Chemical Analysis Report

CEN-DIST-2022-10-13-01

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Lakes: Lotta, Ivanhoe, Crooked, and Ingram**
Request ID: **RQ-2022-10-10-16**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matthew Bearden

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: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 02-NOV-2022 15:46

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: Lake Lotta at Center of southern lobe **Collection Date/Time: 10/12/2022 10:30**

Field ID: G2CE0093 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2362363	DEP SOP: NU-094-1	Color (true)	91		PCU	P420899	
	EPA 180.1 Rev. 2.0	Turbidity	2.2		NTU	P420896	
	EPA 300.0 Rev. 2.1	Chloride	7.5		mg Cl/L	P421514	
		Sulfate	6.7		mg SO4/L	P421519	
	SM 2320 B-2011	Total Alkalinity	52		mg CaCO3/L	P421003	
	SM 2540 C-2015	TDS	97		mg/L	P421409	
	SM 2540 D-2015	TSS	5	I	mg/L	P421413	
	SM 4500-F- C-2011	Fluoride	0.10		mg F/L	P421005	MS
2362364	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P421251	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.80		mg N/L	P421225	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P420968	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P421050	
	SM 5310 B-2011	Organic Carbon	12		mg C/L	P420996	
2362365	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.064		mg P/L	P420868	
2362373	EPA 200.7 Rev. 4.4	Calcium	18.5		mg/L	P420914	
		Iron	100	I	ug/L	P420914	
		Magnesium	2.43		mg/L	P420914	
		Potassium	2.8		mg/L	P420914	
		Sodium	4.9		mg/L	P420914	
		Strontium	40.1		ug/L	P420914	
		Tin	3.0	U	ug/L	P420914	
		Titanium	0.75	U	ug/L	P420914	
		Vanadium	2.0	U	ug/L	P420914	
		Zinc	5.0	U	ug/L	P420914	
	EPA 200.8 Rev. 5.4	Aluminum	39		ug/L	P420914	
		Antimony	0.20		ug/L	P420914	
		Arsenic	0.90		ug/L	P420914	
		Barium	20.6		ug/L	P420914	
		Beryllium	0.010	U	ug/L	P420914	
		Boron	22.5		ug/L	P420914	
		Cadmium	0.020	U	ug/L	P420914	
		Chromium	0.46	I	ug/L	P420914	
		Cobalt	0.040	I	ug/L	P420914	
		Copper	0.85		ug/L	P420914	
		Lead	0.20	U	ug/L	P420914	
		Manganese	15.6		ug/L	P420914	
		Molybdenum	0.89		ug/L	P420914	
		Nickel	0.50	U	ug/L	P420914	
		Selenium	0.20	U	ug/L	P420914	
		Silver	0.010	U	ug/L	P420914	
		Thallium	0.10	U	ug/L	P420914	
	SM 2340 B-2011	Hardness	56.2		mg/L	P420914	

Field ID: G2CE0093 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes

Ref. Method and Comment:
SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Crooked Lake @ Center of N Lobe **Collection Date/Time: 10/12/2022 11:41**

Field ID: G2CE0265 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2362366	DEP SOP: NU-094-1	Color (true)	130		PCU	P420899	
	EPA 180.1 Rev. 2.0	Turbidity	2.7		NTU	P420896	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P421514	
		Sulfate	4.8		mg SO4/L	P421519	
	SM 2320 B-2011	Total Alkalinity	25		mg CaCO3/L	P421003	
	SM 2540 C-2015	TDS	92		mg/L	P421409	
	SM 2540 D-2015	TSS	5	I	mg/L	P421413	
	SM 4500-F- C-2011	Fluoride	0.048	I	mg F/L	P421005	MS
2362368	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P421251	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0		mg N/L	P421225	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P420968	
	EPA 365.1 Rev. 2.0	Total-P	0.054		mg P/L	P421050	
	SM 5310 B-2011	Organic Carbon	22		mg C/L	P420996	

