

Chemical Analysis Report

SW-DIST-2019-04-30-01

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

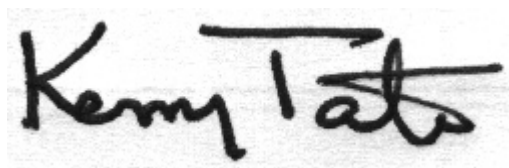
Event Description: **Algal Bloom Response - as needed**
Request ID: **RQ-2019-03-11-20**
Customer: **SW-DIST**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 14-MAY-2019 11:02

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the "T" and a long horizontal stroke at the end.

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: Elam Lake Algal Bloom Response

Collection Date/Time: 04/29/2019 12:40

Field ID: Elam Lake Algal Bloom Response

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2081673	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P363075	
		Cylindrospermopsin**	0.25	U	ug/L	P363075	
		Microcystin LA**	0.47	I	ug/L	P363075	MS
		Microcystin LF**	0.25	U	ug/L	P363075	
		Microcystin LR**	0.31	I	ug/L	P363075	
		Microcystin LY**	0.25	U	ug/L	P363075	MS
		Microcystin RR**	0.25	U	ug/L	P363075	
		Microcystin YR**	0.25	U	ug/L	P363075	
		Saxitoxin**	0.25	UJ	ug/L	P363075	

Ref. Method and Comment:

EPA 8321B: Method validation for saxitoxin is still in progress. Second source was not analyzed.

Sample Location: Elam Lake Algal Bloom Response

Collection Date/Time: 04/29/2019 12:40

Field ID: Elam Lake Algal Bloom Response

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2081687	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P363266	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P363616	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P363245	
	EPA 365.1 Rev. 2.0	Total-P	0.057		mg P/L	P363175	
2081688	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P363120	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363266

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363616

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363245

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P363175

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363120

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

Reference Method: EPA 8321B
Batch ID: P363075

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	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 LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin YR	0.25	U	ug/L
Saxitoxin	0.25	U	ug/L

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P363266

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P363616

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P363245

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: P363175

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P363120

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P363075

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	95.8		P	40 - 140
Cylindrospermopsin	113		P	40 - 140
Microcystin LA	96.1		P	40 - 140
Microcystin LF	76.4		P	40 - 140
Microcystin LR	76.3		P	40 - 140
Microcystin LY	117		P	40 - 140
Microcystin RR	80.1		P	40 - 140
Microcystin YR	77.8		P	40 - 140
Saxitoxin	110		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P363266

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081716	Ammonia-N	100	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P363616

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081598	Kjeldahl Nitrogen	104	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P363245

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081687	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P363175

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081716	Total-P	97.4	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P363120

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081688	O-Phosphate-P	94.6	97.1	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P363075

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2081635	Anatoxin-a	92.8	95.4	P/P	40 - 140
2081635	Cylindrospermopsin	48.2	52.4	P/P	40 - 140
2081635	Microcystin LA	207	240	F/F	40 - 140
2081635	Microcystin LF	111	98.1	P/P	40 - 140
2081635	Microcystin LR	127	122	P/P	40 - 140
2081635	Microcystin LY	194	219	F/F	40 - 140
2081635	Microcystin RR	114	116	P/P	40 - 140
2081635	Microcystin YR	113	83.0	P/P	40 - 140
2081635	Saxitoxin	73.2	79.5	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P363266

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081716	Ammonia-N	1.05	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P363616

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081598	Kjeldahl Nitrogen	4.24	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P363245

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081687	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P363175

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081716	Total-P	0.232	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P363120

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081688	O-Phosphate-P	2.61	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P363075

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2081635	Anatoxin-a	2.76	Spike	P	0 - 30
2081635	Cylindrospermopsin	8.34	Spike	P	0 - 30
2081635	Microcystin LA	15.0	Spike	P	0 - 30
2081635	Microcystin LF	12.0	Spike	P	0 - 30
2081635	Microcystin LR	4.55	Spike	P	0 - 30
2081635	Microcystin LY	12.1	Spike	P	0 - 30
2081635	Microcystin RR	1.71	Spike	P	0 - 30
2081635	Microcystin YR	27.4	Spike	P	0 - 30
2081635	Saxitoxin	8.25	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
 Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Surrogates

Lab Sample ID: 2081673

Field Sample ID: Elam Lake Algal Bloom Response

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	89.6	P	30 - 165

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A91104

Included Lab Sample IDs: 2081688

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.8	99.1	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A91139

Included Lab Sample IDs: 2081673

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	116	115	P/P	50 - 160
Cylindrospermopsin	134	127	P/P	60 - 160
Microcystin LA	106	75.7	P/P	50 - 160
Microcystin LF	102	122	P/P	60 - 160
Microcystin LR	101	95.7	P/P	60 - 160
Microcystin LY	80.1	98.2	P/P	60 - 160
Microcystin RR	98.8	96.1	P/P	60 - 160
Microcystin YR	88.1	88.7	P/P	60 - 160
Saxitoxin	97.8	96.9	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A91151

Included Lab Sample IDs: 2081687

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A91155

Included Lab Sample IDs: 2081687

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A91165

Included Lab Sample IDs: 2081687

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A91333

Included Lab Sample IDs: 2081687

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.3	102	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	103	100	101			1.05
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	104	98.8			4.24
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	100	100			0.0
EPA 365.1 Rev. 2.0	Total-P	102	97.4	97.7			0.232
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	94.6	97.1			2.61
EPA 8321B	Anatoxin-a	95.8	92.8	95.4			2.76
	Cylindrospermopsin	113	48.2	52.4			8.34
	Microcystin LA	96.1	207	240			15.0
	Microcystin LF	76.4	111	98.1			12.0
	Microcystin LR	76.3	127	122			4.55
	Microcystin LY	117	194	219			12.1
	Microcystin RR	80.1	114	116			1.71
	Microcystin YR	77.8	113	83.0			27.4
	Saxitoxin	110	73.2	79.5			8.25

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2081687
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2081687
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2081687
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2081687
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2081688
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2081673

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	04/30/2019			05/02/2019 12:34	Ping Hua	2081687
EPA 351.2 Rev. 2.0	04/30/2019	05/08/2019 12:15	Adrian Shelby	05/09/2019 11:50	Joseph Suarez	2081687
EPA 353.2 Rev. 2.0	04/30/2019			05/02/2019 09:34	Beverly Y. Sanders	2081687
EPA 365.1 Rev. 2.0	04/30/2019	05/01/2019 14:25	Sima Feizi	05/02/2019 10:04	Rosalyn Ballman	2081687
EPA 365.1 Rev. 2.0 dissolved	04/30/2019			04/30/2019 15:45	Jhamieka S. Greenwood	2081688
EPA 8321B	04/30/2019	05/01/2019 09:00	Juyoung Kim	05/01/2019 16:18	Juyoung Kim	2081673