Chemical Analysis Report

WQAP-2021-04-13-01

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-2020-08-17-26**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 03-MAY-2021 11:04

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-Clewistown Boat Ramp **Collection Date/Time: 04/12/2021 11:50**

Field ID: SD-HAB-041221-001 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2239001	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P396437	
		Cylindrospermopsin	0.25	U	ug/L	P396437	
		Desmethyl microcystin LR	0.26	I	ug/L	P396437	
		Microcystin HilR**	0.25	U	ug/L	P396437	
		Microcystin HtyR**	0.25	U	ug/L	P396437	
		Microcystin LA	0.25	U	ug/L	P396437	
		Microcystin LF	0.25	U	ug/L	P396437	
		Microcystin LR	3.9		ug/L	P396437	
		Microcystin LW	0.25	U	ug/L	P396437	
		Microcystin LY	0.25	U	ug/L	P396437	
		Microcystin RR	0.25	U	ug/L	P396437	
		Microcystin WR	0.50	U	ug/L	P396437	
		Microcystin YR	0.25	U	ug/L	P396437	
		Nodularin-R**	0.25	U	ug/L	P396437	
2239002	EPA 350.1 Rev. 2.0	Ammonia-N	0.072		mg N/L	P396760	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P396556	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.077		mg N/L	P396629	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P396640	
2239003	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.040		mg P/L	P396464	

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: P396760

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396556

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396629

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396640

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396464

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

Reference Method: EPA 8321B
Batch ID: P396437

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 HilR	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: P396760

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396556

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: P396629

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396640

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.1		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P396437

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	142		P	40 - 150
Cylindrospermopsin	119		P	40 - 150
Desmethyl microcystin LR	90.4		P	40 - 150
Microcystin HilR	102		P	40 - 150
Microcystin HtyR	106		P	40 - 150
Microcystin LA	107		P	40 - 150
Microcystin LF	88.5		P	40 - 150
Microcystin LR	88.7		P	40 - 150
Microcystin LW	90.2		P	40 - 150
Microcystin LY	91.8		P	40 - 150
Microcystin RR	115		P	40 - 150
Microcystin WR	96.8		P	40 - 150
Microcystin YR	103		P	40 - 150
Nodularin-R	105		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P396760

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238983	Ammonia-N	96.4	94.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396629

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238983	NO2NO3-N	99.0	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396640

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2239055	Total-P	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238988	O-Phosphate-P	95.8	95.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P396437

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2239277	Anatoxin-a	139	124	P/P	40 - 150
2239277	Cylindrospermopsin	90.4	82.7	P/P	40 - 150
2239277	Desmethyl microcystin LR	90.6	82.0	P/P	40 - 150
2239277	Microcystin HilR	99.5	87.9	P/P	40 - 150
2239277	Microcystin HtyR	106	90.4	P/P	40 - 150
2239277	Microcystin LA	106	93.9	P/P	40 - 150
2239277	Microcystin LF	73.6	69.1	P/P	40 - 150
2239277	Microcystin LR	93.9	81.6	P/P	40 - 150
2239277	Microcystin LW	69.5	60.3	P/P	40 - 150
2239277	Microcystin LY	94.6	78.5	P/P	40 - 150
2239277	Microcystin RR	107	92.4	P/P	40 - 150
2239277	Microcystin WR	97.8	82.6	P/P	40 - 150
2239277	Microcystin YR	105	84.3	P/P	40 - 150
2239277	Nodularin-R	109	90.2	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P396760

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238983	Ammonia-N	1.52	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396556

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2239023	Kjeldahl Nitrogen	13.2	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396629

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238983	NO2NO3-N	1.50	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396640

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2239055	Total-P	1.10	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238988	O-Phosphate-P	0.397	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P396437