Ref. Method and Comment:
SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Ivanhoe @ Center of W Lobe **Collection Date/Time: 10/12/2022 12:27**

Field ID: G2CE0262 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2362367	DEP SOP: NU-094-1	Color (true)	12	A	PCU	P420900	
	EPA 180.1 Rev. 2.0	Turbidity	5.4		NTU	P420896	
	EPA 300.0 Rev. 2.1	Chloride	20	A	mg Cl/L	P421515	
		Sulfate	16	A	mg SO4/L	P421520	
	SM 2320 B-2011	Total Alkalinity	34		mg CaCO3/L	P421003	
	SM 2540 C-2015	TDS	86		mg/L	P421409	
	SM 2540 D-2015	TSS	4	I	mg/L	P421413	
	SM 4500-F- C-2011	Fluoride	0.049	I	mg F/L	P421005	MS
2362369	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P421251	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.69		mg N/L	P421225	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P420968	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P421050	
	SM 5310 B-2011	Organic Carbon	3.7		mg C/L	P420996	

Ref. Method and Comment:
SM 2540 D-2015: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P420899

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: DEP SOP: NU-094-1
Batch ID: P420900

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P420896

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420914

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
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421514

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421515

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421519

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421520

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421251

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421225

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420968

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421050

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P420868

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-2011
Batch ID: P421003

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

Reference Method: SM 2540 C-2015
Batch ID: P421409

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2015
Batch ID: P421413

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P421005

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P420996

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P420899

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	94.6		P	90 - 110

Reference Method: DEP SOP: NU-094-1
Batch ID: P420900

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	95.9		P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P420896

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	100		P	85 - 115
Iron	106		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	104		P	85 - 115
Sodium	100		P	85 - 115
Strontium	105		P	85 - 115
Tin	104		P	85 - 115
Titanium	103		P	85 - 115
Vanadium	103		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.5		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	100		P	85 - 115
Barium	104		P	85 - 115
Beryllium	94.2		P	85 - 115
Boron	105		P	85 - 115
Cadmium	98.7		P	85 - 115
Chromium	101		P	85 - 115
Cobalt	96.9		P	85 - 115
Copper	98.0		P	85 - 115
Lead	94.8		P	85 - 115
Manganese	101		P	85 - 115
Molybdenum	97.0		P	85 - 115
Nickel	97.8		P	85 - 115
Selenium	97.6		P	85 - 115
Silver	101		P	85 - 115
Thallium	90.3		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421514

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421515

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421519

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421520

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421251

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	93.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421225

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420968

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: P421050

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P420868

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-2011
Batch ID: P421003

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.2		P	94 - 106

Reference Method: SM 2540 C-2015
Batch ID: P421409

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

Reference Method: SM 2540 D-2015
Batch ID: P421413

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
TSS	101		P	85 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P421005

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	101		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P420996

