

Biological Analysis Report

SE-DIST-2023-11-21-03

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

Event Description: **Highlands Run**
Request ID: **RQ-2023-11-06-53**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
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Certified by: Puja Jasrotia, Environmental Administrator

Date Certified: 27-DEC-2023 11:52

A handwritten signature in black ink, appearing to be 'Puja Jasrotia', written over a horizontal line.

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: Chlorophyll/Grain Size/BOD, Microbiology and Molecular.

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: Indian Prairie Canal upstream of SR 70

Collection Date/Time: 11/20/2023 09:50

Field ID: G4SE0152

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2452521	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	88.2	Q	MPN/100 mL	P438220	

Ref. Method and Comment:

SM 9223 B Quanti-Tray: Precision data is unavailable for E. coli due to the small amount of analyte in the QC sample for the batch.

Sample Location: Jackson Creek at SR66

Collection Date/Time: 11/20/2023 10:40

Field ID: G4SE0187

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2452515	SM 10150 B	Chlorophyll-a, Corrected	8.2		ug/L	P438622	
		Phaeophytin-a	5.2		ug/L	P438622	
		Chlorophyll-a, Uncorrected	12		ug/L	P438622	
2452518	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	8.4	Q	MPN/100 mL	P438220	

Ref. Method and Comment:

SM 10150 B: Precision data is not available for at least one component due to the small amount of analyte in the QC sample. Refer to QA report for available precision data.

SM 9223 B Quanti-Tray: Precision data is unavailable for E. coli due to the small amount of analyte in the QC sample for the batch.

Sample Location: Arbuckle Creek at US Hwy 98

Collection Date/Time: 11/20/2023 11:11

Field ID: G4SE0150

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2452516	SM 10150 B	Chlorophyll-a, Corrected	3.0		ug/L	P438622	
		Phaeophytin-a	2.0	I	ug/L	P438622	
		Chlorophyll-a, Uncorrected	4.3		ug/L	P438622	
2452519	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	104.6	Q	MPN/100 mL	P438220	

Ref. Method and Comment:

SM 10150 B: Precision data is not available for at least one component due to the small amount of analyte in the QC sample. Refer to QA report for available precision data.

SM 9223 B Quanti-Tray: Precision data is unavailable for E. coli due to the small amount of analyte in the QC sample for the batch.

Sample Location: Kissimmee Tributary at US 98 East of Buckhorn

Collection Date/Time: 11/20/2023 12:25

Field ID: G4SE0155

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2452522	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	98.7	Q	MPN/100 mL	P438220	
2452525	SOP-PCR-1.0	HF183-qPCR**	2.2E+03	U	TSC/100 mL	P437973	
	SOP-PCR-1.2	GULL2-qPCR**	2.4E+03	U	TSC/100 mL	P437973	
	SOP-PCR-1.3	GFD-qPCR**	2.4E+03		TSC/100 mL	P437973	RPD
	SOP-PCR-1.4	BacR-qPCR**	2.0E+03	U	TSC/100 mL	P437973	
	SOP-PCR-1.5	DG3-qPCR**	1.7E+03	U	TSC/100 mL	P437973	

Ref. Method and Comment:

SM 9223 B Quanti-Tray: Precision data is unavailable for E. coli due to the small amount of analyte in the QC sample for the batch.

Sample Location: Arbuckle Branch at Abuckle Creek Rd

Collection Date/Time: 11/20/2023 11:40

Field ID: G4SE0149

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2452517	SM 10150 B	Chlorophyll-a, Corrected	12		ug/L	P438622	

Field ID: G4SE0149

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2452517	SM 10150 B	Phaeophytin-a	5.0		ug/L	P438622	
		Chlorophyll-a, Uncorrected	15		ug/L	P438622	
2452520	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	727.0	Q	MPN/100 mL	P438220	
2452524	SOP-PCR-1.0	HF183-qPCR**	3.3E+03	U	TSC/100 mL	P437973	
	SOP-PCR-1.4	BacR-qPCR**	2.13E+05		TSC/100 mL	P437973	
	SOP-PCR-1.5	DG3-qPCR**	2.6E+03	U	TSC/100 mL	P437973	

Ref. Method and Comment:
SM 10150 B: Precision data is not available for at least one component due to the small amount of analyte in the QC sample. Refer to QA report for available precision data.
SM 9223 B Quanti-Tray: Precision data is unavailable for E. coli due to the small amount of analyte in the QC sample for the batch.

