

Chemical Analysis Report

WQAP-2022-07-14-04

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-2022-06-20-68**
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: 01-AUG-2022 09:05

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: Lake Marian Pavilion

Collection Date/Time: 07/13/2022 12:25

Field ID: SEHAB0083

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2341548	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P416580	
		Cylindrospermopsin	0.10	U	ug/L	P416579	
		Desmethyl microcystin LR	0.25	U	ug/L	P416579	
		Microcystin HILR	0.25	U	ug/L	P416579	
		Microcystin HtyR	0.25	U	ug/L	P416579	
		Microcystin LA	0.10	U	ug/L	P416579	
		Microcystin LF	0.15	I	ug/L	P416579	
		Microcystin LR	1.5		ug/L	P416579	
		Microcystin LW	0.25	U	ug/L	P416579	
		Microcystin LY	0.54		ug/L	P416579	
		Microcystin RR	0.10	U	ug/L	P416579	
		Microcystin WR	0.50	U	ug/L	P416579	
		Microcystin YR	0.25	U	ug/L	P416579	
		Nodularin-R	0.10	U	ug/L	P416579	
2341549	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P417187	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0		mg N/L	P416893	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P417105	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P416886	
2341550	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P416674	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417187

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416893

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417105

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416886

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416674

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

Reference Method: EPA 8321B
Batch ID: P416579

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H1LR	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

Reference Method: EPA 8321B
Batch ID: P416580

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417187

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416893

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417105

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: P416886

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416674

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

Reference Method: EPA 8321B
Batch ID: P416579

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	98.5		P	40 - 150
Desmethyl microcystin LR	86.9		P	40 - 150
Microcystin HILR	88.4		P	40 - 150
Microcystin HtyR	97.4		P	40 - 150
Microcystin LA	104		P	40 - 150
Microcystin LF	90.8		P	40 - 150
Microcystin LR	76.6		P	40 - 150
Microcystin LW	88.4		P	40 - 150
Microcystin LY	91.3		P	40 - 150
Microcystin RR	84.0		P	40 - 150
Microcystin WR	89.7		P	40 - 150
Microcystin YR	92.9		P	40 - 150
Nodularin-R	83.1		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P416580

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	93.8		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417187

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2341844	Ammonia-N	96.0	98.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416893

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2341741	Kjeldahl Nitrogen	101	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417105

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2341549	NO2NO3-N	96.0	95.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416886

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2341916	Total-P	99.0	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416674

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2341550	O-Phosphate-P	104	105	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P416579

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2341008	Cylindrospermopsin	103	102	P/P	40 - 150
2341008	Desmethyl microcystin LR	91.8	89.7	P/P	40 - 150
2341008	Microcystin HiLR	90.0	88.7	P/P	40 - 150
2341008	Microcystin HtyR	93.8	91.5	P/P	40 - 150
2341008	Microcystin LA	98.5	97.6	P/P	40 - 150
2341008	Microcystin LF	87.3	92.8	P/P	40 - 150
2341008	Microcystin LR	81.8	80.8	P/P	40 - 150
2341008	Microcystin LW	85.1	90.5	P/P	40 - 150
2341008	Microcystin LY	92.6	91.0	P/P	40 - 150
2341008	Microcystin RR	83.8	81.4	P/P	40 - 150
2341008	Microcystin WR	87.6	88.7	P/P	40 - 150
2341008	Microcystin YR	95.6	94.9	P/P	40 - 150
2341008	Nodularin-R	84.9	82.9	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P416580

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2341008	Anatoxin-a	106	108	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P417187

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2341844	Ammonia-N	2.27	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P416893

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2341741	Kjeldahl Nitrogen	3.03	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P417105

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2341549	NO2NO3-N	1.05	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P416886

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2341916	Total-P	3.77	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P416674

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2341550	O-Phosphate-P	1.43	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P416579

