

Chemical Analysis Report

WQAP-2021-04-28-02

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

Event Description: **Lee County Bloom Response**

Request ID: **RQ-2021-04-19-55**

Customer: **WQAP**

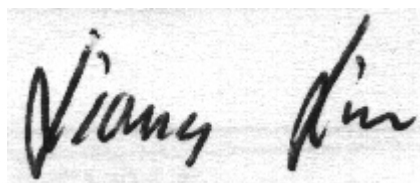
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 13-MAY-2021 13:56

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: Alva Boat Ramp

Collection Date/Time: 04/27/2021 08:30

Field ID: Alva Boat Ramp

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2243448	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P397308	
		Cylindrospermopsin	0.25	U	ug/L	P397308	
		Desmethyl microcystin LR	0.25	U	ug/L	P397308	
		Microcystin HIR**	0.25	U	ug/L	P397308	
		Microcystin HtyR**	0.25	U	ug/L	P397308	
		Microcystin LA	0.25	U	ug/L	P397308	
		Microcystin LF	0.25	U	ug/L	P397308	
		Microcystin LR	0.25	U	ug/L	P397308	
		Microcystin LW	0.25	U	ug/L	P397308	
		Microcystin LY	0.25	U	ug/L	P397308	
		Microcystin RR	0.25	U	ug/L	P397308	
		Microcystin WR	0.50	U	ug/L	P397308	
		Microcystin YR	0.25	U	ug/L	P397308	
		Nodularin-R**	0.25	U	ug/L	P397308	
2243450	EPA 350.1 Rev. 2.0	Ammonia-N	0.024		mg N/L	P397988	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P397549	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.061		mg N/L	P397545	
	EPA 365.1 Rev. 2.0	Total-P	0.098		mg P/L	P397438	
2243452	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.057		mg P/L	P397346	

Sample Location: Davis Boat Ramp

Collection Date/Time: 04/27/2021 09:41

Field ID: Davis Boat Ramp

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2243449	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P397308	
		Cylindrospermopsin	0.25	U	ug/L	P397308	
		Desmethyl microcystin LR	0.25	U	ug/L	P397308	
		Microcystin HIR**	0.25	U	ug/L	P397308	
		Microcystin HtyR**	0.25	U	ug/L	P397308	
		Microcystin LA	0.25	U	ug/L	P397308	
		Microcystin LF	0.25	U	ug/L	P397308	
		Microcystin LR	0.35	I	ug/L	P397308	
		Microcystin LW	0.25	U	ug/L	P397308	
		Microcystin LY	0.25	U	ug/L	P397308	
		Microcystin RR	0.25	U	ug/L	P397308	
		Microcystin WR	0.50	U	ug/L	P397308	
		Microcystin YR	0.25	U	ug/L	P397308	
		Nodularin-R**	0.25	U	ug/L	P397308	
2243451	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P397988	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P397549	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.01	I	mg N/L	P397545	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P397438	
2243453	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.073		mg P/L	P397346	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P397988

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P397549

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397545

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P397438

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P397346

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

Reference Method: EPA 8321B
Batch ID: P397308

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 H1R	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: P397988

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P397549

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: P397545

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: P397438

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P397346

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

Reference Method: EPA 8321B
Batch ID: P397308

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	98.7		P	40 - 150
Cylindrospermopsin	111		P	40 - 150
Desmethyl microcystin LR	101		P	40 - 150
Microcystin HIR	98.6		P	40 - 150
Microcystin HtyR	95.3		P	40 - 150
Microcystin LA	106		P	40 - 150
Microcystin LF	92.4		P	40 - 150
Microcystin LR	86.5		P	40 - 150
Microcystin LW	108		P	40 - 150
Microcystin LY	112		P	40 - 150
Microcystin RR	104		P	40 - 150
Microcystin WR	97.3		P	40 - 150
Microcystin YR	93.8		P	40 - 150
Nodularin-R	93.9		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P397988

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2243268	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P397549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2243450	Kjeldahl Nitrogen	105	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397545

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2243303	NO2NO3-N	97.4	97.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P397438

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2243450	Total-P	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P397346

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2243470	O-Phosphate-P	96.2	95.5	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P397308

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2243214	Anatoxin-a	114	110	P/P	40 - 150
2243214	Cylindrospermopsin	102	104	P/P	40 - 150
2243214	Desmethyl microcystin LR	104	99.9	P/P	40 - 150
2243214	Microcystin HiLR	100	99.3	P/P	40 - 150
2243214	Microcystin HtyR	101	93.0	P/P	40 - 150
2243214	Microcystin LA	106	101	P/P	40 - 150
2243214	Microcystin LF	88.7	89.6	P/P	40 - 150
2243214	Microcystin LR	99.0	97.4	P/P	40 - 150
2243214	Microcystin LW	103	90.8	P/P	40 - 150
2243214	Microcystin LY	111	112	P/P	40 - 150
2243214	Microcystin RR	107	105	P/P	40 - 150
2243214	Microcystin WR	103	99.3	P/P	40 - 150
2243214	Microcystin YR	93.9	95.6	P/P	40 - 150
2243214	Nodularin-R	102	105	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P397988

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2243268	Ammonia-N	0.465	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P397549

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2243450	Kjeldahl Nitrogen	1.65	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P397545

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2243303	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P397438

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2243450	Total-P	1.11	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P397346

