

Chemical Analysis Report

WQAP-2021-06-03-01

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

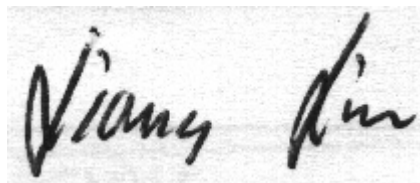
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2021-05-03-64**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

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: Liang Lin, Environmental Administrator

Date Certified: 24-JUN-2021 10:05

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: Timer Powers Park

Collection Date/Time: 06/02/2021 13:15

Field ID: SEHAB0046

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2251748	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P399131	
		Cylindrospermopsin	0.10	U	ug/L	P399131	
		Desmethyl microcystin LR	0.25	U	ug/L	P399131	
		Microcystin HilR**	0.25	U	ug/L	P399131	
		Microcystin HtyR**	0.25	U	ug/L	P399131	
		Microcystin LA	0.10	U	ug/L	P399131	
		Microcystin LF	0.10	U	ug/L	P399131	
		Microcystin LR	5.3		ug/L	P399131	
		Microcystin LW	0.25	U	ug/L	P399131	
		Microcystin LY	0.10	U	ug/L	P399131	
		Microcystin RR	0.10	U	ug/L	P399131	
		Microcystin WR	0.50	U	ug/L	P399131	
		Microcystin YR	0.25	U	ug/L	P399131	
		Nodularin-R**	0.10	U	ug/L	P399131	
2251749	EPA 350.1 Rev. 2.0	Ammonia-N	0.026		mg N/L	P399412	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P399233	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.34		mg N/L	P399217	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P399582	
2251750	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.090		mg P/L	P399171	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399412

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399233

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399217

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399582

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399171

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

Reference Method: EPA 8321B
Batch ID: P399131

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: P399412

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	104		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399233

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	101		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399217

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399582

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399171

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

Reference Method: EPA 8321B
Batch ID: P399131

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	115		P	40 - 150
Cylindrospermopsin	115		P	40 - 150
Desmethyl microcystin LR	101		P	40 - 150
Microcystin HIR	114		P	40 - 150
Microcystin HtyR	104		P	40 - 150
Microcystin LA	116		P	40 - 150
Microcystin LF	110		P	40 - 150
Microcystin LR	89.0		P	40 - 150
Microcystin LW	104		P	40 - 150
Microcystin LY	124		P	40 - 150
Microcystin RR	113		P	40 - 150
Microcystin WR	105		P	40 - 150
Microcystin YR	110		P	40 - 150
Nodularin-R	120		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P399412

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251420	Ammonia-N	99.6	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P399233

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251711	Kjeldahl Nitrogen	95.3	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P399217

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251749	NO2NO3-N	98.8	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P399582

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251765	Total-P	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P399171

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251925	O-Phosphate-P	99.9	99.9	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P399131

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251733	Anatoxin-a	109	107	P/P	40 - 150
2251733	Cylindrospermopsin	111	108	P/P	40 - 150
2251733	Desmethyl microcystin LR	98.8	98.9	P/P	40 - 150
2251733	Microcystin HiLR	104	107	P/P	40 - 150
2251733	Microcystin HtyR	112	100	P/P	40 - 150
2251733	Microcystin LA	103	114	P/P	40 - 150
2251733	Microcystin LF	99.0	101	P/P	40 - 150
2251733	Microcystin LR	101	98.2	P/P	40 - 150
2251733	Microcystin LW	104	103	P/P	40 - 150
2251733	Microcystin LY	114	116	P/P	40 - 150
2251733	Microcystin RR	106	115	P/P	40 - 150
2251733	Microcystin WR	105	109	P/P	40 - 150
2251733	Microcystin YR	114	108	P/P	40 - 150
2251733	Nodularin-R	111	115	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P399412

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251420	Ammonia-N	0.184	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P399233

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251711	Kjeldahl Nitrogen	3.40	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P399217

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251749	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P399582

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251765	Total-P	1.20	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P399171

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251925	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P399131

