Chemical Analysis Report

WQAP-2020-01-15-01

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

Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2019-10-28-57**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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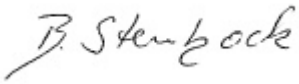
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 04-FEB-2020 13:04



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 Grace @ SE Corner **Collection Date/Time: 01/14/2020 12:54**

Field ID: HABCE0002 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2149423	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P377133	
		Cylindrospermopsin**	0.25	U	ug/L	P377133	
		Desmethyl microcystin LR**	0.25	U	ug/L	P377133	
		Microcystin LA**	0.45	I	ug/L	P377133	
		Microcystin LF**	0.25	U	ug/L	P377133	
		Microcystin LR**	0.32	I	ug/L	P377133	
		Microcystin LW**	0.25	U	ug/L	P377133	
		Microcystin LY**	0.25	U	ug/L	P377133	
		Microcystin RR**	0.25	U	ug/L	P377133	
		Microcystin WR**	0.50	U	ug/L	P377133	
		Microcystin YR**	0.25	U	ug/L	P377133	
2149431	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P377307	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P377889	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.062		mg N/L	P377419	
	EPA 365.1 Rev. 2.0	Total-P	0.092		mg P/L	P377543	
2149432	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P377211	

Ref. Method and Comment:
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: P377307

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P377889

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P377419

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377543

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P377211

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

Reference Method: EPA 8321B
Batch ID: P377133

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: P377307

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.3		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P377889

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P377419

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377543

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: P377211

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	104		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P377133

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	95.8		P	40 - 140
Cylindrospermopsin	104		P	40 - 140
Desmethyl microcystin LR	91.4		P	40 - 140
Microcystin LA	96.4		P	40 - 140
Microcystin LF	110		P	40 - 140
Microcystin LR	94.0		P	40 - 140
Microcystin LW	93.8		P	40 - 140
Microcystin LY	92.0		P	40 - 140
Microcystin RR	105		P	40 - 140
Microcystin WR	93.1		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: P377307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2149431	Ammonia-N	96.4	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P377419

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2149378	NO2NO3-N	94.5	94.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377543

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2149375	Total-P	107	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P377211

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2149376	O-Phosphate-P	95.4	96.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P377133

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2148613	Anatoxin-a	107	98.2	P/P	40 - 140
2148613	Cylindrospermopsin	100	92.1	P/P	40 - 140
2148613	Desmethyl microcystin LR	97.2	102	P/P	40 - 140
2148613	Microcystin LA	106	93.6	P/P	40 - 140
2148613	Microcystin LF	102	95.3	P/P	40 - 140
2148613	Microcystin LR	102	101	P/P	40 - 140
2148613	Microcystin LW	86.5	89.9	P/P	40 - 140
2148613	Microcystin LY	90.2	79.9	P/P	40 - 140
2148613	Microcystin RR	88.5	90.6	P/P	40 - 140
2148613	Microcystin WR	90.9	89.6	P/P	40 - 140
2148613	Microcystin YR	96.2	93.3	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P377307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2149431	Ammonia-N	2.71	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P377889

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2150156	Kjeldahl Nitrogen	2.46	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P377419

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2149378	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377543

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2149375	Total-P	1.11	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P377211

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2149376	O-Phosphate-P	0.961	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P377133

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2148613	Anatoxin-a	8.21	Spike	P	0 - 30
2148613	Cylindrospermopsin	8.42	Spike	P	0 - 30
2148613	Desmethyl microcystin LR	4.34	Spike	P	0 - 30
2148613	Microcystin LA	12.0	Spike	P	0 - 30
2148613	Microcystin LF	6.84	Spike	P	0 - 30
2148613	Microcystin LR	0.795	Spike	P	0 - 30
2148613	Microcystin LW	3.78	Spike	P	0 - 30
2148613	Microcystin LY	12.1	Spike	P	0 - 30
2148613	Microcystin RR	2.26	Spike	P	0 - 30
2148613	Microcystin WR	1.43	Spike	P	0 - 30
2148613	Microcystin YR	3.10	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2149423
Field Sample ID: HABCE0002

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	87.8	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A96905
Included Lab Sample IDs: 2149432

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	98.9	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A96939
Included Lab Sample IDs: 2149423

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	80.8	76.0	P/P	50 - 160
Cylindrospermopsin	81.7	80.4	P/P	60 - 160
Desmethyl microcystin LR	73.7	74.8	P/P	60 - 160
Microcystin LA	86.4	83.2	P/P	50 - 160
Microcystin LF	78.3	84.7	P/P	60 - 160
Microcystin LR	78.2	78.1	P/P	60 - 160
Microcystin LW	79.3	77.8	P/P	60 - 160
Microcystin LY	72.1	74.5	P/P	60 - 160
Microcystin RR	80.4	76.3	P/P	60 - 160
Microcystin WR	72.9	74.5	P/P	60 - 160
Microcystin YR	74.8	75.6	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A96950
Included Lab Sample IDs: 2149431

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A96974
Included Lab Sample IDs: 2149431

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	97.0	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A97097
Included Lab Sample IDs: 2149431

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A97208
Included Lab Sample IDs: 2149431

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	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	99.3	96.4	99.8			2.71
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106					2.46
EPA 353.2 Rev. 2.0	NO2NO3-N	97.5	94.5	94.5			0.0
EPA 365.1 Rev. 2.0	Total-P	105	107	108			1.11
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	95.4	96.6			0.961
EPA 8321B	Anatoxin-a	95.8	107	98.2			8.21
	Cylindrospermopsin	104	100	92.1			8.42
	Desmethyl microcystin LR	91.4	97.2	102			4.34
	Microcystin LA	96.4	106	93.6			12.0
	Microcystin LF	110	102	95.3			6.84
	Microcystin LR	94.0	102	101			0.795
	Microcystin LW	93.8	86.5	89.9			3.78
	Microcystin LY	92.0	90.2	79.9			12.1
	Microcystin RR	105	88.5	90.6			2.26
	Microcystin WR	93.1	90.9	89.6			1.43
	Microcystin YR	94.1	96.2	93.3			3.10

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2149431
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2149431
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2149431
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2149431
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2149432
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2149423

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	01/15/2020			01/16/2020 15:52	Ping Hua	2149431
EPA 351.2 Rev. 2.0	01/15/2020	01/29/2020 14:30	Jhamieka S. Greenwood	01/30/2020 09:42	Jhamieka S. Greenwood	2149431
EPA 353.2 Rev. 2.0	01/15/2020			01/17/2020 12:05	Beverly Y. Sanders	2149431
EPA 365.1 Rev. 2.0	01/15/2020	01/22/2020 14:24	Yen Ta	01/23/2020 14:55	Benjamin T. Nordmann	2149431
EPA 365.1 Rev. 2.0 dissolved	01/15/2020			01/15/2020 17:37	Jhamieka S. Greenwood	2149432
EPA 8321B	01/15/2020	01/16/2020 08:05	Juyoung Kim	01/16/2020 13:41	Juyoung Kim	2149423