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2243470	O-Phosphate-P	0.424	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P397308

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2243214	Anatoxin-a	3.62	Spike	P	0 - 30
2243214	Cylindrospermopsin	1.08	Spike	P	0 - 30
2243214	Desmethyl microcystin LR	4.30	Spike	P	0 - 30
2243214	Microcystin H1LR	1.12	Spike	P	0 - 30
2243214	Microcystin HtyR	8.37	Spike	P	0 - 30
2243214	Microcystin LA	4.63	Spike	P	0 - 30
2243214	Microcystin LF	0.964	Spike	P	0 - 30
2243214	Microcystin LR	1.59	Spike	P	0 - 30
2243214	Microcystin LW	13.0	Spike	P	0 - 30
2243214	Microcystin LY	1.09	Spike	P	0 - 30
2243214	Microcystin RR	2.09	Spike	P	0 - 30
2243214	Microcystin WR	3.42	Spike	P	0 - 30
2243214	Microcystin YR	1.78	Spike	P	0 - 30
2243214	Nodularin-R	2.72	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: 2243448

Field Sample ID: Alva Boat Ramp

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	73.7	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	60.2	P	30 - 160

Lab Sample ID: 2243449

Field Sample ID: Davis Boat Ramp

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	76.8	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	68.3	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A105061

Included Lab Sample IDs: 2243452, 2243453

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	99.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A105065

Included Lab Sample IDs: 2243448, 2243449

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	89.6	94.3	P/P	50 - 160
Cylindrospermopsin	94.7	99.3	P/P	50 - 160
Desmethyl microcystin LR	86.3	83.5	P/P	50 - 160
Microcystin H1R	85.6	88.9	P/P	50 - 160
Microcystin HtyR	84.3	86.3	P/P	50 - 160
Microcystin LA	96.1	99.7	P/P	50 - 160
Microcystin LF	88.6	87.4	P/P	50 - 160
Microcystin LR	74.4	78.9	P/P	50 - 160
Microcystin LW	92.9	94.4	P/P	50 - 160
Microcystin LY	101	101	P/P	50 - 160
Microcystin RR	93.2	91.9	P/P	50 - 160
Microcystin WR	82.6	85.5	P/P	50 - 160
Microcystin YR	83.3	80.8	P/P	50 - 160
Nodularin-R	87.6	84.4	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A105105

Included Lab Sample IDs: 2243450, 2243451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	101	P/P	90 - 110
Total-P	101	99.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A105129

Included Lab Sample IDs: 2243450, 2243451

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A105166

Included Lab Sample IDs: 2243450, 2243451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	102	P/P	90 - 110
Kjeldahl Nitrogen	106	96.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A105340

Included Lab Sample IDs: 2243450, 2243451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	101	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	97.8	101	102			0.465
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	105	109			1.65
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	97.4	97.4			0.0
EPA 365.1 Rev. 2.0	Total-P	104	104	105			1.11
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.0	96.2	95.5			0.424
EPA 8321B	Anatoxin-a	98.7	114	110			3.62
	Cylindrospermopsin	111	102	104			1.08
	Desmethyl microcystin LR	101	104	99.9			4.30
	Microcystin HiLR	98.6	100	99.3			1.12
	Microcystin HtyR	95.3	101	93.0			8.37
	Microcystin LA	106	106	101			4.63
	Microcystin LF	92.4	88.7	89.6			0.964
	Microcystin LR	86.5	99.0	97.4			1.59
	Microcystin LW	108	103	90.8			13.0
	Microcystin LY	112	111	112			1.09
	Microcystin RR	104	107	105			2.09
	Microcystin WR	97.3	103	99.3			3.42
	Microcystin YR	93.8	93.9	95.6			1.78
	Nodularin-R	93.9	102	105			2.72

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2243450, 2243451
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2243450, 2243451
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2243450, 2243451
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2243450, 2243451
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2243452, 2243453
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2243448, 2243449

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	04/28/2021			05/11/2021 13:02	Ping Hua	2243450
	04/28/2021			05/11/2021 13:04	Ping Hua	2243451
EPA 351.2 Rev. 2.0	04/28/2021	05/03/2021 13:05	Benjamin T. Nordmann	05/04/2021 13:19	Virginia P. Brown	2243450
	04/28/2021	05/03/2021 13:05	Benjamin T. Nordmann	05/04/2021 14:01	Virginia P. Brown	2243451
EPA 353.2 Rev. 2.0	04/28/2021			05/03/2021 11:23	Beverly Y. Sanders	2243450
	04/28/2021			05/03/2021 11:24	Beverly Y. Sanders	2243451
EPA 365.1 Rev. 2.0	04/28/2021	04/29/2021 15:25	Yen Ta	04/30/2021 12:09	Shengyu Ding	2243450
	04/28/2021	04/29/2021 15:25	Yen Ta	04/30/2021 12:15	Shengyu Ding	2243451
EPA 365.1 Rev. 2.0 dissolved	04/28/2021			04/28/2021 15:15	Patrick M. Roche	2243452
	04/28/2021			04/28/2021 15:16	Patrick M. Roche	2243453
EPA 8321B	04/28/2021	04/28/2021 12:30	Pramila Ghimire	04/29/2021 02:31	Pramila Ghimire	2243448
	04/28/2021	04/28/2021 12:30	Pramila Ghimire	04/29/2021 02:47	Pramila Ghimire	2243449