Chemical Analysis Report

WQAP-2021-07-09-02

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

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2021-07-12-37**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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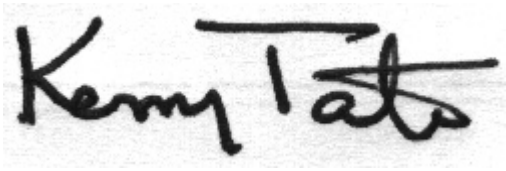
Date Certified: 02-AUG-2021 11:42



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: S. Olga Dr **Collection Date/Time: 07/08/2021 08:45**

Field ID: HAB-SD-070821-001 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2260907	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P400733	
		Cylindrospermopsin	0.10	U	ug/L	P400733	
		Desmethyl microcystin LR	0.25	U	ug/L	P400733	
		Microcystin HilR**	0.25	U	ug/L	P400733	
		Microcystin HtyR**	0.25	U	ug/L	P400733	
		Microcystin LA	0.10	U	ug/L	P400733	
		Microcystin LF	0.10	U	ug/L	P400733	
		Microcystin LR	0.25	U	ug/L	P400733	
		Microcystin LW	0.25	U	ug/L	P400733	
		Microcystin LY	0.10	U	ug/L	P400733	
		Microcystin RR	0.10	U	ug/L	P400733	
		Microcystin WR	0.50	U	ug/L	P400733	
		Microcystin YR	0.25	U	ug/L	P400733	
		Nodularin-R**	0.10	U	ug/L	P400733	
2260908	EPA 350.1 Rev. 2.0	Ammonia-N	0.14		mg N/L	P401233	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P401174	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.23		mg N/L	P400791	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P401091	
2260909	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.072		mg P/L	P400753	

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: P401233

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401174

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400791

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401091

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400753

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

Reference Method: EPA 8321B
Batch ID: P400733

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: P401233

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401174

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400791

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401091

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400753

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P400733

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	113		P	40 - 150
Cylindrospermopsin	114		P	40 - 150
Desmethyl microcystin LR	113		P	40 - 150
Microcystin HilR	110		P	40 - 150
Microcystin HtyR	106		P	40 - 150
Microcystin LA	122		P	40 - 150
Microcystin LF	101		P	40 - 150
Microcystin LR	110		P	40 - 150
Microcystin LW	102		P	40 - 150
Microcystin LY	113		P	40 - 150
Microcystin RR	112		P	40 - 150
Microcystin WR	119		P	40 - 150
Microcystin YR	100		P	40 - 150
Nodularin-R	118		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401233

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2260887	Ammonia-N	95.0	97.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400791

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2260885	NO2NO3-N	100	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401091

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2260885	Total-P	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400753

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2260892	O-Phosphate-P	95.6	94.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P400733

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2260884	Anatoxin-a	100	100	P/P	40 - 150
2260884	Cylindrospermopsin	97.8	103	P/P	40 - 150
2260884	Desmethyl microcystin LR	88.6	93.2	P/P	40 - 150
2260884	Microcystin HilR	88.0	94.1	P/P	40 - 150
2260884	Microcystin HtyR	89.4	94.3	P/P	40 - 150
2260884	Microcystin LA	95.6	96.5	P/P	40 - 150
2260884	Microcystin LF	76.1	75.8	P/P	40 - 150
2260884	Microcystin LR	83.4	94.4	P/P	40 - 150
2260884	Microcystin LW	89.0	92.0	P/P	40 - 150
2260884	Microcystin LY	89.5	86.8	P/P	40 - 150
2260884	Microcystin RR	92.5	94.0	P/P	40 - 150
2260884	Microcystin WR	94.6	92.8	P/P	40 - 150
2260884	Microcystin YR	83.7	83.6	P/P	40 - 150
2260884	Nodularin-R	94.8	99.1	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401233

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260887	Ammonia-N	2.07	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260908	Kjeldahl Nitrogen	6.34	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400791

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260885	NO2NO3-N	1.24	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401091

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260885	Total-P	0.107	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400753

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260892	O-Phosphate-P	0.646	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P400733

