Chemical Analysis Report

WQAP-2019-12-19-05

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-2019-12-23-31**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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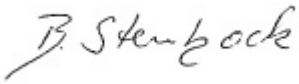
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 10-JAN-2020 17:12



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 Trafford **Collection Date/Time: 12/18/2019 09:05**

Field ID: SD121819-001 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2145341	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P375958	
		Cylindrospermopsin**	0.25	U	ug/L	P375958	
		Desmethyl microcystin LR**	0.25	U	ug/L	P375958	
		Microcystin LA**	0.25	U	ug/L	P375958	
		Microcystin LF**	0.25	U	ug/L	P375958	
		Microcystin LR**	0.38	I	ug/L	P375958	
		Microcystin LW**	0.25	U	ug/L	P375958	
		Microcystin LY**	0.25	U	ug/L	P375958	
		Microcystin RR**	0.25	U	ug/L	P375958	
		Microcystin WR**	0.25	U	ug/L	P375958	
		Microcystin YR**	0.25	U	ug/L	P375958	
2145346	EPA 350.1 Rev. 2.0	Ammonia-N	0.052		mg N/L	P376464	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P376585	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.016		mg N/L	P376473	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P376270	
2145347	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.007	I	mg P/L	P376180	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376464

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376585

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P376473

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P376270

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P376180

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

Reference Method: EPA 8321B
Batch ID: P375958

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	0.25	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: P376464

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.3		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376585

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P376473

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: P376270

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: P376180

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

Reference Method: EPA 8321B
Batch ID: P375958

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	112		P	40 - 140
Cylindrospermopsin	112		P	40 - 140
Desmethyl microcystin LR	104		P	40 - 140
Microcystin LA	96.8		P	40 - 140
Microcystin LF	98.3		P	40 - 140
Microcystin LR	95.0		P	40 - 140
Microcystin LW	95.2		P	40 - 140
Microcystin LY	96.8		P	40 - 140
Microcystin RR	101		P	40 - 140
Microcystin WR	84.1		P	40 - 140
Microcystin YR	94.1		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2145421	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376585

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2145302	Kjeldahl Nitrogen	105	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P376473

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2145337	NO2NO3-N	97.5	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P376270

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2145334	Total-P	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P376180

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2145335	O-Phosphate-P	99.8	96.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P375958

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2144501	Anatoxin-a	94.2	98.2	P/P	40 - 140
2144501	Cylindrospermopsin	81.5	81.6	P/P	40 - 140
2144501	Desmethyl microcystin LR	93.2	98.9	P/P	40 - 140
2144501	Microcystin LA	83.2	85.2	P/P	40 - 140
2144501	Microcystin LF	80.4	86.9	P/P	40 - 140
2144501	Microcystin LR	88.4	96.7	P/P	40 - 140
2144501	Microcystin LW	83.3	81.8	P/P	40 - 140
2144501	Microcystin LY	84.8	88.7	P/P	40 - 140
2144501	Microcystin RR	87.0	92.5	P/P	40 - 140
2144501	Microcystin WR	79.8	85.0	P/P	40 - 140
2144501	Microcystin YR	92.7	95.2	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2145421	Ammonia-N	0.736	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376585

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2145302	Kjeldahl Nitrogen	2.66	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P376473

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2145337	NO2NO3-N	1.02	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P376270

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2145334	Total-P	0.951	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P376180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2145335	O-Phosphate-P	2.91	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P375958

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2144501	Anatoxin-a	4.23	Spike	P	0 - 30
2144501	Cylindrospermopsin	0.0674	Spike	P	0 - 30
2144501	Desmethyl microcystin LR	5.94	Spike	P	0 - 30
2144501	Microcystin LA	2.36	Spike	P	0 - 30
2144501	Microcystin LF	7.75	Spike	P	0 - 30
2144501	Microcystin LR	8.97	Spike	P	0 - 30
2144501	Microcystin LW	1.82	Spike	P	0 - 30
2144501	Microcystin LY	4.45	Spike	P	0 - 30
2144501	Microcystin RR	6.13	Spike	P	0 - 30
2144501	Microcystin WR	6.33	Spike	P	0 - 30
2144501	Microcystin YR	2.74	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2145341
Field Sample ID: SD121819-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	89.3	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A96474
Included Lab Sample IDs: 2145341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	83.6	84.1	P/P	50 - 160
Cylindrospermopsin	96.2	99.3	P/P	60 - 160
Desmethyl microcystin LR	91.1	92.9	P/P	50 - 160
Microcystin LA	85.7	87.6	P/P	50 - 160
Microcystin LF	86.1	87.5	P/P	60 - 160
Microcystin LR	81.9	87.4	P/P	60 - 160
Microcystin LW	83.8	84.8	P/P	50 - 160
Microcystin LY	84.9	86.1	P/P	60 - 160
Microcystin RR	85.4	87.2	P/P	60 - 160
Microcystin WR	74.2	79.2	P/P	60 - 160
Microcystin YR	83.6	83.6	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A96476
Included Lab Sample IDs: 2145347

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.3	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A96537
Included Lab Sample IDs: 2145346

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A96586
Included Lab Sample IDs: 2145346

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A96590
Included Lab Sample IDs: 2145346

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A96702
Included Lab Sample IDs: 2145346

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.0	100	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	98.3	101	102			0.736
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	105	101			2.66
EPA 353.2 Rev. 2.0	NO2NO3-N	100	97.5	98.5			1.02
EPA 365.1 Rev. 2.0	Total-P	104	104	103			0.951
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.8	96.1			2.91
EPA 8321B	Anatoxin-a	112	94.2	98.2			4.23
	Cylindrospermopsin	112	81.5	81.6			0.0674
	Desmethyl microcystin LR	104	93.2	98.9			5.94
	Microcystin LA	96.8	83.2	85.2			2.36
	Microcystin LF	98.3	80.4	86.9			7.75
	Microcystin LR	95.0	88.4	96.7			8.97
	Microcystin LW	95.2	83.3	81.8			1.82
	Microcystin LY	96.8	84.8	88.7			4.45
	Microcystin RR	101	87.0	92.5			6.13
	Microcystin WR	84.1	79.8	85.0			6.33
	Microcystin YR	94.1	92.7	95.2			2.74

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2145346
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2145346
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2145346
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2145346
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2145347
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2145341

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	12/19/2019			12/26/2019 16:52	Ping Hua	2145346
EPA 351.2 Rev. 2.0	12/19/2019	01/02/2020 13:10	Sima Feizi	01/03/2020 15:38	Virginia P. Brown	2145346
EPA 353.2 Rev. 2.0	12/19/2019			12/27/2019 10:24	Beverly Y. Sanders	2145346
EPA 365.1 Rev. 2.0	12/19/2019	12/20/2019 13:10	Yen Ta	12/23/2019 13:03	Benjamin T. Nordmann	2145346
EPA 365.1 Rev. 2.0 dissolved	12/19/2019			12/19/2019 16:05	Samantha Davila	2145347
EPA 8321B	12/19/2019	12/19/2019 13:20	Juyoung Kim	12/19/2019 15:31	Juyoung Kim	2145341