

Biological Analysis Report

SE-DIST-2017-04-26-01

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

Overflow Analyses Performed By:
Flowers Chemical Laboratories Inc.
571 NW Mercantile Pl. Ste. 111
Port St. Lucie, FL 34986
DOH Accreditation E86562

Event Description: **SMP-G2 Jupiter Run**
Request ID: **RQ-2017-04-03-25**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
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2199 South Rock Road
Fort Pierce, FL 34945
Attn: Matthew Sewell

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Certified by: Daisys Matthews,

Date Certified: 01-JUN-2017 07:57

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, Molecular and Overflow.

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: C-24 CANAL @ PSL BLVD

Collection Date/Time: 04/25/2017 12:00

Field ID: G2SE0011

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1892525	SM 10200 H (mod.)	Chlorophyll-a, Corrected	15		ug/L	P324398	
		Phaeophytin-a	2.9		ug/L	P324398	
		Chlorophyll/Phaeophytin Ratio	1.6			P324398	
		Chlorophyll-a, Uncorrected	17		ug/L	P324398	
1892529	SOP-PCR-4.0	HF183 - Human Source Marker**	Below Threshold				
1892537	SM 9223 Quanti-Tray	Escherichia Coli-Quanti-Tray	28.1		MPN/100 mL		

Sample Location: TIDAL CREEK TO LOX

Collection Date/Time: 04/25/2017 13:40

Field ID: G2SE0027

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1892523	SM 10200 H (mod.)	Chlorophyll-a, Corrected	3.0		ug/L	P324398	
		Phaeophytin-a	0.88	I	ug/L	P324398	
		Chlorophyll/Phaeophytin Ratio	1.5			P324398	
		Chlorophyll-a, Uncorrected	3.6		ug/L	P324398	
1892527	SOP-PCR-1.0	HF183-qPCR**	120	I	GEU/100 mL	P324882	
	SOP-PCR-4.0	HF183 - Human Source Marker**	Above Threshold				
1892533	Enterolert/QT	Enterococci-Quanti-Tray	1210		MPN/100 mL		
1892535	SM 9222 D	Fecal Coliforms-Membrane Filter	2700		cfu/100 mL		

Sample Location: SW FORK LOX @ LOX RIVER RD.

Collection Date/Time: 04/25/2017 13:10

Field ID: G2SE0023

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1892524	SM 10200 H (mod.)	Chlorophyll-a, Corrected	28		ug/L	P324398	
		Phaeophytin-a	2.7		ug/L	P324398	
		Chlorophyll/Phaeophytin Ratio	1.6			P324398	
		Chlorophyll-a, Uncorrected	31		ug/L	P324398	
1892528	SOP-PCR-1.0	HF183-qPCR**	140	U	GEU/100 mL	P324882	
	SOP-PCR-1.2	GULL2-qPCR**	8.4E+03	U	TSC/100 mL	P324882	RPD
	SOP-PCR-1.3	GFD-purified-qPCR**	99	TJ	TSC/100 mL	P324456	LCS, MS, RPD
	SOP-PCR-1.4	BacR-qPCR**	1.5E+03	U	TSC/100 mL	P324882	LCS
	SOP-PCR-4.0	HF183 - Human Source Marker**	Above Threshold				
1892534	Enterolert/QT	Enterococci-Quanti-Tray	132		MPN/100 mL		
1892536	SM 9222 D	Fecal Coliforms-Membrane Filter	16.0	B	cfu/100 mL		

Ref. Method and Comment:

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

SOP-PCR-1.2: No amplification of GULL2 marker.

SOP-PCR-1.3: Analyte detected at a level below the current nominal MDL. Quality control failure(s) observed. See QA report for details.

SOP-PCR-1.4: No amplification of BACR marker.

Sample Location: N FORK LOX @ COUNTY LINE

Collection Date/Time: 04/25/2017 14:00

Field ID: G2SE0021

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1892522	SM 10200 H (mod.)	Chlorophyll-a, Corrected	4.3		ug/L	P324398	

Field ID: G2SE0021

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1892522	SM 10200 H (mod.)	Phaeophytin-a	1.6		ug/L	P324398	
		Chlorophyll/Phaeophytin Ratio	1.5			P324398	
		Chlorophyll-a, Uncorrected	5.4		ug/L	P324398	
1892526	SOP-PCR-1.0	HF183-qPCR**	37	T	GEU/100 mL	P323807	MS
1892532	Enterolert/QT	Enterococci-Quanti-Tray	20.0		MPN/100 mL		
1892538	SM 9222 D	Fecal Coliforms-Membrane Filter	440		cfu/100 mL		

Sample Location: NORTH FORK UPPER LOX

Collection Date/Time: 04/25/2017 14:30

Field ID: G2SE0020

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1892520	SM 10200 H (mod.)	Chlorophyll-a, Corrected	21		ug/L	P324398	
		Phaeophytin-a	3.7		ug/L	P324398	
		Chlorophyll/Phaeophytin Ratio	1.6			P324398	
		Chlorophyll-a, Uncorrected	24		ug/L	P324398	
1892530	SM 9223 Quanti-Tray	Escherichia Coli-Quanti-Tray	150		MPN/100 mL		

