

Chemical Analysis Report

WQAP-2021-09-28-02

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-2021-05-24-52**
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

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Certified by: Colin Wright, Program Administrator

Date Certified: 21-OCT-2021 11:23

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: Lake Okeechobee-S308C (Lakeside)

Collection Date/Time: 09/27/2021 14:00

Field ID: SEHAB0062

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2278594	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P404268	
		Cylindrospermopsin	0.10	U	ug/L	P404268	
		Desmethyl microcystin LR	0.25	U	ug/L	P404268	
		Microcystin HilR**	0.25	U	ug/L	P404268	
		Microcystin HtyR**	0.25	U	ug/L	P404268	
		Microcystin LA	0.10	U	ug/L	P404268	
		Microcystin LF	0.10	U	ug/L	P404268	
		Microcystin LR	0.25	U	ug/L	P404268	
		Microcystin LW	0.25	U	ug/L	P404268	
		Microcystin LY	0.10	U	ug/L	P404268	
		Microcystin RR	0.10	U	ug/L	P404268	
		Microcystin WR	0.50	U	ug/L	P404268	
		Microcystin YR	0.25	U	ug/L	P404268	
		Nodularin-R**	0.10	U	ug/L	P404268	
2278596	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P404475	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P404397	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.23		mg N/L	P404335	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P404321	
2278598	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.069		mg P/L	P404292	MS

Sample Location: C44 CANAL-S308C (CANAL SIDE)

Collection Date/Time: 09/27/2021 14:15

Field ID: SEHAB0063

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2278595	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P404268	
		Cylindrospermopsin	0.10	U	ug/L	P404268	
		Desmethyl microcystin LR	0.25	U	ug/L	P404268	
		Microcystin HilR**	0.25	U	ug/L	P404268	
		Microcystin HtyR**	0.25	U	ug/L	P404268	
		Microcystin LA	0.10	U	ug/L	P404268	
		Microcystin LF	0.10	U	ug/L	P404268	
		Microcystin LR	0.25	U	ug/L	P404268	
		Microcystin LW	0.25	U	ug/L	P404268	
		Microcystin LY	0.10	U	ug/L	P404268	
		Microcystin RR	0.10	U	ug/L	P404268	
		Microcystin WR	0.50	U	ug/L	P404268	
		Microcystin YR	0.25	U	ug/L	P404268	
		Nodularin-R**	0.10	U	ug/L	P404268	
2278597	EPA 350.1 Rev. 2.0	Ammonia-N	0.019		mg N/L	P404475	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P404397	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.19		mg N/L	P404335	
	EPA 365.1 Rev. 2.0	Total-P	0.23		mg P/L	P404321	
2278599	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.17		mg P/L	P404292	MS

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P404475

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404397

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404335

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404321

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404292

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

Reference Method: EPA 8321B
Batch ID: P404268

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 H1R	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: P404475

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404397

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404335

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404321

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: P404292

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

Reference Method: EPA 8321B
Batch ID: P404268

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	103		P	40 - 150
Cylindrospermopsin	100		P	40 - 150
Desmethyl microcystin LR	112		P	40 - 150
Microcystin HIR	106		P	40 - 150
Microcystin HtyR	105		P	40 - 150
Microcystin LA	88.6		P	40 - 150
Microcystin LF	122		P	40 - 150
Microcystin LR	101		P	40 - 150
Microcystin LW	110		P	40 - 150
Microcystin LY	98.5		P	40 - 150
Microcystin RR	105		P	40 - 150
Microcystin WR	101		P	40 - 150
Microcystin YR	102		P	40 - 150
Nodularin-R	112		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P404475

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278617	Ammonia-N	97.0	98.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P404397

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278556	Kjeldahl Nitrogen	103	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P404335

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278556	NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P404321

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278661	Total-P	111	114	F/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P404292

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278609	O-Phosphate-P	99.1	99.0	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P404268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2278524	Anatoxin-a	105	98.9	P/P	40 - 150
2278524	Cylindrospermopsin	93.9	89.0	P/P	40 - 150
2278524	Desmethyl microcystin LR	100	95.8	P/P	40 - 150
2278524	Microcystin HiLR	98.8	88.7	P/P	40 - 150
2278524	Microcystin HtyR	93.0	94.5	P/P	40 - 150
2278524	Microcystin LA	85.0	84.2	P/P	40 - 150
2278524	Microcystin LF	98.5	108	P/P	40 - 150
2278524	Microcystin LR	96.5	97.9	P/P	40 - 150
2278524	Microcystin LW	100	95.3	P/P	40 - 150
2278524	Microcystin LY	99.8	95.4	P/P	40 - 150
2278524	Microcystin RR	91.8	90.8	P/P	40 - 150
2278524	Microcystin WR	93.5	88.0	P/P	40 - 150
2278524	Microcystin YR	92.7	91.7	P/P	40 - 150
2278524	Nodularin-R	99.3	93.3	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P404475

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278617	Ammonia-N	0.884	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P404397

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278556	Kjeldahl Nitrogen	2.23	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P404335

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278556	NO2NO3-N	0.399	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P404321

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278661	Total-P	2.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P404292

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278609	O-Phosphate-P	0.101	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P404268

