

Biological Analysis Report

CEN-DIST-2023-11-02-02

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

Event Description: **Tiger Lake Outlet - WBID 1573Z**
Request ID: **RQ-2023-10-30-51**
Customer: **CEN-DIST**
Project ID: **TMDL**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Matthew Bearden

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Certified by: Sarah Menz, Environmental Administrator

Date Certified: 18-DEC-2023 10:38

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: 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: TIGER LAKE INLET AT SAM KEEN RD

Collection Date/Time: 11/01/2023 12:13

Field ID: G4CE0248

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2448525	SM 10150 B	Chlorophyll-a, Corrected	21		ug/L	P437557	
		Phaeophytin-a	3.0	U	ug/L	P437557	
		Chlorophyll-a, Uncorrected	23		ug/L	P437557	
2448531	SM 9223 B Quanti-Tray	Escherichia Coli-Quanti-Tray	272.3	Q	MPN/100 mL	P437348	
2448536	SOP-PCR-1.0	HF183-qPCR**	6.6E+03	U	TSC/100 mL	P437264	
	SOP-PCR-1.2	GULL2-qPCR**	3.6E+03	U	TSC/100 mL	P438830	
	SOP-PCR-1.3	GFD-qPCR**	940	I	TSC/100 mL	P438830	
	SOP-PCR-1.4	BacR-qPCR**	3.1E+04		TSC/100 mL	P437264	
	SOP-PCR-1.5	DG3-qPCR**	5.1E+03	U	TSC/100 mL	P437264	

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.
SOP-PCR-1.2: Precision data unavailable for Gull2-qPCR component.
SOP-PCR-1.3: Precision data unavailable for GFD-qPCR component.

Quality Assurance Report

Method Blank Results

Reference Method: SM 10150 B
Batch ID: P437557

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: P437348

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

Reference Method: SOP-PCR-1.0
Batch ID: P437264

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

Reference Method: SOP-PCR-1.2
Batch ID: P438830

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

Reference Method: SOP-PCR-1.3
Batch ID: P438830

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: P437264

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

Reference Method: SOP-PCR-1.5
Batch ID: P437264

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: P437557

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chlorophyll-a, Corrected	99.7		P	84 - 116

Reference Method: SOP-PCR-1.0
Batch ID: P437264

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
HF183-qPCR	80.5	78.1	P/P	50 - 175

Reference Method: SOP-PCR-1.2
Batch ID: P438830

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GULL2-qPCR	95.7	96.9	P/P	50 - 175

Reference Method: SOP-PCR-1.3
Batch ID: P438830

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
GFD-qPCR	83.1	92.1	P/P	50 - 175

Reference Method: SOP-PCR-1.4
Batch ID: P437264

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
BacR-qPCR	106	73.6	P/P	50 - 175

Reference Method: SOP-PCR-1.5
Batch ID: P437264

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
DG3-qPCR	97.7	75.3	P/P	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.0

Batch ID: P437264

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2448288	HF183-qPCR	84.5	85.4	P/P	50 - 175
2448536	HF183-qPCR	92.8		P	50 - 175
2448796	HF183-qPCR	82.6		P	50 - 175
2448814	HF183-qPCR	100		P	50 - 175
2448815	HF183-qPCR	92.5		P	50 - 175
2448816	HF183-qPCR	94.5		P	50 - 175
2449854	HF183-qPCR	93.7		P	50 - 175
2449855	HF183-qPCR	87.0		P	50 - 175
2449906	HF183-qPCR	94.7		P	50 - 175
2450493	HF183-qPCR	86.4		P	50 - 175
2450518	HF183-qPCR	80.5		P	50 - 175
2450802	HF183-qPCR	99.0		P	50 - 175
2450908	HF183-qPCR	90.4		P	50 - 175

Reference Method: SOP-PCR-1.2

Batch ID: P438830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2448536	GULL2-qPCR	56.8		P	50 - 175

Reference Method: SOP-PCR-1.3

Batch ID: P438830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2448536	GFD-qPCR	99.7		P	50 - 175

Reference Method: SOP-PCR-1.4

Batch ID: P437264

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2448288	BacR-qPCR	87.2	86.0	P/P	50 - 175
2448536	BacR-qPCR	101		P	50 - 175
2448796	BacR-qPCR	81.4		P	50 - 175
2448814	BacR-qPCR	86.0		P	50 - 175
2448815	BacR-qPCR	96.3		P	50 - 175
2448816	BacR-qPCR	90.5		P	50 - 175
2449854	BacR-qPCR	90.9		P	50 - 175
2449855	BacR-qPCR	94.7		P	50 - 175
2449906	BacR-qPCR	94.4		P	50 - 175
2450493	BacR-qPCR	94.0		P	50 - 175
2450518	BacR-qPCR	55.9		P	50 - 175
2450802	BacR-qPCR	94.1		P	50 - 175
2450908	BacR-qPCR	100		P	50 - 175