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362199	Calcium	100		P	80 - 120
2362199	Iron	105	112	P/P	80 - 120
2362199	Magnesium	103	114	P/P	80 - 120
2362199	Potassium	104	109	P/P	80 - 120
2362199	Sodium	102		P	80 - 120
2362199	Strontium	105	108	P/P	80 - 120
2362199	Tin	104	103	P/P	80 - 120
2362199	Titanium	105	106	P/P	80 - 120
2362199	Vanadium	104	105	P/P	80 - 120
2362199	Zinc	102	104	P/P	80 - 120
2362445	Calcium	100		P	80 - 120
2362445	Iron	102		P	80 - 120
2362445	Magnesium	97.4		P	80 - 120
2362445	Potassium	102		P	80 - 120
2362445	Sodium	102		P	80 - 120
2362445	Strontium	99.6		P	80 - 120
2362445	Tin	101		P	80 - 120
2362445	Titanium	105		P	80 - 120
2362445	Vanadium	106		P	80 - 120
2362445	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362199	Aluminum	97.3	101	P/P	80 - 120
2362199	Antimony	103	104	P/P	80 - 120
2362199	Arsenic	100	102	P/P	80 - 120
2362199	Barium	103	105	P/P	80 - 120
2362199	Beryllium	93.1	95.9	P/P	80 - 120
2362199	Boron	101	103	P/P	80 - 120
2362199	Cadmium	98.9	98.7	P/P	80 - 120
2362199	Chromium	100	103	P/P	80 - 120
2362199	Cobalt	96.2	98.0	P/P	80 - 120
2362199	Copper	98.2	99.9	P/P	80 - 120
2362199	Lead	94.1	96.2	P/P	80 - 120
2362199	Manganese	99.1	101	P/P	80 - 120
2362199	Molybdenum	96.8	98.5	P/P	80 - 120
2362199	Nickel	98.2	99.5	P/P	80 - 120
2362199	Selenium	97.5	98.5	P/P	80 - 120
2362199	Silver	99.2	101	P/P	80 - 120
2362199	Thallium	92.5	96.7	P/P	80 - 120
2362445	Aluminum	98.2		P	80 - 120
2362445	Antimony	107		P	80 - 120
2362445	Arsenic	103		P	80 - 120
2362445	Barium	106		P	80 - 120
2362445	Beryllium	93.1		P	80 - 120
2362445	Boron	101		P	80 - 120
2362445	Cadmium	101		P	80 - 120
2362445	Chromium	102		P	80 - 120
2362445	Cobalt	97.9		P	80 - 120
2362445	Copper	97.2		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362445	Lead	95.0		P	80 - 120
2362445	Manganese	102		P	80 - 120
2362445	Molybdenum	99.8		P	80 - 120
2362445	Nickel	98.5		P	80 - 120
2362445	Selenium	101		P	80 - 120
2362445	Silver	101		P	80 - 120
2362445	Thallium	93.3		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362241	Chloride	91.1		P	90 - 110
2362258	Chloride	103		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421515

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362367	Chloride	97.6		P	90 - 110
2362542	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421519

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362241	Sulfate	95.3		P	90 - 110
2362258	Sulfate	104		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421520

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362367	Sulfate	97.8		P	90 - 110
2362542	Sulfate	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421251

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362261	Ammonia-N	101	94.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421225

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362483	Kjeldahl Nitrogen	105	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420968

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420968

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362369	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P420868

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362131	O-Phosphate-P	97.2	96.1	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Batch ID: P421005

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362193	Fluoride	107	108	F/F	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P420996

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2362180	Organic Carbon	98.8	99.8	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P420899

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362241	Color (true)	6.98	Sample	P	0 - 20

Reference Method: DEP SOP: NU-094-1
Batch ID: P420900

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362367	Color (true)	1.53	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P420896

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362233	Turbidity	2.11	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P420914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362199	Calcium	3.30	Spike	P	0 - 20
2362199	Iron	6.04	Spike	P	0 - 20
2362199	Magnesium	6.13	Spike	P	0 - 20
2362199	Potassium	3.12	Spike	P	0 - 20
2362199	Sodium	4.14	Spike	P	0 - 20
2362199	Strontium	3.24	Spike	P	0 - 20
2362199	Tin	0.217	Spike	P	0 - 20
2362199	Titanium	1.24	Spike	P	0 - 20
2362199	Vanadium	1.19	Spike	P	0 - 20
2362199	Zinc	1.61	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362199	Aluminum	3.29	Spike	P	0 - 20
2362199	Antimony	0.836	Spike	P	0 - 20
2362199	Arsenic	1.89	Spike	P	0 - 20
2362199	Barium	1.16	Spike	P	0 - 20
2362199	Beryllium	2.99	Spike	P	0 - 20
2362199	Boron	1.87	Spike	P	0 - 20
2362199	Cadmium	0.212	Spike	P	0 - 20
2362199	Chromium	2.07	Spike	P	0 - 20
2362199	Cobalt	1.88	Spike	P	0 - 20
2362199	Copper	1.70	Spike	P	0 - 20
2362199	Lead	2.19	Spike	P	0 - 20
2362199	Manganese	1.58	Spike	P	0 - 20
2362199	Molybdenum	1.69	Spike	P	0 - 20
2362199	Nickel	1.29	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P420914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362199	Selenium	1.05	Spike	P	0 - 20
2362199	Silver	1.53	Spike	P	0 - 20
2362199	Thallium	4.42	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362241	Chloride	1.34	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362367	Chloride	0.330	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421519

