

Chemical Analysis Report

WQAP-2022-06-21-03

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

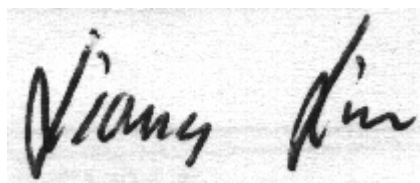
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-06-13-52**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: 12-JUL-2022 17:00

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: Lake Okeechobee - Pahokee Marina

Collection Date/Time: 06/20/2022 12:00

Field ID: SEHAB022

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2335727	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P415478	
		Cylindrospermopsin	0.10	U	ug/L	P415478	
		Desmethyl microcystin LR	0.25	U	ug/L	P415478	
		Microcystin HilR**	0.25	U	ug/L	P415478	
		Microcystin HtyR**	0.25	U	ug/L	P415478	
		Microcystin LA	0.10	U	ug/L	P415478	
		Microcystin LF	0.10	U	ug/L	P415478	
		Microcystin LR	0.25	U	ug/L	P415478	
		Microcystin LW	0.25	U	ug/L	P415478	
		Microcystin LY	0.10	U	ug/L	P415478	
		Microcystin RR	0.10	U	ug/L	P415478	
		Microcystin WR	0.50	U	ug/L	P415478	
		Microcystin YR	0.25	U	ug/L	P415478	
		Nodularin-R**	0.10	U	ug/L	P415478	
2335728	EPA 350.1 Rev. 2.0	Ammonia-N	0.034		mg N/L	P415880	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P415787	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P416225	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P415847	
2335729	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.065		mg P/L	P415501	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415880

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416225

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415847

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415501

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

Reference Method: EPA 8321B
Batch ID: P415478

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: P415880

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416225

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: P415847

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415501

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

Reference Method: EPA 8321B
Batch ID: P415478

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	81.2		P	40 - 150
Cylindrospermopsin	91.6		P	40 - 150
Desmethyl microcystin LR	94.5		P	40 - 150
Microcystin HIR	88.7		P	40 - 150
Microcystin HtyR	82.5		P	40 - 150
Microcystin LA	67.1		P	40 - 150
Microcystin LF	106		P	40 - 150
Microcystin LR	83.6		P	40 - 150
Microcystin LW	103		P	40 - 150
Microcystin LY	69.1		P	40 - 150
Microcystin RR	83.1		P	40 - 150
Microcystin WR	79.4		P	40 - 150
Microcystin YR	84.6		P	40 - 150
Nodularin-R	82.3		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415880

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335662	Ammonia-N	101	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335631	Kjeldahl Nitrogen	90.8	85.9	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416225

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335675	NO2NO3-N	97.0	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415847

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335976	Total-P	106	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335669	O-Phosphate-P	97.0	96.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P415478

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335667	Anatoxin-a	90.2	97.6	P/P	40 - 150
2335667	Cylindrospermopsin	92.8	96.1	P/P	40 - 150
2335667	Desmethyl microcystin LR	111	112	P/P	40 - 150
2335667	Microcystin HiLR	95.0	100	P/P	40 - 150
2335667	Microcystin HtyR	87.5	92.8	P/P	40 - 150
2335667	Microcystin LA	71.6	78.3	P/P	40 - 150
2335667	Microcystin LF	101	116	P/P	40 - 150
2335667	Microcystin LR	98.6	106	P/P	40 - 150
2335667	Microcystin LW	79.8	91.0	P/P	40 - 150
2335667	Microcystin LY	71.0	82.0	P/P	40 - 150
2335667	Microcystin RR	84.8	87.9	P/P	40 - 150
2335667	Microcystin WR	87.0	86.9	P/P	40 - 150
2335667	Microcystin YR	87.9	92.4	P/P	40 - 150
2335667	Nodularin-R	88.2	93.3	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415880

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335662	Ammonia-N	1.96	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415787

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335631	Kjeldahl Nitrogen	4.29	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416225

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335675	NO2NO3-N	2.40	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415847

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335976	Total-P	1.05	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415501

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335669	O-Phosphate-P	0.206	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P415478

