

Chemical Analysis Report

WQAP-2022-04-26-01

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

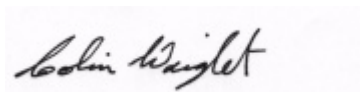
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-01-31-59**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Program Administrator

Date Certified: 17-MAY-2022 09:28

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a white rectangular 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: Maule Lake

Collection Date/Time: 04/25/2022 11:05

Field ID: SEHAB0077

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2321866	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P412946	
		Cylindrospermopsin	0.10	U	ug/L	P412946	
		Desmethyl microcystin LR	0.25	U	ug/L	P412946	
		Microcystin HIR**	0.25	U	ug/L	P412946	
		Microcystin HtyR**	0.25	U	ug/L	P412946	
		Microcystin LA	0.10	U	ug/L	P412946	
		Microcystin LF	0.10	U	ug/L	P412946	
		Microcystin LR	0.25	U	ug/L	P412946	
		Microcystin LW	0.25	U	ug/L	P412946	
		Microcystin LY	0.10	U	ug/L	P412946	
		Microcystin RR	0.10	U	ug/L	P412946	
		Microcystin WR	0.50	U	ug/L	P412946	
		Microcystin YR	0.25	U	ug/L	P412946	
		Nodularin-R**	0.10	U	ug/L	P412946	
2321867	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P413278	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.23	I	mg N/L	P413269	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P413134	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P413542	
2321868	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P412913	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413278

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413269

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413134

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413542

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P412913

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

Reference Method: EPA 8321B
Batch ID: P412946

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: P413278

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413269

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: P413134

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	97.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413542

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	97.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P412913

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

Reference Method: EPA 8321B
Batch ID: P412946

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	108		P	40 - 150
Cylindrospermopsin	94.6		P	40 - 150
Desmethyl microcystin LR	97.1		P	40 - 150
Microcystin HIR	98.5		P	40 - 150
Microcystin HtyR	117		P	40 - 150
Microcystin LA	96.4		P	40 - 150
Microcystin LF	91.1		P	40 - 150
Microcystin LR	98.3		P	40 - 150
Microcystin LW	118		P	40 - 150
Microcystin LY	103		P	40 - 150
Microcystin RR	98.4		P	40 - 150
Microcystin WR	90.8		P	40 - 150
Microcystin YR	96.7		P	40 - 150
Nodularin-R	95.8		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P413278

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321177	Ammonia-N	104	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P413269

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321420	Kjeldahl Nitrogen	96.8	94.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P413134

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321047	NO2NO3-N	97.0	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P413542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2322012	Total-P	100	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P412913

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321868	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P412946

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2321454	Anatoxin-a	104	104	P/P	40 - 150
2321454	Cylindrospermopsin	95.4	98.7	P/P	40 - 150
2321454	Desmethyl microcystin LR	107	107	P/P	40 - 150
2321454	Microcystin HiLR	108	107	P/P	40 - 150
2321454	Microcystin HtyR	113	112	P/P	40 - 150
2321454	Microcystin LA	89.3	101	P/P	40 - 150
2321454	Microcystin LF	80.4	63.5	P/P	40 - 150
2321454	Microcystin LR	110	111	P/P	40 - 150
2321454	Microcystin LW	103	94.5	P/P	40 - 150
2321454	Microcystin LY	96.4	102	P/P	40 - 150
2321454	Microcystin RR	103	99.4	P/P	40 - 150
2321454	Microcystin WR	95.2	110	P/P	40 - 150
2321454	Microcystin YR	100	107	P/P	40 - 150
2321454	Nodularin-R	97.1	97.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P413278

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321177	Ammonia-N	0.332	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P413269

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321420	Kjeldahl Nitrogen	1.93	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P413134

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321047	NO2NO3-N	1.53	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P413542

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2322012	Total-P	0.389	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P412913

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321868	O-Phosphate-P	0.398	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P412946

