

Chemical Analysis Report

WQAP-2021-02-23-02

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response - SWD**
Request ID: **RQ-2020-07-27-32**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637
Attn: Matthew Bearden

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 15-MAR-2021 14:53

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: Thomas Lake-Center

Collection Date/Time: 02/22/2021 10:35

Field ID: HAB-SW-0028

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2226498	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P394166	
		Cylindrospermopsin	0.25	U	ug/L	P394166	
		Desmethyl microcystin LR	0.25	U	ug/L	P394166	
		Microcystin HIR**	0.25	U	ug/L	P394166	
		Microcystin HtyR**	0.25	U	ug/L	P394166	
		Microcystin LA	0.25	U	ug/L	P394166	
		Microcystin LF	0.25	U	ug/L	P394166	
		Microcystin LR	0.25	U	ug/L	P394166	
		Microcystin LW	0.25	U	ug/L	P394166	
		Microcystin LY	0.25	U	ug/L	P394166	
		Microcystin RR	0.25	U	ug/L	P394166	
		Microcystin WR	0.50	U	ug/L	P394166	
		Microcystin YR	0.25	U	ug/L	P394166	
2226499	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P394300	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.4		mg N/L	P394206	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P394137	
	EPA 365.1 Rev. 2.0	Total-P	0.061		mg P/L	P394156	
2226500	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P394103	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394300

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P394206

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394137

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394156

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394103

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

Reference Method: EPA 8321B
Batch ID: P394166

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 HIR	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: P394300

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: P394206

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	104		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394137

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394156

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: P394103

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

Reference Method: EPA 8321B
Batch ID: P394166

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	54.6		P	40 - 150
Cylindrospermopsin	113		P	40 - 150
Desmethyl microcystin LR	96.4		P	40 - 150
Microcystin HIR	109		P	40 - 150
Microcystin HtyR	109		P	40 - 150
Microcystin LA	104		P	40 - 150
Microcystin LF	114		P	40 - 150
Microcystin LR	103		P	40 - 150
Microcystin LW	136		P	40 - 150
Microcystin LY	110		P	40 - 150
Microcystin RR	128		P	40 - 150
Microcystin WR	109		P	40 - 150
Microcystin YR	107		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P394300

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2226522	Ammonia-N	97.2	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P394206

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2226516	Kjeldahl Nitrogen	105	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P394137

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2226499	NO2NO3-N	99.0	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P394156

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2226499	Total-P	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P394103

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2226419	O-Phosphate-P	94.6	94.4	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P394166

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2226498	Anatoxin-a	61.8	65.4	P/P	40 - 150
2226498	Cylindrospermopsin	111	99.7	P/P	40 - 150
2226498	Desmethyl microcystin LR	97.8	91.2	P/P	40 - 150
2226498	Microcystin HiLR	113	106	P/P	40 - 150
2226498	Microcystin HtyR	104	95.4	P/P	40 - 150
2226498	Microcystin LA	106	98.0	P/P	40 - 150
2226498	Microcystin LF	101	96.8	P/P	40 - 150
2226498	Microcystin LR	93.3	92.3	P/P	40 - 150
2226498	Microcystin LW	123	112	P/P	40 - 150
2226498	Microcystin LY	99.1	92.2	P/P	40 - 150
2226498	Microcystin RR	126	119	P/P	40 - 150
2226498	Microcystin WR	110	104	P/P	40 - 150
2226498	Microcystin YR	103	96.0	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P394300

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2226522	Ammonia-N	0.181	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P394206

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2226516	Kjeldahl Nitrogen	1.89	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P394137

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2226499	NO2NO3-N	0.506	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P394156

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2226499	Total-P	1.38	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P394103

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2226419	O-Phosphate-P	0.198	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P394166

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2226498	Anatoxin-a	5.64	Spike	P	0 - 30
2226498	Cylindrospermopsin	11.1	Spike	P	0 - 30
2226498	Desmethyl microcystin LR	7.01	Spike	P	0 - 30
2226498	Microcystin H1LR	6.54	Spike	P	0 - 30
2226498	Microcystin HtyR	8.81	Spike	P	0 - 30
2226498	Microcystin LA	7.85	Spike	P	0 - 30
2226498	Microcystin LF	3.92	Spike	P	0 - 30
2226498	Microcystin LR	1.08	Spike	P	0 - 30
2226498	Microcystin LW	9.98	Spike	P	0 - 30
2226498	Microcystin LY	7.17	Spike	P	0 - 30
2226498	Microcystin RR	5.65	Spike	P	0 - 30
2226498	Microcystin WR	5.36	Spike	P	0 - 30
2226498	Microcystin YR	7.51	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2226498

Field Sample ID: HAB-SW-0028

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	81.3	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	72.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A103726

Included Lab Sample IDs: 2226500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.5	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A103736

Included Lab Sample IDs: 2226499

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A103747

Included Lab Sample IDs: 2226499

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	106	104	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A103766

Included Lab Sample IDs: 2226498

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	116	120	P/P	50 - 160
Cylindrospermopsin	122	123	P/P	60 - 160
Desmethyl microcystin LR	113	105	P/P	60 - 160
Microcystin H1LR	124	116	P/P	60 - 160
Microcystin HtyR	120	115	P/P	60 - 160
Microcystin LA	114	117	P/P	50 - 160
Microcystin LF	118	107	P/P	50 - 160
Microcystin LR	111	109	P/P	60 - 160
Microcystin LW	139	127	P/P	60 - 160
Microcystin LY	117	107	P/P	60 - 160
Microcystin RR	135	142	P/P	60 - 160
Microcystin WR	118	113	P/P	60 - 160
Microcystin YR	119	96.0	P/P	60 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A103798

Included Lab Sample IDs: 2226499

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.2	98.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A103809

Included Lab Sample IDs: 2226499

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	98.6	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	101	97.2	97.0			0.181
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	105	101			1.89
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	99.0	98.5			0.506
EPA 365.1 Rev. 2.0	Total-P	103	103	102			1.38
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	94.6	94.4			0.198
EPA 8321B	Anatoxin-a	54.6	61.8	65.4			5.64
	Cylindrospermopsin	113	111	99.7			11.1
	Desmethyl microcystin LR	96.4	97.8	91.2			7.01
	Microcystin HiLR	109	113	106			6.54
	Microcystin HtyR	109	104	95.4			8.81
	Microcystin LA	104	106	98.0			7.85
	Microcystin LF	114	101	96.8			3.92
	Microcystin LR	103	93.3	92.3			1.08
	Microcystin LW	136	123	112			9.98
	Microcystin LY	110	99.1	92.2			7.17
	Microcystin RR	128	126	119			5.65
	Microcystin WR	109	110	104			5.36
	Microcystin YR	107	103	96.0			7.51

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2226499
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2226499
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2226499
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2226499
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2226500
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2226498

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	02/23/2021			02/27/2021 13:50	Ping Hua	2226499
EPA 351.2 Rev. 2.0	02/23/2021	02/25/2021 12:02	Yen Ta	02/26/2021 12:39	Virginia P. Brown	2226499
EPA 353.2 Rev. 2.0	02/23/2021			02/24/2021 09:13	Beverly Y. Sanders	2226499
EPA 365.1 Rev. 2.0	02/23/2021	02/24/2021 11:30	Shengyu Wang	02/24/2021 16:04	Shengyu Wang	2226499
EPA 365.1 Rev. 2.0 dissolved	02/23/2021			02/23/2021 14:09	Lipi Saha	2226500
EPA 8321B	02/23/2021	02/25/2021 07:00	Pramila Ghimire	02/25/2021 09:55	Pramila Ghimire	2226498