

Biological Analysis Report

SE-DIST-2018-08-03-02

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- Loxah**
Request ID: **RQ-2018-06-11-22**
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
Attn: Matthew Sewell

For additional information please contact
Cheryl Swanson - Administrator
J. Marshall Faircloth - Aquatic Toxicology
Jacqueline Savage - Bench Biology
Jacqueline Savage - Microbiology
Puja Jasrotia, Ph.D. - Molecular Biology
Amelia Rankin - Taxonomy (Invertebrate & Algal)
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8177

Certified by: Amelia G. Rankin,

Date Certified: 20-SEP-2018 16:58



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: Roebuck Creek @ Locks

Collection Date/Time: 08/02/2018 09:50

Field ID: G2SE0029

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013664	SM 10200 H (mod.)	Chlorophyll-a, Corrected	18		ug/L	P349836	
		Phaeophytin-a	5.9		ug/L	P349836	
		Chlorophyll-a, Uncorrected	22		ug/L	P349836	
2013668	SOP-PCR-1.0	HF183-qPCR**	140	U	GEU/100 mL	P350505	
	SOP-PCR-1.4	BacR-qPCR**	1.7E+03	I	TSC/100 mL	P350505	LCS
	SOP-PCR-4.0	HF183 - Human Source Marker**	Above Threshold				
2013671	Enterolert/QT	Enterococci-Quanti-Tray	364		MPN/100 mL		

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.

SOP-PCR-1.4: Precision data unavailable for Analysis Batch A86258

Sample Location: Roebuck Creek @ Mouth

Collection Date/Time: 08/02/2018 10:05

Field ID: G2SE0005

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013665	SM 10200 H (mod.)	Chlorophyll-a, Corrected	8.7		ug/L	P349836	
		Phaeophytin-a	2.8		ug/L	P349836	
		Chlorophyll-a, Uncorrected	11		ug/L	P349836	
2013669	SOP-PCR-1.0	HF183-qPCR**	280	U	GEU/100 mL	P350505	
	SOP-PCR-1.2	GULL2-qPCR**	1.7E+04	U	TSC/100 mL	P350505	
	SOP-PCR-1.3	GFD-purified-qPCR**	3.55E+03		TSC/100 mL	P351074	LCS, MS
	SOP-PCR-1.4	BacR-qPCR**	3.0E+03	U	TSC/100 mL	P350505	LCS
	SOP-PCR-4.0	HF183 - Human Source Marker**	Above Threshold				
2013672	Enterolert/QT	Enterococci-Quanti-Tray	738		MPN/100 mL		

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.

SOP-PCR-1.2: Precision data unavailable for Analysis Batch A86295

SOP-PCR-1.4: Precision data unavailable for Analysis Batch A86258

Sample Location: East Branch North Fork Lox @ JD Park

Collection Date/Time: 08/02/2018 11:00

Field ID: G2SE0035

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013673	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	63.0		MPN/100 mL		

Sample Location: West Branch North Fork Lox @ JD Park

Collection Date/Time: 08/02/2018 11:05

Field ID: G2SE0020

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013674	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	20.0		MPN/100 mL		

Sample Location: NF Lox @ Girl Scout Boat Ramp

Collection Date/Time: 08/02/2018 12:25

Field ID: G2SE0036

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013675	Enterolert/QT	Enterococci-Quanti-Tray	20.0		MPN/100 mL		

Field ID: G2SE0036

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013677	SM 9222 D	Fecal Coliforms-Membrane Filter	56.0		cfu/100 mL		

Sample Location: NF Lox @ County Line

Collection Date/Time: 08/02/2018 12:35

Field ID: G2SE0021

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013676	Enterolert/QT	Enterococci-Quanti-Tray	84.0		MPN/100 mL		
2013678	SM 9222 D	Fecal Coliforms-Membrane Filter	34.0	B	cfu/100 mL		

Sample Location: Tidal Creek to Lox

Collection Date/Time: 08/02/2018 13:05

Field ID: G2SE0027

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013666	SM 10200 H (mod.)	Chlorophyll-a, Corrected	12		ug/L	P349836	
		Phaeophytin-a	2.5		ug/L	P349836	
		Chlorophyll-a, Uncorrected	14		ug/L	P349836	
2013670	SOP-PCR-4.0	HF183 - Human Source Marker**	Below Threshold				
2013679	Enterolert/QT	Enterococci-Quanti-Tray	31.0		MPN/100 mL		

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: C-17 @ 45th

Collection Date/Time: 08/02/2018 13:40

Field ID: G3SE0023

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2013667	SM 10200 H (mod.)	Chlorophyll-a, Corrected	40		ug/L	P349836	
		Phaeophytin-a	6.5		ug/L	P349836	
		Chlorophyll-a, Uncorrected	45		ug/L	P349836	
2013680	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	238		MPN/100 mL		

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.