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362241	Sulfate	1.78	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P421520

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362367	Sulfate	0.609	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421251

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362261	Ammonia-N	5.50	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421225

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362483	Kjeldahl Nitrogen	1.56	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420968

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P420968

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362369	NO2NO3-N	0.489	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421050

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362407	Total-P	2.15	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P420868

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362131	O-Phosphate-P	1.14	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P421003

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362193	Total Alkalinity	0.902	Sample	P	0 - 3.8

Reference Method: SM 2540 C-2015
Batch ID: P421409

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362320	TDS	4.99	Sample	P	0 - 10

Reference Method: SM 4500-F- C-2011
Batch ID: P421005

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362193	Fluoride	0.474	Spike	P	0 - 1.6

Reference Method: SM 5310 B-2011
Batch ID: P420996

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2362180	Organic Carbon	0.536	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A115278
Included Lab Sample IDs: 2362365

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.5	99.8	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A115295
Included Lab Sample IDs: 2362363, 2362366, 2362367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	99.5	P/P	95 - 105
Turbidity	99.5	99.5	P/P	95 - 105

Reference Method: DEP SOP: NU-094-1
Run ID: A115297
Included Lab Sample IDs: 2362363, 2362366, 2362367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	95.6	99.6	P/P	90 - 110
Color (true)	99.6	97.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A115338
Included Lab Sample IDs: 2362364, 2362368, 2362369

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A115346
Included Lab Sample IDs: 2362373

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	96.6	97.1	P/P	90 - 110
Iron	98.5	98.5	P/P	90 - 110
Magnesium	97.2	97.6	P/P	90 - 110
Potassium	98.1	97.9	P/P	90 - 110
Sodium	99.7	99.6	P/P	90 - 110
Strontium	102	104	P/P	90 - 110
Tin	102	101	P/P	90 - 110
Titanium	103	102	P/P	90 - 110
Vanadium	103	102	P/P	90 - 110
Zinc	101	101	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A115351
Included Lab Sample IDs: 2362364, 2362368, 2362369

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.8	99.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-2011
Run ID: A115356
Included Lab Sample IDs: 2362363, 2362366, 2362367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	96.2	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A115356
Included Lab Sample IDs: 2362363, 2362366, 2362367

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A115378
Included Lab Sample IDs: 2362373

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	103	P/P	90 - 110
Antimony	103	104	P/P	90 - 110
Arsenic	101	101	P/P	90 - 110
Barium	102	102	P/P	90 - 110
Beryllium	99.4	99.4	P/P	90 - 110
Boron	101	102	P/P	90 - 110
Cadmium	101	103	P/P	90 - 110
Chromium	100	101	P/P	90 - 110
Cobalt	96.6	95.7	P/P	90 - 110
Copper	97.9	97.4	P/P	90 - 110
Lead	93.4	93.9	P/P	90 - 110
Manganese	100	101	P/P	90 - 110
Molybdenum	99.4	99.3	P/P	90 - 110
Nickel	98.4	96.7	P/P	90 - 110
Selenium	103	99.3	P/P	90 - 110
Silver	99.4	99.9	P/P	90 - 110
Thallium	96.2	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A115428
Included Lab Sample IDs: 2362364

