

Chemical Analysis Report

WQAP-2022-03-30-02

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

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2022-03-14-09**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2295 Victoria AVE
Suite 364
Fort Myers, FL 33901
Attn: Kirby Wolfe

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 15-APR-2022 11:12

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

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: Lake Glenada Dock

Collection Date/Time: 03/29/2022 11:05

Field ID: HAB-SD-03292022-1105

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2315296	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P411740	
		Cylindrospermopsin	0.10	U	ug/L	P411740	
		Desmethyl microcystin LR	0.25	U	ug/L	P411740	
		Microcystin HIR**	0.25	U	ug/L	P411740	
		Microcystin HtyR**	0.25	U	ug/L	P411740	
		Microcystin LA	0.10	U	ug/L	P411740	
		Microcystin LF	0.10	U	ug/L	P411740	
		Microcystin LR	0.25	U	ug/L	P411740	
		Microcystin LW	0.25	U	ug/L	P411740	
		Microcystin LY	0.10	U	ug/L	P411740	
		Microcystin RR	0.10	U	ug/L	P411740	
		Microcystin WR	0.50	U	ug/L	P411740	
		Microcystin YR	0.25	U	ug/L	P411740	
		Nodularin-R**	0.10	U	ug/L	P411740	
2315297	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P411960	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P412167	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P411798	
	EPA 365.1 Rev. 2.0	Total-P	0.060		mg P/L	P411938	
2315298	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P411764	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411960

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412167

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411798

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411938

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411764

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

Reference Method: EPA 8321B
Batch ID: P411740

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: P411960

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412167

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411798

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411938

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411764

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P411740

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	104		P	40 - 150
Cylindrospermopsin	118		P	40 - 150
Desmethyl microcystin LR	105		P	40 - 150
Microcystin HIR	110		P	40 - 150
Microcystin HtyR	111		P	40 - 150
Microcystin LA	112		P	40 - 150
Microcystin LF	113		P	40 - 150
Microcystin LR	98.5		P	40 - 150
Microcystin LW	113		P	40 - 150
Microcystin LY	101		P	40 - 150
Microcystin RR	106		P	40 - 150
Microcystin WR	111		P	40 - 150
Microcystin YR	117		P	40 - 150
Nodularin-R	110		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P411960

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315240	Ammonia-N	98.4	99.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P412167

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315498	Kjeldahl Nitrogen	97.6	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P411798

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315260	NO2NO3-N	97.0	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P411938

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315351	Total-P	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P411764

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2315276	O-Phosphate-P	103	103	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P411740

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2314873	Anatoxin-a	127	141	P/P	40 - 150
2314873	Cylindrospermopsin	127	148	P/P	40 - 150
2314873	Desmethyl microcystin LR	120	144	P/P	40 - 150
2314873	Microcystin HiLR	118	131	P/P	40 - 150
2314873	Microcystin HtyR	113	146	P/P	40 - 150
2314873	Microcystin LA	127	139	P/P	40 - 150
2314873	Microcystin LF	113	132	P/P	40 - 150
2314873	Microcystin LR	123	141	P/P	40 - 150
2314873	Microcystin LW	121	146	P/P	40 - 150
2314873	Microcystin LY	116	139	P/P	40 - 150
2314873	Microcystin RR	122	137	P/P	40 - 150
2314873	Microcystin WR	111	135	P/P	40 - 150
2314873	Microcystin YR	107	127	P/P	40 - 150
2314873	Nodularin-R	124	139	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P411960

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315240	Ammonia-N	1.21	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P412167

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315498	Kjeldahl Nitrogen	5.26	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P411798

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315260	NO2NO3-N	0.517	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P411938

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315351	Total-P	0.317	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P411764

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2315276	O-Phosphate-P	0.150	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P411740