Quality Assurance Report

Method Blank Results

Reference Method: SM 10200 H (mod.)

Batch ID: P349836

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: P350505

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: P350505

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

Reference Method: SOP-PCR-1.3
Batch ID: P351074

Component	Result	Code	Units
GFD-purified-qPCR	340	U	TSC/100 mL

Reference Method: SOP-PCR-1.4
Batch ID: P350505

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: P349836

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chlorophyll-a, Corrected	94.9		P	84 - 116

Reference Method: SOP-PCR-1.0
Batch ID: P350505

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	88.4	83.1	P/P	50 - 175

Reference Method: SOP-PCR-1.2
Batch ID: P350505

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GULL2-qPCR	84.0	164	P/P	50 - 300

Reference Method: SOP-PCR-1.3
Batch ID: P351074

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GFD-purified-qPCR	121	49.7	P/F	50 - 175

Reference Method: SOP-PCR-1.4
Batch ID: P350505

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
BacR-qPCR	137	201	P/F	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.0

Batch ID: P350505

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2013668	HF183-qPCR	68.5		P	50 - 175
2013669	HF183-qPCR	75.1		P	50 - 175
2016247	HF183-qPCR	73.9		P	50 - 175
2016299	HF183-qPCR	67.0		P	50 - 175
2016300	HF183-qPCR	63.3		P	50 - 175
2017880	HF183-qPCR	70.6		P	50 - 175
2018595	HF183-qPCR	73.5		P	50 - 175
2018596	HF183-qPCR	64.6	66.8	P/P	50 - 175
2018597	HF183-qPCR	64.7		P	50 - 175
2018598	HF183-qPCR	68.2		P	50 - 175
2019031	HF183-qPCR	81.1		P	50 - 175
2019032	HF183-qPCR	78.3		P	50 - 175
2020117	HF183-qPCR	84.0		P	50 - 175

Reference Method: SOP-PCR-1.2

Batch ID: P350505

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2013669	GULL2-qPCR	74.3		P	50 - 300
2016247	GULL2-qPCR	68.7		P	50 - 300
2018597	GULL2-qPCR	52.0		P	50 - 300
2018598	GULL2-qPCR	51.9		P	50 - 300
2020117	GULL2-qPCR	83.5		P	50 - 300

Reference Method: SOP-PCR-1.3

Batch ID: P351074

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2013669	GFD-purified-qPCR	157		P	50 - 175
2015786	GFD-purified-qPCR	172		P	50 - 175
2016247	GFD-purified-qPCR	50.0		F	50 - 175
2016293	GFD-purified-qPCR	138		P	50 - 175
2017669	GFD-purified-qPCR	177		F	50 - 175
2017670	GFD-purified-qPCR	130		P	50 - 175
2017671	GFD-purified-qPCR	143		P	50 - 175
2018597	GFD-purified-qPCR	172		P	50 - 175
2018598	GFD-purified-qPCR	133		P	50 - 175
2019428	GFD-purified-qPCR	153		P	50 - 175
2023260	GFD-purified-qPCR	153		P	50 - 175
2023261	GFD-purified-qPCR	172	150	P/P	50 - 175
2023262	GFD-purified-qPCR	95.4		P	50 - 175
2023263	GFD-purified-qPCR	44.8		F	50 - 175
2023264	GFD-purified-qPCR	66.9		P	50 - 175
2023265	GFD-purified-qPCR	106		P	50 - 175
2023266	GFD-purified-qPCR	131		P	50 - 175
2023267	GFD-purified-qPCR	160		P	50 - 175

Reference Method: SOP-PCR-1.4

Batch ID: P350505

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2013668	BacR-qPCR	87.8		P	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.4
Batch ID: P350505

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2013669	BacR-qPCR	92.3		P	50 - 175
2016247	BacR-qPCR	84.9		P	50 - 175
2016299	BacR-qPCR	73.6		P	50 - 175
2016300	BacR-qPCR	86.9		P	50 - 175
2017880	BacR-qPCR	79.6		P	50 - 175
2018597	BacR-qPCR	88.6		P	50 - 175
2018598	BacR-qPCR	91.9		P	50 - 175
2020117	BacR-qPCR	112		P	50 - 175