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2321454	Anatoxin-a	0.0181	Spike	P	0 - 30
2321454	Cylindrospermopsin	3.43	Spike	P	0 - 30
2321454	Desmethyl microcystin LR	0.0997	Spike	P	0 - 30
2321454	Microcystin HtIR	1.03	Spike	P	0 - 30
2321454	Microcystin HtyR	0.949	Spike	P	0 - 30
2321454	Microcystin LA	8.93	Spike	P	0 - 30
2321454	Microcystin LF	23.5	Spike	P	0 - 30
2321454	Microcystin LR	0.724	Spike	P	0 - 30
2321454	Microcystin LW	8.99	Spike	P	0 - 30
2321454	Microcystin LY	6.05	Spike	P	0 - 30
2321454	Microcystin RR	3.21	Spike	P	0 - 30
2321454	Microcystin WR	13.3	Spike	P	0 - 30
2321454	Microcystin YR	6.02	Spike	P	0 - 30
2321454	Nodularin-R	0.773	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: 2321866
Field Sample ID: SEHAB0077

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	79.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A111698

Included Lab Sample IDs: 2321868

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.8	99.2	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A111782

Included Lab Sample IDs: 2321866

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	102	101	P/P	50 - 160
Cylindrospermopsin	95.1	93.4	P/P	50 - 160
Desmethyl microcystin LR	95.2	84.9	P/P	50 - 160
Microcystin HIR	100	92.0	P/P	50 - 160
Microcystin HtyR	97.5	96.8	P/P	50 - 160
Microcystin LA	101	89.0	P/P	50 - 160
Microcystin LF	76.1	92.3	P/P	50 - 160
Microcystin LR	95.8	101	P/P	50 - 160
Microcystin LW	85.1	92.5	P/P	50 - 160
Microcystin LY	101	92.4	P/P	50 - 160
Microcystin RR	92.6	92.0	P/P	50 - 160
Microcystin WR	94.2	105	P/P	50 - 160
Microcystin YR	86.3	88.1	P/P	50 - 160
Nodularin-R	88.7	93.3	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A111804

Included Lab Sample IDs: 2321867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A111875

Included Lab Sample IDs: 2321867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A112016

Included Lab Sample IDs: 2321867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.9	94.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A112035

Included Lab Sample IDs: 2321867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.8	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 SMP	MS
			LCS			
EPA 350.1 Rev. 2.0	Ammonia-N	99.8	104	104		0.332
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	96.8	94.8		1.93
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	97.5	97.0	98.5		1.53
EPA 365.1 Rev. 2.0	Total-P	97.4	100	99.6		0.389
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	100	101		0.398
EPA 8321B	Anatoxin-a	108	104	104		0.0181
	Cylindrospermopsin	94.6	95.4	98.7		3.43
	Desmethyl microcystin LR	97.1	107	107		0.0997
	Microcystin HiLR	98.5	108	107		1.03
	Microcystin HtyR	117	113	112		0.949
	Microcystin LA	96.4	89.3	101		8.93
	Microcystin LF	91.1	80.4	63.5		23.5
	Microcystin LR	98.3	110	111		0.724
	Microcystin LW	118	103	94.5		8.99
	Microcystin LY	103	96.4	102		6.05
	Microcystin RR	98.4	103	99.4		3.21
	Microcystin WR	90.8	95.2	110		13.3
	Microcystin YR	96.7	100	107		6.02
	Nodularin-R	95.8	97.1	97.9		0.773

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2321867
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2321867
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2321867
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2321867
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2321868
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2321866

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	04/26/2022			05/03/2022 11:26	Ping Hua	2321867
EPA 351.2 Rev. 2.0	04/26/2022	05/04/2022 16:20	Alexandra J Mattheus	05/09/2022 13:43	Samantha L Bates	2321867
EPA 353.2 Rev. 2.0	04/26/2022			04/29/2022 09:44	Beverly Y. Sanders	2321867
EPA 365.1 Rev. 2.0	04/26/2022	05/09/2022 14:45	Simonne.V. Calhoun	05/10/2022 14:58	James L Waggeberby	2321867
EPA 365.1 Rev. 2.0 dissolved	04/26/2022			04/26/2022 15:40	Nathaniel J Jones	2321868
EPA 8321B	04/26/2022	04/28/2022 10:00	Manjita Shrestha	04/28/2022 13:32	Manjita Shrestha	2321866