

Chemical Analysis Report

WQAP-2021-12-29-02

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

Event Description: **Algal Bloom Response -SOROC -Collier**
Request ID: **RQ-2021-12-06-31**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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2295 Victoria AVE
Suite 364
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 18-JAN-2022 14:39

A handwritten signature in black ink, appearing to read "Liang Lin", is shown on a light-colored background.

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: Nutrients and Pesticides.

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: Trafford Dock

Collection Date/Time: 12/28/2021 11:14

Field ID: Trafford Dock

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2296826	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P407948	MS
		Cylindrospermopsin	0.12	I	ug/L	P407948	
		Desmethyl microcystin LR	0.25	U	ug/L	P407948	
		Microcystin HIR**	0.25	U	ug/L	P407948	
		Microcystin HtyR**	0.25	U	ug/L	P407948	
		Microcystin LA	0.10	U	ug/L	P407948	
		Microcystin LF	0.10	U	ug/L	P407948	
		Microcystin LR	0.74	I	ug/L	P407948	
		Microcystin LW	0.25	U	ug/L	P407948	
		Microcystin LY	0.10	U	ug/L	P407948	
		Microcystin RR	0.10	U	ug/L	P407948	
		Microcystin WR	0.50	U	ug/L	P407948	
		Microcystin YR	0.25	U	ug/L	P407948	
		Nodularin-R**	0.10	U	ug/L	P407948	
2296828	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P408292	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.3		mg N/L	P407959	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P408005	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P408031	
2296829	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P407967	MS

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408292

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407959

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408005

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408031

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407967

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: EPA 8321B
Batch ID: P407948

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HIR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408292

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407959

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	105		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408005

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408031

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	109		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407967

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.3		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P407948

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	102		P	40 - 150
Cylindrospermopsin	96.7		P	40 - 150
Desmethyl microcystin LR	84.7		P	40 - 150
Microcystin HIR	89.6		P	40 - 150
Microcystin HtyR	91.8		P	40 - 150
Microcystin LA	104		P	40 - 150
Microcystin LF	106		P	40 - 150
Microcystin LR	105		P	40 - 150
Microcystin LW	90.1		P	40 - 150
Microcystin LY	94.7		P	40 - 150
Microcystin RR	106		P	40 - 150
Microcystin WR	90.1		P	40 - 150
Microcystin YR	87.6		P	40 - 150
Nodularin-R	96.2		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408292

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296681	Ammonia-N	96.2	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407959

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296830	Kjeldahl Nitrogen	96.7	96.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408005

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296828	NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408031

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296866	Total-P	110	111	P/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407967

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296831	O-Phosphate-P	98.1	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P407948

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296809	Anatoxin-a	196	193	F/F	40 - 150
2296809	Cylindrospermopsin	113	115	P/P	40 - 150
2296809	Desmethyl microcystin LR	102	99.6	P/P	40 - 150
2296809	Microcystin HiLR	96.7	100	P/P	40 - 150
2296809	Microcystin HtyR	105	106	P/P	40 - 150
2296809	Microcystin LA	109	98.9	P/P	40 - 150
2296809	Microcystin LF	95.7	96.6	P/P	40 - 150
2296809	Microcystin LR	124	120	P/P	40 - 150
2296809	Microcystin LW	74.6	74.9	P/P	40 - 150
2296809	Microcystin LY	105	96.6	P/P	40 - 150
2296809	Microcystin RR	110	108	P/P	40 - 150
2296809	Microcystin WR	78.9	81.6	P/P	40 - 150
2296809	Microcystin YR	101	97.0	P/P	40 - 150
2296809	Nodularin-R	107	101	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P408292

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296681	Ammonia-N	0.826	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P407959

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296830	Kjeldahl Nitrogen	0.228	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P408005

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296828	NO2NO3-N	0.494	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P408031

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296866	Total-P	1.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P407967

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296831	O-Phosphate-P	2.12	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P407948