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335667	Anatoxin-a	7.93	Spike	P	0 - 30
2335667	Cylindrospermopsin	3.49	Spike	P	0 - 30
2335667	Desmethyl microcystin LR	0.539	Spike	P	0 - 30
2335667	Microcystin H1IR	5.26	Spike	P	0 - 30
2335667	Microcystin HtyR	5.86	Spike	P	0 - 30
2335667	Microcystin LA	8.93	Spike	P	0 - 30
2335667	Microcystin LF	13.9	Spike	P	0 - 30
2335667	Microcystin LR	6.84	Spike	P	0 - 30
2335667	Microcystin LW	13.1	Spike	P	0 - 30
2335667	Microcystin LY	14.3	Spike	P	0 - 30
2335667	Microcystin RR	3.58	Spike	P	0 - 30
2335667	Microcystin WR	0.181	Spike	P	0 - 30
2335667	Microcystin YR	5.05	Spike	P	0 - 30
2335667	Nodularin-R	5.63	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: 2335727
Field Sample ID: SEHAB022

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	118	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A112962

Included Lab Sample IDs: 2335729

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	98.4	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A112993

Included Lab Sample IDs: 2335727

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.1	88.7	P/P	50 - 160
Cylindrospermopsin	96.2	96.5	P/P	50 - 160
Desmethyl microcystin LR	108	101	P/P	50 - 160
Microcystin HIR	94.9	94.8	P/P	50 - 160
Microcystin HtyR	94.3	88.5	P/P	50 - 160
Microcystin LA	71.8	79.4	P/P	50 - 160
Microcystin LF	70.2	74.9	P/P	50 - 160
Microcystin LR	101	98.3	P/P	50 - 160
Microcystin LW	79.4	92.9	P/P	50 - 160
Microcystin LY	73.1	73.6	P/P	50 - 160
Microcystin RR	89.8	92.3	P/P	50 - 160
Microcystin WR	92.8	92.5	P/P	50 - 160
Microcystin YR	91.1	90.6	P/P	50 - 160
Nodularin-R	93.6	90.5	P/P	50 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113138

Included Lab Sample IDs: 2335728

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.7	98.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113179

Included Lab Sample IDs: 2335728

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.6	98.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113207

Included Lab Sample IDs: 2335728

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113310

Included Lab Sample IDs: 2335728

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	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	97.0	101	103			1.96
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.6	90.8	85.9			4.29
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	97.0	99.5			2.40
EPA 365.1 Rev. 2.0	Total-P	100	106	104			1.05
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.3	97.0	96.8			0.206
EPA 8321B	Anatoxin-a	81.2	90.2	97.6			7.93
	Cylindrospermopsin	91.6	92.8	96.1			3.49
	Desmethyl microcystin LR	94.5	111	112			0.539
	Microcystin HiLR	88.7	95.0	100			5.26
	Microcystin HtyR	82.5	87.5	92.8			5.86
	Microcystin LA	67.1	71.6	78.3			8.93
	Microcystin LF	106	101	116			13.9
	Microcystin LR	83.6	98.6	106			6.84
	Microcystin LW	103	79.8	91.0			13.1
	Microcystin LY	69.1	71.0	82.0			14.3
	Microcystin RR	83.1	84.8	87.9			3.58
	Microcystin WR	79.4	87.0	86.9			0.181
	Microcystin YR	84.6	87.9	92.4			5.05
	Nodularin-R	82.3	88.2	93.3			5.63

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2335728
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2335728
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2335728
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2335728
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2335729
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2335727

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	06/21/2022			06/28/2022 10:49	Ping Hua	2335728
EPA 351.2 Rev. 2.0	06/21/2022	06/28/2022 09:59	Samantha L Bates	06/29/2022 15:05	Alexandra J Mattheus	2335728
EPA 353.2 Rev. 2.0	06/21/2022			07/06/2022 12:11	Judith K. Clark	2335728
EPA 365.1 Rev. 2.0	06/21/2022	06/29/2022 15:05	Simonne.V. Calhoun	06/30/2022 13:14	Simonne.V. Calhoun	2335728
EPA 365.1 Rev. 2.0 dissolved	06/21/2022			06/21/2022 16:07	Nathaniel J Jones	2335729
EPA 8321B	06/21/2022	06/22/2022 10:00	Manjita Shrestha	06/22/2022 14:59	Manjita Shrestha	2335727