Chemical Analysis Report

WQAP-2021-12-17-01

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

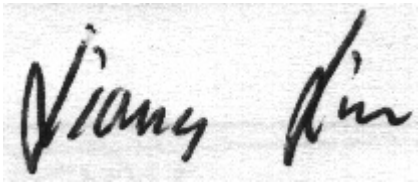
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2021-05-17-67**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: 11-JAN-2022 16:28



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: Caloosahatchee River - River Forest Kayak Launch **Collection Date/Time: 12/16/2021 09:03**

Field ID: HAB-SD-12162021001 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2295870	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P407674	
		Cylindrospermopsin	0.10	U	ug/L	P407674	
		Desmethyl microcystin LR	0.25	U	ug/L	P407674	
		Microcystin HilR**	0.25	U	ug/L	P407674	
		Microcystin HtyR**	0.25	U	ug/L	P407674	
		Microcystin LA	0.10	U	ug/L	P407674	
		Microcystin LF	0.10	UJ	ug/L	P407674	LCS, MS
		Microcystin LR	0.25	U	ug/L	P407674	
		Microcystin LW	0.25	U	ug/L	P407674	
		Microcystin LY	0.10	U	ug/L	P407674	
		Microcystin RR	0.10	U	ug/L	P407674	
		Microcystin WR	0.50	U	ug/L	P407674	
		Microcystin YR	0.25	U	ug/L	P407674	
		Nodularin-R**	0.10	U	ug/L	P407674	
2295871	EPA 350.1 Rev. 2.0	Ammonia-N	0.035		mg N/L	P408041	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P408074	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.20		mg N/L	P407738	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P407844	
2295872	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.063		mg P/L	P407624	

Ref. Method and Comment:
EPA 8321B: Refer to the Lab Analysis Report for an explanation of QC Codes.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408041

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408074

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407738

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407844

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407624

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

Reference Method: EPA 8321B
Batch ID: P407674

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: P408041

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408074

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407738

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407844

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407624

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

Reference Method: EPA 8321B
Batch ID: P407674

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	104		P	40 - 150
Cylindrospermopsin	97.2		P	40 - 150
Desmethyl microcystin LR	103		P	40 - 150
Microcystin HilR	105		P	40 - 150
Microcystin HtyR	98.5		P	40 - 150
Microcystin LA	128		P	40 - 150
Microcystin LF	154		F	40 - 150
Microcystin LR	93.5		P	40 - 150
Microcystin LW	127		P	40 - 150
Microcystin LY	135		P	40 - 150
Microcystin RR	103		P	40 - 150
Microcystin WR	94.1		P	40 - 150
Microcystin YR	107		P	40 - 150
Nodularin-R	108		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408041

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295795	Ammonia-N	96.6	99.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408074

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295921	Kjeldahl Nitrogen	116	114	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407738

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295800	NO2NO3-N	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407844

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295856	Total-P	109	110	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407624

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295890	O-Phosphate-P	96.6	96.0	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P407674

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295870	Anatoxin-a	120	128	P/P	40 - 150
2295870	Cylindrospermopsin	94.2	102	P/P	40 - 150
2295870	Desmethyl microcystin LR	115	120	P/P	40 - 150
2295870	Microcystin HilR	114	118	P/P	40 - 150
2295870	Microcystin HtyR	104	112	P/P	40 - 150
2295870	Microcystin LA	131	136	P/P	40 - 150
2295870	Microcystin LF	146	154	P/F	40 - 150
2295870	Microcystin LR	103	103	P/P	40 - 150
2295870	Microcystin LW	125	126	P/P	40 - 150
2295870	Microcystin LY	139	143	P/P	40 - 150
2295870	Microcystin RR	109	110	P/P	40 - 150
2295870	Microcystin WR	96.8	102	P/P	40 - 150
2295870	Microcystin YR	118	126	P/P	40 - 150
2295870	Nodularin-R	119	121	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408041

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295795	Ammonia-N	2.35	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295921	Kjeldahl Nitrogen	0.992	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407738

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295800	NO2NO3-N	0.449	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407844

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295856	Total-P	0.539	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407624

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295890	O-Phosphate-P	0.505	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P407674

