

Biological Analysis Report

SO-DIST-2022-01-12-02

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

Overflow Analyses Performed By:
Sanders Laboratories
10090 Bavaria Road
Ft. Myers, FL 33913
DOH Accreditation E85457

Event Description: **2022 SMP : Rookery Bay**

Request ID: **RQ-2022-01-10-45**

Customer: **SO-DIST**

Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
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Certified by: Sarah Menz, Environmental Administrator

Date Certified: 23-FEB-2022 10:25

A handwritten signature in dark ink, appearing to be 'Sarah Menz', with a long, sweeping horizontal stroke extending to the right.

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: 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 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: Rock Creek

Collection Date/Time: 01/11/2022 09:50

Field ID: G1SD0095

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299135	SOP-PCR-1.0	HF183-qPCR**	1.7E+03	U	TSC/100 mL	P408425	
	SOP-PCR-1.2	GULL2-qPCR**	1.8E+03	U	TSC/100 mL	P408425	
	SOP-PCR-1.3	GFD-qPCR**	1.56E+04	A	TSC/100 mL	P408425	
	SOP-PCR-1.4	BacR-qPCR**	1.5E+03	U	TSC/100 mL	P408425	
	SOP-PCR-1.5	DG3-qPCR**	1.3E+03	U	TSC/100 mL	P408425	
2299136	Enterolert/QT	ENTEROCOCCI-ENTEROLERT	1350		MPN/100 mL		

Sample Location: RookeryCanal@SalinasDr

Collection Date/Time: 01/11/2022 12:55

Field ID: G1SD0111

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299137	Colilert-18	Escherichia Coli-Quanti-Tray	41.0		MPN/100 mL		
2299141	Enterolert/QT	ENTEROCOCCI-ENTEROLERT	10.0		MPN/100 mL		
	SM 9222 D	Fecal Coliforms-Membrane Filter	1300	B	cfu/100 mL		

Sample Location: RookeryCanal@MoonBaySt

Collection Date/Time: 01/11/2022 12:35

Field ID: G1SD0110

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299138	Colilert-18	Escherichia Coli-Quanti-Tray	631		MPN/100 mL		
2299142	Enterolert/QT	ENTEROCOCCI-ENTEROLERT	86.0		MPN/100 mL		
	SM 9222 D	Fecal Coliforms-Membrane Filter	736	B	cfu/100 mL		

Sample Location: Rookery Bay Site 1

Collection Date/Time: 01/11/2022 11:25

Field ID: G1SD0067

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299139	Colilert-18	Escherichia Coli-Quanti-Tray	10.0		MPN/100 mL		
2299143	Enterolert/QT	ENTEROCOCCI-ENTEROLERT	10.0	U	MPN/100 mL		
	SM 9222 D	Fecal Coliforms-Membrane Filter	4.00	B	cfu/100 mL		

Sample Location: HendersonCrkRookeryDock

Collection Date/Time: 01/11/2022 10:30

Field ID: G1SD0112

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2299140	Colilert-18	Escherichia Coli-Quanti-Tray	199		MPN/100 mL		
2299144	Enterolert/QT	ENTEROCOCCI-ENTEROLERT	84.0		MPN/100 mL		
	SM 9222 D	Fecal Coliforms-Membrane Filter	38.0	B	cfu/100 mL		

Quality Assurance Report Method Blank Results

Reference Method: SOP-PCR-1.0
Batch ID: P408425

Component	Result	Code	Units
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Quality Assurance Report Method Blank Results

Reference Method: SOP-PCR-1.0
Batch ID: P408425

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

Reference Method: SOP-PCR-1.2
Batch ID: P408425

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

Reference Method: SOP-PCR-1.3
Batch ID: P408425

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

Reference Method: SOP-PCR-1.4
Batch ID: P408425

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

Reference Method: SOP-PCR-1.5
Batch ID: P408425

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SOP-PCR-1.0
Batch ID: P408425

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	69.4	72.0	P/P	50 - 175

Reference Method: SOP-PCR-1.2
Batch ID: P408425

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GULL2-qPCR	77.0	92.7	P/P	50 - 300
GULL2-qPCR	77.0	92.7	P/P	50 - 300

Reference Method: SOP-PCR-1.3
Batch ID: P408425

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GFD-qPCR	83.2	88.2	P/P	50 - 175
GFD-qPCR	83.2	88.2	P/P	50 - 175

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SOP-PCR-1.4
Batch ID: P408425

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
BacR-qPCR	85.7	79.6	P/P	50 - 175

