

Chemical Analysis Report

WQAP-2020-08-26-01

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

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2020-02-10-17**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 15-SEP-2020 13:04

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: Makai Canal

Collection Date/Time: 08/25/2020 09:03

Field ID: CC-082520-001

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2192116	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P386558	
		Cylindrospermopsin**	0.25	U	ug/L	P386558	
		Desmethyl microcystin LR**	0.63	I	ug/L	P386558	
		Microcystin LA**	1.3		ug/L	P386558	
		Microcystin LF**	0.25	U	ug/L	P386558	
		Microcystin LR**	21		ug/L	P386558	
		Microcystin LW**	0.25	U	ug/L	P386558	
		Microcystin LY**	0.25	U	ug/L	P386558	
		Microcystin RR**	0.25	U	ug/L	P386558	
		Microcystin WR**	0.50	U	ug/L	P386558	
		Microcystin YR**	0.25	U	ug/L	P386558	
2192118	EPA 350.1 Rev. 2.0	Ammonia-N	0.018		mg N/L	P387016	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	6.0		mg N/L	P386882	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P386606	
	EPA 365.1 Rev. 2.0	Total-P	0.33		mg P/L	P386613	
2192120	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P386587	

Sample Location: Highlander Canal, South of Bridge

Collection Date/Time: 08/25/2020 09:35

Field ID: CC-082520-002

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2192117	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P386558	
		Cylindrospermopsin**	0.25	U	ug/L	P386558	
		Desmethyl microcystin LR**	0.25	U	ug/L	P386558	
		Microcystin LA**	0.25	U	ug/L	P386558	
		Microcystin LF**	0.25	U	ug/L	P386558	
		Microcystin LR**	0.97	I	ug/L	P386558	
		Microcystin LW**	0.25	U	ug/L	P386558	
		Microcystin LY**	0.25	U	ug/L	P386558	
		Microcystin RR**	0.25	U	ug/L	P386558	
		Microcystin WR**	0.50	U	ug/L	P386558	
		Microcystin YR**	0.25	U	ug/L	P386558	
2192119	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P387016	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P386685	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P386606	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P386613	
2192121	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P386587	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387016

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386685

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386882

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386606

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386613

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386587

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

Reference Method: EPA 8321B
Batch ID: P386558

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387016

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386685

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386882

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386606

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: P386613

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386587

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

Reference Method: EPA 8321B
Batch ID: P386558

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	95.4		P	40 - 140
Cylindrospermopsin	118		P	40 - 140
Desmethyl microcystin LR	118		P	40 - 140
Microcystin LA	118		P	40 - 140
Microcystin LF	130		P	40 - 140
Microcystin LR	108		P	40 - 140
Microcystin LW	118		P	40 - 140
Microcystin LY	110		P	40 - 140
Microcystin RR	116		P	40 - 140
Microcystin WR	129		P	40 - 140
Microcystin YR	106		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387016

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192152	Ammonia-N	98.5	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386685

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192144	Kjeldahl Nitrogen	101	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386882

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193269	Kjeldahl Nitrogen	106	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192075	NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386613

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192024	Total-P	107	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386587

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192121	O-Phosphate-P	102	102	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P386558

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192249	Anatoxin-a	132	127	P/P	40 - 140
2192249	Cylindrospermopsin	128	116	P/P	40 - 140
2192249	Desmethyl microcystin LR	86.0	80.5	P/P	40 - 140
2192249	Microcystin LA	63.8	61.2	P/P	40 - 140
2192249	Microcystin LF	76.5	70.7	P/P	40 - 140
2192249	Microcystin LR	76.5	88.3	P/P	40 - 140
2192249	Microcystin LW	76.2	68.3	P/P	40 - 140
2192249	Microcystin LY	61.1	59.4	P/P	40 - 140
2192249	Microcystin RR	103	98.9	P/P	40 - 140
2192249	Microcystin WR	73.8	76.3	P/P	40 - 140
2192249	Microcystin YR	93.2	83.8	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387016

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192152	Ammonia-N	0.614	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386685

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192144	Kjeldahl Nitrogen	2.50	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386882

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193269	Kjeldahl Nitrogen	0.568	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192075	NO2NO3-N	0.494	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386613

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192024	Total-P	0.628	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386587

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192121	O-Phosphate-P	0.938	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P386558

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192249	Anatoxin-a	3.52	Spike	P	0 - 30
2192249	Cylindrospermopsin	9.68	Spike	P	0 - 30
2192249	Desmethyl microcystin LR	6.67	Spike	P	0 - 30
2192249	Microcystin LA	4.05	Spike	P	0 - 30
2192249	Microcystin LF	7.80	Spike	P	0 - 30
2192249	Microcystin LR	14.4	Spike	P	0 - 30
2192249	Microcystin LW	11.0	Spike	P	0 - 30
2192249	Microcystin LY	2.80	Spike	P	0 - 30
2192249	Microcystin RR	4.24	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P386558

