

Biological Analysis Report

WQ-ASSESS-2017-04-18-01

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

Event Description: **Wakulla, Moriah, Wards, Caney**

Request ID: **RQ-2017-04-03-28**

Customer: **WQ-ASSESS**

Project ID: **SMP**

Send Reports to:

FL Dept. of Environmental Protection
Division Of Water Facilities, FL DEP
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Certified by: Daisys Matthews,

Date Certified: 01-JUN-2017 07:45

A handwritten signature in black ink, appearing to read "D Matthews". The signature is stylized with a large, sweeping initial "D" and a cursive "Matthews".

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 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: Moriah Creek 100 meters upstream of Newport Rd. **Collection Date/Time: 04/18/2017 08:25**

Field ID: G1WA0057_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889874	SM 10200 H (mod.)	Chlorophyll-a, Corrected	0.55	U	ug/L	P323916	
		Phaeophytin-a	0.46	I	ug/L	P323916	
		Chlorophyll/Phaeophytin Ratio	0.99			P323916	
		Chlorophyll-a, Uncorrected	0.40	U	ug/L	P323916	

Ref. Method and Comment:

SM 10200 H (mod.): 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.

Sample Location: Wakulla River Below Highway 98 Bridge **Collection Date/Time: 04/18/2017 09:13**

Field ID: G1WA0028_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889875	SM 10200 H (mod.)	Chlorophyll-a, Corrected	0.65	I	ug/L	P323916	
		Phaeophytin-a	0.90	I	ug/L	P323916	
		Chlorophyll/Phaeophytin Ratio	1.3			P323916	
		Chlorophyll-a, Uncorrected	1.2		ug/L	P323916	

Ref. Method and Comment:

SM 10200 H (mod.): 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.

Sample Location: Caney Creek Upstream of US 90 **Collection Date/Time: 04/18/2017 10:55**

Field ID: G1WA0014_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889876	SM 10200 H (mod.)	Chlorophyll-a, Corrected	1.0	I	ug/L	P323916	
		Phaeophytin-a	0.93	I	ug/L	P323916	
		Chlorophyll/Phaeophytin Ratio	1.4			P323916	
		Chlorophyll-a, Uncorrected	1.6		ug/L	P323916	

Ref. Method and Comment:

SM 10200 H (mod.): 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.

Sample Location: Caney Creek Upstream of US 90 **Collection Date/Time: 04/18/2017 10:55**

Field ID: G1WA0014_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889878	SM 9223 Quanti-Tray	Escherichia Coli-Quanti-Tray	980.4		MPN/100 mL	P324329	

Ref. Method and Comment:

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

Sample Location: Caney Creek Upstream of US 90 **Collection Date/Time: 04/18/2017 10:55**

Field ID: G1WA0014_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889881	SOP-PCR-1.0	HF183-qPCR**	2.4	TJ	GEU/100 mL	P324012	LCS, SUR

Ref. Method and Comment:

SOP-PCR-1.0: Sample processed with an additional purification step to reduce inhibition, which can reduce overall DNA recovery. See QA report.

Sample Location: Wards Creek upstream of bridge at CR 259 **Collection Date/Time: 04/18/2017 11:25**

Field ID: G1WA0002_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889879	SM 9223 Quanti-Tray	Escherichia Coli-Quanti-Tray	75.4		MPN/100 mL	P324329	

Ref. Method and Comment:

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

Sample Location: Wards Creek upstream of bridge at CR 259

Collection Date/Time: 04/18/2017 11:25

Field ID: G1WA0002_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889882	SOP-PCR-1.0	HF183-qPCR**	24	UJ	GEU/100 mL	P324012	LCS, SUR
	SOP-PCR-1.2	GULL2-qPCR**	1.4E+03	UJ	TSC/100 mL	P324012	LCS, MS, RPD, SUR
	SOP-PCR-1.3	GFD-purified-qPCR**	1.2E+03	T	TSC/100 mL	P324012	LCS, MS
	SOP-PCR-1.4	BacR-qPCR**	250	UJ	TSC/100 mL	P324012	SUR

Ref. Method and Comment:

SOP-PCR-1.0: No amplification of HF183 marker. Sample processed with an additional purification step to reduce inhibition, which can reduce overall DNA recovery. See QA report.

SOP-PCR-1.2: No amplification of GULL2 marker. Sample processed with an additional purification step to reduce inhibition, which can reduce overall DNA recovery. See QA report.

SOP-PCR-1.3: Analyte detected at a level below the current nominal MDL.

SOP-PCR-1.4: No amplification of BACR marker. Sample processed with an additional purification step to reduce inhibition, which can reduce overall DNA recovery. See QA report.

Sample Location: Caney Creek Downstream of 158A

Collection Date/Time: 04/18/2017 12:05

Field ID: G1WA0060_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889877	SM 10200 H (mod.)	Chlorophyll-a, Corrected	8.6		ug/L	P323916	
		Phaeophytin-a	6.6		ug/L	P323916	
		Chlorophyll/Phaeophytin Ratio	1.4			P323916	
		Chlorophyll-a, Uncorrected	13		ug/L	P323916	

Ref. Method and Comment:

SM 10200 H (mod.): 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.

