Chemical Analysis Report

WQAP-2021-03-18-02

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-2021-03-08-52**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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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: Huckleberry Lake (Canal Entrance) **Collection Date/Time: 03/17/2021 13:45**

Field ID: Huckleberry Lake (Canal Entran Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2232371	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P395088	
		Cylindrospermopsin	0.25	U	ug/L	P395088	
		Desmethyl microcystin LR	0.55	I	ug/L	P395088	
		Microcystin HilR**	0.25	U	ug/L	P395088	
		Microcystin HtyR**	0.25	U	ug/L	P395088	
		Microcystin LA	1.8		ug/L	P395088	
		Microcystin LF	0.25	U	ug/L	P395088	
		Microcystin LR	7.4		ug/L	P395088	
		Microcystin LW	0.25	U	ug/L	P395088	
		Microcystin LY	0.25	U	ug/L	P395088	
		Microcystin RR	1.8		ug/L	P395088	
		Microcystin WR	0.50	U	ug/L	P395088	
		Microcystin YR	0.26	I	ug/L	P395088	
2232372	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P395450	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	3.3		mg N/L	P395532	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P395287	
	EPA 365.1 Rev. 2.0	Total-P	0.23		mg P/L	P395210	
2232373	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.007	I	mg P/L	P395166	

Ref. Method and Comment:
EPA 8321B: Results confirmed in re-analysis.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395450

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395532

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395287

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395210

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395166

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

Reference Method: EPA 8321B
Batch ID: P395088

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395450

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395532

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395287

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: P395210

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395166

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.2		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P395088

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	103		P	40 - 150
Cylindrospermopsin	105		P	40 - 150
Desmethyl microcystin LR	101		P	40 - 150
Microcystin HilR	106		P	40 - 150
Microcystin HtyR	104		P	40 - 150
Microcystin LA	102		P	40 - 150
Microcystin LF	90.3		P	40 - 150
Microcystin LR	99.7		P	40 - 150
Microcystin LW	92.0		P	40 - 150
Microcystin LY	97.0		P	40 - 150
Microcystin RR	107		P	40 - 150
Microcystin WR	105		P	40 - 150
Microcystin YR	87.6		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395450

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2232316	Ammonia-N	100	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2232349	Kjeldahl Nitrogen	106	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395287

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2232349	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395210

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231645	Total-P	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395166

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2232319	O-Phosphate-P	98.5	98.5	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P395088

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2231643	Anatoxin-a	77.6	73.2	P/P	40 - 150
2231643	Cylindrospermopsin	96.4	89.4	P/P	40 - 150
2231643	Desmethyl microcystin LR	97.3	91.8	P/P	40 - 150
2231643	Microcystin HilR	93.4	92.1	P/P	40 - 150
2231643	Microcystin HtyR	94.2	94.6	P/P	40 - 150
2231643	Microcystin LA	94.2	93.7	P/P	40 - 150
2231643	Microcystin LF	80.1	71.9	P/P	40 - 150
2231643	Microcystin LR	105	106	P/P	40 - 150
2231643	Microcystin LW	85.3	81.3	P/P	40 - 150
2231643	Microcystin LY	86.3	88.4	P/P	40 - 150
2231643	Microcystin RR	99.5	97.7	P/P	40 - 150
2231643	Microcystin WR	87.6	89.0	P/P	40 - 150
2231643	Microcystin YR	77.2	87.5	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395450

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2232316	Ammonia-N	0.797	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2232349	Kjeldahl Nitrogen	1.59	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395287

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2232349	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231645	Total-P	1.15	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395166

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2232319	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P395088