Sample Location: HENDERSON POND

Collection Date/Time: 04/25/2017 15:40

Field ID: G2SE0010

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1892521	SM 10200 H (mod.)	Chlorophyll-a, Corrected	6.7		ug/L	P324398	
		Phaeophytin-a	2.2		ug/L	P324398	
		Chlorophyll/Phaeophytin Ratio	1.5			P324398	
		Chlorophyll-a, Uncorrected	8.3		ug/L	P324398	

Quality Assurance Report Method Blank Results

Reference Method: SM 10200 H (mod.)

Batch ID: P324398

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: SOP-PCR-1.0

Batch ID: P323807

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

Reference Method: SOP-PCR-1.0

Batch ID: P324882

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

Quality Assurance Report Method Blank Results

Reference Method: SOP-PCR-1.2
Batch ID: P324882

Component	Result	Code	Units
GULL2-qPCR	1.7E+04	U	TSC/100 mL

Reference Method: SOP-PCR-1.3
Batch ID: P324456

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

Reference Method: SOP-PCR-1.4
Batch ID: P324882

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 10200 H (mod.)
Batch ID: P324398

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chlorophyll-a, Corrected	99.3		P	84 - 116

Reference Method: SOP-PCR-1.0
Batch ID: P323807

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	87.4		P	50 - 175

Reference Method: SOP-PCR-1.0
Batch ID: P324882

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	76.0	65.4	P/P	50 - 175

Reference Method: SOP-PCR-1.2
Batch ID: P324882

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GULL2-qPCR	94.2	59.9	P/P	50 - 300

Reference Method: SOP-PCR-1.3
Batch ID: P324456

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GFD-purified-qPCR	118	18.6	P/F	50 - 175

Reference Method: SOP-PCR-1.4
Batch ID: P324882

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SOP-PCR-1.4
 Batch ID: P324882

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
BacR-qPCR	66.1	46.4	P/F	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.0
 Batch ID: P323807

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1885146	HF183-qPCR	88.4		P	50 - 175
1885147	HF183-qPCR	97.4		P	50 - 175
1891900	HF183-qPCR	83.5		P	50 - 175
1891901	HF183-qPCR	87.3		P	50 - 175
1892526	HF183-qPCR	89.5	91.5	P/P	50 - 175
1892629	HF183-qPCR	91.7		P	50 - 175
1892630	HF183-qPCR	79.2		P	50 - 175
1892631	HF183-qPCR	221		F	50 - 175
1892632	HF183-qPCR	77.7		P	50 - 175
1893784	HF183-qPCR	83.4		P	50 - 175

Reference Method: SOP-PCR-1.0
 Batch ID: P324882

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1890664	HF183-qPCR	91.5		P	50 - 175
1892527	HF183-qPCR	82.0		P	50 - 175
1892528	HF183-qPCR	76.8		P	50 - 175
1896107	HF183-qPCR	76.4		P	50 - 175
1897147	HF183-qPCR	87.8	77.4	P/P	50 - 175
1897658	HF183-qPCR	61.3		P	50 - 175
1897680	HF183-qPCR	90.8		P	50 - 175
1897681	HF183-qPCR	92.6		P	50 - 175
1897690	HF183-qPCR	88.1		P	50 - 175

Reference Method: SOP-PCR-1.2
 Batch ID: P324882

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1890664	GULL2-qPCR	149		P	50 - 300
1892528	GULL2-qPCR	79.9		P	50 - 300

Reference Method: SOP-PCR-1.3
 Batch ID: P324456

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1888121	GFD-purified-qPCR	73.8	118	P/P	50 - 175
1888671	GFD-purified-qPCR	85.6		P	50 - 175
1888810	GFD-purified-qPCR	46.9		F	50 - 175
1889571	GFD-purified-qPCR	141		P	50 - 175
1892528	GFD-purified-qPCR	41.0		F	50 - 175
1892629	GFD-purified-qPCR	13.7		F	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.3
Batch ID: P324456

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1892632	GFD-purified-qPCR	87.5		P	50 - 175

Reference Method: SOP-PCR-1.4
Batch ID: P324882

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1890664	BacR-qPCR	78.9		P	50 - 175
1892528	BacR-qPCR	59.8		P	50 - 175
1896107	BacR-qPCR	58.5	67.4	P/P	50 - 175
1897680	BacR-qPCR	55.0		P	50 - 175

Quality Assurance Report Precision

Reference Method: SM 10200 H (mod.)
Batch ID: P324398

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1892328	Chlorophyll/Phaeophytin Ratio	0.0	Sample	P	0 - 25
1892328	Chlorophyll-a, Corrected	2.85	Sample	P	0 - 25
1892328	Chlorophyll-a, Uncorrected	3.41	Sample	P	0 - 25
1892328	Phaeophytin-a	5.83	Sample	P	0 - 25

