

Chemical Analysis Report

WQAP-2021-05-20-04

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-2021-03-22-17**
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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 07-JUN-2021 17:17



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: Barron Park, LaBelle - Caloosahatchee

Collection Date/Time: 05/19/2021 09:14

Field ID: HAB-SD-05192021-01

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2248767	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P398482	
		Cylindrospermopsin	0.10	U	ug/L	P398482	
		Desmethyl microcystin LR	0.25	U	ug/L	P398482	
		Microcystin HilR**	0.25	U	ug/L	P398482	
		Microcystin HtyR**	0.25	U	ug/L	P398482	
		Microcystin LA	0.10	U	ug/L	P398482	
		Microcystin LF	0.10	U	ug/L	P398482	
		Microcystin LR	2.8		ug/L	P398482	
		Microcystin LW	0.25	U	ug/L	P398482	
		Microcystin LY	0.10	U	ug/L	P398482	
		Microcystin RR	0.10	U	ug/L	P398482	
		Microcystin WR	0.50	U	ug/L	P398482	
		Microcystin YR	0.25	U	ug/L	P398482	
		Nodularin-R**	0.10	U	ug/L	P398482	
2248768	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P399060	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P398683	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P398577	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P398732	
2248769	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.044		mg P/L	P398552	

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: P399060

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398683

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398577

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398732

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398552

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

Reference Method: EPA 8321B
Batch ID: P398482

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: P399060

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398683

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: P398577

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: P398732

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: P398552

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

Reference Method: EPA 8321B
Batch ID: P398482

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	106		P	40 - 150
Cylindrospermopsin	111		P	40 - 150
Desmethyl microcystin LR	96.6		P	40 - 150
Microcystin HIR	93.4		P	40 - 150
Microcystin HtyR	87.7		P	40 - 150
Microcystin LA	105		P	40 - 150
Microcystin LF	103		P	40 - 150
Microcystin LR	97.0		P	40 - 150
Microcystin LW	107		P	40 - 150
Microcystin LY	101		P	40 - 150
Microcystin RR	104		P	40 - 150
Microcystin WR	88.7		P	40 - 150
Microcystin YR	82.7		P	40 - 150
Nodularin-R	104		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248188	Ammonia-N	98.6	96.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398577

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248625	NO2NO3-N	99.0	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398732

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248768	Total-P	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398552

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248750	O-Phosphate-P	97.0	97.5	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P398482

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248712	Anatoxin-a	98.0	101	P/P	40 - 150
2248712	Cylindrospermopsin	93.1	94.3	P/P	40 - 150
2248712	Desmethyl microcystin LR	86.7	93.9	P/P	40 - 150
2248712	Microcystin HilR	87.3	85.7	P/P	40 - 150
2248712	Microcystin HtyR	78.0	80.4	P/P	40 - 150
2248712	Microcystin LA	89.2	90.7	P/P	40 - 150
2248712	Microcystin LF	91.5	87.1	P/P	40 - 150
2248712	Microcystin LR	82.2	87.2	P/P	40 - 150
2248712	Microcystin LW	87.0	82.7	P/P	40 - 150
2248712	Microcystin LY	84.7	89.6	P/P	40 - 150
2248712	Microcystin RR	94.3	94.7	P/P	40 - 150
2248712	Microcystin WR	86.1	80.4	P/P	40 - 150
2248712	Microcystin YR	80.0	79.0	P/P	40 - 150
2248712	Nodularin-R	104	103	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P399060

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248188	Ammonia-N	1.72	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P398683

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248748	Kjeldahl Nitrogen	1.72	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P398577

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248625	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P398732

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248768	Total-P	0.0945	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P398552

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248750	O-Phosphate-P	0.349	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P398482