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A115435
Included Lab Sample IDs: 2362368, 2362369

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	104	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A115454
Included Lab Sample IDs: 2362364, 2362368, 2362369

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A115454
Included Lab Sample IDs: 2362364, 2362368, 2362369

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.1	97.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A115481
Included Lab Sample IDs: 2362364, 2362368, 2362369

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A115558
Included Lab Sample IDs: 2362363, 2362366, 2362367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Chloride	101	100	P/P	90 - 110
Sulfate	101	102	P/P	90 - 110
Sulfate	102	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
DEP SOP: NU-094-1	Color (true)	94.6					6.98	
	Color (true)	95.9					1.53	
EPA 180.1 Rev. 2.0	Turbidity	100					2.11	
EPA 200.7 Rev. 4.4	Calcium	100	100	100				3.30
	Iron	106	105	112	102			6.04
	Magnesium	107	103	114	97.4			6.13
	Potassium	104	104	109	102			3.12
	Sodium	100	102	102				4.14
	Strontium	105	105	108	99.6			3.24
	Tin	104	104	103	101			0.217
	Titanium	103	105	106	105			1.24
	Vanadium	103	104	105	106			1.19
	Zinc	103	102	104	101			1.61
EPA 200.8 Rev. 5.4	Aluminum	99.5	97.3	101	98.2			3.29
	Antimony	104	103	104	107			0.836
	Arsenic	100	100	102	103			1.89
	Barium	104	103	105	106			1.16
	Beryllium	94.2	93.1	95.9	93.1			2.99
	Boron	105	101	103	101			1.87
	Cadmium	98.7	98.9	98.7	101			0.212
	Chromium	101	100	103	102			2.07
	Cobalt	96.9	96.2	98.0	97.9			1.88
	Copper	98.0	98.2	99.9	97.2			1.70
	Lead	94.8	94.1	96.2	95.0			2.19
	Manganese	101	99.1	101	102			1.58
	Molybdenum	97.0	96.8	98.5	99.8			1.69
	Nickel	97.8	98.2	99.5	98.5			1.29
	Selenium	97.6	97.5	98.5	101			1.05
	Silver	101	99.2	101	101			1.53
	Thallium	90.3	92.5	96.7	93.3			4.42
EPA 300.0 Rev. 2.1	Chloride	98.3	91.1	103			1.34	
	Chloride	98.2	97.6	101			0.330	
	Sulfate	98.5	95.3	104			1.78	
	Sulfate	100	97.8	102			0.609	
EPA 350.1 Rev. 2.0	Ammonia-N	93.0	101	94.0				5.50
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	105	108				1.56
EPA 353.2 Rev. 2.0	NO2NO3-N	102	102	102				0.489
EPA 365.1 Rev. 2.0	Total-P	103						2.15
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	97.2	96.1				1.14
SM 2320 B-2011	Total Alkalinity	98.2					0.902	
SM 2540 C-2015	TDS	98.0					4.99	
SM 2540 D-2015	TSS	101						
SM 4500-F- C-2011	Fluoride	101	107	108				0.474
SM 5310 B-2011	Organic Carbon	97.8	98.8	99.8				0.536

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2362363, 2362366, 2362367
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2362363, 2362366, 2362367
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2362373

Reference Method Descriptions

Method	Description	Associated Samples
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2362373
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2362363, 2362366, 2362367
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2362363, 2362366, 2362367
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2362364, 2362368, 2362369
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2362364, 2362368, 2362369
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2362364, 2362368, 2362369
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2362364, 2362368, 2362369
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2362365
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2362363, 2362366, 2362367
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2362373
SM 2540 C-2015	Total Dissolved Solids in aqueous matrices	2362363, 2362366, 2362367
SM 2540 D-2015	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2362363, 2362366, 2362367
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2362363, 2362366, 2362367
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2362364, 2362368, 2362369