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2239277	Anatoxin-a	11.6	Spike	P	0 - 30
2239277	Cylindrospermopsin	8.85	Spike	P	0 - 30
2239277	Desmethyl microcystin LR	9.95	Spike	P	0 - 30
2239277	Microcystin HilR	12.4	Spike	P	0 - 30
2239277	Microcystin HtyR	16.0	Spike	P	0 - 30
2239277	Microcystin LA	12.4	Spike	P	0 - 30
2239277	Microcystin LF	6.28	Spike	P	0 - 30
2239277	Microcystin LR	14.0	Spike	P	0 - 30
2239277	Microcystin LW	14.2	Spike	P	0 - 30
2239277	Microcystin LY	18.6	Spike	P	0 - 30
2239277	Microcystin RR	15.1	Spike	P	0 - 30
2239277	Microcystin WR	16.9	Spike	P	0 - 30
2239277	Microcystin YR	21.7	Spike	P	0 - 30
2239277	Nodularin-R	18.8	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: 2239001
Field Sample ID: SD-HAB-041221-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	94.3	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	85.6	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A104702
Included Lab Sample IDs: 2239003

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	99.5	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A104708
Included Lab Sample IDs: 2239001

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	125	117	P/P	50 - 160
Cylindrospermopsin	94.5	97.4	P/P	60 - 160
Desmethyl microcystin LR	88.2	85.8	P/P	60 - 160
Microcystin HilR	86.2	99.4	P/P	60 - 160
Microcystin HtyR	92.3	99.3	P/P	60 - 160
Microcystin LA	87.2	105	P/P	50 - 160
Microcystin LF	83.0	72.8	P/P	50 - 160
Microcystin LR	87.6	97.6	P/P	60 - 160
Microcystin LW	75.1	71.3	P/P	60 - 160
Microcystin LY	94.6	94.6	P/P	60 - 160
Microcystin RR	99.8	101	P/P	60 - 160
Microcystin WR	77.4	87.0	P/P	60 - 160
Microcystin YR	90.9	89.8	P/P	60 - 160
Nodularin-R	87.0	96.7	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104763
Included Lab Sample IDs: 2239002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104767
Included Lab Sample IDs: 2239002

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104782
Included Lab Sample IDs: 2239002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104806
Included Lab Sample IDs: 2239002

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.7	97.4	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	101	96.4	94.8			1.52
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101					13.2
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	99.0	100			1.50
EPA 365.1 Rev. 2.0	Total-P	103	102	101			1.10
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.1	95.8	95.4			0.397
EPA 8321B	Anatoxin-a	142	139	124			11.6
	Cylindrospermopsin	119	90.4	82.7			8.85
	Desmethyl microcystin LR	90.4	90.6	82.0			9.95
	Microcystin HilR	102	99.5	87.9			12.4
	Microcystin HtyR	106	106	90.4			16.0
	Microcystin LA	107	106	93.9			12.4
	Microcystin LF	88.5	73.6	69.1			6.28
	Microcystin LR	88.7	93.9	81.6			14.0
	Microcystin LW	90.2	69.5	60.3			14.2
	Microcystin LY	91.8	94.6	78.5			18.6
	Microcystin RR	115	107	92.4			15.1
	Microcystin WR	96.8	97.8	82.6			16.9
	Microcystin YR	103	105	84.3			21.7
	Nodularin-R	105	109	90.2			18.8

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2239002
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2239002
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2239002
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2239002
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2239003
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2239001

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	04/13/2021			04/18/2021 15:54	Ping Hua	2239002
EPA 351.2 Rev. 2.0	04/13/2021	04/14/2021 12:50	Yen Ta	04/15/2021 14:46	Virginia P. Brown	2239002
EPA 353.2 Rev. 2.0	04/13/2021			04/15/2021 14:27	Lauren Lees	2239002
EPA 365.1 Rev. 2.0	04/13/2021	04/15/2021 17:39	Madeline Gruver	04/16/2021 10:53	Shengyu Ding	2239002
EPA 365.1 Rev. 2.0 dissolved	04/13/2021			04/13/2021 14:10	Patrick M. Roche	2239003
EPA 8321B	04/13/2021	04/13/2021 12:00	Pramila Ghimire	04/13/2021 14:57	Pramila Ghimire	2239001