Chemical Analysis Report

WQAP-2021-09-28-03

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

Event Description: **Algal Bloom Response -SOROC- Highlands**
Request ID: **RQ-2021-05-10-68**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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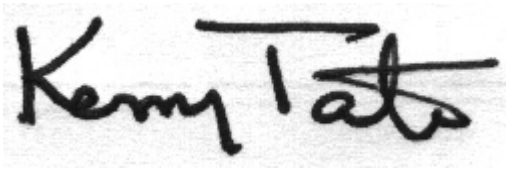
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 20-OCT-2021 10:07



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 Lotela **Collection Date/Time: 09/27/2021 11:00**

Field ID: LAB-HC-092721-01 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2278631	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P404268	
		Cylindrospermopsin	0.10	U	ug/L	P404268	
		Desmethyl microcystin LR	0.25	U	ug/L	P404268	
		Microcystin HilR**	0.25	U	ug/L	P404268	
		Microcystin HtyR**	0.25	U	ug/L	P404268	
		Microcystin LA	0.10	U	ug/L	P404268	
		Microcystin LF	0.10	U	ug/L	P404268	
		Microcystin LR	0.25	U	ug/L	P404268	
		Microcystin LW	0.25	U	ug/L	P404268	
		Microcystin LY	0.10	U	ug/L	P404268	
		Microcystin RR	0.10	U	ug/L	P404268	
		Microcystin WR	0.50	U	ug/L	P404268	
		Microcystin YR	0.25	U	ug/L	P404268	
		Nodularin-R**	0.10	U	ug/L	P404268	
2278632	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P404477	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.45		mg N/L	P404394	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P404336	
	EPA 365.1 Rev. 2.0	Total-P	0.012		mg P/L	P404416	
2278633	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P404293	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404477

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404394

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404336

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404416

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404293

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

Reference Method: EPA 8321B
Batch ID: P404268

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 HilR	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: P404477

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404394

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	103		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404336

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: P404416

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: P404293

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.1		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P404268

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	103		P	40 - 150
Cylindrospermopsin	100		P	40 - 150
Desmethyl microcystin LR	112		P	40 - 150
Microcystin HilR	106		P	40 - 150
Microcystin HtyR	105		P	40 - 150
Microcystin LA	88.6		P	40 - 150
Microcystin LF	122		P	40 - 150
Microcystin LR	101		P	40 - 150
Microcystin LW	110		P	40 - 150
Microcystin LY	98.5		P	40 - 150
Microcystin RR	105		P	40 - 150
Microcystin WR	101		P	40 - 150
Microcystin YR	102		P	40 - 150
Nodularin-R	112		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404477

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278632	Ammonia-N	94.2	95.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404394

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278632	Kjeldahl Nitrogen	94.9	98.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404336

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278632	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404416

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278552	Total-P	108	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404293

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278633	O-Phosphate-P	95.8	97.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P404268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278524	Anatoxin-a	105	98.9	P/P	40 - 150
2278524	Cylindrospermopsin	93.9	89.0	P/P	40 - 150
2278524	Desmethyl microcystin LR	100	95.8	P/P	40 - 150
2278524	Microcystin HilR	98.8	88.7	P/P	40 - 150
2278524	Microcystin HtyR	93.0	94.5	P/P	40 - 150
2278524	Microcystin LA	85.0	84.2	P/P	40 - 150
2278524	Microcystin LF	98.5	108	P/P	40 - 150
2278524	Microcystin LR	96.5	97.9	P/P	40 - 150
2278524	Microcystin LW	100	95.3	P/P	40 - 150
2278524	Microcystin LY	99.8	95.4	P/P	40 - 150
2278524	Microcystin RR	91.8	90.8	P/P	40 - 150
2278524	Microcystin WR	93.5	88.0	P/P	40 - 150
2278524	Microcystin YR	92.7	91.7	P/P	40 - 150
2278524	Nodularin-R	99.3	93.3	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404477

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278632	Ammonia-N	0.760	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404394

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278632	Kjeldahl Nitrogen	2.51	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404336

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278632	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404416

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278552	Total-P	2.05	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404293

