

Chemical Analysis Report

CEN-DIST-2021-07-14-02

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

Event Description: **Livingston Creek (West segment)**
Request ID: **RQ-2021-06-28-03**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection

3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Kalina Warren

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: 11-AUG-2021 09:29



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 group are included in this report: 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: SJR Upstream of Lake Hellen Blazes

Collection Date/Time: 07/13/2021 11:07

Field ID: G3CE0018

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2262036	EPA 180.1 Rev. 2.0	Turbidity	4.9		NTU	P400986	
	EPA 300.0 Rev. 2.1	Chloride	93		mg Cl/L	P401360	
		Sulfate	17		mg SO4/L	P401363	
		Color (true)	240		PCU	P400969	
	SM 2320 B-2011	Total Alkalinity	101		mg CaCO3/L	P401143	
	SM 2540 C-2011	TDS	380	A	mg/L	P401421	
	SM 2540 D-2011	TSS	9	IA	mg/L	P401227	
	SM 4500 F-C-2011	Fluoride	0.23		mg F/L	P401146	
2262037	EPA 350.1 Rev. 2.0	Ammonia-N	0.059		mg N/L	P401540	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.1	V	mg N/L	P401998	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.011		mg N/L	P401060	
	EPA 365.1 Rev. 2.0	Total-P	0.32		mg P/L	P401223	
	SM 5310 B-2011	Organic Carbon	29		mg C/L	P401487	
2262038	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.22		mg P/L	P400956	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Analyte was detected above the MDL in both the method blank and sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P400986

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401360

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401363

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401540

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401998

Component	Result	Code	Units
Kjeldahl Nitrogen	0.11	I	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401060

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401223

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400956

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

Reference Method: SM 2120 B-2011
Batch ID: P400969

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report

Method Blank Results

Reference Method: SM 2320 B-2011
Batch ID: P401143

Component	Result	Code	Units
Total Alkalinity	1.2	I	mg CaCO ₃ /L

Reference Method: SM 2540 C-2011
Batch ID: P401421

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P401227

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P401146

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P401487

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401360

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401363

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401540

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401998

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401060

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401223

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400956

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.9		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P400969

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	101		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P401143

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	94 - 106

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P401146

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P401487

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401360

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261754	Chloride	96.3		P	90 - 110
2262166	Chloride	96.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401363

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261754	Sulfate	96.4		P	90 - 110
2262166	Sulfate	99.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262034	Ammonia-N	99.4	99.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401998

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262091	Kjeldahl Nitrogen	107	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262037	NO2NO3-N	100	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401223

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262019	Total-P	107	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400956

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262128	O-Phosphate-P	91.3	93.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P401146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262470	Fluoride	99.2	99.2	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P401487

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262027	Organic Carbon	96.5	97.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P400986

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262026	Turbidity	0.133	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401360

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261754	Chloride	0.625	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401363

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261754	Sulfate	1.52	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401540

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262034	Ammonia-N	0.122	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401998

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262091	Kjeldahl Nitrogen	2.42	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262037	NO2NO3-N	0.475	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401223

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262019	Total-P	0.0687	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400956

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262128	O-Phosphate-P	1.78	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B-2011
Batch ID: P400969

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262033	Color (true)	0.966	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P401143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262470	Total Alkalinity	0.117	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P401421

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262036	TDS	6.57	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P401146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262470	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P401487

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262027	Organic Carbon	0.856	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: A106614

Included Lab Sample IDs: 2262038

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.9	96.7	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A106621

Included Lab Sample IDs: 2262036

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A106624

Included Lab Sample IDs: 2262036

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	102	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106656

Included Lab Sample IDs: 2262037

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	105	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A106679

Included Lab Sample IDs: 2262036

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	98.0	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A106679

Included Lab Sample IDs: 2262036

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106732

Included Lab Sample IDs: 2262037

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A106762

Included Lab Sample IDs: 2262036

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-2011

Run ID: A106803

Included Lab Sample IDs: 2262037

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.0	98.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A106828

Included Lab Sample IDs: 2262037

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107072

Included Lab Sample IDs: 2262037

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	104	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	MS
EPA 180.1 Rev. 2.0	Turbidity				0.133	
EPA 300.0 Rev. 2.1	Chloride	100	96.3	96.4	0.625	
	Sulfate	100	96.4	99.1	1.52	
EPA 350.1 Rev. 2.0	Ammonia-N	102	99.4	99.6		0.122
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	107	103		2.42
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	103	100	99.6		0.475
EPA 365.1 Rev. 2.0	Total-P	106	107	107		0.0687
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.9	91.3	93.1		1.78
SM 2120 B-2011	Color (true)	101			0.966	
SM 2320 B-2011	Total Alkalinity	104			0.117	
SM 2540 C-2011	TDS				6.57	
SM 4500 F-C-2011	Fluoride	100	99.2	99.2		0.0
SM 5310 B-2011	Organic Carbon	96.3	96.5	97.6		0.856

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2262036
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2262036
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2262036
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2262037
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2262037
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2262037
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2262037
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2262038
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2262036
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2262036
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2262036
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2262036
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2262036
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2262037

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	07/14/2021			07/14/2021 16:49	Sarah A Nixon	2262036
EPA 300.0 Rev. 2.1	07/14/2021			07/20/2021 20:12	Lipi Saha	2262036
EPA 350.1 Rev. 2.0	07/14/2021			07/26/2021 13:25	Roberta Tatti	2262037
EPA 351.2 Rev. 2.0	07/14/2021	08/04/2021 14:07	Benjamin T. Nordmann	08/05/2021 14:22	Virginia P. Brown	2262037
EPA 353.2 Rev. 2.0	07/14/2021			07/16/2021 09:36	Beverly Y. Sanders	2262037
EPA 365.1 Rev. 2.0	07/14/2021	07/20/2021 13:32	Shengyu Ding	07/21/2021 11:34	Shengyu Ding	2262037
EPA 365.1 Rev. 2.0 dissolved	07/14/2021			07/14/2021 15:56	Ping Hua	2262038
SM 2120 B-2011	07/14/2021			07/14/2021 18:12	Sarah A Nixon	2262036
SM 2320 B-2011	07/14/2021			07/17/2021 02:04	Dale L. Simmons	2262036
SM 2540 C-2011	07/14/2021			07/16/2021 14:42	Yijie Li	2262036
SM 2540 D-2011	07/14/2021			07/16/2021 14:42	Yijie Li	2262036
SM 4500 F-C-2011	07/14/2021			07/17/2021 02:04	Dale L. Simmons	2262036
SM 5310 B-2011	07/14/2021			07/22/2021 00:49	Madeline Gruver	2262037