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295870	Anatoxin-a	6.72	Spike	P	0 - 30
2295870	Cylindrospermopsin	8.26	Spike	P	0 - 30
2295870	Desmethyl microcystin LR	3.90	Spike	P	0 - 30
2295870	Microcystin HilR	3.18	Spike	P	0 - 30
2295870	Microcystin HtyR	7.41	Spike	P	0 - 30
2295870	Microcystin LA	3.37	Spike	P	0 - 30
2295870	Microcystin LF	5.42	Spike	P	0 - 30
2295870	Microcystin LR	0.616	Spike	P	0 - 30
2295870	Microcystin LW	0.711	Spike	P	0 - 30
2295870	Microcystin LY	3.08	Spike	P	0 - 30
2295870	Microcystin RR	1.29	Spike	P	0 - 30
2295870	Microcystin WR	5.01	Spike	P	0 - 30
2295870	Microcystin YR	6.67	Spike	P	0 - 30
2295870	Nodularin-R	2.02	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: 2295870
Field Sample ID: HAB-SD-12162021001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	93.1	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	96.8	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A109460
Included Lab Sample IDs: 2295872

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A109508
Included Lab Sample IDs: 2295871

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A109518
Included Lab Sample IDs: 2295870

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	84.8	87.0	P/P	50 - 160
Cylindrospermopsin	70.1	98.4	P/P	60 - 160
Desmethyl microcystin LR	76.9	105	P/P	60 - 160
Microcystin HilR	78.9	104	P/P	60 - 160
Microcystin HtyR	73.4	99.4	P/P	60 - 160
Microcystin LA	95.5	128	P/P	50 - 160
Microcystin LF	116	153	P/P	60 - 160
Microcystin LR	73.1	92.9	P/P	60 - 160
Microcystin LW	95.4	123	P/P	60 - 160
Microcystin LY	102	138	P/P	60 - 160
Microcystin RR	73.5	101	P/P	60 - 160
Microcystin WR	76.2	97.1	P/P	60 - 160
Microcystin YR	73.4	102	P/P	60 - 160
Nodularin-R	79.4	109	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A109584
Included Lab Sample IDs: 2295871

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	106	105	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A109647
Included Lab Sample IDs: 2295871

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.2	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A109713
Included Lab Sample IDs: 2295871

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.6	91.9	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	98.0	96.6	99.6			2.35
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	116	114			0.992
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	103			0.449
EPA 365.1 Rev. 2.0	Total-P	106	109	110			0.539
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	96.6	96.0			0.505
EPA 8321B	Anatoxin-a	104	120	128			6.72
	Cylindrospermopsin	97.2	94.2	102			8.26
	Desmethyl microcystin LR	103	115	120			3.90
	Microcystin HilR	105	114	118			3.18
	Microcystin HtyR	98.5	104	112			7.41
	Microcystin LA	128	131	136			3.37
	Microcystin LF	154	146	154			5.42
	Microcystin LR	93.5	103	103			0.616
	Microcystin LW	127	125	126			0.711
	Microcystin LY	135	139	143			3.08
	Microcystin RR	103	109	110			1.29
	Microcystin WR	94.1	96.8	102			5.01
	Microcystin YR	107	118	126			6.67
	Nodularin-R	108	119	121			2.02

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2295871
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2295871
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2295871
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2295871
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2295872
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2295870

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	12/17/2021			01/03/2022 14:47	Ping Hua	2295871
EPA 351.2 Rev. 2.0	12/17/2021	01/05/2022 09:59	Samantha L Bates	01/06/2022 16:45	Alexandra J Mattheus	2295871
EPA 353.2 Rev. 2.0	12/17/2021			12/21/2021 10:55	Beverly Y. Sanders	2295871
EPA 365.1 Rev. 2.0	12/17/2021	12/27/2021 15:00	Simonne.V. Calhoun	12/28/2021 11:03	Shengyu Ding	2295871
EPA 365.1 Rev. 2.0 dissolved	12/17/2021			12/17/2021 13:43	James L Waggerby	2295872
EPA 8321B	12/17/2021	12/21/2021 12:00	Manjita Shrestha	12/21/2021 14:18	Manjita Shrestha	2295870