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296809	Anatoxin-a	1.51	Spike	P	0 - 30
2296809	Cylindrospermopsin	1.55	Spike	P	0 - 30
2296809	Desmethyl microcystin LR	2.52	Spike	P	0 - 30
2296809	Microcystin HtIR	3.61	Spike	P	0 - 30
2296809	Microcystin HtyR	1.44	Spike	P	0 - 30
2296809	Microcystin LA	9.50	Spike	P	0 - 30
2296809	Microcystin LF	0.941	Spike	P	0 - 30
2296809	Microcystin LR	2.73	Spike	P	0 - 30
2296809	Microcystin LW	0.425	Spike	P	0 - 30
2296809	Microcystin LY	8.07	Spike	P	0 - 30
2296809	Microcystin RR	2.05	Spike	P	0 - 30
2296809	Microcystin WR	3.40	Spike	P	0 - 30
2296809	Microcystin YR	3.69	Spike	P	0 - 30
2296809	Nodularin-R	6.22	Spike	P	0 - 30

Quality Assurance Report Precision

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

Quality Assurance Report Surrogates

Lab Sample ID: 2296826

Field Sample ID: Trafford Dock

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	99.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	90.1	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A109609

Included Lab Sample IDs: 2296829

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	99.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A109638

Included Lab Sample IDs: 2296828

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A109666

Included Lab Sample IDs: 2296828

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.6	94.3	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A109716

Included Lab Sample IDs: 2296826

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.7	87.1	P/P	50 - 160
Cylindrospermopsin	88.8	91.4	P/P	50 - 160
Desmethyl microcystin LR	83.8	87.6	P/P	50 - 160
Microcystin H1LR	83.9	89.3	P/P	50 - 160
Microcystin HtyR	85.0	86.8	P/P	50 - 160
Microcystin LA	98.9	93.4	P/P	50 - 160
Microcystin LF	94.6	104	P/P	50 - 160
Microcystin LR	101	97.9	P/P	50 - 160
Microcystin LW	77.7	83.1	P/P	50 - 160
Microcystin LY	95.0	94.4	P/P	50 - 160
Microcystin RR	95.0	98.2	P/P	50 - 160
Microcystin WR	80.5	84.5	P/P	50 - 160
Microcystin YR	80.8	86.8	P/P	50 - 160
Nodularin-R	91.8	90.8	P/P	50 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A109770

Included Lab Sample IDs: 2296828

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.6	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109785

Included Lab Sample IDs: 2296828

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	107	P/P	90 - 110

Quality Assurance Report

Calibration Verification

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	99.4	96.2	97.2			0.826
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	96.7	96.3			0.228
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	101			0.494
EPA 365.1 Rev. 2.0	Total-P	109	110	111			1.01
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.3	98.1	100			2.12
EPA 8321B	Anatoxin-a	102	196	193			1.51
	Cylindrospermopsin	96.7	113	115			1.55
	Desmethyl microcystin LR	84.7	102	99.6			2.52
	Microcystin HiLR	89.6	96.7	100			3.61
	Microcystin HtyR	91.8	105	106			1.44
	Microcystin LA	104	109	98.9			9.50
	Microcystin LF	106	95.7	96.6			0.941
	Microcystin LR	105	124	120			2.73
	Microcystin LW	90.1	74.6	74.9			0.425
	Microcystin LY	94.7	105	96.6			8.07
	Microcystin RR	106	110	108			2.05
	Microcystin WR	90.1	78.9	81.6			3.40
	Microcystin YR	87.6	101	97.0			3.69
	Nodularin-R	96.2	107	101			6.22

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2296828
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2296828
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2296828
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2296828
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2296829
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2296826

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 350.1 Rev. 2.0	12/29/2021			01/10/2022 10:34	Ping Hua	2296828
EPA 351.2 Rev. 2.0	12/29/2021	01/03/2022 11:55	Samantha L Bates	01/04/2022 12:15	Virginia P. Brown	2296828
EPA 353.2 Rev. 2.0	12/29/2021			01/03/2022 10:01	Beverly Y. Sanders	2296828
EPA 365.1 Rev. 2.0	12/29/2021	01/05/2022 15:30	Simonne.V. Calhoun	01/11/2022 11:19	Shengyu Ding	2296828
EPA 365.1 Rev. 2.0 dissolved	12/29/2021			12/29/2021 13:58	James L Waggeberby	2296829
EPA 8321B	12/29/2021	01/03/2022 09:00	Juyoung Kim	01/07/2022 02:16	Juyoung Kim	2296826