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251733	Anatoxin-a	2.34	Spike	P	0 - 30
2251733	Cylindrospermopsin	2.32	Spike	P	0 - 30
2251733	Desmethyl microcystin LR	0.0604	Spike	P	0 - 30
2251733	Microcystin HtIR	3.13	Spike	P	0 - 30
2251733	Microcystin HtyR	10.7	Spike	P	0 - 30
2251733	Microcystin LA	9.71	Spike	P	0 - 30
2251733	Microcystin LF	1.58	Spike	P	0 - 30
2251733	Microcystin LR	2.69	Spike	P	0 - 30
2251733	Microcystin LW	0.883	Spike	P	0 - 30
2251733	Microcystin LY	2.21	Spike	P	0 - 30
2251733	Microcystin RR	7.99	Spike	P	0 - 30
2251733	Microcystin WR	4.20	Spike	P	0 - 30
2251733	Microcystin YR	6.00	Spike	P	0 - 30
2251733	Nodularin-R	3.99	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: 2251748

Field Sample ID: SEHAB0046

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	102	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	100	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A105851
Included Lab Sample IDs: 2251748

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	88.7	93.6	P/P	50 - 160
Cylindrospermopsin	91.1	94.7	P/P	50 - 160
Desmethyl microcystin LR	85.8	83.1	P/P	50 - 160
Microcystin H1R	88.6	87.1	P/P	50 - 160
Microcystin HtyR	94.4	91.3	P/P	50 - 160
Microcystin LA	98.8	96.2	P/P	50 - 160
Microcystin LF	87.1	91.7	P/P	50 - 160
Microcystin LR	87.6	89.6	P/P	50 - 160
Microcystin LW	84.6	84.1	P/P	50 - 160
Microcystin LY	104	103	P/P	50 - 160
Microcystin RR	90.2	95.2	P/P	50 - 160
Microcystin WR	89.6	85.4	P/P	50 - 160
Microcystin YR	94.1	96.1	P/P	50 - 160
Nodularin-R	94.3	92.8	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A105855
Included Lab Sample IDs: 2251750

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.0	96.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A105874
Included Lab Sample IDs: 2251749

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A105917
Included Lab Sample IDs: 2251749

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	98.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A105961
Included Lab Sample IDs: 2251749

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	96.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106033
Included Lab Sample IDs: 2251749

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	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	104	99.6	99.8			0.184
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	95.3	100			3.40
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	98.8	98.8			0.0
EPA 365.1 Rev. 2.0	Total-P	105	103	104			1.20
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	99.9	99.9			0.0
EPA 8321B	Anatoxin-a	115	109	107			2.34
	Cylindrospermopsin	115	111	108			2.32
	Desmethyl microcystin LR	101	98.8	98.9			0.0604
	Microcystin HiLR	114	104	107			3.13
	Microcystin HtyR	104	112	100			10.7
	Microcystin LA	116	103	114			9.71
	Microcystin LF	110	99.0	101			1.58
	Microcystin LR	89.0	101	98.2			2.69
	Microcystin LW	104	104	103			0.883
	Microcystin LY	124	114	116			2.21
	Microcystin RR	113	106	115			7.99
	Microcystin WR	105	105	109			4.20
	Microcystin YR	110	114	108			6.00
	Nodularin-R	120	111	115			3.99

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2251749
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2251749
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2251749
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2251749
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2251750
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2251748

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	06/03/2021			06/08/2021 12:36	Ping Hua	2251749
EPA 351.2 Rev. 2.0	06/03/2021	06/04/2021 13:04	Benjamin T. Nordmann	06/07/2021 12:41	Virginia P. Brown	2251749
EPA 353.2 Rev. 2.0	06/03/2021			06/04/2021 10:34	Beverly Y. Sanders	2251749
EPA 365.1 Rev. 2.0	06/03/2021	06/11/2021 14:33	Madeline Gruver	06/14/2021 08:44	Shengyu Ding	2251749
EPA 365.1 Rev. 2.0 dissolved	06/03/2021			06/03/2021 15:31	Blanca Fach	2251750
EPA 8321B	06/03/2021	06/03/2021 10:35	Pramila Ghimire	06/03/2021 13:47	Pramila Ghimire	2251748