

Chemical Analysis Report

WQAP-2022-05-06-01

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-2022-02-28-44**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2295 Victoria AVE
Suite 364
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 31-MAY-2022 12:00

A handwritten signature in black ink, appearing to read "Liang Lin", 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: Josephine Creek - SR27

Collection Date/Time: 05/05/2022 09:40

Field ID: HAB-SD-05052022-0940

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2325266	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P413529	
		Cylindrospermopsin	0.10	U	ug/L	P413529	
		Desmethyl microcystin LR	0.25	U	ug/L	P413529	
		Microcystin HilR**	0.25	U	ug/L	P413529	
		Microcystin HtyR**	0.25	U	ug/L	P413529	
		Microcystin LA	0.10	U	ug/L	P413529	
		Microcystin LF	0.10	U	ug/L	P413529	
		Microcystin LR	0.25	U	ug/L	P413529	
		Microcystin LW	0.25	U	ug/L	P413529	
		Microcystin LY	0.10	U	ug/L	P413529	
		Microcystin RR	0.10	U	ug/L	P413529	
		Microcystin WR	0.50	U	ug/L	P413529	
		Microcystin YR	0.25	U	ug/L	P413529	
		Nodularin-R**	0.10	U	ug/L	P413529	
2325267	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P413903	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.77		mg N/L	P413921	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P413931	
	EPA 365.1 Rev. 2.0	Total-P	0.076		mg P/L	P413693	
2325268	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P413514	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413903

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413921

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413931

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413693

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P413514

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

Reference Method: EPA 8321B
Batch ID: P413529

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 HIR	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: P413903

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413921

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413931

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413693

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: P413514

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

Reference Method: EPA 8321B
Batch ID: P413529

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	101		P	40 - 150
Cylindrospermopsin	104		P	40 - 150
Desmethyl microcystin LR	90.3		P	40 - 150
Microcystin H1R	92.2		P	40 - 150
Microcystin HtyR	91.5		P	40 - 150
Microcystin LA	95.2		P	40 - 150
Microcystin LF	91.0		P	40 - 150
Microcystin LR	96.3		P	40 - 150
Microcystin LW	84.7		P	40 - 150
Microcystin LY	103		P	40 - 150
Microcystin RR	99.8		P	40 - 150
Microcystin WR	78.8		P	40 - 150
Microcystin YR	83.2		P	40 - 150
Nodularin-R	91.0		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P413903

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2325246	Ammonia-N	101	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P413921

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2325161	Kjeldahl Nitrogen	98.6	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P413931

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2325246	NO2NO3-N	96.0	95.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P413693

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2325267	Total-P	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P413514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2325151	O-Phosphate-P	97.8	99.0	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P413529

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2325149	Anatoxin-a	106	107	P/P	40 - 150
2325149	Cylindrospermopsin	95.0	88.2	P/P	40 - 150
2325149	Desmethyl microcystin LR	82.6	89.1	P/P	40 - 150
2325149	Microcystin HiLR	75.4	84.8	P/P	40 - 150
2325149	Microcystin HtyR	83.5	80.5	P/P	40 - 150
2325149	Microcystin LA	78.4	88.6	P/P	40 - 150
2325149	Microcystin LF	77.7	95.5	P/P	40 - 150
2325149	Microcystin LR	90.0	94.0	P/P	40 - 150
2325149	Microcystin LW	66.4	78.5	P/P	40 - 150
2325149	Microcystin LY	108	98.7	P/P	40 - 150
2325149	Microcystin RR	91.7	87.1	P/P	40 - 150
2325149	Microcystin WR	82.9	78.7	P/P	40 - 150
2325149	Microcystin YR	81.2	78.0	P/P	40 - 150
2325149	Nodularin-R	84.4	85.6	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P413903

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2325246	Ammonia-N	3.26	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P413921

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2325161	Kjeldahl Nitrogen	5.02	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P413931

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2325246	NO2NO3-N	0.509	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P413693

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2325267	Total-P	0.186	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P413514

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2325151	O-Phosphate-P	1.07	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P413529