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260884	Anatoxin-a	0.295	Spike	P	0 - 30
2260884	Cylindrospermopsin	5.01	Spike	P	0 - 30
2260884	Desmethyl microcystin LR	5.10	Spike	P	0 - 30
2260884	Microcystin HilR	6.75	Spike	P	0 - 30
2260884	Microcystin HtyR	5.36	Spike	P	0 - 30
2260884	Microcystin LA	0.925	Spike	P	0 - 30
2260884	Microcystin LF	0.464	Spike	P	0 - 30
2260884	Microcystin LR	12.4	Spike	P	0 - 30
2260884	Microcystin LW	3.27	Spike	P	0 - 30
2260884	Microcystin LY	3.00	Spike	P	0 - 30
2260884	Microcystin RR	1.58	Spike	P	0 - 30
2260884	Microcystin WR	1.91	Spike	P	0 - 30
2260884	Microcystin YR	0.158	Spike	P	0 - 30
2260884	Nodularin-R	4.47	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: 2260907
Field Sample ID: HAB-SD-070821-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	79.8	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	63.4	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A106533
Included Lab Sample IDs: 2260909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	98.7	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A106538
Included Lab Sample IDs: 2260907

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	105	106	P/P	50 - 160
Cylindrospermopsin	112	103	P/P	60 - 160
Desmethyl microcystin LR	108	95.6	P/P	50 - 160
Microcystin HilR	94.9	101	P/P	60 - 160
Microcystin HtyR	96.1	98.8	P/P	60 - 160
Microcystin LA	111	105	P/P	50 - 160
Microcystin LF	101	97.4	P/P	60 - 160
Microcystin LR	95.1	102	P/P	60 - 160
Microcystin LW	99.3	95.8	P/P	60 - 160
Microcystin LY	102	99.4	P/P	60 - 160
Microcystin RR	108	107	P/P	60 - 160
Microcystin WR	102	97.9	P/P	60 - 160
Microcystin YR	84.8	88.1	P/P	60 - 160
Nodularin-R	104	109	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106549
Included Lab Sample IDs: 2260908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106678
Included Lab Sample IDs: 2260908

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106712
Included Lab Sample IDs: 2260908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	98.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A106716
Included Lab Sample IDs: 2260908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.0	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	102	95.0	97.6			2.07
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106					6.34
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	98.5			1.24
EPA 365.1 Rev. 2.0	Total-P	105	104	104			0.107
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	95.6	94.8			0.646
EPA 8321B	Anatoxin-a	113	100	100			0.295
	Cylindrospermopsin	114	97.8	103			5.01
	Desmethyl microcystin LR	113	88.6	93.2			5.10
	Microcystin HilR	110	88.0	94.1			6.75
	Microcystin HtyR	106	89.4	94.3			5.36
	Microcystin LA	122	95.6	96.5			0.925
	Microcystin LF	101	76.1	75.8			0.464
	Microcystin LR	110	83.4	94.4			12.4
	Microcystin LW	102	89.0	92.0			3.27
	Microcystin LY	113	89.5	86.8			3.00
	Microcystin RR	112	92.5	94.0			1.58
	Microcystin WR	119	94.6	92.8			1.91
	Microcystin YR	100	83.7	83.6			0.158
	Nodularin-R	118	94.8	99.1			4.47

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2260908
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2260908
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2260908
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2260908
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2260909
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2260907

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	07/09/2021			07/20/2021 12:35	Roberta Tatti	2260908
EPA 351.2 Rev. 2.0	07/09/2021	07/19/2021 15:09	Benjamin T. Nordmann	07/20/2021 17:05	Letuzia M De Oliveira	2260908
EPA 353.2 Rev. 2.0	07/09/2021			07/12/2021 09:12	Beverly Y. Sanders	2260908
EPA 365.1 Rev. 2.0	07/09/2021	07/16/2021 17:30	Simonne.V. Calhoun	07/19/2021 09:35	Shengyu Ding	2260908
EPA 365.1 Rev. 2.0 dissolved	07/09/2021			07/09/2021 13:18	Lipi Saha	2260909
EPA 8321B	07/09/2021	07/09/2021 12:00	Pramila Ghimire	07/09/2021 19:24	Pramila Ghimire	2260907