

Chemical Analysis Report

WQAP-2021-08-31-02

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

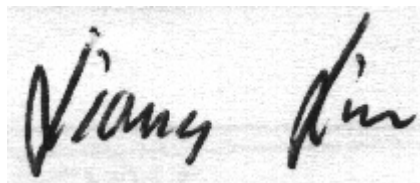
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2021-03-08-16**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2295 Victoria AVE
Suite 364
Fort Myers, FL 33901
Attn: Kirby Wolfe

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: Liang Lin, Environmental Administrator

Date Certified: 23-SEP-2021 14:01

A handwritten signature in black ink, appearing to read "Liang Lin", is shown 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: Vanderbilt Lagoon

Collection Date/Time: 08/30/2021 14:19

Field ID: Vanderbilt Lagoon

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2272758	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P403171	
		Cylindrospermopsin	0.10	U	ug/L	P403171	
		Desmethyl microcystin LR	0.25	U	ug/L	P403171	
		Microcystin HIR**	0.25	U	ug/L	P403171	
		Microcystin HtyR**	0.25	U	ug/L	P403171	
		Microcystin LA	0.10	U	ug/L	P403171	
		Microcystin LF	0.10	U	ug/L	P403171	
		Microcystin LR	0.25	U	ug/L	P403171	
		Microcystin LW	0.25	U	ug/L	P403171	
		Microcystin LY	0.10	U	ug/L	P403171	
		Microcystin RR	0.10	U	ug/L	P403171	
		Microcystin WR	0.50	U	ug/L	P403171	
		Microcystin YR	0.25	U	ug/L	P403171	
		Nodularin-R**	0.10	U	ug/L	P403171	
2272759	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P403360	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.64		mg N/L	P403354	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P403248	
	EPA 365.1 Rev. 2.0	Total-P	0.076		mg P/L	P403257	
2272760	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.013		mg P/L	P403221	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403360

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403354

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403248

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403257

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403221

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

Reference Method: EPA 8321B
Batch ID: P403171

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: P403360

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403354

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	94.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403248

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: P403257

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403221

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

Reference Method: EPA 8321B
Batch ID: P403171

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	75.7		P	40 - 150
Cylindrospermopsin	95.2		P	40 - 150
Desmethyl microcystin LR	76.0		P	40 - 150
Microcystin HIR	100		P	40 - 150
Microcystin HtyR	89.7		P	40 - 150
Microcystin LA	128		P	40 - 150
Microcystin LF	128		P	40 - 150
Microcystin LR	99.0		P	40 - 150
Microcystin LW	111		P	40 - 150
Microcystin LY	126		P	40 - 150
Microcystin RR	96.8		P	40 - 150
Microcystin WR	92.6		P	40 - 150
Microcystin YR	85.7		P	40 - 150
Nodularin-R	105		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403360

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2273394	Ammonia-N	103	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403354

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272759	Kjeldahl Nitrogen	100	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403248

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272331	NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403257

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272353	Total-P	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403221

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272760	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P403171

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272321	Anatoxin-a	89.0	87.1	P/P	40 - 150
2272321	Cylindrospermopsin	103	99.8	P/P	40 - 150
2272321	Desmethyl microcystin LR	81.2	82.2	P/P	40 - 150
2272321	Microcystin HiLR	105	102	P/P	40 - 150
2272321	Microcystin HtyR	95.0	92.6	P/P	40 - 150
2272321	Microcystin LA	119	123	P/P	40 - 150
2272321	Microcystin LF	125	127	P/P	40 - 150
2272321	Microcystin LR	99.5	101	P/P	40 - 150
2272321	Microcystin LW	119	114	P/P	40 - 150
2272321	Microcystin LY	128	123	P/P	40 - 150
2272321	Microcystin RR	103	102	P/P	40 - 150
2272321	Microcystin WR	92.4	88.5	P/P	40 - 150
2272321	Microcystin YR	91.5	89.5	P/P	40 - 150
2272321	Nodularin-R	102	96.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P403360

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2273394	Ammonia-N	0.512	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P403354

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272759	Kjeldahl Nitrogen	0.791	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P403248

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272331	NO2NO3-N	0.494	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P403257

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272353	Total-P	1.10	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P403221

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272760	O-Phosphate-P	0.968	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P403171

