

Chemical Analysis Report

WQAP-2020-01-23-01

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

Event Description: **Algal Bloom Response - SWD**
Request ID: **RQ-2019-12-23-10**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637
Attn: Matthew Bearden

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-FEB-2020 17:39

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: Lake Clinch - NE Lobe

Collection Date/Time: 01/22/2020 09:15

Field ID: HAB-SW-0009

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2151116	EPA 8321B	Anatoxin-a**	0.25	UJ	ug/L	P377504	
		Cylindrospermopsin**	0.25	U	ug/L	P377504	
		Desmethyl microcystin LR**	0.25	U	ug/L	P377504	
		Microcystin LA**	0.25	U	ug/L	P377504	
		Microcystin LF**	0.25	U	ug/L	P377504	
		Microcystin LR**	0.25	U	ug/L	P377504	
		Microcystin LW**	0.25	U	ug/L	P377504	
		Microcystin LY**	0.25	U	ug/L	P377504	
		Microcystin RR**	0.25	U	ug/L	P377504	
		Microcystin WR**	0.50	U	ug/L	P377504	
		Microcystin YR**	0.25	U	ug/L	P377504	
2151117	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P378020	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.58		mg N/L	P377990	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.050		mg N/L	P377842	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P377913	
2151118	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P377646	

Ref. Method and Comment:

EPA 8321B: J- Initial Calibration Verification (ICV) exceeded the upper acceptance criteria.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378020

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P377990

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P377842

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377913

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P377646

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

Reference Method: EPA 8321B
Batch ID: P377504

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: P378020

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P377990

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: P377842

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377913

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: P377646

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.6		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P377504

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	108		P	40 - 140
Cylindrospermopsin	114		P	40 - 140
Desmethyl microcystin LR	119		P	40 - 140
Microcystin LA	116		P	40 - 140
Microcystin LF	115		P	40 - 140
Microcystin LR	110		P	40 - 140
Microcystin LW	103		P	40 - 140
Microcystin LY	122		P	40 - 140
Microcystin RR	111		P	40 - 140
Microcystin WR	117		P	40 - 140
Microcystin YR	96.6		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378020

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2151045	Ammonia-N	99.1	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P377842

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2151089	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377913

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2151092	Total-P	104	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P377646

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2151042	O-Phosphate-P	95.0	96.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P377504

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2150087	Anatoxin-a	97.2	110	P/P	40 - 140
2150087	Cylindrospermopsin	102	95.6	P/P	40 - 140
2150087	Desmethyl microcystin LR	101	105	P/P	40 - 140
2150087	Microcystin LA	99.8	96.8	P/P	40 - 140
2150087	Microcystin LF	96.8	87.6	P/P	40 - 140
2150087	Microcystin LR	102	103	P/P	40 - 140
2150087	Microcystin LW	85.8	88.3	P/P	40 - 140
2150087	Microcystin LY	105	105	P/P	40 - 140
2150087	Microcystin RR	106	103	P/P	40 - 140
2150087	Microcystin WR	102	104	P/P	40 - 140
2150087	Microcystin YR	92.6	91.7	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378020

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2151045	Ammonia-N	0.771	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P377990

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2151125	Kjeldahl Nitrogen	6.45	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P377842

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2151089	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377913

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2151092	Total-P	1.12	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P377646

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2151042	O-Phosphate-P	0.932	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P377504

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2150087	Anatoxin-a	12.4	Spike	P	0 - 30
2150087	Cylindrospermopsin	6.48	Spike	P	0 - 30
2150087	Desmethyl microcystin LR	4.25	Spike	P	0 - 30
2150087	Microcystin LA	3.01	Spike	P	0 - 30
2150087	Microcystin LF	10.0	Spike	P	0 - 30
2150087	Microcystin LR	0.611	Spike	P	0 - 30
2150087	Microcystin LW	2.79	Spike	P	0 - 30
2150087	Microcystin LY	0.215	Spike	P	0 - 30
2150087	Microcystin RR	3.46	Spike	P	0 - 30
2150087	Microcystin WR	2.44	Spike	P	0 - 30
2150087	Microcystin YR	0.997	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2151116
Field Sample ID: HAB-SW-0009

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	124	P	30 - 165

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B

Run ID: A97075

Included Lab Sample IDs: 2151116

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	89.4	109	P/P	50 - 160
Cylindrospermopsin	104	115	P/P	60 - 160
Desmethyl microcystin LR	101	106	P/P	60 - 160
Microcystin LA	95.1	105	P/P	50 - 160
Microcystin LF	101	102	P/P	60 - 160
Microcystin LR	93.7	104	P/P	60 - 160
Microcystin LW	88.4	94.3	P/P	60 - 160
Microcystin LY	109	113	P/P	60 - 160
Microcystin RR	99.8	109	P/P	60 - 160
Microcystin WR	95.3	117	P/P	60 - 160
Microcystin YR	81.4	89.0	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A97076

Included Lab Sample IDs: 2151118

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.4	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A97138

Included Lab Sample IDs: 2151117

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A97221

Included Lab Sample IDs: 2151117

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.8	99.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A97234

Included Lab Sample IDs: 2151117

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.6	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A97256

Included Lab Sample IDs: 2151117

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	108	108	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 SMP	MS
			LCS	MS		
EPA 350.1 Rev. 2.0	Ammonia-N	97.8	100	99.1		0.771
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107				6.45
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	101	101		0.0
EPA 365.1 Rev. 2.0	Total-P	104	104	106		1.12
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	95.0	96.1		0.932
EPA 8321B	Anatoxin-a	108	97.2	110		12.4
	Cylindrospermopsin	114	102	95.6		6.48
	Desmethyl microcystin LR	119	101	105		4.25
	Microcystin LA	116	99.8	96.8		3.01
	Microcystin LF	115	96.8	87.6		10.0
	Microcystin LR	110	102	103		0.611
	Microcystin LW	103	85.8	88.3		2.79
	Microcystin LY	122	105	105		0.215
	Microcystin RR	111	106	103		3.46
	Microcystin WR	117	102	104		2.44
	Microcystin YR	96.6	92.6	91.7		0.997

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2151117
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2151117
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2151117
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2151117
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2151118
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2151116

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	01/23/2020			01/30/2020 15:09	Ping Hua	2151117
EPA 351.2 Rev. 2.0	01/23/2020	01/30/2020 17:30	Jhamieka S. Greenwood	01/31/2020 10:08	Jhamieka S. Greenwood	2151117
EPA 353.2 Rev. 2.0	01/23/2020			01/28/2020 11:30	Beverly Y. Sanders	2151117
EPA 365.1 Rev. 2.0	01/23/2020	01/29/2020 15:35	Yen Ta	01/31/2020 13:27	Benjamin T. Nordmann	2151117
EPA 365.1 Rev. 2.0 dissolved	01/23/2020			01/23/2020 16:03	Carlos Miranda	2151118
EPA 8321B	01/23/2020	01/23/2020 11:00	Juyoung Kim	01/23/2020 14:35	Juyoung Kim	2151116