Reference Method: SOP-PCR-1.0
Batch ID: P323807

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1892526	HF183-qPCR	2.30	Spike	P	0 - 25

Reference Method: SOP-PCR-1.0
Batch ID: P324882

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1897147	HF183-qPCR	12.6	Spike	P	0 - 25

Reference Method: SOP-PCR-1.2
Batch ID: P324882

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

Reference Method: SOP-PCR-1.3
Batch ID: P324456

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1888121	GFD-purified-qPCR	46.3	Spike	F	0 - 25

Quality Assurance Report Precision

Reference Method: SOP-PCR-1.4
Batch ID: P324882

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1896107	BacR-qPCR	14.1	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: 1892526
Field Sample ID: G2SE0021

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	94.5	P	50 - 300

Lab Sample ID: 1892527
Field Sample ID: G2SE0027

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	90.7	P	50 - 300

Lab Sample ID: 1892528
Field Sample ID: G2SE0023

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	74.4	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	74.4	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	81.3	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	99.3						2.85	
	Chlorophyll-a, Uncorrected							3.41	
	Phaeophytin-a							5.83	
SOP-PCR-1.0	HF183-qPCR	87.4		88.4	97.4	83.5			2.30
				87.3					
	HF183-qPCR	65.4	76.0	87.8	77.4	90.8			12.6
				92.6					
SOP-PCR-1.2	GULL2-qPCR	59.9	94.2	149	79.9				27.7
SOP-PCR-1.3	GFD-purified-qPCR	18.6	118	141	73.8	118			46.3
				46.9					
SOP-PCR-1.4	BacR-qPCR	46.4	66.1	78.9	59.8	58.5			14.1
				67.4					

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
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Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
Enterolert/QT / E86562	Enterococci by Enterolert Quanti-Tray method by Flowers Overflow Laboratory for Southeast District	1892532, 1892533, 1892534
SM 10200 H (mod.) / E31780	Phytoplankton chlorophyll-a corrected, uncorrected, phaeophytin and ratio by spectrophotometry	1892520, 1892521, 1892522, 1892523, 1892524, 1892525
SM 9222 D / E86562	Fecal coliforms by membrane filter method by Flowers Overflow Laboratory for SED	1892535, 1892536, 1892538
SM 9223 Quanti-Tray / E86562	Escherichia coli by Colilert 18 Quanti-Tray method by FlowersOverflow Laboratory for Southeast District	1892530, 1892537
SOP-PCR-1.0 / E31780	Detection and quantification of human-specific HF183 Bacteroides genetic marker with quantitative polymerase chain reaction	1892526, 1892527, 1892528
SOP-PCR-1.2 / E31780	Detection and quantification of coastal bird specific Catellicoccus marimammalium genetic marker with quantitative polymerase chain reaction	1892528
SOP-PCR-1.3 / E31780	Detection and quantification of bird specific Helicobacter genetic marker with quantitative polymerase chain reaction	1892528
SOP-PCR-1.4 / E31780	Detection and quantification of Ruminant specific Bacteroidetes genetic marker with quantitative polymerase chain reaction	1892528
SOP-PCR-4.0 / E31780	Preparation of Samples by Filtration and held for qPCR Analysis	1892527, 1892528, 1892529

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
Enterolert/QT	04/25/2017			04/25/2017 17:15	Flowers-PSL	1892532, 1892533, 1892534
SM 10200 H (mod.)	04/26/2017	04/26/2017 13:55	Jennifer Mihalic	05/02/2017	Brian Cumbie	1892520, 1892521, 1892522, 1892523, 1892524, 1892525
SM 9222 D	04/25/2017			04/25/2017 17:35	Flowers-PSL	1892535, 1892536, 1892538
SM 9223 Quanti-Tray	04/25/2017			04/25/2017 17:50	Flowers-PSL	1892530, 1892537
SOP-PCR-1.0	04/26/2017	04/26/2017 13:35	Puja Jasrotia	05/01/2017	Puja Jasrotia	1892526
	04/26/2017	04/26/2017 13:38	Avril Wood	05/18/2017	Puja Jasrotia	1892527, 1892528
SOP-PCR-1.2	04/26/2017	04/26/2017 13:38	Avril Wood	05/22/2017	Sarah Menz	1892528
SOP-PCR-1.3	04/26/2017	04/26/2017 13:38	Puja Jasrotia	05/23/2017	Sarah Menz	1892528
SOP-PCR-1.4	04/26/2017	04/26/2017 13:38	Avril Wood	05/22/2017	Sarah Menz	1892528
SOP-PCR-4.0	04/26/2017	04/26/2017 13:38	Sarah Menz	05/12/2017	Puja Jasrotia	1892527, 1892528, 1892529