Sample Location: Kissimmee Tributary at US 98 West of Cornwell Collection Date/Time: 11/20/2023 12:40

Field ID: G4SE0154

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2452523	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	95.9	Q	MPN/100 mL	P438220	

Ref. Method and Comment:
SM 9223 B Quanti-Tray: Precision data is unavailable for E. coli due to the small amount of analyte in the QC sample for the batch.

Quality Assurance Report
Method Blank Results

Reference Method: SM 10150 B
Batch ID: P438622

Component	Result	Code	Units
Chlorophyll-a, Corrected	0.82	U	ug/L
Chlorophyll-a, Uncorrected	0.60	U	ug/L
Phaeophytin-a	0.90	U	ug/L

Reference Method: SM 9223 B Quanti-Tray
Batch ID: P438220

Component	Result	Code	Units
Escherichia Coli-Quanti-Tray	1.0	U	MPN/100 mL

Reference Method: SOP-PCR-1.0
Batch ID: P437973

Component	Result	Code	Units
HF183-qPCR	3.3E+03	U	TSC/100 mL

Reference Method: SOP-PCR-1.2
Batch ID: P437973

Component	Result	Code	Units
GULL2-qPCR	3.6E+03	U	TSC/100 mL

Reference Method: SOP-PCR-1.3
Batch ID: P437973

Component	Result	Code	Units
GFD-qPCR	720	U	TSC/100 mL

Quality Assurance Report
Method Blank Results

Reference Method: SOP-PCR-1.4
Batch ID: P437973

Component	Result	Code	Units
BacR-qPCR	3.0E+03	U	TSC/100 mL

Reference Method: SOP-PCR-1.5
Batch ID: P437973

Component	Result	Code	Units
DG3-qPCR	2.6E+03	U	TSC/100 mL

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 10150 B
Batch ID: P438622

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chlorophyll-a, Corrected	88.8		P	84 - 116

Reference Method: SOP-PCR-1.0
Batch ID: P437973

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	88.8	87.5	P/P	50 - 175

Reference Method: SOP-PCR-1.2
Batch ID: P437973

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GULL2-qPCR	103	68.5	P/P	50 - 175

Reference Method: SOP-PCR-1.3
Batch ID: P437973

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GFD-qPCR	86.5	80.8	P/P	50 - 175

Reference Method: SOP-PCR-1.4
Batch ID: P437973

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
BacR-qPCR	104	71.6	P/P	50 - 175

Reference Method: SOP-PCR-1.5
Batch ID: P437973

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
DG3-qPCR	98.5	72.3	P/P	50 - 175

Quality Assurance Report
Matrix Spike Accuracy

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.0

Batch ID: P437973

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2452147	HF183-qPCR	102	101	P/P	50 - 175
2452471	HF183-qPCR	85.8		P	50 - 175
2452524	HF183-qPCR	86.1		P	50 - 175
2452525	HF183-qPCR	86.6		P	50 - 175
2452535	HF183-qPCR	93.7		P	50 - 175
2452749	HF183-qPCR	87.6		P	50 - 175
2452843	HF183-qPCR	82.9		P	50 - 175
2453084	HF183-qPCR	82.5		P	50 - 175
2453085	HF183-qPCR	84.5		P	50 - 175
2453171	HF183-qPCR	84.8		P	50 - 175
2453336	HF183-qPCR	94.8		P	50 - 175
2453424	HF183-qPCR	87.4		P	50 - 175
2453534	HF183-qPCR	90.9		P	50 - 175