Quality Assurance Report Precision

Reference Method: SOP-PCR-1.0
Batch ID: P350505

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2018596	HF183-qPCR	3.44	Spike	P	0 - 25

Reference Method: SOP-PCR-1.3
Batch ID: P351074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2023261	GFD-purified-qPCR	13.4	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: 2013668
Field Sample ID: G2SE0029

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	99.3	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	84.6	P	50 - 300

Lab Sample ID: 2013669
Field Sample ID: G2SE0005

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	106	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	99.8	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	97.7	P	50 - 300

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery		MS % Recovery			LCS	Precision SMP	MS
SM 10200 H (mod.)	Chlorophyll-a, Corrected	94.9							
SOP-PCR-1.0	HF183-qPCR	83.1	88.4	73.5	64.6	66.8			3.44
				64.7					
SOP-PCR-1.2	GULL2-qPCR	164	84.0	52.0	51.9	74.3			
				68.7					
SOP-PCR-1.3	GFD-purified-qPCR	49.7	121	172	177	157			13.4
				50.0					
SOP-PCR-1.4	BacR-qPCR	201	137	88.6	91.9	87.8			
				92.3					

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
Enterolert/QT / E86562	Enterococci by Enterolert Quanti-Tray method by Flowers Chemical Laboratory in Port St. Lucie	2013671, 2013672, 2013675, 2013676, 2013679
SM 10200 H (mod.) / E31780	Phytoplankton chlorophyll-a corrected, uncorrected, and phaeophytin by spectrophotometry	2013664, 2013665, 2013666, 2013667
SM 9222 D / E86562	Fecal coliforms by membrane filter method by Flowers Chemical Laboratory in Port St Lucie	2013677, 2013678
SM 9223 B Quanti-Tray / E86562	Escherichia coli by Colilert 18 Quanti-Tray method by Flowers Chemical Laboratory in Port St. Lucie	2013673, 2013674, 2013680
SOP-PCR-1.0 / E31780	Detection and quantification of human-specific HF183 Bacteroides genetic marker with quantitative polymerase chain reaction	2013668, 2013669
SOP-PCR-1.2 / E31780	Detection and quantification of coastal bird specific Catellicoccus marimammalium Gull2 genetic marker with quantitative polymerase chain reaction	2013669
SOP-PCR-1.3 / E31780	Detection and quantification of bird specific Helicobacter GFD genetic marker with quantitative polymerase chain reaction	2013669
SOP-PCR-1.4 / E31780	Detection and quantification of Ruminant specific Bacteroidetes BacR genetic marker with quantitative polymerase chain reaction	2013668, 2013669
SOP-PCR-4.0 / E31780	Preparation of Samples by Filtration and held for qPCR Analysis	2013668, 2013669, 2013670

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
Enterolert/QT	08/02/2018	08/02/2018 15:10		08/03/2018 15:20	Flowers-PSL	2013671, 2013672, 2013675, 2013676, 2013679
SM 10200 H (mod.)	08/03/2018	08/03/2018 17:45	Jennifer Mihalic	08/08/2018 09:35	Carina A. Tull	2013664, 2013665, 2013666, 2013667
SM 9222 D	08/02/2018	08/02/2018 15:35		08/03/2018 14:05	Flowers-PSL	2013677, 2013678
SM 9223 B Quanti-Tray	08/02/2018	08/02/2018 15:25		08/03/2018 09:45	Flowers-PSL	2013673, 2013674, 2013680
SOP-PCR-1.0	08/03/2018	08/03/2018 17:35	Angela Smith	08/29/2018 11:31	Mailin Lopez	2013668, 2013669
SOP-PCR-1.2	08/03/2018	08/03/2018 17:35	Angela Smith	09/05/2018 08:41	Mailin Lopez	2013669
SOP-PCR-1.3	08/03/2018	08/03/2018 17:35	Sarah Menz	09/13/2018 15:38	Sarah Menz	2013669
SOP-PCR-1.4	08/03/2018	08/03/2018 17:35	Angela Smith	08/31/2018 14:49	Mailin Lopez	2013668, 2013669
SOP-PCR-4.0	08/03/2018	08/03/2018 17:35	Angela Smith	08/22/2018 09:44	Sarah Menz	2013668, 2013669, 2013670