Chemical Analysis Report

WQAP-2019-11-21-03

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-2019-07-08-79**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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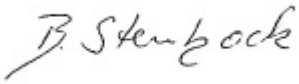
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 11-DEC-2019 17:44



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: HAB_112019_LkHunter **Collection Date/Time: 11/20/2019 11:50**

Field ID: HAB-SW-0004 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2137987	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P374279	
		Cylindrospermopsin**	0.25	U	ug/L	P374279	
		Desmethyl microcystin LR**	0.25	U	ug/L	P374279	
		Microcystin LA**	0.32	I	ug/L	P374279	
		Microcystin LF**	0.25	U	ug/L	P374279	
		Microcystin LR**	0.48	I	ug/L	P374279	
		Microcystin LW**	0.25	U	ug/L	P374279	
		Microcystin LY**	0.25	U	ug/L	P374279	
		Microcystin RR**	0.25	U	ug/L	P374279	
		Microcystin WR**	0.25	U	ug/L	P374279	
		Microcystin YR**	0.25	U	ug/L	P374279	

Sample Location: HAB_112019_LkHunter **Collection Date/Time: 11/20/2019 11:50**

Field ID: HAB-SW-0004 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2137988	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P374839	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.2		mg N/L	P375082	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P374702	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P375112	
2137989	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P374596	

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: P374839

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P375082

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P374702

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P375112

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P374596

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

Reference Method: EPA 8321B
Batch ID: P374279

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: P374839

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.7		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P375082

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: P374702

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: P375112

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: P374596

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

Reference Method: EPA 8321B
Batch ID: P374279

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	101		P	40 - 140
Cylindrospermopsin	85.8		P	40 - 140
Desmethyl microcystin LR	103		P	40 - 140
Microcystin LA	102		P	40 - 140
Microcystin LF	98.0		P	40 - 140
Microcystin LR	107		P	40 - 140
Microcystin LW	104		P	40 - 140
Microcystin LY	97.6		P	40 - 140
Microcystin RR	96.0		P	40 - 140
Microcystin WR	97.4		P	40 - 140
Microcystin YR	92.6		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P374839

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2137621	Ammonia-N	98.7	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P374702

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2137988	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P375112

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2137969	Total-P	106	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P374596

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2137929	O-Phosphate-P	94.9	95.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P374279

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2136528	Anatoxin-a	101	96.8	P/P	40 - 140
2136528	Cylindrospermopsin	75.0	77.8	P/P	40 - 140
2136528	Desmethyl microcystin LR	108	114	P/P	40 - 140
2136528	Microcystin LA	95.9	99.5	P/P	40 - 140
2136528	Microcystin LF	97.8	95.0	P/P	40 - 140
2136528	Microcystin LR	107	111	P/P	40 - 140
2136528	Microcystin LW	99.5	102	P/P	40 - 140
2136528	Microcystin LY	101	108	P/P	40 - 140
2136528	Microcystin RR	99.0	97.8	P/P	40 - 140
2136528	Microcystin WR	105	105	P/P	40 - 140
2136528	Microcystin YR	110	107	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P374839

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2137621	Ammonia-N	1.45	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P375082

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2138024	Kjeldahl Nitrogen	6.48	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P374702

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2137988	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P375112

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2137969	Total-P	5.09	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P374596

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2137929	O-Phosphate-P	0.421	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P374279

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2136528	Anatoxin-a	4.62	Spike	P	0 - 30
2136528	Cylindrospermopsin	3.57	Spike	P	0 - 30
2136528	Desmethyl microcystin LR	5.25	Spike	P	0 - 30
2136528	Microcystin LA	3.64	Spike	P	0 - 30
2136528	Microcystin LF	2.93	Spike	P	0 - 30
2136528	Microcystin LR	3.15	Spike	P	0 - 30
2136528	Microcystin LW	2.63	Spike	P	0 - 30
2136528	Microcystin LY	6.29	Spike	P	0 - 30
2136528	Microcystin RR	1.27	Spike	P	0 - 30
2136528	Microcystin WR	0.520	Spike	P	0 - 30
2136528	Microcystin YR	2.60	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2137987
Field Sample ID: HAB-SW-0004

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	85.0	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A95880
Included Lab Sample IDs: 2137989

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	100	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A95888
Included Lab Sample IDs: 2137987

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	133	93.6	P/P	50 - 160
Cylindrospermopsin	104	92.2	P/P	60 - 160
Desmethyl microcystin LR	95.4	86.1	P/P	50 - 160
Microcystin LA	101	91.5	P/P	50 - 160
Microcystin LF	92.5	83.7	P/P	60 - 160
Microcystin LR	103	98.8	P/P	60 - 160
Microcystin LW	89.6	89.8	P/P	50 - 160
Microcystin LY	105	86.2	P/P	60 - 160
Microcystin RR	98.3	88.9	P/P	60 - 160
Microcystin WR	88.9	88.4	P/P	60 - 160
Microcystin YR	99.4	82.4	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A95909
Included Lab Sample IDs: 2137988

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: A95959
Included Lab Sample IDs: 2137988

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.6	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A96108
Included Lab Sample IDs: 2137988

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A96111
Included Lab Sample IDs: 2137988

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	104	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	97.7	98.7	100			1.45
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102					6.48
EPA 353.2 Rev. 2.0	NO2NO3-N	101	100	100			0.0
EPA 365.1 Rev. 2.0	Total-P	104	106	101			5.09
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	95.4	94.9	95.3			0.421
EPA 8321B	Anatoxin-a	101	101	96.8			4.62
	Cylindrospermopsin	85.8	75.0	77.8			3.57
	Desmethyl microcystin LR	103	108	114			5.25
	Microcystin LA	102	95.9	99.5			3.64
	Microcystin LF	98.0	97.8	95.0			2.93
	Microcystin LR	107	107	111			3.15
	Microcystin LW	104	99.5	102			2.63
	Microcystin LY	97.6	101	108			6.29
	Microcystin RR	96.0	99.0	97.8			1.27
	Microcystin WR	97.4	105	105			0.520
	Microcystin YR	92.6	110	107			2.60

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2137988
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2137988
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2137988
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2137988
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2137989
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2137987

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	11/21/2019			11/25/2019 12:11	Ping Hua	2137988
EPA 351.2 Rev. 2.0	11/21/2019	12/03/2019 12:50	Sima Feizi	12/04/2019 13:36	Jhamieka S. Greenwood	2137988
EPA 353.2 Rev. 2.0	11/21/2019			11/22/2019 13:13	Beverly Y. Sanders	2137988
EPA 365.1 Rev. 2.0	11/21/2019	12/03/2019 13:30	Lipi Saha	12/04/2019 12:05	Benjamin T. Nordmann	2137988
EPA 365.1 Rev. 2.0 dissolved	11/21/2019			11/21/2019 13:09	Lipi Saha	2137989
EPA 8321B	11/21/2019	11/21/2019 11:30	Juyoung Kim	11/21/2019 22:35	Juyoung Kim	2137987