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278633	O-Phosphate-P	1.45	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P404268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278524	Anatoxin-a	5.61	Spike	P	0 - 30
2278524	Cylindrospermopsin	5.38	Spike	P	0 - 30
2278524	Desmethyl microcystin LR	4.77	Spike	P	0 - 30
2278524	Microcystin HilR	10.7	Spike	P	0 - 30
2278524	Microcystin HtyR	1.54	Spike	P	0 - 30
2278524	Microcystin LA	0.952	Spike	P	0 - 30
2278524	Microcystin LF	9.14	Spike	P	0 - 30
2278524	Microcystin LR	1.31	Spike	P	0 - 30
2278524	Microcystin LW	4.99	Spike	P	0 - 30
2278524	Microcystin LY	4.51	Spike	P	0 - 30
2278524	Microcystin RR	1.11	Spike	P	0 - 30
2278524	Microcystin WR	6.07	Spike	P	0 - 30
2278524	Microcystin YR	1.12	Spike	P	0 - 30
2278524	Nodularin-R	6.21	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: 2278631
Field Sample ID: LAB-HC-092721-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	90.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	101	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A108036
Included Lab Sample IDs: 2278633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.5	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A108038
Included Lab Sample IDs: 2278631

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	93.4	96.8	P/P	50 - 160
Cylindrospermopsin	93.5	89.2	P/P	60 - 160
Desmethyl microcystin LR	95.2	90.7	P/P	60 - 160
Microcystin HilR	95.1	94.7	P/P	60 - 160
Microcystin HtyR	91.3	94.2	P/P	60 - 160
Microcystin LA	80.1	81.5	P/P	50 - 160
Microcystin LF	99.9	105	P/P	60 - 160
Microcystin LR	100	95.6	P/P	60 - 160
Microcystin LW	95.6	97.9	P/P	60 - 160
Microcystin LY	87.3	86.8	P/P	60 - 160
Microcystin RR	92.8	86.9	P/P	60 - 160
Microcystin WR	88.8	88.4	P/P	60 - 160
Microcystin YR	94.0	92.1	P/P	60 - 160
Nodularin-R	94.4	101	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A108052
Included Lab Sample IDs: 2278632

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: A108103
Included Lab Sample IDs: 2278632

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	104	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A108109
Included Lab Sample IDs: 2278632

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.5	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A108150
Included Lab Sample IDs: 2278632

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	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		Precision		
					LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	95.2	94.2	95.0			0.760
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	94.9	98.3			2.51
EPA 353.2 Rev. 2.0	NO2NO3-N	102	102	102			0.0
EPA 365.1 Rev. 2.0	Total-P	108	108	105			2.05
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	95.8	97.2			1.45
EPA 8321B	Anatoxin-a	103	105	98.9			5.61
	Cylindrospermopsin	100	93.9	89.0			5.38
	Desmethyl microcystin LR	112	100	95.8			4.77
	Microcystin HilR	106	98.8	88.7			10.7
	Microcystin HtyR	105	93.0	94.5			1.54
	Microcystin LA	88.6	85.0	84.2			0.952
	Microcystin LF	122	98.5	108			9.14
	Microcystin LR	101	96.5	97.9			1.31
	Microcystin LW	110	100	95.3			4.99
	Microcystin LY	98.5	99.8	95.4			4.51
	Microcystin RR	105	91.8	90.8			1.11
	Microcystin WR	101	93.5	88.0			6.07
	Microcystin YR	102	92.7	91.7			1.12
	Nodularin-R	112	99.3	93.3			6.21

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2278632
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2278632
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2278632
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2278632
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2278633
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2278631

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	09/28/2021			10/01/2021 13:40	Ping Hua	2278632
EPA 351.2 Rev. 2.0	09/28/2021	09/30/2021 12:55	Benjamin T. Nordmann	10/01/2021 12:42	Alexandra J Mattheus	2278632
EPA 353.2 Rev. 2.0	09/28/2021			09/29/2021 10:18	Beverly Y. Sanders	2278632
EPA 365.1 Rev. 2.0	09/28/2021	10/01/2021 14:15	Simonne.V. Calhoun	10/05/2021 12:30	Lipi Saha	2278632
EPA 365.1 Rev. 2.0 dissolved	09/28/2021			09/28/2021 14:59	James L Waggerby	2278633
EPA 8321B	09/28/2021	09/28/2021 12:00	Manjita Shrestha	09/28/2021 21:25	Manjita Shrestha	2278631