Reference Method: SOP-PCR-1.5

Batch ID: P437264

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2448288	DG3-qPCR	93.3	88.8	P/P	50 - 175
2448536	DG3-qPCR	92.4		P	50 - 175
2448796	DG3-qPCR	92.2		P	50 - 175
2448814	DG3-qPCR	87.7		P	50 - 175

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SOP-PCR-1.5
 Batch ID: P437264

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2448815	DG3-qPCR	100		P	50 - 175
2448816	DG3-qPCR	92.9		P	50 - 175
2449854	DG3-qPCR	96.7		P	50 - 175
2449855	DG3-qPCR	95.2		P	50 - 175
2449906	DG3-qPCR	94.0		P	50 - 175
2450493	DG3-qPCR	93.4		P	50 - 175
2450518	DG3-qPCR	71.3		P	50 - 175
2450802	DG3-qPCR	95.2		P	50 - 175
2450908	DG3-qPCR	94.9		P	50 - 175

Quality Assurance Report Precision

Reference Method: SM 10150 B
 Batch ID: P437557

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2448611	Chlorophyll-a, Corrected	7.59	Sample	P	0 - 25
2448611	Chlorophyll-a, Uncorrected	7.02	Sample	P	0 - 25

Reference Method: SOP-PCR-1.0
 Batch ID: P437264

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2448288	HF183-qPCR	1.00	Spike	P	0 - 25

Reference Method: SOP-PCR-1.4
 Batch ID: P437264

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2448288	BacR-qPCR	1.44	Spike	P	0 - 25

Reference Method: SOP-PCR-1.5
 Batch ID: P437264

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2448288	DG3-qPCR	4.93	Spike	P	0 - 25

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

Quality Assurance Report Surrogates

Quality Assurance Report Surrogates

Lab Sample ID: 2448536
 Field Sample ID: G4CE0248

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
SOP-PCR-1.0	SKETA-qPCR	98.3	P	50 - 300
SOP-PCR-1.2	SKETA-qPCR	85.4	P	50 - 300
SOP-PCR-1.3	SKETA-qPCR	88.6	P	50 - 300
SOP-PCR-1.4	SKETA-qPCR	120	P	50 - 300
SOP-PCR-1.5	SKETA-qPCR	110	P	50 - 300

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery		MS % Recovery			LCS	Precision SMP	MS
SM 10150 B	Chlorophyll-a, Corrected	99.7						7.59	
	Chlorophyll-a, Uncorrected							7.02	
SOP-PCR-1.0	HF183-qPCR	78.1	80.5	84.5	85.4	92.8			1.00
				82.6					
SOP-PCR-1.2	GULL2-qPCR	96.9	95.7	56.8					
SOP-PCR-1.3	GFD-qPCR	92.1	83.1	99.7					
SOP-PCR-1.4	BacR-qPCR	73.6	106	87.2	86.0	101			1.44
				81.4					
SOP-PCR-1.5	DG3-qPCR	75.3	97.7	93.3	88.8	92.4			4.93
				92.2					

Reference Method Descriptions

Method	Description	Associated Samples
SM 10150 B	Phytoplankton chlorophyll-a corrected, uncorrected, and phaeophytin by spectrophotometry	2448525
SM 9223 B Quanti-Tray	Escherichia coli by Colilert 18 Quanti-Tray method - non-chlorinated water systems	2448531
SOP-PCR-1.0	Detection and quantification of human-specific HF183 Bacteroides genetic marker with quantitative polymerase chain reaction	2448536
SOP-PCR-1.2	Detection and quantification of coastal bird specific Catellicoccus marimammalium Gull2 genetic marker with quantitative polymerase chain reaction	2448536
SOP-PCR-1.3	Detection and quantification of bird specific Helicobacter GFD genetic marker with quantitative polymerase chain reaction	2448536
SOP-PCR-1.4	Detection and quantification of Ruminant specific Bacteroidetes BacR genetic marker with quantitative polymerase chain reaction	2448536
SOP-PCR-1.5	Detection and quantification of canine-specific DG3 Bacteroides genetic marker with quantitative polymerase chain reaction	2448536

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 10150 B	11/02/2023	11/02/2023 12:59	Julia Herten	11/06/2023 15:30	Tynan A Branch	2448525
SM 9223 B Quanti-Tray	11/02/2023	11/02/2023 14:38	Megan Higbee	11/03/2023 10:50	Megan Higbee	2448531
SOP-PCR-1.0	11/02/2023	11/02/2023 12:20	Madeline Gruver	11/21/2023 08:44	Roberta Tatti	2448536
SOP-PCR-1.2	11/02/2023	11/02/2023 12:20	Madeline Gruver	12/13/2023 14:14	Jennifer Mihalic	2448536
SOP-PCR-1.3	11/02/2023	11/02/2023 12:20	Madeline Gruver	12/12/2023 13:32	Jennifer Mihalic	2448536
SOP-PCR-1.4	11/02/2023	11/02/2023 12:20	Madeline Gruver	11/27/2023 08:50	Roberta Tatti	2448536
SOP-PCR-1.5	11/02/2023	11/02/2023 12:20	Madeline Gruver	11/27/2023 09:41	Roberta Tatti	2448536