

Chemical Analysis Report

WQAP-2021-06-30-01

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

Event Description: **Algal Bloom Response -Lee County**
Request ID: **RQ-2021-05-24-54**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Date Certified: 22-JUL-2021 10:36



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: Davis Boat Ramp

Collection Date/Time: 06/29/2021 09:33

Field ID: Davis Boat Ramp

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2257955	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P400366	
		Cylindrospermopsin	0.10	U	ug/L	P400366	
		Desmethyl microcystin LR	0.25	U	ug/L	P400366	
		Microcystin HIR**	0.25	U	ug/L	P400366	
		Microcystin HtyR**	0.25	U	ug/L	P400366	
		Microcystin LA	0.10	U	ug/L	P400366	
		Microcystin LF	0.10	U	ug/L	P400366	
		Microcystin LR	3.0		ug/L	P400366	
		Microcystin LW	0.25	U	ug/L	P400366	
		Microcystin LY	0.10	U	ug/L	P400366	
		Microcystin RR	0.10	U	ug/L	P400366	
		Microcystin WR	0.50	U	ug/L	P400366	
		Microcystin YR	0.25	U	ug/L	P400366	
		Nodularin-R**	0.10	U	ug/L	P400366	
2257956	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P400694	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P400588	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.052		mg N/L	P400444	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P400527	
2257957	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.087		mg P/L	P400410	

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: P400694

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400588

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400444

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400527

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400410

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

Reference Method: EPA 8321B
Batch ID: P400366

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HlIR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400694

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400588

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400444

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400527

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400410

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

Reference Method: EPA 8321B
Batch ID: P400366

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	108		P	40 - 150
Cylindrospermopsin	107		P	40 - 150
Desmethyl microcystin LR	105		P	40 - 150
Microcystin HIR	111		P	40 - 150
Microcystin HtyR	112		P	40 - 150
Microcystin LA	112		P	40 - 150
Microcystin LF	116		P	40 - 150
Microcystin LR	108		P	40 - 150
Microcystin LW	122		P	40 - 150
Microcystin LY	116		P	40 - 150
Microcystin RR	112		P	40 - 150
Microcystin WR	114		P	40 - 150
Microcystin YR	115		P	40 - 150
Nodularin-R	107		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400694

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257956	Ammonia-N	98.2	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400444

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257947	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400527

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257956	Total-P	107	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400410

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2258067	O-Phosphate-P	101	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P400366

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257485	Anatoxin-a	106	112	P/P	40 - 150
2257485	Cylindrospermopsin	105	113	P/P	40 - 150
2257485	Desmethyl microcystin LR	109	110	P/P	40 - 150
2257485	Microcystin HilR	106	116	P/P	40 - 150
2257485	Microcystin HtyR	107	119	P/P	40 - 150
2257485	Microcystin LA	108	110	P/P	40 - 150
2257485	Microcystin LF	122	114	P/P	40 - 150
2257485	Microcystin LR	99.8	112	P/P	40 - 150
2257485	Microcystin LW	106	111	P/P	40 - 150
2257485	Microcystin LY	111	117	P/P	40 - 150
2257485	Microcystin RR	109	119	P/P	40 - 150
2257485	Microcystin WR	100	119	P/P	40 - 150
2257485	Microcystin YR	110	117	P/P	40 - 150
2257485	Nodularin-R	103	115	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P400694

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257956	Ammonia-N	0.492	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P400588

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257818	Kjeldahl Nitrogen	2.60	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P400444

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257947	NO2NO3-N	0.489	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P400527

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257956	Total-P	1.47	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P400410

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2258067	O-Phosphate-P	0.166	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P400366

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2257485	Anatoxin-a	5.25	Spike	P	0 - 30
2257485	Cylindrospermopsin	7.66	Spike	P	0 - 30
2257485	Desmethyl microcystin LR	1.05	Spike	P	0 - 30
2257485	Microcystin H1LR	9.50	Spike	P	0 - 30
2257485	Microcystin HtyR	11.0	Spike	P	0 - 30
2257485	Microcystin LA	1.50	Spike	P	0 - 30
2257485	Microcystin LF	6.17	Spike	P	0 - 30
2257485	Microcystin LR	11.5	Spike	P	0 - 30
2257485	Microcystin LW	4.43	Spike	P	0 - 30
2257485	Microcystin LY	5.66	Spike	P	0 - 30
2257485	Microcystin RR	8.76	Spike	P	0 - 30
2257485	Microcystin WR	16.9	Spike	P	0 - 30
2257485	Microcystin YR	6.07	Spike	P	0 - 30
2257485	Nodularin-R	11.5	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: 2257955

Field Sample ID: Davis Boat Ramp

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	131	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	110	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A106369

Included Lab Sample IDs: 2257957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.3	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A106376

Included Lab Sample IDs: 2257955

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	104	98.1	P/P	50 - 160
Cylindrospermopsin	110	106	P/P	50 - 160
Desmethyl microcystin LR	100	94.6	P/P	50 - 160
Microcystin H1R	116	99.1	P/P	50 - 160
Microcystin HtyR	109	104	P/P	50 - 160
Microcystin LA	116	101	P/P	50 - 160
Microcystin LF	119	110	P/P	50 - 160
Microcystin LR	102	94.6	P/P	50 - 160
Microcystin LW	121	105	P/P	50 - 160
Microcystin LY	112	105	P/P	50 - 160
Microcystin RR	115	108	P/P	50 - 160
Microcystin WR	113	106	P/P	50 - 160
Microcystin YR	116	99.9	P/P	50 - 160
Nodularin-R	111	101	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106386

Included Lab Sample IDs: 2257956

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106449

Included Lab Sample IDs: 2257956

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A106506

Included Lab Sample IDs: 2257956

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.0	98.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A106580

Included Lab Sample IDs: 2257956

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.3	98.2	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 SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	99.2	98.2	99.0			0.492
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107					2.60
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	102	102			0.489
EPA 365.1 Rev. 2.0	Total-P	101	107	104			1.47
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	101	100			0.166
EPA 8321B	Anatoxin-a	108	106	112			5.25
	Cylindrospermopsin	107	105	113			7.66
	Desmethyl microcystin LR	105	109	110			1.05
	Microcystin HiLR	111	106	116			9.50
	Microcystin HtyR	112	107	119			11.0
	Microcystin LA	112	108	110			1.50
	Microcystin LF	116	122	114			6.17
	Microcystin LR	108	99.8	112			11.5
	Microcystin LW	122	106	111			4.43
	Microcystin LY	116	111	117			5.66
	Microcystin RR	112	109	119			8.76
	Microcystin WR	114	100	119			16.9
	Microcystin YR	115	110	117			6.07
	Nodularin-R	107	103	115			11.5

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2257956
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2257956
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2257956
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2257956
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2257957
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2257955

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	06/30/2021			07/08/2021 12:43	Roberta Tatti	2257956
EPA 351.2 Rev. 2.0	06/30/2021	07/06/2021 14:20	Benjamin T. Nordmann	07/13/2021 12:17	Letuzia M De Oliveira	2257956
EPA 353.2 Rev. 2.0	06/30/2021			07/01/2021 09:22	Beverly Y. Sanders	2257956
EPA 365.1 Rev. 2.0	06/30/2021	07/02/2021 14:09	Madeline Gruver	07/06/2021 09:07	Shengyu Ding	2257956
EPA 365.1 Rev. 2.0 dissolved	06/30/2021			06/30/2021 14:10	Ping Hua	2257957
EPA 8321B	06/30/2021	06/30/2021 12:00	Pramila Ghimire	07/01/2021 00:05	Pramila Ghimire	2257955