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2231643	Anatoxin-a	5.88	Spike	P	0 - 30
2231643	Cylindrospermopsin	7.55	Spike	P	0 - 30
2231643	Desmethyl microcystin LR	5.91	Spike	P	0 - 30
2231643	Microcystin HilR	1.43	Spike	P	0 - 30
2231643	Microcystin HtyR	0.427	Spike	P	0 - 30
2231643	Microcystin LA	0.581	Spike	P	0 - 30
2231643	Microcystin LF	10.9	Spike	P	0 - 30
2231643	Microcystin LR	0.806	Spike	P	0 - 30
2231643	Microcystin LW	4.82	Spike	P	0 - 30
2231643	Microcystin LY	2.34	Spike	P	0 - 30
2231643	Microcystin RR	1.90	Spike	P	0 - 30
2231643	Microcystin WR	1.61	Spike	P	0 - 30
2231643	Microcystin YR	12.5	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2232371
Field Sample ID: Huckleberry Lake (Canal Entran

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	146	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	144	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A104138
Included Lab Sample IDs: 2232373

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	98.1	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A104147
Included Lab Sample IDs: 2232371

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	50.2	50.0	P/P	50 - 160
Cylindrospermopsin	89.6	100	P/P	60 - 160
Desmethyl microcystin LR	90.4	102	P/P	60 - 160
Microcystin HilR	95.3	100	P/P	60 - 160
Microcystin HtyR	94.6	94.1	P/P	60 - 160
Microcystin LA	90.6	101	P/P	50 - 160
Microcystin LF	92.8	107	P/P	50 - 160
Microcystin LR	132	139	P/P	60 - 160
Microcystin LW	89.3	110	P/P	60 - 160
Microcystin LY	96.1	102	P/P	60 - 160
Microcystin RR	96.1	90.3	P/P	60 - 160
Microcystin WR	91.7	102	P/P	60 - 160
Microcystin YR	89.4	98.1	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104194
Included Lab Sample IDs: 2232372

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104195
Included Lab Sample IDs: 2232372

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104259
Included Lab Sample IDs: 2232372

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104367
Included Lab Sample IDs: 2232372

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.1	95.5	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	98.2	100	101			0.797
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	106	109			1.59
EPA 353.2 Rev. 2.0	NO2NO3-N	100	101	100			0.496
EPA 365.1 Rev. 2.0	Total-P	106	104	103			1.15
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.2	98.5	98.5			0.0
EPA 8321B	Anatoxin-a	103	77.6	73.2			5.88
	Cylindrospermopsin	105	96.4	89.4			7.55
	Desmethyl microcystin LR	101	91.8	97.3			5.91
	Microcystin HilR	106	92.1	93.4			1.43
	Microcystin HtyR	104	94.6	94.2			0.427
	Microcystin LA	102	93.7	94.2			0.581
	Microcystin LF	90.3	71.9	80.1			10.9
	Microcystin LR	99.7	105	106			0.806
	Microcystin LW	92.0	81.3	85.3			4.82
	Microcystin LY	97.0	88.4	86.3			2.34
	Microcystin RR	107	99.5	97.7			1.90
	Microcystin WR	105	89.0	87.6			1.61
	Microcystin YR	87.6	87.5	77.2			12.5

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2232372
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2232372
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2232372
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2232372
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2232373
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2232371

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	03/18/2021			03/24/2021 18:42	Ping Hua	2232372
EPA 351.2 Rev. 2.0	03/18/2021	03/26/2021 13:02	Benjamin T. Nordmann	03/30/2021 10:39	Virginia P. Brown	2232372
EPA 353.2 Rev. 2.0	03/18/2021			03/22/2021 11:32	Beverly Y. Sanders	2232372
EPA 365.1 Rev. 2.0	03/18/2021	03/19/2021 12:46	Yen Ta	03/22/2021 11:43	Shengyu Ding	2232372
EPA 365.1 Rev. 2.0 dissolved	03/18/2021			03/18/2021 15:15	Patrick M. Roche	2232373
EPA 8321B	03/18/2021	03/18/2021 12:00	Juyoung Kim	03/18/2021 20:00	Pramila Ghimire	2232371
	03/18/2021	03/18/2021 12:00	Juyoung Kim	03/19/2021 05:14	Pramila Ghimire	2232371