Chemical Analysis Report

WQAP-2022-06-08-01

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

Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-06-06-70**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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2199 South Rock Road
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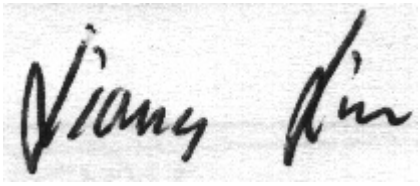
Date Certified: 30-JUN-2022 09:40



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 Okeechobee Dock - Pahokee Marina **Collection Date/Time: 06/07/2022 11:00**

Field ID: SEHAB0079 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2332941	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P414871	
		Cylindrospermopsin	0.10	U	ug/L	P414871	
		Desmethyl microcystin LR	0.25	U	ug/L	P414871	
		Microcystin HilR**	0.25	U	ug/L	P414871	
		Microcystin HtyR**	0.25	U	ug/L	P414871	
		Microcystin LA	0.10	U	ug/L	P414871	
		Microcystin LF	0.10	U	ug/L	P414871	
		Microcystin LR	0.25	U	ug/L	P414871	
		Microcystin LW	0.25	U	ug/L	P414871	
		Microcystin LY	0.10	U	ug/L	P414871	
		Microcystin RR	0.10	U	ug/L	P414871	
		Microcystin WR	0.50	U	ug/L	P414871	
		Microcystin YR	0.25	U	ug/L	P414871	
		Nodularin-R**	0.10	U	ug/L	P414871	
2332942	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P415564	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P415099	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P415661	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P415465	
2332943	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.068		mg P/L	P414906	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415564

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415099

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415661

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415465

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414906

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

Reference Method: EPA 8321B
Batch ID: P414871

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: P415564

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415099

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415661

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: P415465

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414906

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.9		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P414871

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	107		P	40 - 150
Cylindrospermopsin	92.7		P	40 - 150
Desmethyl microcystin LR	101		P	40 - 150
Microcystin HilR	86.7		P	40 - 150
Microcystin HtyR	95.5		P	40 - 150
Microcystin LA	83.0		P	40 - 150
Microcystin LF	123		P	40 - 150
Microcystin LR	93.4		P	40 - 150
Microcystin LW	107		P	40 - 150
Microcystin LY	99.0		P	40 - 150
Microcystin RR	94.9		P	40 - 150
Microcystin WR	87.0		P	40 - 150
Microcystin YR	99.0		P	40 - 150
Nodularin-R	97.2		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415564

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333047	Ammonia-N	94.6	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2332730	Kjeldahl Nitrogen	104	95.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415661

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334584	NO2NO3-N	100	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333840	Total-P	107	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414906

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333048	O-Phosphate-P	97.7	99.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P414871

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2332361	Anatoxin-a	109	118	P/P	40 - 150
2332361	Cylindrospermopsin	84.5	95.3	P/P	40 - 150
2332361	Desmethyl microcystin LR	113	114	P/P	40 - 150
2332361	Microcystin HilR	87.2	101	P/P	40 - 150
2332361	Microcystin HtyR	94.4	108	P/P	40 - 150
2332361	Microcystin LA	76.4	100	P/P	40 - 150
2332361	Microcystin LF	97.5	132	P/P	40 - 150
2332361	Microcystin LR	102	118	P/P	40 - 150
2332361	Microcystin LW	94.1	127	P/P	40 - 150
2332361	Microcystin LY	95.1	103	P/P	40 - 150
2332361	Microcystin RR	87.9	97.8	P/P	40 - 150
2332361	Microcystin WR	86.9	96.1	P/P	40 - 150
2332361	Microcystin YR	95.1	109	P/P	40 - 150
2332361	Nodularin-R	93.3	102	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415564

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333047	Ammonia-N	1.79	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2332730	Kjeldahl Nitrogen	6.34	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415661

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334584	NO2NO3-N	1.50	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415465

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333840	Total-P	1.98	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414906

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333048	O-Phosphate-P	1.50	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P414871