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2341008	Cylindrospermopsin	0.988	Spike	P	0 - 30
2341008	Desmethyl microcystin LR	2.38	Spike	P	0 - 30
2341008	Microcystin H1LR	1.44	Spike	P	0 - 30
2341008	Microcystin HtyR	2.53	Spike	P	0 - 30
2341008	Microcystin LA	0.929	Spike	P	0 - 30
2341008	Microcystin LF	6.06	Spike	P	0 - 30
2341008	Microcystin LR	1.21	Spike	P	0 - 30
2341008	Microcystin LW	6.08	Spike	P	0 - 30
2341008	Microcystin LY	1.72	Spike	P	0 - 30
2341008	Microcystin RR	2.69	Spike	P	0 - 30
2341008	Microcystin WR	1.31	Spike	P	0 - 30
2341008	Microcystin YR	0.697	Spike	P	0 - 30
2341008	Nodularin-R	2.31	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P416580

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2341008	Anatoxin-a	1.42	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2341548
Field Sample ID: SEHAB0083

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	88.6	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	91.4	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A113509

Included Lab Sample IDs: 2341550

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

Reference Method: EPA 8321B

Run ID: A113512

Included Lab Sample IDs: 2341548

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	90.1	88.7	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A113513

Included Lab Sample IDs: 2341548

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	110	111	P/P	60 - 160
Desmethyl microcystin LR	87.2	86.7	P/P	60 - 160
Microcystin HII R	87.6	90.6	P/P	60 - 160
Microcystin HtyR	95.6	99.1	P/P	60 - 160
Microcystin LA	104	108	P/P	50 - 160
Microcystin LF	87.0	89.8	P/P	60 - 160
Microcystin LR	79.9	85.7	P/P	60 - 160
Microcystin LW	85.0	89.9	P/P	60 - 160
Microcystin LY	97.0	98.0	P/P	60 - 160
Microcystin RR	86.9	83.3	P/P	60 - 160
Microcystin WR	88.9	91.5	P/P	60 - 160
Microcystin YR	99.4	104	P/P	60 - 160
Nodularin-R	83.4	88.1	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113659

Included Lab Sample IDs: 2341549

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113689

Included Lab Sample IDs: 2341549

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113699

Included Lab Sample IDs: 2341549

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	97.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113713

Included Lab Sample IDs: 2341549

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

* 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		Precision	MS
			LCS	SMP		
EPA 350.1 Rev. 2.0	Ammonia-N	95.2	96.0	98.2		2.27
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.8	101	106		3.03
EPA 353.2 Rev. 2.0	NO2NO3-N	100	96.0	95.0		1.05
EPA 365.1 Rev. 2.0	Total-P	101	99.0	103		3.77
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	104	105		1.43
EPA 8321B	Anatoxin-a	93.8	106	108		1.42
	Cylindrospermopsin	98.5	103	102		0.988
	Desmethyl microcystin LR	86.9	91.8	89.7		2.38
	Microcystin HiLR	88.4	90.0	88.7		1.44
	Microcystin HtyR	97.4	93.8	91.5		2.53
	Microcystin LA	104	98.5	97.6		0.929
	Microcystin LF	90.8	87.3	92.8		6.06
	Microcystin LR	76.6	81.8	80.8		1.21
	Microcystin LW	88.4	85.1	90.5		6.08
	Microcystin LY	91.3	92.6	91.0		1.72
	Microcystin RR	84.0	83.8	81.4		2.69
	Microcystin WR	89.7	87.6	88.7		1.31
	Microcystin YR	92.9	95.6	94.9		0.697
	Nodularin-R	83.1	84.9	82.9		2.31

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2341549
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2341549
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2341549
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2341549
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2341550
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2341548
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2341548

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	07/14/2022			07/26/2022 15:32	Ping Hua	2341549
EPA 351.2 Rev. 2.0	07/14/2022	07/21/2022 10:28	Samantha L Bates	07/25/2022 16:13	Samantha L Bates	2341549
EPA 353.2 Rev. 2.0	07/14/2022			07/25/2022 09:43	Beverly Y. Sanders	2341549
EPA 365.1 Rev. 2.0	07/14/2022	07/21/2022 15:53	Adam P Silver	07/22/2022 10:26	James L Waggeberby	2341549
EPA 365.1 Rev. 2.0 dissolved	07/14/2022			07/14/2022 15:11	James L Waggeberby	2341550
EPA 8321B	07/14/2022	07/14/2022 12:00	Manjita Shrestha	07/14/2022 22:26	Manjita Shrestha	2341548
	07/14/2022	07/14/2022 12:00	Umesh Chiluwal	07/15/2022 01:14	Umesh Chiluwal	2341548