Reference Method: SOP-PCR-1.2

Batch ID: P437973

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2452147	GULL2-qPCR	99.0	95.3	P/P	50 - 175
2452525	GULL2-qPCR	84.6		P	50 - 175
2452535	GULL2-qPCR	76.7		P	50 - 175
2452843	GULL2-qPCR	85.9		P	50 - 175
2453084	GULL2-qPCR	79.0		P	50 - 175
2453171	GULL2-qPCR	101		P	50 - 175
2453336	GULL2-qPCR	79.5		P	50 - 175
2453424	GULL2-qPCR	85.3		P	50 - 175
2453534	GULL2-qPCR	83.6		P	50 - 175

Reference Method: SOP-PCR-1.3

Batch ID: P437973

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2452147	GFD-qPCR	98.6	98.7	P/P	50 - 175
2452525	GFD-qPCR	84.9		P	50 - 175
2452535	GFD-qPCR	93.5		P	50 - 175
2452843	GFD-qPCR	81.8		P	50 - 175
2453084	GFD-qPCR	89.3		P	50 - 175
2453171	GFD-qPCR	90.8		P	50 - 175
2453336	GFD-qPCR	98.0		P	50 - 175
2453424	GFD-qPCR	93.7		P	50 - 175
2453534	GFD-qPCR	90.3		P	50 - 175

Reference Method: SOP-PCR-1.4

Batch ID: P437973

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2452147	BacR-qPCR	98.6	95.5	P/P	50 - 175
2452471	BacR-qPCR	84.0		P	50 - 175
2452524	BacR-qPCR	63.3		P	50 - 175
2452525	BacR-qPCR	80.1		P	50 - 175
2452535	BacR-qPCR	63.4		P	50 - 175
2452749	BacR-qPCR	67.5		P	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.4
Batch ID: P437973

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2452843	BacR-qPCR	79.0		P	50 - 175
2453084	BacR-qPCR	64.0		P	50 - 175
2453085	BacR-qPCR	71.6		P	50 - 175
2453171	BacR-qPCR	88.7		P	50 - 175
2453336	BacR-qPCR	85.2		P	50 - 175
2453424	BacR-qPCR	92.6		P	50 - 175
2453534	BacR-qPCR	86.2		P	50 - 175

Reference Method: SOP-PCR-1.5
Batch ID: P437973

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2452147	DG3-qPCR	106	110	P/P	50 - 175
2452471	DG3-qPCR	97.5		P	50 - 175
2452524	DG3-qPCR	89.6		P	50 - 175
2452525	DG3-qPCR	97.7		P	50 - 175
2452535	DG3-qPCR	89.8		P	50 - 175
2452749	DG3-qPCR	94.8		P	50 - 175
2452843	DG3-qPCR	87.9		P	50 - 175
2453084	DG3-qPCR	98.4		P	50 - 175
2453085	DG3-qPCR	94.8		P	50 - 175
2453171	DG3-qPCR	93.0		P	50 - 175
2453336	DG3-qPCR	101		P	50 - 175
2453424	DG3-qPCR	96.6		P	50 - 175
2453534	DG3-qPCR	97.9		P	50 - 175

Quality Assurance Report Precision

Reference Method: SM 10150 B
Batch ID: P438622

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2452532	Chlorophyll-a, Uncorrected	3.80	Sample	P	0 - 25

Reference Method: SOP-PCR-1.0
Batch ID: P437973

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2452147	HF183-qPCR	0.899	Spike	P	0 - 25

Reference Method: SOP-PCR-1.2
Batch ID: P437973

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2452147	GULL2-qPCR	3.84	Spike	P	0 - 25

Quality Assurance Report

Precision

Reference Method: SOP-PCR-1.3

Batch ID: P437973

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2452147	GFD-qPCR	26.8	Sample	F	0 - 25

Reference Method: SOP-PCR-1.4

Batch ID: P437973

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2452147	BacR-qPCR	3.21	Spike	P	0 - 25