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2332361	Anatoxin-a	7.45	Spike	P	0 - 30
2332361	Cylindrospermopsin	12.0	Spike	P	0 - 30
2332361	Desmethyl microcystin LR	1.00	Spike	P	0 - 30
2332361	Microcystin HilR	14.3	Spike	P	0 - 30
2332361	Microcystin HtyR	13.2	Spike	P	0 - 30
2332361	Microcystin LA	27.1	Spike	P	0 - 30
2332361	Microcystin LF	29.8	Spike	P	0 - 30
2332361	Microcystin LR	14.9	Spike	P	0 - 30
2332361	Microcystin LW	29.9	Spike	P	0 - 30
2332361	Microcystin LY	8.36	Spike	P	0 - 30
2332361	Microcystin RR	10.6	Spike	P	0 - 30
2332361	Microcystin WR	10.1	Spike	P	0 - 30
2332361	Microcystin YR	13.2	Spike	P	0 - 30
2332361	Nodularin-R	9.15	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: 2332941
Field Sample ID: SEHAB0079

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	70.7	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A112678
Included Lab Sample IDs: 2332943

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.9	99.9	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A112684
Included Lab Sample IDs: 2332941

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	112	114	P/P	50 - 160
Cylindrospermopsin	92.6	94.3	P/P	50 - 160
Desmethyl microcystin LR	99.9	109	P/P	50 - 160
Microcystin HilR	87.6	91.8	P/P	50 - 160
Microcystin HtyR	104	104	P/P	50 - 160
Microcystin LA	91.7	91.8	P/P	50 - 160
Microcystin LF	138	115	P/P	50 - 160
Microcystin LR	97.5	98.4	P/P	50 - 160
Microcystin LW	111	92.1	P/P	50 - 160
Microcystin LY	87.7	102	P/P	50 - 160
Microcystin RR	99.9	101	P/P	50 - 160
Microcystin WR	90.8	90.4	P/P	50 - 160
Microcystin YR	99.0	94.0	P/P	50 - 160
Nodularin-R	101	98.5	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A112887
Included Lab Sample IDs: 2332942

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.0	94.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A112983
Included Lab Sample IDs: 2332942

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.4	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113008
Included Lab Sample IDs: 2332942

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113014
Included Lab Sample IDs: 2332942

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	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	94.4	94.6	97.0			1.79
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.2	104	95.6			6.34
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	100	99.0			1.50
EPA 365.1 Rev. 2.0	Total-P	107	107	105			1.98
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.9	97.7	99.3			1.50
EPA 8321B	Anatoxin-a	107	109	118			7.45
	Cylindrospermopsin	92.7	84.5	95.3			12.0
	Desmethyl microcystin LR	101	113	114			1.00
	Microcystin HilR	86.7	87.2	101			14.3
	Microcystin HtyR	95.5	94.4	108			13.2
	Microcystin LA	83.0	76.4	100			27.1
	Microcystin LF	123	97.5	132			29.8
	Microcystin LR	93.4	102	118			14.9
	Microcystin LW	107	94.1	127			29.9
	Microcystin LY	99.0	95.1	103			8.36
	Microcystin RR	94.9	87.9	97.8			10.6
	Microcystin WR	87.0	86.9	96.1			10.1
	Microcystin YR	99.0	95.1	109			13.2
	Nodularin-R	97.2	93.3	102			9.15

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2332942
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2332942
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2332942
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2332942
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2332943
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2332941

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	06/08/2022			06/22/2022 13:07	Ping Hua	2332942
EPA 351.2 Rev. 2.0	06/08/2022	06/14/2022 16:18	Samantha L Bates	06/16/2022 11:26	Alexandra J Mattheus	2332942
EPA 353.2 Rev. 2.0	06/08/2022			06/22/2022 17:35	Touraj Touran	2332942
EPA 365.1 Rev. 2.0	06/08/2022	06/22/2022 17:36	Adam P Silver	06/23/2022 11:04	James L Waggerby	2332942
EPA 365.1 Rev. 2.0 dissolved	06/08/2022			06/08/2022 14:24	James L Waggerby	2332943
EPA 8321B	06/08/2022	06/08/2022 13:30	Manjita Shrestha	06/08/2022 19:08	Manjita Shrestha	2332941