Reference Method: SOP-PCR-1.5
Batch ID: P408425

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
DG3-qPCR	73.1	77.7	P/P	50 - 175
DG3-qPCR	73.1	77.7	P/P	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.0
Batch ID: P408425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299135	HF183-qPCR	77.1	91.4	P/P	50 - 175
2299302	HF183-qPCR	79.6		P	50 - 175
2299486	HF183-qPCR	87.6		P	50 - 175
2299487	HF183-qPCR	82.8		P	50 - 175
2299488	HF183-qPCR	83.9		P	50 - 175
2299724	HF183-qPCR	77.2		P	50 - 175
2299888	HF183-qPCR	76.6		P	50 - 175
2299889	HF183-qPCR	72.2		P	50 - 175
2299984	HF183-qPCR	71.7		P	50 - 175
2299985	HF183-qPCR	77.8		P	50 - 175
2299986	HF183-qPCR	77.4		P	50 - 175
2299987	HF183-qPCR	81.4		P	50 - 175
2300067	HF183-qPCR	86.7		P	50 - 175

Reference Method: SOP-PCR-1.2
Batch ID: P408425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299135	GULL2-qPCR	94.0	94.0	P/P	50 - 300
2299135	GULL2-qPCR	87.6	87.6	P/P	50 - 300
2299302	GULL2-qPCR	77.2	77.2	P/P	50 - 300
2299487	GULL2-qPCR	53.5	53.5	P/P	50 - 300
2299488	GULL2-qPCR	21.3	21.3	F/F	50 - 300
2299724	GULL2-qPCR	86.8	86.8	P/P	50 - 300
2299888	GULL2-qPCR	72.6	72.6	P/P	50 - 300
2299889	GULL2-qPCR	75.8	75.8	P/P	50 - 300
2299984	GULL2-qPCR	78.0	78.0	P/P	50 - 300
2299985	GULL2-qPCR	81.6	81.6	P/P	50 - 300
2299986	GULL2-qPCR	80.7	80.7	P/P	50 - 300
2299987	GULL2-qPCR	82.7	82.7	P/P	50 - 300
2300067	GULL2-qPCR	76.8	76.8	P/P	50 - 300

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.3

Batch ID: P408425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299135	GFD-qPCR	101	101	P/P	50 - 175
2299135	GFD-qPCR	86.3	86.3	P/P	50 - 175
2299302	GFD-qPCR	96.6	96.6	P/P	50 - 175
2299487	GFD-qPCR	97.4	97.4	P/P	50 - 175
2299488	GFD-qPCR	62.8	62.8	P/P	50 - 175
2299724	GFD-qPCR	89.8	89.8	P/P	50 - 175
2299888	GFD-qPCR	89.1	89.1	P/P	50 - 175
2299889	GFD-qPCR	87.1	87.1	P/P	50 - 175
2299984	GFD-qPCR	91.1	91.1	P/P	50 - 175
2299985	GFD-qPCR	81.2	81.2	P/P	50 - 175
2299986	GFD-qPCR	79.4	79.4	P/P	50 - 175
2299987	GFD-qPCR	88.1	88.1	P/P	50 - 175
2300067	GFD-qPCR	95.6	95.6	P/P	50 - 175

Reference Method: SOP-PCR-1.4

Batch ID: P408425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299135	BacR-qPCR	68.8	79.3	P/P	50 - 175
2299302	BacR-qPCR	68.3		P	50 - 175
2299486	BacR-qPCR	51.8		P	50 - 175
2299487	BacR-qPCR	59.5		P	50 - 175
2299488	BacR-qPCR	58.4		P	50 - 175
2299724	BacR-qPCR	75.2		P	50 - 175
2299888	BacR-qPCR	66.5		P	50 - 175
2299889	BacR-qPCR	58.1		P	50 - 175
2299984	BacR-qPCR	55.3		P	50 - 175
2299985	BacR-qPCR	66.6		P	50 - 175
2299986	BacR-qPCR	73.4		P	50 - 175
2299987	BacR-qPCR	62.1		P	50 - 175
2300067	BacR-qPCR	50.2		P	50 - 175

Reference Method: SOP-PCR-1.5

Batch ID: P408425

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2299135	DG3-qPCR	79.4	79.4	P/P	50 - 175
2299135	DG3-qPCR	78.5	78.5	P/P	50 - 175
2299302	DG3-qPCR	61.5	61.5	P/P	50 - 175
2299486	DG3-qPCR	74.3	74.3	P/P	50 - 175
2299487	DG3-qPCR	50.0	50.0	P/P	50 - 175
2299488	DG3-qPCR	67.3	67.3	P/P	50 - 175
2299724	DG3-qPCR	77.4	77.4	P/P	50 - 175
2299888	DG3-qPCR	75.4	75.4	P/P	50 - 175
2299889	DG3-qPCR	70.5	70.5	P/P	50 - 175
2299984	DG3-qPCR	72.5	72.5	P/P	50 - 175
2299985	DG3-qPCR	74.1	74.1	P/P	50 - 175
2299986	DG3-qPCR	72.8	72.8	P/P	50 - 175
2299987	DG3-qPCR	74.7	74.7	P/P	50 - 175
2300067	DG3-qPCR	69.5	69.5	P/P	50 - 175

Quality Assurance Report Precision

Reference Method: SOP-PCR-1.0
Batch ID: P408425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299135	HF183-qPCR	16.9	Spike	P	0 - 25