Reference Method: SOP-PCR-1.5

Batch ID: P437973

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2452147	DG3-qPCR	4.43	Spike	P	0 - 25

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

Quality Assurance Report

Surrogates

Lab Sample ID: 2452524

Field Sample ID: G4SE0149

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	81.0	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	88.6	P	50 - 300
SOP-PCR-1.5	SKETA-qPCR	82.0	P	50 - 300

Lab Sample ID: 2452525

Field Sample ID: G4SE0155

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	99.2	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	102	P	50 - 300
SOP-PCR-1.3	SKETA-qPCR	127	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	97.8	P	50 - 300
SOP-PCR-1.5	SKETA-qPCR	102	P	50 - 300

Quality Assurance Report

Summary

Ref. Method	Analyte	LCS % Recovery		MS % Recovery			Precision		
							LCS	SMP	MS
SM 10150 B	Chlorophyll-a, Corrected	88.8							
	Chlorophyll-a, Uncorrected						3.80		
SOP-PCR-1.0	HF183-qPCR	87.5	88.8	82.9	82.5	84.5			0.899
				84.8					

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery			MS % Recovery			Precision SMP	MS
SOP-PCR-1.2	GULL2-qPCR	68.5	103		99.0	95.3	84.6		3.84
SOP-PCR-1.3	GFD-qPCR	80.8	86.5		98.6	98.7	84.9	26.8	
SOP-PCR-1.4	BacR-qPCR	71.6	104		98.6	95.5	84.0		3.21
SOP-PCR-1.5	DG3-qPCR	72.3	98.5		106	110	97.5		4.43
					89.6				

Reference Method Descriptions

Method	Description	Associated Samples
SM 10150 B	Phytoplankton chlorophyll-a corrected, uncorrected, and phaeophytin by spectrophotometry	2452515, 2452516, 2452517
SM 9223 B Quanti-Tray	Escherichia coli by Colilert 18 Quanti-Tray method - non-chlorinated water systems	2452518, 2452519, 2452520, 2452521, 2452522, 2452523
SOP-PCR-1.0	Detection and quantification of human-specific HF183 Bacteroides genetic marker with quantitative polymerase chain reaction	2452524, 2452525
SOP-PCR-1.2	Detection and quantification of coastal bird specific Catellicoccus marimammalium Gull2 genetic marker with quantitative polymerase chain reaction	2452525
SOP-PCR-1.3	Detection and quantification of bird specific Helicobacter GFD genetic marker with quantitative polymerase chain reaction	2452525
SOP-PCR-1.4	Detection and quantification of Ruminant specific Bacteroidetes BacR genetic marker with quantitative polymerase chain reaction	2452524, 2452525
SOP-PCR-1.5	Detection and quantification of canine-specific DG3 Bacteroides genetic marker with quantitative polymerase chain reaction	2452524, 2452525

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 10150 B	11/21/2023	11/21/2023 12:47	Julia Herten	11/30/2023 16:04	Callie Williams	2452515, 2452516, 2452517
SM 9223 B Quanti-Tray	11/21/2023	11/21/2023 15:16	Megan Higbee	11/22/2023 10:18	Megan Higbee	2452518, 2452519, 2452520, 2452521, 2452522, 2452523
SOP-PCR-1.0	11/21/2023	11/21/2023 13:11	Madeline Gruver	12/12/2023 08:59	Roberta Tatti	2452524, 2452525
SOP-PCR-1.2	11/21/2023	11/21/2023 13:11	Madeline Gruver	12/19/2023 14:09	Jennifer Mihalic	2452525
SOP-PCR-1.3	11/21/2023	11/21/2023 13:11	Madeline Gruver	12/18/2023 16:07	Madeline Gruver	2452525
SOP-PCR-1.4	11/21/2023	11/21/2023 13:11	Madeline Gruver	12/14/2023 09:19	Roberta Tatti	2452524, 2452525
SOP-PCR-1.5	11/21/2023	11/21/2023 13:11	Madeline Gruver	12/14/2023 10:17	Roberta Tatti	2452524, 2452525