

Chemical Analysis Report

WQAP-2021-03-11-01

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-2021-03-08-13**
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: Colin Wright, Program Administrator

Date Certified: 01-APR-2021 14:28

A handwritten signature in black ink, appearing to read "Colin Wright", is positioned on a light-colored rectangular 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: Lake Crago by Boat Ramp

Collection Date/Time: 03/10/2021 09:40

Field ID: HAB-SW-0031

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2230704	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P394768	
		Cylindrospermopsin	0.25	U	ug/L	P394768	
		Desmethyl microcystin LR	0.25	U	ug/L	P394768	
		Microcystin HIR**	0.25	U	ug/L	P394768	
		Microcystin HtyR**	0.25	U	ug/L	P394768	
		Microcystin LA	0.25	U	ug/L	P394768	
		Microcystin LF	0.25	U	ug/L	P394768	
		Microcystin LR	0.52	I	ug/L	P394768	
		Microcystin LW	0.25	U	ug/L	P394768	
		Microcystin LY	0.25	U	ug/L	P394768	
		Microcystin RR	0.25	U	ug/L	P394768	
		Microcystin WR	0.50	U	ug/L	P394768	
		Microcystin YR	0.25	U	ug/L	P394768	
2230705	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P394935	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P395141	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P394966	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P394990	
2230706	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P394810	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394935

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395141

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394966

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394990

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394810

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

Reference Method: EPA 8321B
Batch ID: P394768

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: P394935

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: P395141

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: P394966

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: P394990

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	108		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394810

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

Reference Method: EPA 8321B
Batch ID: P394768

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	108		P	40 - 150
Cylindrospermopsin	104		P	40 - 150
Desmethyl microcystin LR	92.1		P	40 - 150
Microcystin HIR	97.1		P	40 - 150
Microcystin HtyR	102		P	40 - 150
Microcystin LA	104		P	40 - 150
Microcystin LF	105		P	40 - 150
Microcystin LR	82.4		P	40 - 150
Microcystin LW	98.3		P	40 - 150
Microcystin LY	107		P	40 - 150
Microcystin RR	103		P	40 - 150
Microcystin WR	85.5		P	40 - 150
Microcystin YR	103		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P394935

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230408	Ammonia-N	95.4	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395141

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230420	Kjeldahl Nitrogen	109	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P394966

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230705	NO2NO3-N	99.0	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P394990

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230668	Total-P	108	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P394810

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2230958	O-Phosphate-P	96.1	97.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P394768

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2229997	Anatoxin-a	110	118	P/P	40 - 150
2229997	Cylindrospermopsin	100	115	P/P	40 - 150
2229997	Desmethyl microcystin LR	89.1	101	P/P	40 - 150
2229997	Microcystin HiLR	94.0	114	P/P	40 - 150
2229997	Microcystin HtyR	96.9	109	P/P	40 - 150
2229997	Microcystin LA	102	117	P/P	40 - 150
2229997	Microcystin LF	99.4	105	P/P	40 - 150
2229997	Microcystin LR	94.6	109	P/P	40 - 150
2229997	Microcystin LW	88.6	101	P/P	40 - 150
2229997	Microcystin LY	99.8	114	P/P	40 - 150
2229997	Microcystin RR	106	120	P/P	40 - 150
2229997	Microcystin WR	81.4	98.2	P/P	40 - 150
2229997	Microcystin YR	102	106	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P394935

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230408	Ammonia-N	1.89	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P395141

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230420	Kjeldahl Nitrogen	1.31	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P394966

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230705	NO2NO3-N	0.506	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P394990

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230668	Total-P	0.921	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P394810

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2230958	O-Phosphate-P	0.962	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P394768

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2229997	Anatoxin-a	7.03	Spike	P	0 - 30
2229997	Cylindrospermopsin	13.8	Spike	P	0 - 30
2229997	Desmethyl microcystin LR	12.9	Spike	P	0 - 30
2229997	Microcystin H1LR	19.7	Spike	P	0 - 30
2229997	Microcystin HtyR	12.1	Spike	P	0 - 30
2229997	Microcystin LA	13.9	Spike	P	0 - 30
2229997	Microcystin LF	5.90	Spike	P	0 - 30
2229997	Microcystin LR	14.0	Spike	P	0 - 30
2229997	Microcystin LW	12.6	Spike	P	0 - 30
2229997	Microcystin LY	13.5	Spike	P	0 - 30
2229997	Microcystin RR	12.3	Spike	P	0 - 30
2229997	Microcystin WR	18.8	Spike	P	0 - 30
2229997	Microcystin YR	3.76	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2230704

Field Sample ID: HAB-SW-0031

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	103	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	115	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A104009
Included Lab Sample IDs: 2230704

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	107	102	P/P	50 - 160
Cylindrospermopsin	100	101	P/P	60 - 160
Desmethyl microcystin LR	87.2	104	P/P	60 - 160
Microcystin H1R	92.4	92.8	P/P	60 - 160
Microcystin HtyR	104	99.7	P/P	60 - 160
Microcystin LA	104	102	P/P	50 - 160
Microcystin LF	96.1	92.3	P/P	50 - 160
Microcystin LR	96.4	94.1	P/P	60 - 160
Microcystin LW	97.2	96.2	P/P	60 - 160
Microcystin LY	97.6	102	P/P	60 - 160
Microcystin RR	94.7	103	P/P	60 - 160
Microcystin WR	86.8	88.4	P/P	60 - 160
Microcystin YR	94.3	89.6	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A104013
Included Lab Sample IDs: 2230706

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104048
Included Lab Sample IDs: 2230705

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.9	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104062
Included Lab Sample IDs: 2230705

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104104
Included Lab Sample IDs: 2230705

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104202
Included Lab Sample IDs: 2230705

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.4	102	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	95.4	97.4			1.89
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	109	107			1.31
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.0	99.0	98.5			0.506
EPA 365.1 Rev. 2.0	Total-P	108	108	109			0.921
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.2	96.1	97.4			0.962
EPA 8321B	Anatoxin-a	108	110	118			7.03
	Cylindrospermopsin	104	100	115			13.8
	Desmethyl microcystin LR	92.1	89.1	101			12.9
	Microcystin HiR	97.1	94.0	114			19.7
	Microcystin HtyR	102	96.9	109			12.1
	Microcystin LA	104	102	117			13.9
	Microcystin LF	105	99.4	105			5.90
	Microcystin LR	82.4	94.6	109			14.0
	Microcystin LW	98.3	88.6	101			12.6
	Microcystin LY	107	99.8	114			13.5
	Microcystin RR	103	106	120			12.3
	Microcystin WR	85.5	81.4	98.2			18.8
	Microcystin YR	103	102	106			3.76

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2230705
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2230705
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2230705
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2230705
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2230706
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2230704

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	03/11/2021			03/14/2021 11:57	Ping Hua	2230705
EPA 351.2 Rev. 2.0	03/11/2021	03/18/2021 12:47	Benjamin T. Nordmann	03/22/2021 18:31	Julia Storbeck	2230705
EPA 353.2 Rev. 2.0	03/11/2021			03/15/2021 09:57	Beverly Y. Sanders	2230705
EPA 365.1 Rev. 2.0	03/11/2021	03/15/2021 13:12	Yen Ta	03/17/2021 12:03	Shengyu Ding	2230705
EPA 365.1 Rev. 2.0 dissolved	03/11/2021			03/11/2021 13:49	Patrick M. Roche	2230706
EPA 8321B	03/11/2021	03/11/2021 12:00	Pramila Ghimire	03/11/2021 13:27	Pramila Ghimire	2230704