Reference Method: SOP-PCR-1.2
Batch ID: P408425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299135	GULL2-qPCR	7.10	Spike	P	0 - 25
2299135	GULL2-qPCR	7.10	Spike	P	0 - 25

Reference Method: SOP-PCR-1.3
Batch ID: P408425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299135	GFD-qPCR	15.8	Spike	P	0 - 25
2299135	GFD-qPCR	15.8	Spike	P	0 - 25

Reference Method: SOP-PCR-1.4
Batch ID: P408425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299135	BacR-qPCR	14.3	Spike	P	0 - 25

Reference Method: SOP-PCR-1.5
Batch ID: P408425

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2299135	DG3-qPCR	1.15	Spike	P	0 - 25
2299135	DG3-qPCR	1.15	Spike	P	0 - 25

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

Quality Assurance Report Surrogates

Lab Sample ID: 2299135
Field Sample ID: G1SD0095

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	96.6	P	50 - 300
SOP-PCR-1.0	SKETA-qPCR	91.5	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	85.9	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	75.8	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	76.5	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	85.1	P	50 - 300
SOP-PCR-1.3	SKETA-qPCR	86.7	P	50 - 300

Quality Assurance Report Surrogates

Lab Sample ID: 2299135
Field Sample ID: G1SD0095

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.3	SKETA-qPCR	76.3	P	50 - 300
SOP-PCR-1.3	SKETA-qPCR	77.2	P	50 - 300
SOP-PCR-1.3	SKETA-qPCR	85.6	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	108	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	107	P	50 - 300
SOP-PCR-1.5	SKETA-qPCR	96.7	P	50 - 300
SOP-PCR-1.5	SKETA-qPCR	80.5	P	50 - 300
SOP-PCR-1.5	SKETA-qPCR	86.2	P	50 - 300
SOP-PCR-1.5	SKETA-qPCR	90.4	P	50 - 300

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery		MS % Recovery			LCS	Precision SMP	MS
SOP-PCR-1.0	HF183-qPCR	72.0	69.4	77.1	91.4	79.6			16.9
SOP-PCR-1.2	GULL2-qPCR	77.0	92.7	77.0	94.0	87.6			7.10
SOP-PCR-1.3	GFD-qPCR	83.2	88.2	83.2	101	86.3			15.8
SOP-PCR-1.4	BacR-qPCR	79.6	85.7		68.8	79.3			14.3
SOP-PCR-1.5	DG3-qPCR	73.1	77.7	73.1	79.4	78.5			1.15

Reference Method Descriptions

Method	Description	Associated Samples
Colilert-18	E. coli by Colilert-18/QT by Sanders in Fort Myers	2299137, 2299138, 2299139, 2299140
Enterolert/QT	Enterococci by Enterolert/QT by Sanders in Fort Myers	2299136, 2299141, 2299142, 2299143, 2299144
SM 9222 D	Fecal coliforms by MF by Sanders in Fort Myers	2299141, 2299142, 2299143, 2299144
SOP-PCR-1.0	Detection and quantification of human-specific HF183 Bacteroides genetic marker with quantitative polymerase chain reaction	2299135
SOP-PCR-1.2	Detection and quantification of coastal bird specific Catellicoccus marimammalium Gull2 genetic marker with quantitative polymerase chain reaction	2299135
SOP-PCR-1.3	Detection and quantification of bird specific Helicobacter GFD genetic marker with quantitative polymerase chain reaction	2299135
SOP-PCR-1.4	Detection and quantification of Ruminant specific Bacteroidetes BacR genetic marker with quantitative polymerase chain reaction	2299135
SOP-PCR-1.5	Detection and quantification of canine-specific DG3 Bacteroides genetic marker with quantitative polymerase chain reaction	2299135

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
Colilert-18	01/11/2022	01/11/2022 15:15		01/12/2022 10:37	Sanders-Fort Myers	2299137, 2299138, 2299139, 2299140
Enterolert/QT	01/11/2022	01/11/2022 15:45		01/12/2022 16:27	Sanders-Fort Myers	2299136, 2299141, 2299142, 2299143, 2299144
SM 9222 D	01/11/2022	01/11/2022 16:39	Luke Hudson	01/12/2022 15:01	Sanders-Fort Myers	2299141, 2299142, 2299143, 2299144
SOP-PCR-1.0	01/12/2022	01/12/2022 13:40		02/02/2022 11:25	DeAsia Armster	2299135
SOP-PCR-1.2	01/12/2022	01/12/2022 13:40		02/15/2022 12:49	DeAsia Armster	2299135
SOP-PCR-1.3	01/12/2022	01/12/2022 13:40		02/16/2022 09:27	DeAsia Armster	2299135
SOP-PCR-1.4	01/12/2022	01/12/2022 13:40		02/04/2022 10:00	DeAsia Armster	2299135
SOP-PCR-1.5	01/12/2022	01/12/2022 13:40		02/15/2022 11:25	DeAsia Armster	2299135