Sample Location: Caney Creek Downstream of 158A

Collection Date/Time: 04/18/2017 12:05

Field ID: G1WA0060_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889880	SM 9223 Quanti-Tray	Escherichia Coli-Quanti-Tray	1299.7		MPN/100 mL	P324329	

Ref. Method and Comment:

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

Sample Location: Caney Creek Downstream of 158A

Collection Date/Time: 04/18/2017 12:05

Field ID: G1WA0060_04182017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1889883	SOP-PCR-1.0	HF183-qPCR**	140	U	GEU/100 mL	P323581	
	SOP-PCR-1.4	BacR-qPCR**	180	TJ	TSC/100 mL	P324014	MS

Ref. Method and Comment:

SOP-PCR-1.0: No amplification of HF183 marker.

SOP-PCR-1.4: Duplicate was analyzed and result is 1.50E+03 U. Quality control failure(s) observed. See QA report for details.

Quality Assurance Report Method Blank Results

Reference Method: SM 10200 H (mod.)
 Batch ID: P323916

Component	Result	Code	Units
Chlorophyll-a, Corrected	0.55	U	ug/L
Chlorophyll-a, Uncorrected	0.40	U	ug/L
Phaeophytin-a	0.40	U	ug/L

Reference Method: SM 9223 Quanti-Tray
 Batch ID: P324329

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

Reference Method: SOP-PCR-1.0
 Batch ID: P323581

Component	Result	Code	Units
HF183-qPCR	280	U	GEU/100 mL

Reference Method: SOP-PCR-1.0
 Batch ID: P324012

Component	Result	Code	Units
HF183-qPCR	47	U	GEU/100 mL

Reference Method: SOP-PCR-1.2
 Batch ID: P324012

Component	Result	Code	Units
GULL2-qPCR	2.8E+03	U	TSC/100 mL
GULL2-qPCR	280	T	TSC/100 mL

Reference Method: SOP-PCR-1.3
 Batch ID: P324012

Component	Result	Code	Units
GFD-purified-qPCR	4.0E+04	U	TSC/100 mL

Reference Method: SOP-PCR-1.4
 Batch ID: P324012

Component	Result	Code	Units
BacR-qPCR	510	U	TSC/100 mL

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 10200 H (mod.)
 Batch ID: P323916

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chlorophyll-a, Corrected	103		P	84 - 116

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SOP-PCR-1.0

Batch ID: P323581

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	80.5	63.9	P/P	50 - 175

Reference Method: SOP-PCR-1.0

Batch ID: P324012

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	85.0	4.06	P/F	50 - 175

Reference Method: SOP-PCR-1.2

Batch ID: P324012

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GULL2-qPCR	18.0	94.2	F/P	50 - 300
GULL2-qPCR	25.5	72.0	F/P	50 - 300

Reference Method: SOP-PCR-1.3

Batch ID: P324012

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GFD-purified-qPCR	86.6	17.9	P/F	50 - 175

Reference Method: SOP-PCR-1.4

Batch ID: P324012

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
BacR-qPCR	66.1		P	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.0

Batch ID: P323581

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1883005	HF183-qPCR	78.7		P	50 - 175
1883844	HF183-qPCR	87.8		P	50 - 175
1889883	HF183-qPCR	70.9	64.5	P/P	50 - 175
1890153	HF183-qPCR	62.3		P	50 - 175
1890156	HF183-qPCR	60.4		P	50 - 175
1890157	HF183-qPCR	85.9		P	50 - 175
1890158	HF183-qPCR	78.6		P	50 - 175
1890159	HF183-qPCR	70.4		P	50 - 175
1890160	HF183-qPCR	94.7		P	50 - 175

Reference Method: SOP-PCR-1.0

Batch ID: P324012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1884896	HF183-qPCR	85.1		P	50 - 175
1889881	HF183-qPCR	79.3		P	50 - 175
1889882	HF183-qPCR	85.3		P	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.0
 Batch ID: P324012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1890154	HF183-qPCR	86.5		P	50 - 175
1890155	HF183-qPCR	83.4		P	50 - 175
1891012	HF183-qPCR	79.8		P	50 - 175
1891017	HF183-qPCR	75.9		P	50 - 175

Reference Method: SOP-PCR-1.2
 Batch ID: P324012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1882563	GULL2-qPCR	45.8		F	50 - 300
1883005	GULL2-qPCR	61.7	44.3	P/F	50 - 300
1884896	GULL2-qPCR	65.6		P	50 - 300
1889882	GULL2-qPCR	88.1		P	50 - 300

Reference Method: SOP-PCR-1.3
 Batch ID: P324012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1882563	GFD-purified-qPCR	163		P	50 - 175
1883005	GFD-purified-qPCR	179	192	F/F	50 - 175
1884896	GFD-purified-qPCR	169		P	50 - 175
1889882	GFD-purified-qPCR	107		P	50 - 175

Reference Method: SOP-PCR-1.4
 Batch ID: P324012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1889882	BacR-qPCR	82.1		P	50 - 175