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2314873	Anatoxin-a	10.1	Spike	P	0 - 30
2314873	Cylindrospermopsin	15.6	Spike	P	0 - 30
2314873	Desmethyl microcystin LR	17.6	Spike	P	0 - 30
2314873	Microcystin HtIR	10.2	Spike	P	0 - 30
2314873	Microcystin HtyR	25.6	Spike	P	0 - 30
2314873	Microcystin LA	8.75	Spike	P	0 - 30
2314873	Microcystin LF	15.4	Spike	P	0 - 30
2314873	Microcystin LR	13.8	Spike	P	0 - 30
2314873	Microcystin LW	19.0	Spike	P	0 - 30
2314873	Microcystin LY	18.3	Spike	P	0 - 30
2314873	Microcystin RR	11.5	Spike	P	0 - 30
2314873	Microcystin WR	19.2	Spike	P	0 - 30
2314873	Microcystin YR	17.2	Spike	P	0 - 30
2314873	Nodularin-R	11.5	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: 2315296
Field Sample ID: HAB-SD-03292022-1105

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	94.9	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A111236

Included Lab Sample IDs: 2315298

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A111245

Included Lab Sample IDs: 2315297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	97.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A111253

Included Lab Sample IDs: 2315296

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	142	141	P/P	50 - 160
Cylindrospermopsin	153	154	P/P	60 - 160
Desmethyl microcystin LR	141	148	P/P	60 - 160
Microcystin HILR	147	155	P/P	60 - 160
Microcystin HtyR	143	147	P/P	60 - 160
Microcystin LA	145	160	P/P	50 - 160
Microcystin LF	135	146	P/P	60 - 160
Microcystin LR	128	137	P/P	60 - 160
Microcystin LW	141	142	P/P	60 - 160
Microcystin LY	134	139	P/P	60 - 160
Microcystin RR	147	147	P/P	60 - 160
Microcystin WR	143	141	P/P	60 - 160
Microcystin YR	139	129	P/P	60 - 160
Nodularin-R	137	150	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A111304

Included Lab Sample IDs: 2315297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.6	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A111379

Included Lab Sample IDs: 2315297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.6	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A111453

Included Lab Sample IDs: 2315297

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	101	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	97.6	98.4	99.6			1.21
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.2	97.6	107			5.26
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	98.0	97.0	96.5			0.517
EPA 365.1 Rev. 2.0	Total-P	103	104	104			0.317
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.7	103	103			0.150
EPA 8321B	Anatoxin-a	104	127	141			10.1
	Cylindrospermopsin	118	127	148			15.6
	Desmethyl microcystin LR	105	120	144			17.6
	Microcystin HiLR	110	118	131			10.2
	Microcystin HtyR	111	113	146			25.6
	Microcystin LA	112	127	139			8.75
	Microcystin LF	113	132	113			15.4
	Microcystin LR	98.5	123	141			13.8
	Microcystin LW	113	121	146			19.0
	Microcystin LY	101	116	139			18.3
	Microcystin RR	106	122	137			11.5
	Microcystin WR	111	111	135			19.2
	Microcystin YR	117	107	127			17.2
	Nodularin-R	110	124	139			11.5

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2315297
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2315297
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2315297
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2315297
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2315298
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2315296

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	03/30/2022			04/01/2022 13:18	Ping Hua	2315297
EPA 351.2 Rev. 2.0	03/30/2022	04/13/2022 07:54	Samantha L Bates	04/13/2022 12:29	Alexandra J Mattheus	2315297
EPA 353.2 Rev. 2.0	03/30/2022			03/31/2022 10:00	Beverly Y. Sanders	2315297
EPA 365.1 Rev. 2.0	03/30/2022	04/07/2022 10:00	Simonne.V. Calhoun	04/07/2022 16:26	Sarah A Nixon	2315297
EPA 365.1 Rev. 2.0 dissolved	03/30/2022			03/30/2022 15:32	Nathaniel J Jones	2315298
EPA 8321B	03/30/2022	03/31/2022 09:00	Manjita Shrestha	03/31/2022 13:18	Manjita Shrestha	2315296