

Chemical Analysis Report

WQAP-2021-04-27-01

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-2020-08-31-26**
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: Liang Lin, Environmental Administrator

Date Certified: 13-MAY-2021 13:32

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: Clewiston Boat Ramp

Collection Date/Time: 04/26/2021 13:00

Field ID: HAB-SD-042621-01

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2242726	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P397212	
		Cylindrospermopsin	0.25	U	ug/L	P397212	
		Desmethyl microcystin LR	0.25	U	ug/L	P397212	
		Microcystin HilR**	0.25	U	ug/L	P397212	
		Microcystin HtyR**	0.25	U	ug/L	P397212	
		Microcystin LA	0.25	U	ug/L	P397212	
		Microcystin LF	0.25	U	ug/L	P397212	
		Microcystin LR	4.6		ug/L	P397212	
		Microcystin LW	0.25	U	ug/L	P397212	
		Microcystin LY	0.25	U	ug/L	P397212	
		Microcystin RR	0.25	U	ug/L	P397212	
		Microcystin WR	0.50	U	ug/L	P397212	
		Microcystin YR	0.25	U	ug/L	P397212	
		Nodularin-R**	0.25	U	ug/L	P397212	
2242727	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P397723	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P397449	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.024		mg N/L	P397273	
	EPA 365.1 Rev. 2.0	Total-P	0.098		mg P/L	P397339	
2242728	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.040		mg P/L	P397258	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P397723

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P397449

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397273

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P397339

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P397258

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

Reference Method: EPA 8321B
Batch ID: P397212

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H11R	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P397723

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P397449

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397273

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: P397339

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: P397258

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P397212

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	105		P	40 - 150
Cylindrospermopsin	96.2		P	40 - 150
Desmethyl microcystin LR	105		P	40 - 150
Microcystin HIR	107		P	40 - 150
Microcystin HtyR	106		P	40 - 150
Microcystin LA	104		P	40 - 150
Microcystin LF	94.3		P	40 - 150
Microcystin LR	91.9		P	40 - 150
Microcystin LW	109		P	40 - 150
Microcystin LY	97.3		P	40 - 150
Microcystin RR	119		P	40 - 150
Microcystin WR	111		P	40 - 150
Microcystin YR	111		P	40 - 150
Nodularin-R	98.0		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P397723

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2242930	Ammonia-N	97.6	98.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P397273

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2242683	NO2NO3-N	97.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P397339

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2242683	Total-P	107	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P397258

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2242728	O-Phosphate-P	97.7	96.1	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P397212

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2242726	Anatoxin-a	109	106	P/P	40 - 150
2242726	Cylindrospermopsin	92.8	93.5	P/P	40 - 150
2242726	Desmethyl microcystin LR	106	111	P/P	40 - 150
2242726	Microcystin H1LR	107	111	P/P	40 - 150
2242726	Microcystin HtyR	110	105	P/P	40 - 150
2242726	Microcystin LA	111	117	P/P	40 - 150
2242726	Microcystin LF	91.5	91.1	P/P	40 - 150
2242726	Microcystin LR	95.1	91.9	P/P	40 - 150
2242726	Microcystin LW	91.4	90.5	P/P	40 - 150
2242726	Microcystin LY	98.7	105	P/P	40 - 150
2242726	Microcystin RR	124	117	P/P	40 - 150
2242726	Microcystin WR	106	104	P/P	40 - 150
2242726	Microcystin YR	108	105	P/P	40 - 150
2242726	Nodularin-R	102	107	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P397723

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2242930	Ammonia-N	0.240	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P397449

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2242727	Kjeldahl Nitrogen	7.22	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P397273

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2242683	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P397339

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2242683	Total-P	1.06	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P397258

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2242728	O-Phosphate-P	1.17	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P397212