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	10/13/2022			10/13/2022 16:00	Anna M. Plaviak	2362363, 2362366
	10/13/2022			10/13/2022 16:03	Anna M. Plaviak	2362367
EPA 180.1 Rev. 2.0	10/13/2022			10/13/2022 15:08	Khloe J Berg	2362363
	10/13/2022			10/13/2022 15:11	Khloe J Berg	2362366
	10/13/2022			10/13/2022 15:13	Khloe J Berg	2362367
EPA 200.7 Rev. 4.4	10/13/2022	10/14/2022 11:20	George D Taylor	10/17/2022 19:26	McKinley C Carter	2362373
EPA 200.8 Rev. 5.4	10/13/2022	10/14/2022 11:20	George D Taylor	10/18/2022 21:03	Emily M Philpot	2362373
EPA 300.0 Rev. 2.1	10/13/2022			10/25/2022 21:04	Anna M. Plaviak	2362363
	10/13/2022			10/25/2022 21:20	Anna M. Plaviak	2362366
	10/13/2022			10/25/2022 22:50	Anna M. Plaviak	2362367
EPA 350.1 Rev. 2.0	10/13/2022			10/21/2022 10:39	Judith K. Clark	2362364
	10/13/2022			10/21/2022 10:40	Judith K. Clark	2362368
	10/13/2022			10/21/2022 10:41	Judith K. Clark	2362369
EPA 351.2 Rev. 2.0	10/13/2022	10/21/2022 11:19	Simonne.V. Calhoun	10/24/2022 12:29	Alexandra J Mattheus	2362364
	10/13/2022	10/21/2022 11:19	Simonne.V. Calhoun	10/24/2022 12:31	Alexandra J Mattheus	2362368
	10/13/2022	10/21/2022 11:19	Simonne.V. Calhoun	10/24/2022 12:32	Alexandra J Mattheus	2362369
EPA 353.2 Rev. 2.0	10/13/2022			10/17/2022 09:03	Beverly Y. Sanders	2362369
	10/13/2022			10/17/2022 09:10	Beverly Y. Sanders	2362364
	10/13/2022			10/17/2022 09:11	Beverly Y. Sanders	2362368
EPA 365.1 Rev. 2.0	10/13/2022	10/19/2022 14:47	Adam P Silver	10/20/2022 11:41	Simonne.V. Calhoun	2362364
	10/13/2022	10/19/2022 14:47	Adam P Silver	10/20/2022 14:59	Simonne.V. Calhoun	2362368
	10/13/2022	10/19/2022 14:47	Adam P Silver	10/20/2022 15:00	Simonne.V. Calhoun	2362369
EPA 365.1 Rev. 2.0 dissolved	10/13/2022			10/13/2022 13:24	Elise M. Gillis	2362365
SM 2320 B-2011	10/13/2022			10/15/2022 02:45	Dale L. Simmons	2362363
	10/13/2022			10/15/2022 02:58	Dale L. Simmons	2362366
	10/13/2022			10/15/2022 03:09	Dale L. Simmons	2362367
SM 2340 B-2011	10/13/2022			10/17/2022 19:26	McKinley C Carter	2362373
SM 2540 C-2015	10/13/2022			10/18/2022 15:43	Yijie Li	2362363, 2362366, 2362367
SM 2540 D-2015	10/13/2022			10/18/2022 15:43	Yijie Li	2362363, 2362366, 2362367
SM 4500-F- C-2011	10/13/2022			10/15/2022 02:45	Dale L. Simmons	2362363
	10/13/2022			10/15/2022 02:58	Dale L. Simmons	2362366
	10/13/2022			10/15/2022 03:09	Dale L. Simmons	2362367
SM 5310 B-2011	10/13/2022			10/18/2022 03:06	Khloe J Berg	2362364
	10/13/2022			10/18/2022 03:19	Khloe J Berg	2362368
	10/13/2022			10/18/2022 03:33	Khloe J Berg	2362369