
Arsenic	99.0	98.6	P/P	90 - 110
Cadmium	92.9	96.0	P/P	90 - 110
Cadmium	96.4	96.8	P/P	90 - 110
Copper	94.5	98.1	P/P	90 - 110
Copper	99.1	98.2	P/P	90 - 110
Lead	100	101	P/P	90 - 110
Lead	100	97.0	P/P	90 - 110
Lead	101	100	P/P	90 - 110
Nickel	94.9	98.3	P/P	90 - 110
Nickel	98.2	98.0	P/P	90 - 110
Silver	94.0	96.8	P/P	90 - 110
Silver	97.1	97.8	P/P	90 - 110
Zinc	94.0	97.7	P/P	90 - 110
Zinc	98.2	97.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A81914

Included Lab Sample IDs: 1961909, 1961910, 1961911, 1961912

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	100	98.0	P/P	90 - 110
Chromium	98.0	98.3	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		LCS	Precision	MS
						SMP	
EPA 200.7 Rev. 4.4	Iron	103	102	101			0.709
EPA 200.8 Rev. 5.4	Arsenic	101	103	108			5.23
	Cadmium	102	88.7	94.1			5.92
	Chromium	103	85.9	88.1			2.54
	Copper	97.7	90.4	95.4			5.13
	Lead	103	113	111			1.07
	Nickel	99.6	96.8	102			5.60
	Silver	97.3	84.2	89.4			6.05
	Zinc	98.0	82.1	86.4			5.05
EPA 350.1 Rev. 2.0	Ammonia-N	99.9	106	105			0.733
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.3	95.5	98.4			2.17
EPA 353.2 Rev. 2.0	NO2NO3-N	102	102	102			0.0
	NO2NO3-N	102	98.5	98.5			0.0
EPA 365.1 Rev. 2.0	Total-P	109	105	105			0.224
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	95.9	96.2			0.244
SM 2320 B-97	Total Alkalinity	98.3				0.363	
SM 4500 F-C-97	Fluoride	96.6	96.5	97.9			0.993
SM 5310 B-00	Organic Carbon	96.9	93.3	94.7			1.19
	Organic Carbon	92.8	96.3	93.3			2.38
SM 5310 B-00 dissolved	Organic Carbon	96.9	93.3	94.7			1.19
	Organic Carbon	92.8	96.3	93.3			2.38

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1961909, 1961910, 1961911, 1961912
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1961909, 1961910, 1961911, 1961912
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1961893, 1961894, 1961895, 1961896
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1961893, 1961894, 1961895, 1961896
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1961893, 1961894, 1961895, 1961896
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1961893, 1961894, 1961895, 1961896
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1961897, 1961898, 1961899, 1961900
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1961885, 1961886, 1961887, 1961888
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1961885, 1961886, 1961887, 1961888
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1961885, 1961886, 1961887, 1961888
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1961893, 1961894, 1961895, 1961896
SM 5310 B-00 dissolved / E31780	Dissolved Nonpurgeable Organic Carbon in filtered, aqueous matrices	1961889, 1961890, 1961891, 1961892

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 200.7 Rev. 4.4	01/25/2018	01/30/2018	Elliott D. Healy	01/31/2018	Betina Topolski	1961909, 1961910, 1961911, 1961912
EPA 200.8 Rev. 5.4	01/25/2018	01/30/2018	Elliott D. Healy	02/06/2018	Nadine Brooks	1961909, 1961910, 1961911, 1961912
	01/25/2018	01/30/2018	Elliott D. Healy	02/07/2018	Nadine Brooks	1961909, 1961910, 1961911, 1961912
EPA 350.1 Rev. 2.0	01/25/2018			01/30/2018	Julia Storbeck	1961893, 1961894, 1961895, 1961896
EPA 351.2 Rev. 2.0	01/25/2018	01/26/2018	Adrian Shelby	01/29/2018	Joseph Suarez	1961893, 1961894, 1961895, 1961896
EPA 353.2 Rev. 2.0	01/25/2018			01/26/2018	Beverly Y. Sanders	1961893, 1961894, 1961895, 1961896
EPA 365.1 Rev. 2.0	01/25/2018	01/29/2018	Sima Feizi	01/30/2018	Beverly Y. Sanders	1961893, 1961894, 1961895, 1961896
EPA 365.1 Rev. 2.0 dissolved	01/25/2018			01/25/2018 15:27	Megan Treadwell	1961897
	01/25/2018			01/25/2018 15:33	Megan Treadwell	1961898
	01/25/2018			01/25/2018 15:34	Megan Treadwell	1961899
	01/25/2018			01/25/2018 15:35	Megan Treadwell	1961900
SM 2320 B-97	01/25/2018			02/03/2018	Dale L. Simmons	1961885, 1961886, 1961887, 1961888
SM 2540 D-97	01/25/2018			01/26/2018	DeAsia Armster	1961885, 1961886, 1961887, 1961888
SM 4500 F-C-97	01/25/2018			02/03/2018	Dale L. Simmons	1961885, 1961886, 1961887, 1961888
SM 5310 B-00	01/25/2018			01/31/2018	Megan Treadwell	1961896
	01/25/2018			02/01/2018	Megan Treadwell	1961893, 1961894, 1961895
SM 5310 B-00 dissolved	01/25/2018			01/31/2018	Megan Treadwell	1961892
	01/25/2018			02/01/2018	Megan Treadwell	1961889, 1961890, 1961891