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2325149	Anatoxin-a	0.404	Spike	P	0 - 30
2325149	Cylindrospermopsin	7.41	Spike	P	0 - 30
2325149	Desmethyl microcystin LR	7.54	Spike	P	0 - 30
2325149	Microcystin HtIR	11.7	Spike	P	0 - 30
2325149	Microcystin HtyR	3.69	Spike	P	0 - 30
2325149	Microcystin LA	12.3	Spike	P	0 - 30
2325149	Microcystin LF	20.5	Spike	P	0 - 30
2325149	Microcystin LR	4.34	Spike	P	0 - 30
2325149	Microcystin LW	16.7	Spike	P	0 - 30
2325149	Microcystin LY	9.07	Spike	P	0 - 30
2325149	Microcystin RR	5.24	Spike	P	0 - 30
2325149	Microcystin WR	5.13	Spike	P	0 - 30
2325149	Microcystin YR	4.02	Spike	P	0 - 30
2325149	Nodularin-R	1.36	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: 2325266
Field Sample ID: HAB-SD-05052022-0940

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	87.3	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A111971

Included Lab Sample IDs: 2325268

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

Reference Method: EPA 8321B

Run ID: A112011

Included Lab Sample IDs: 2325266

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	99.1	97.0	P/P	50 - 160
Cylindrospermopsin	101	96.4	P/P	50 - 160
Desmethyl microcystin LR	86.4	84.8	P/P	50 - 160
Microcystin HIR	81.9	82.7	P/P	50 - 160
Microcystin HtyR	87.1	87.2	P/P	50 - 160
Microcystin LA	100	105	P/P	50 - 160
Microcystin LF	90.5	82.3	P/P	50 - 160
Microcystin LR	89.7	101	P/P	50 - 160
Microcystin LW	76.0	85.3	P/P	50 - 160
Microcystin LY	97.9	108	P/P	50 - 160
Microcystin RR	91.2	94.2	P/P	50 - 160
Microcystin WR	79.3	83.8	P/P	50 - 160
Microcystin YR	79.7	81.5	P/P	50 - 160
Nodularin-R	84.7	88.5	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A112132

Included Lab Sample IDs: 2325267

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A112183

Included Lab Sample IDs: 2325267

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A112196

Included Lab Sample IDs: 2325267

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A112278

Included Lab Sample IDs: 2325267

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.9	96.1	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	Precision SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	96.6	101	97.4			3.26
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	98.6	105			5.02
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	98.5	96.0	95.6			0.509
EPA 365.1 Rev. 2.0	Total-P	101	102	102			0.186
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.8	99.0			1.07
EPA 8321B	Anatoxin-a	101	106	107			0.404
	Cylindrospermopsin	104	95.0	88.2			7.41
	Desmethyl microcystin LR	90.3	82.6	89.1			7.54
	Microcystin HiLR	92.2	75.4	84.8			11.7
	Microcystin HtyR	91.5	83.5	80.5			3.69
	Microcystin LA	95.2	78.4	88.6			12.3
	Microcystin LF	91.0	77.7	95.5			20.5
	Microcystin LR	96.3	90.0	94.0			4.34
	Microcystin LW	84.7	66.4	78.5			16.7
	Microcystin LY	103	108	98.7			9.07
	Microcystin RR	99.8	91.7	87.1			5.24
	Microcystin WR	78.8	82.9	78.7			5.13
	Microcystin YR	83.2	81.2	78.0			4.02
	Nodularin-R	91.0	84.4	85.6			1.36

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2325267
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2325267
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2325267
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2325267
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2325268
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2325266

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	05/06/2022			05/16/2022 14:37	Judith K. Clark	2325267
EPA 351.2 Rev. 2.0	05/06/2022	05/18/2022 16:22	Samantha L Bates	05/19/2022 14:47	Samantha L Bates	2325267
EPA 353.2 Rev. 2.0	05/06/2022			05/17/2022 12:11	Beverly Y. Sanders	2325267
EPA 365.1 Rev. 2.0	05/06/2022	05/12/2022 16:34	Simonne.V. Calhoun	05/13/2022 13:28	Sarah A Nixon	2325267
EPA 365.1 Rev. 2.0 dissolved	05/06/2022			05/06/2022 15:31	Nathaniel J Jones	2325268
EPA 8321B	05/06/2022	05/09/2022 10:00	Manjita Shrestha	05/09/2022 16:25	Manjita Shrestha	2325266