Chemical Analysis Report

WQAP-2019-06-27-01

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-2019-06-24-60**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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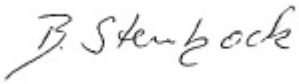
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 10-JUL-2019 16:39



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: HILLS. RIVER MOUTH @ DAVIS ISLAND **Collection Date/Time: 06/26/2019 14:00**

Field ID: HILLS. RIVER MOUTH @ DAVIS ISL Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2098769	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P366373	
		Cylindrospermopsin**	0.25	U	ug/L	P366373	
		Microcystin LA**	0.25	U	ug/L	P366373	
		Microcystin LF**	0.25	U	ug/L	P366373	
		Microcystin LR**	0.25	U	ug/L	P366373	
		Microcystin LY**	0.25	U	ug/L	P366373	
		Microcystin RR**	0.25	U	ug/L	P366373	
		Microcystin YR**	0.25	U	ug/L	P366373	
		Saxitoxin**	0.25	UJ	ug/L	P366373	MS

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

Sample Location: HILLS. RIVER MOUTH @ DAVIS ISLAND **Collection Date/Time: 06/26/2019 14:00**

Field ID: HILLS. RIVER MOUTH @ DAVIS ISL Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2098774	EPA 350.1 Rev. 2.0	Ammonia-N	0.041		mg N/L	P366550	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.53		mg N/L	P366471	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.011		mg N/L	P366596	
	EPA 365.1 Rev. 2.0	Total-P	0.22		mg P/L	P366467	
2098775	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.20		mg P/L	P366457	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P366550

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P366471

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366596

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P366467

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P366457

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

Reference Method: EPA 8321B
Batch ID: P366373

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: P366550

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P366471

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366596

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: P366467

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P366457

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

Reference Method: EPA 8321B
Batch ID: P366373

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	107		P	40 - 140
Cylindrospermopsin	102		P	40 - 140
Microcystin LA	90.6		P	40 - 140
Microcystin LF	114		P	40 - 140
Microcystin LR	88.9		P	40 - 140
Microcystin LY	98.3		P	40 - 140
Microcystin RR	101		P	40 - 140
Microcystin YR	85.8		P	40 - 140
Saxitoxin	140		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P366550

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2098774	Ammonia-N	108	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P366471

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2098881	Kjeldahl Nitrogen	98.7	94.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366596

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2098724	NO2NO3-N	108	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P366467

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2098881	Total-P	93.9	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P366457

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2098982	O-Phosphate-P	96.2	97.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P366373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2098384	Anatoxin-a	104	104	P/P	40 - 140
2098384	Cylindrospermopsin	92.0	93.0	P/P	40 - 140
2098384	Microcystin LA	81.8	80.3	P/P	40 - 140
2098384	Microcystin LF	103	102	P/P	40 - 140
2098384	Microcystin LR	83.4	85.8	P/P	40 - 140
2098384	Microcystin LY	86.3	84.9	P/P	40 - 140
2098384	Microcystin RR	93.7	92.2	P/P	40 - 140
2098384	Microcystin YR	87.3	83.7	P/P	40 - 140
2098384	Saxitoxin	38.8	44.7	F/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P366550

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2098774	Ammonia-N	0.295	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P366471

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2098881	Kjeldahl Nitrogen	3.27	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P366596

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2098724	NO2NO3-N	3.79	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P366467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2098881	Total-P	1.86	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P366457

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2098982	O-Phosphate-P	1.44	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P366373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2098384	Anatoxin-a	0.144	Spike	P	0 - 30
2098384	Cylindrospermopsin	1.12	Spike	P	0 - 30
2098384	Microcystin LA	1.76	Spike	P	0 - 30
2098384	Microcystin LF	1.48	Spike	P	0 - 30
2098384	Microcystin LR	2.85	Spike	P	0 - 30
2098384	Microcystin LY	1.67	Spike	P	0 - 30
2098384	Microcystin RR	1.62	Spike	P	0 - 30
2098384	Microcystin YR	4.25	Spike	P	0 - 30
2098384	Saxitoxin	14.3	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: 2098769
Field Sample ID: HILLS. RIVER MOUTH @ DAVIS ISL

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	101	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A92421
Included Lab Sample IDs: 2098775

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.4	97.5	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A92441
Included Lab Sample IDs: 2098769

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	103	104	P/P	50 - 160
Cylindrospermopsin	96.8	98.4	P/P	60 - 160
Microcystin LA	91.4	87.8	P/P	50 - 160
Microcystin LF	100	99.5	P/P	60 - 160
Microcystin LR	85.6	82.0	P/P	60 - 160
Microcystin LY	95.8	89.8	P/P	60 - 160
Microcystin RR	99.0	95.7	P/P	60 - 160
Microcystin YR	89.4	83.4	P/P	60 - 160
Saxitoxin	112	114	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A92461
Included Lab Sample IDs: 2098774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	107	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A92464
Included Lab Sample IDs: 2098774

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A92496
Included Lab Sample IDs: 2098774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A92514
Included Lab Sample IDs: 2098774

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.9	95.6	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	105	108	108			0.295
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.2	98.7	94.3			3.27
EPA 353.2 Rev. 2.0	NO2NO3-N	102	108	104			3.79
EPA 365.1 Rev. 2.0	Total-P	99.4	93.9	95.8			1.86
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	96.2	97.6			1.44
EPA 8321B	Anatoxin-a	107	104	104			0.144
	Cylindrospermopsin	102	92.0	93.0			1.12
	Microcystin LA	90.6	81.8	80.3			1.76
	Microcystin LF	114	103	102			1.48
	Microcystin LR	88.9	83.4	85.8			2.85
	Microcystin LY	98.3	86.3	84.9			1.67
	Microcystin RR	101	93.7	92.2			1.62
	Microcystin YR	85.8	87.3	83.7			4.25
	Saxitoxin	140	38.8	44.7			14.3

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2098774
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2098774
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2098774
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2098774
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2098775
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2098769

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	06/27/2019			06/27/2019 14:08	Ping Hua	2098774
EPA 351.2 Rev. 2.0	06/27/2019	06/28/2019 11:25	Sima Feizi	07/02/2019 12:47	Joseph Suarez	2098774
EPA 353.2 Rev. 2.0	06/27/2019			07/02/2019 10:37	Beverly Y. Sanders	2098774
EPA 365.1 Rev. 2.0	06/27/2019	06/28/2019 12:40	Sima Feizi	07/01/2019 09:43	Beverly Y. Sanders	2098774
EPA 365.1 Rev. 2.0 dissolved	06/27/2019			06/27/2019 16:16	Jhamieka S. Greenwood	2098775
EPA 8321B	06/27/2019	06/28/2019 12:00	Juyoung Kim	06/28/2019 14:06	Juyoung Kim	2098769