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2278524	Anatoxin-a	5.61	Spike	P	0 - 30
2278524	Cylindrospermopsin	5.38	Spike	P	0 - 30
2278524	Desmethyl microcystin LR	4.77	Spike	P	0 - 30
2278524	Microcystin H1LR	10.7	Spike	P	0 - 30
2278524	Microcystin HtyR	1.54	Spike	P	0 - 30
2278524	Microcystin LA	0.952	Spike	P	0 - 30
2278524	Microcystin LF	9.14	Spike	P	0 - 30
2278524	Microcystin LR	1.31	Spike	P	0 - 30
2278524	Microcystin LW	4.99	Spike	P	0 - 30
2278524	Microcystin LY	4.51	Spike	P	0 - 30
2278524	Microcystin RR	1.11	Spike	P	0 - 30
2278524	Microcystin WR	6.07	Spike	P	0 - 30
2278524	Microcystin YR	1.12	Spike	P	0 - 30
2278524	Nodularin-R	6.21	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: 2278594
Field Sample ID: SEHAB0062

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	74.5	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	104	P	30 - 160

Lab Sample ID: 2278595
Field Sample ID: SEHAB0063

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	71.4	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	101	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A108036

Included Lab Sample IDs: 2278598, 2278599

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.9	97.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A108038

Included Lab Sample IDs: 2278594, 2278595

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	93.4	96.8	P/P	50 - 160
Cylindrospermopsin	93.5	89.2	P/P	60 - 160
Desmethyl microcystin LR	95.2	90.7	P/P	60 - 160
Microcystin HIR	95.1	94.7	P/P	60 - 160
Microcystin HtyR	91.3	94.2	P/P	60 - 160
Microcystin LA	80.1	81.5	P/P	50 - 160
Microcystin LF	99.9	105	P/P	60 - 160
Microcystin LR	100	95.6	P/P	60 - 160
Microcystin LW	95.6	97.9	P/P	60 - 160
Microcystin LY	87.3	86.8	P/P	60 - 160
Microcystin RR	92.8	86.9	P/P	60 - 160
Microcystin WR	88.8	88.4	P/P	60 - 160
Microcystin YR	94.0	92.1	P/P	60 - 160
Nodularin-R	94.4	101	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A108052

Included Lab Sample IDs: 2278596, 2278597

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: A108079

Included Lab Sample IDs: 2278596, 2278597

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.6	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A108100

Included Lab Sample IDs: 2278596, 2278597

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A108109

Included Lab Sample IDs: 2278596, 2278597

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.1	98.5	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	97.4	97.0	98.0			0.884
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	103	100			2.23
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	101			0.399
EPA 365.1 Rev. 2.0	Total-P	107	111	114			2.01
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.8	99.1	99.0			0.101
EPA 8321B	Anatoxin-a	103	105	98.9			5.61
	Cylindrospermopsin	100	93.9	89.0			5.38
	Desmethyl microcystin LR	112	100	95.8			4.77
	Microcystin HiLR	106	98.8	88.7			10.7
	Microcystin HtyR	105	93.0	94.5			1.54
	Microcystin LA	88.6	85.0	84.2			0.952
	Microcystin LF	122	98.5	108			9.14
	Microcystin LR	101	96.5	97.9			1.31
	Microcystin LW	110	100	95.3			4.99
	Microcystin LY	98.5	99.8	95.4			4.51
	Microcystin RR	105	91.8	90.8			1.11
	Microcystin WR	101	93.5	88.0			6.07
	Microcystin YR	102	92.7	91.7			1.12
	Nodularin-R	112	99.3	93.3			6.21

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2278596, 2278597
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2278596, 2278597
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2278596, 2278597
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2278596, 2278597
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2278598, 2278599
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2278594, 2278595

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	09/28/2021			10/01/2021 12:55	Ping Hua	2278596
	09/28/2021			10/01/2021 12:56	Ping Hua	2278597
EPA 351.2 Rev. 2.0	09/28/2021	09/29/2021 11:23	Benjamin T. Nordmann	10/01/2021 10:48	Alexandra J Mattheus	2278596
	09/28/2021	09/29/2021 11:23	Benjamin T. Nordmann	10/01/2021 10:50	Alexandra J Mattheus	2278597
EPA 353.2 Rev. 2.0	09/28/2021			09/29/2021 09:55	Beverly Y. Sanders	2278596
	09/28/2021			09/29/2021 09:56	Beverly Y. Sanders	2278597
EPA 365.1 Rev. 2.0	09/28/2021	09/29/2021 16:23	Simonne.V. Calhoun	09/30/2021 14:57	Lipi Saha	2278596
	09/28/2021	09/29/2021 16:23	Simonne.V. Calhoun	09/30/2021 14:58	Lipi Saha	2278597
EPA 365.1 Rev. 2.0 dissolved	09/28/2021			09/28/2021 14:47	James L Waggerby	2278598
	09/28/2021			09/28/2021 14:48	James L Waggerby	2278599
EPA 8321B	09/28/2021	09/28/2021 12:00	Manjita Shrestha	09/28/2021 20:52	Manjita Shrestha	2278594
	09/28/2021	09/28/2021 12:00	Manjita Shrestha	09/28/2021 21:08	Manjita Shrestha	2278595