Reference Method: SOP-PCR-1.4
 Batch ID: P324014

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1889883	BacR-qPCR	26.0	24.7	F/F	50 - 175

Quality Assurance Report Precision

Reference Method: SM 10200 H (mod.)
 Batch ID: P323916

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1889932	Chlorophyll/Phaeophytin Ratio	0.0	Sample	P	0 - 25
1889932	Chlorophyll-a, Corrected	0.747	Sample	P	0 - 25
1889932	Chlorophyll-a, Uncorrected	0.504	Sample	P	0 - 25

Quality Assurance Report Precision

Reference Method: SOP-PCR-1.0
 Batch ID: P323581

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1889883	HF183-qPCR	9.51	Spike	P	0 - 25

Reference Method: SOP-PCR-1.2
 Batch ID: P324012

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1883005	GULL2-qPCR	32.8	Spike	F	0 - 25
1888810	GULL2-qPCR	27.7	Spike	F	0 - 25

Reference Method: SOP-PCR-1.3
 Batch ID: P324012

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1883005	GFD-purified-qPCR	6.92	Spike	P	0 - 25

Reference Method: SOP-PCR-1.4
 Batch ID: P324012

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1896107	BacR-qPCR	14.1	Spike	P	0 - 25

Reference Method: SOP-PCR-1.4
 Batch ID: P324014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1889883	BacR-qPCR	5.15	Spike	P	0 - 25

* 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 Surrogates

Lab Sample ID: 1889881
 Field Sample ID: G1WA0014_04182017

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	6.80	F	30 - 300

Lab Sample ID: 1889882
 Field Sample ID: G1WA0002_04182017

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	6.86	F	30 - 300
SOP-PCR-1.2	SKETA-qPCR	9.42	F	30 - 300
SOP-PCR-1.4	SKETA-qPCR	8.89	F	30 - 300

Quality Assurance Report Surrogates

Lab Sample ID: 1889883

Field Sample ID: G1WA0060_04182017

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	51.8	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	57.9	P	50 - 300

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery		MS % Recovery			LCS	Precision SMP	MS
SM 10200 H (mod.)	Chlorophyll/Phaeophytin Ratio							0.0	
	Chlorophyll-a, Corrected	103						0.747	
	Chlorophyll-a, Uncorrected							0.504	
SOP-PCR-1.0	HF183-qPCR	63.9	80.5	70.9	64.5	62.3			9.51
				60.4					
	HF183-qPCR	4.06	85.0	85.1	79.3	85.3			
				86.5					
SOP-PCR-1.2	GULL2-qPCR	18.0	72.0	25.5	45.8	61.7	44.3		32.8 27.7
		94.2			65.6				
SOP-PCR-1.3	GFD-purified-qPCR	17.9	86.6	163	179	192			6.92
				169					
SOP-PCR-1.4	BacR-qPCR	66.1		82.1					14.1
	BacR-qPCR			26.0	24.7				5.15

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 10200 H (mod.) / E31780	Phytoplankton chlorophyll-a corrected, uncorrected, phaeophytin and ratio by spectrophotometry	1889874, 1889875, 1889876, 1889877
SM 9223 Quanti-Tray / E31780	Escherichia coli by Colilert 18 Quanti-Tray method - non-chlorinated water systems	1889878, 1889879, 1889880
SOP-PCR-1.0 / E31780	Detection and quantification of human-specific HF183 Bacteroides genetic marker with quantitative polymerase chain reaction	1889881, 1889882, 1889883
SOP-PCR-1.2 / E31780	Detection and quantification of coastal bird specific Catellicoccus marimammalium genetic marker with quantitative polymerase chain reaction	1889882
SOP-PCR-1.3 / E31780	Detection and quantification of bird specific Helicobacter genetic marker with quantitative polymerase chain reaction	1889882
SOP-PCR-1.4 / E31780	Detection and quantification of Ruminant specific Bacteroidetes genetic marker with quantitative polymerase chain reaction	1889882, 1889883

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 10200 H (mod.)	04/18/2017	04/18/2017 15:30	Jennifer Mihalic	04/24/2017	Kim M. Spencer	1889874, 1889875, 1889876, 1889877
SM 9223 Quanti-Tray	04/18/2017	04/18/2017 14:55	Morgan Lane	04/19/2017 09:05	Morgan Lane	1889878, 1889879, 1889880
SOP-PCR-1.0	04/18/2017	04/18/2017 14:45	Avril Wood	04/21/2017	Puja Jasrotia	1889883
	04/18/2017	04/18/2017 14:45	Sarah Menz	04/28/2017	Puja Jasrotia	1889881, 1889882
SOP-PCR-1.2	04/18/2017	04/18/2017 14:45	Puja Jasrotia	05/22/2017	Sarah Menz	1889882
SOP-PCR-1.3	04/18/2017	04/18/2017 14:45	Puja Jasrotia	05/23/2017	Sarah Menz	1889882
SOP-PCR-1.4	04/18/2017	04/18/2017 14:45	Sarah Menz	04/25/2017	Sarah Menz	1889883
	04/18/2017	04/18/2017 14:45	Sarah Menz	05/22/2017	Sarah Menz	1889882