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248712	Anatoxin-a	2.87	Spike	P	0 - 30
2248712	Cylindrospermopsin	1.31	Spike	P	0 - 30
2248712	Desmethyl microcystin LR	7.71	Spike	P	0 - 30
2248712	Microcystin H1LR	1.81	Spike	P	0 - 30
2248712	Microcystin HtyR	3.13	Spike	P	0 - 30
2248712	Microcystin LA	1.60	Spike	P	0 - 30
2248712	Microcystin LF	4.92	Spike	P	0 - 30
2248712	Microcystin LR	2.07	Spike	P	0 - 30
2248712	Microcystin LW	5.04	Spike	P	0 - 30
2248712	Microcystin LY	5.65	Spike	P	0 - 30
2248712	Microcystin RR	0.355	Spike	P	0 - 30
2248712	Microcystin WR	6.89	Spike	P	0 - 30
2248712	Microcystin YR	1.22	Spike	P	0 - 30
2248712	Nodularin-R	1.02	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: 2248767

Field Sample ID: HAB-SD-05192021-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	84.3	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	83.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A105571

Included Lab Sample IDs: 2248769

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.5	99.7	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A105574

Included Lab Sample IDs: 2248767

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	112	116	P/P	50 - 160
Cylindrospermopsin	109	115	P/P	50 - 160
Desmethyl microcystin LR	93.0	102	P/P	50 - 160
Microcystin H1R	104	99.7	P/P	50 - 160
Microcystin HtyR	89.3	91.0	P/P	50 - 160
Microcystin LA	105	112	P/P	50 - 160
Microcystin LF	104	111	P/P	50 - 160
Microcystin LR	106	108	P/P	50 - 160
Microcystin LW	105	111	P/P	50 - 160
Microcystin LY	99.8	108	P/P	50 - 160
Microcystin RR	104	111	P/P	50 - 160
Microcystin WR	98.1	106	P/P	50 - 160
Microcystin YR	85.9	98.6	P/P	50 - 160
Nodularin-R	104	111	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A105591

Included Lab Sample IDs: 2248768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	94.0	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A105667

Included Lab Sample IDs: 2248768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	102	P/P	85 - 115

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A105791

Included Lab Sample IDs: 2248768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.7	99.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A105796

Included Lab Sample IDs: 2248768

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	98.7	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	98.0	98.6	96.8			1.72
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102					1.72
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	99.0	99.0			0.0
EPA 365.1 Rev. 2.0	Total-P	100	104	104			0.0945
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	97.0	97.5			0.349
EPA 8321B	Anatoxin-a	106	98.0	101			2.87
	Cylindrospermopsin	111	93.1	94.3			1.31
	Desmethyl microcystin LR	96.6	86.7	93.9			7.71
	Microcystin HiLR	93.4	87.3	85.7			1.81
	Microcystin HtyR	87.7	78.0	80.4			3.13
	Microcystin LA	105	89.2	90.7			1.60
	Microcystin LF	103	91.5	87.1			4.92
	Microcystin LR	97.0	82.2	87.2			2.07
	Microcystin LW	107	87.0	82.7			5.04
	Microcystin LY	101	84.7	89.6			5.65
	Microcystin RR	104	94.3	94.7			0.355
	Microcystin WR	88.7	86.1	80.4			6.89
	Microcystin YR	82.7	80.0	79.0			1.22
	Nodularin-R	104	104	103			1.02

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2248768
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2248768
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2248768
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2248768
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2248769
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2248767

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	05/20/2021			06/01/2021 14:29	Roberta Tatti	2248768
EPA 351.2 Rev. 2.0	05/20/2021	05/24/2021 12:59	Benjamin T. Nordmann	05/27/2021 17:30	Virginia P. Brown	2248768
EPA 353.2 Rev. 2.0	05/20/2021			05/21/2021 09:37	Beverly Y. Sanders	2248768
EPA 365.1 Rev. 2.0	05/20/2021	05/25/2021 12:56	Yen Ta	05/26/2021 11:01	Shengyu Ding	2248768
EPA 365.1 Rev. 2.0 dissolved	05/20/2021			05/20/2021 16:22	Ping Hua	2248769
EPA 8321B	05/20/2021	05/20/2021 11:30	Pramila Ghimire	05/20/2021 17:15	Pramila Ghimire	2248767