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192249	Microcystin WR	3.36	Spike	P	0 - 30
2192249	Microcystin YR	10.6	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Surrogates

Lab Sample ID: 2192116

Field Sample ID: CC-082520-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	99.2	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	86.6	P	30 - 160

Lab Sample ID: 2192117

Field Sample ID: CC-082520-002

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	80.8	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	114	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A100663

Included Lab Sample IDs: 2192120, 2192121

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	96.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A100673

Included Lab Sample IDs: 2192118, 2192119

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	102	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A100674

Included Lab Sample IDs: 2192116, 2192117

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	134	132	P/P	50 - 160
Cylindrospermopsin	123	127	P/P	60 - 160
Desmethyl microcystin LR	70.2	73.2	P/P	60 - 160
Microcystin LA	62.8	64.6	P/P	50 - 160
Microcystin LF	69.6	74.7	P/P	60 - 160
Microcystin LR	75.0	80.2	P/P	60 - 160
Microcystin LW	83.6	77.6	P/P	60 - 160
Microcystin LY	61.1	66.7	P/P	60 - 160
Microcystin RR	91.6	92.5	P/P	60 - 160
Microcystin WR	67.6	65.5	P/P	60 - 160
Microcystin YR	75.9	73.3	P/P	60 - 160

Reference Method: EPA 8321B

Run ID: A100683

Included Lab Sample IDs: 2192116

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Microcystin LR	108	102	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A100710

Included Lab Sample IDs: 2192118, 2192119

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100731

Included Lab Sample IDs: 2192119

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	92.2	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100823

Included Lab Sample IDs: 2192118

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.8	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A100832

Included Lab Sample IDs: 2192118, 2192119

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	99.6	P/P	90 - 110

* 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	99.5	98.5	97.8			0.614
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.8	101	105			2.50
	Kjeldahl Nitrogen	108	106	105			0.568
EPA 353.2 Rev. 2.0	NO2NO3-N	100	101	102			0.494
EPA 365.1 Rev. 2.0	Total-P	105	107	108			0.628
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	102	102			0.938
EPA 8321B	Anatoxin-a	95.4	132	127			3.52
	Cylindrospermopsin	118	128	116			9.68
	Desmethyl microcystin LR	118	86.0	80.5			6.67
	Microcystin LA	118	63.8	61.2			4.05
	Microcystin LF	130	76.5	70.7			7.80
	Microcystin LR	108	76.5	88.3			14.4
	Microcystin LW	118	76.2	68.3			11.0
	Microcystin LY	110	61.1	59.4			2.80
	Microcystin RR	116	103	98.9			4.24
	Microcystin WR	129	73.8	76.3			3.36
	Microcystin YR	106	93.2	83.8			10.6

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2192118, 2192119
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2192118, 2192119
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2192118, 2192119
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2192118, 2192119
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2192120, 2192121
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2192116, 2192117

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	08/26/2020			09/05/2020 11:29	Ping Hua	2192118
	08/26/2020			09/05/2020 11:30	Ping Hua	2192119
EPA 351.2 Rev. 2.0	08/26/2020	08/28/2020 12:10	David Boose	08/31/2020 10:50	Virginia P. Brown	2192119
	08/26/2020	09/03/2020 09:45	Sima Feizi	09/04/2020 11:55	Elliott Rodriguez	2192118
EPA 353.2 Rev. 2.0	08/26/2020			08/27/2020 11:41	Beverly Y. Sanders	2192118
	08/26/2020			08/27/2020 11:42	Beverly Y. Sanders	2192119
EPA 365.1 Rev. 2.0	08/26/2020	08/27/2020 11:54	Yen Ta	08/28/2020 13:24	Benjamin T. Nordmann	2192118
	08/26/2020	08/27/2020 11:54	Yen Ta	08/28/2020 13:25	Benjamin T. Nordmann	2192119
EPA 365.1 Rev. 2.0 dissolved	08/26/2020			08/26/2020 18:38	Blanca Fach	2192121
	08/26/2020			08/26/2020 18:43	Blanca Fach	2192120
EPA 8321B	08/26/2020	08/26/2020 14:00	Juyoung Kim	08/27/2020 05:25	Juyoung Kim	2192116
	08/26/2020	08/26/2020 14:00	Juyoung Kim	08/27/2020 05:42	Juyoung Kim	2192117
	08/26/2020	08/26/2020 14:00	Juyoung Kim	08/27/2020 13:40	Juyoung Kim	2192116