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272321	Anatoxin-a	2.25	Spike	P	0 - 30
2272321	Cylindrospermopsin	3.42	Spike	P	0 - 30
2272321	Desmethyl microcystin LR	1.17	Spike	P	0 - 30
2272321	Microcystin HtIR	3.04	Spike	P	0 - 30
2272321	Microcystin HtyR	2.55	Spike	P	0 - 30
2272321	Microcystin LA	2.77	Spike	P	0 - 30
2272321	Microcystin LF	1.07	Spike	P	0 - 30
2272321	Microcystin LR	1.05	Spike	P	0 - 30
2272321	Microcystin LW	4.20	Spike	P	0 - 30
2272321	Microcystin LY	4.03	Spike	P	0 - 30
2272321	Microcystin RR	1.54	Spike	P	0 - 30
2272321	Microcystin WR	4.25	Spike	P	0 - 30
2272321	Microcystin YR	2.20	Spike	P	0 - 30
2272321	Nodularin-R	5.01	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: 2272758

Field Sample ID: Vanderbilt Lagoon

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	92.3	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	102	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A107576

Included Lab Sample IDs: 2272760

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

Reference Method: EPA 8321B

Run ID: A107579

Included Lab Sample IDs: 2272758

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	77.0	74.7	P/P	50 - 160
Cylindrospermopsin	97.9	96.4	P/P	50 - 160
Desmethyl microcystin LR	83.4	83.3	P/P	50 - 160
Microcystin HIR	108	99.2	P/P	50 - 160
Microcystin HtyR	99.9	97.1	P/P	50 - 160
Microcystin LA	140	136	P/P	50 - 160
Microcystin LF	123	118	P/P	50 - 160
Microcystin LR	105	99.2	P/P	50 - 160
Microcystin LW	112	108	P/P	50 - 160
Microcystin LY	132	124	P/P	50 - 160
Microcystin RR	103	98.2	P/P	50 - 160
Microcystin WR	90.2	92.3	P/P	50 - 160
Microcystin YR	94.2	95.4	P/P	50 - 160
Nodularin-R	107	107	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A107595

Included Lab Sample IDs: 2272759

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A107622

Included Lab Sample IDs: 2272759

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A107641

Included Lab Sample IDs: 2272759

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107660

Included Lab Sample IDs: 2272759

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.5	97.5	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	99.4	103	103			0.512
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	94.5	100	101			0.791
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	102	101			0.494
EPA 365.1 Rev. 2.0	Total-P	104	102	103			1.10
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	100	101			0.968
EPA 8321B	Anatoxin-a	75.7	89.0	87.1			2.25
	Cylindrospermopsin	95.2	103	99.8			3.42
	Desmethyl microcystin LR	76.0	81.2	82.2			1.17
	Microcystin HiLR	100	105	102			3.04
	Microcystin HtyR	89.7	95.0	92.6			2.55
	Microcystin LA	128	119	123			2.77
	Microcystin LF	128	125	127			1.07
	Microcystin LR	99.0	99.5	101			1.05
	Microcystin LW	111	119	114			4.20
	Microcystin LY	126	128	123			4.03
	Microcystin RR	96.8	103	102			1.54
	Microcystin WR	92.6	92.4	88.5			4.25
	Microcystin YR	85.7	91.5	89.5			2.20
	Nodularin-R	105	102	96.9			5.01

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2272759
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2272759
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2272759
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2272759
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2272760
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2272758

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	08/31/2021			09/03/2021 12:07	Ping Hua	2272759
EPA 351.2 Rev. 2.0	08/31/2021	09/03/2021 17:03	Benjamin T. Nordmann	09/07/2021 10:37	Alexandra J Mattheus	2272759
EPA 353.2 Rev. 2.0	08/31/2021			09/01/2021 10:36	Beverly Y. Sanders	2272759
EPA 365.1 Rev. 2.0	08/31/2021	09/01/2021 14:48	Simonne.V. Calhoun	09/02/2021 15:40	Lipi Saha	2272759
EPA 365.1 Rev. 2.0 dissolved	08/31/2021			08/31/2021 15:09	James L Waggeberby	2272760
EPA 8321B	08/31/2021	08/31/2021 12:00	Mohammad Ghaffari	08/31/2021 19:39	Mohammad Ghaffari	2272758