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2242726	Anatoxin-a	3.02	Spike	P	0 - 30
2242726	Cylindrospermopsin	0.754	Spike	P	0 - 30
2242726	Desmethyl microcystin LR	4.75	Spike	P	0 - 30
2242726	Microcystin HtIR	3.36	Spike	P	0 - 30
2242726	Microcystin HtyR	4.82	Spike	P	0 - 30
2242726	Microcystin LA	5.50	Spike	P	0 - 30
2242726	Microcystin LF	0.475	Spike	P	0 - 30
2242726	Microcystin LR	2.30	Spike	P	0 - 30
2242726	Microcystin LW	1.05	Spike	P	0 - 30
2242726	Microcystin LY	5.89	Spike	P	0 - 30
2242726	Microcystin RR	5.83	Spike	P	0 - 30
2242726	Microcystin WR	2.51	Spike	P	0 - 30
2242726	Microcystin YR	2.56	Spike	P	0 - 30
2242726	Nodularin-R	5.08	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: 2242726

Field Sample ID: HAB-SD-042621-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	92.8	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	90.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A105022

Included Lab Sample IDs: 2242727

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A105024

Included Lab Sample IDs: 2242728

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	99.6	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A105032

Included Lab Sample IDs: 2242726

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	102	109	P/P	50 - 160
Cylindrospermopsin	106	97.6	P/P	50 - 160
Desmethyl microcystin LR	107	107	P/P	50 - 160
Microcystin HILR	114	114	P/P	50 - 160
Microcystin HtyR	115	116	P/P	50 - 160
Microcystin LA	111	115	P/P	50 - 160
Microcystin LF	99.7	101	P/P	50 - 160
Microcystin LR	102	94.0	P/P	50 - 160
Microcystin LW	105	115	P/P	50 - 160
Microcystin LY	112	93.7	P/P	50 - 160
Microcystin RR	126	120	P/P	50 - 160
Microcystin WR	112	127	P/P	50 - 160
Microcystin YR	122	111	P/P	50 - 160
Nodularin-R	111	108	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A105103

Included Lab Sample IDs: 2242727

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A105110

Included Lab Sample IDs: 2242727

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	94.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A105202

Included Lab Sample IDs: 2242727

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.5	98.1	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		Precision LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	96.8	97.6	98.0			0.240
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102					7.22
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	97.5				0.0
EPA 365.1 Rev. 2.0	Total-P	109	107	106			1.06
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.7	97.7	96.1			1.17
EPA 8321B	Anatoxin-a	105	106	109			3.02
	Cylindrospermopsin	96.2	93.5	92.8			0.754
	Desmethyl microcystin LR	105	106	111			4.75
	Microcystin HiLR	107	107	111			3.36
	Microcystin HtyR	106	105	110			4.82
	Microcystin LA	104	111	117			5.50
	Microcystin LF	94.3	91.5	91.1			0.475
	Microcystin LR	91.9	95.1	91.9			2.30
	Microcystin LW	109	91.4	90.5			1.05
	Microcystin LY	97.3	98.7	105			5.89
	Microcystin RR	119	117	124			5.83
	Microcystin WR	111	106	104			2.51
	Microcystin YR	111	105	108			2.56
	Nodularin-R	98.0	107	102			5.08

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2242727
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2242727
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2242727
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2242727
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2242728
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2242726

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	04/27/2021			05/05/2021 17:40	Ping Hua	2242727
EPA 351.2 Rev. 2.0	04/27/2021	04/29/2021 14:30	Benjamin T. Nordmann	04/30/2021 14:10	Virginia P. Brown	2242727
EPA 353.2 Rev. 2.0	04/27/2021			04/27/2021 14:40	Touraj Touran	2242727
EPA 365.1 Rev. 2.0	04/27/2021	04/28/2021 14:55	Yen Ta	04/29/2021 12:36	Shengyu Ding	2242727
EPA 365.1 Rev. 2.0 dissolved	04/27/2021			04/27/2021 15:02	Blanca Fach	2242728
EPA 8321B	04/27/2021	04/27/2021 11:30	Pramila Ghimire	04/27/2021 14:27	Pramila Ghimire	2242726