Chemical Analysis Report

WQAP-2021-06-04-05

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

Event Description: **Algal Bloom Response -Lee County**
Request ID: **RQ-2021-06-07-55**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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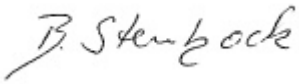
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 24-JUN-2021 18:11



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: Alva Boat Ramp **Collection Date/Time: 06/03/2021 08:45**

Field ID: Alva Boat Ramp Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2252222	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P399191	
		Cylindrospermopsin	0.10	U	ug/L	P399191	
		Desmethyl microcystin LR	0.25	U	ug/L	P399191	
		Microcystin HilR**	0.25	U	ug/L	P399191	
		Microcystin HtyR**	0.25	U	ug/L	P399191	
		Microcystin LA	0.10	U	ug/L	P399191	
		Microcystin LF	0.10	U	ug/L	P399191	
		Microcystin LR	0.52	I	ug/L	P399191	
		Microcystin LW	0.25	U	ug/L	P399191	
		Microcystin LY	0.10	U	ug/L	P399191	
		Microcystin RR	0.10	U	ug/L	P399191	
		Microcystin WR	0.50	U	ug/L	P399191	
		Microcystin YR	0.25	U	ug/L	P399191	
		Nodularin-R**	0.10	U	ug/L	P399191	
2252223	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P399518	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P399565	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P399291	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P399438	
2252224	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.032		mg P/L	P399266	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399518

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399438

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399266

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

Reference Method: EPA 8321B
Batch ID: P399191

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HilR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399518

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

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: P399438

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: P399266

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

Reference Method: EPA 8321B
Batch ID: P399191

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	109		P	40 - 150
Cylindrospermopsin	122		P	40 - 150
Desmethyl microcystin LR	109		P	40 - 150
Microcystin HilR	113		P	40 - 150
Microcystin HtyR	107		P	40 - 150
Microcystin LA	124		P	40 - 150
Microcystin LF	118		P	40 - 150
Microcystin LR	98.5		P	40 - 150
Microcystin LW	116		P	40 - 150
Microcystin LY	132		P	40 - 150
Microcystin RR	127		P	40 - 150
Microcystin WR	105		P	40 - 150
Microcystin YR	108		P	40 - 150
Nodularin-R	120		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399518

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252175	Ammonia-N	95.0	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252070	Kjeldahl Nitrogen	104	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252175	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399438

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251805	Total-P	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399266

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252144	O-Phosphate-P	99.0	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P399191

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252104	Anatoxin-a	114	107	P/P	40 - 150
2252104	Cylindrospermopsin	114	111	P/P	40 - 150
2252104	Desmethyl microcystin LR	103	96.5	P/P	40 - 150
2252104	Microcystin HilR	114	102	P/P	40 - 150
2252104	Microcystin HtyR	108	109	P/P	40 - 150
2252104	Microcystin LA	117	117	P/P	40 - 150
2252104	Microcystin LF	108	106	P/P	40 - 150
2252104	Microcystin LR	102	104	P/P	40 - 150
2252104	Microcystin LW	110	108	P/P	40 - 150
2252104	Microcystin LY	119	116	P/P	40 - 150
2252104	Microcystin RR	119	119	P/P	40 - 150
2252104	Microcystin WR	110	106	P/P	40 - 150
2252104	Microcystin YR	115	113	P/P	40 - 150
2252104	Nodularin-R	120	111	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399518

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252175	Ammonia-N	5.55	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399565

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252070	Kjeldahl Nitrogen	1.61	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399291

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252175	NO2NO3-N	0.407	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399438

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251805	Total-P	1.22	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399266

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252144	O-Phosphate-P	1.40	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P399191

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252104	Anatoxin-a	6.13	Spike	P	0 - 30
2252104	Cylindrospermopsin	2.46	Spike	P	0 - 30
2252104	Desmethyl microcystin LR	6.07	Spike	P	0 - 30
2252104	Microcystin HilR	10.7	Spike	P	0 - 30
2252104	Microcystin HtyR	0.511	Spike	P	0 - 30
2252104	Microcystin LA	0.716	Spike	P	0 - 30
2252104	Microcystin LF	2.21	Spike	P	0 - 30
2252104	Microcystin LR	1.83	Spike	P	0 - 30
2252104	Microcystin LW	2.31	Spike	P	0 - 30
2252104	Microcystin LY	2.45	Spike	P	0 - 30
2252104	Microcystin RR	0.0402	Spike	P	0 - 30
2252104	Microcystin WR	4.24	Spike	P	0 - 30
2252104	Microcystin YR	1.65	Spike	P	0 - 30
2252104	Nodularin-R	7.43	Spike	P	0 - 30

Quality Assurance Report
Precision

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2252222
Field Sample ID: Alva Boat Ramp

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	101	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	102	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A105880
Included Lab Sample IDs: 2252222

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	103	97.9	P/P	50 - 160
Cylindrospermopsin	114	115	P/P	50 - 160
Desmethyl microcystin LR	110	99.5	P/P	50 - 160
Microcystin HilR	114	111	P/P	50 - 160
Microcystin HtyR	113	115	P/P	50 - 160
Microcystin LA	130	124	P/P	50 - 160
Microcystin LF	123	126	P/P	50 - 160
Microcystin LR	109	113	P/P	50 - 160
Microcystin LW	115	116	P/P	50 - 160
Microcystin LY	130	127	P/P	50 - 160
Microcystin RR	122	120	P/P	50 - 160
Microcystin WR	116	118	P/P	50 - 160
Microcystin YR	121	119	P/P	50 - 160
Nodularin-R	124	116	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A105891
Included Lab Sample IDs: 2252224

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	99.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A105912
Included Lab Sample IDs: 2252223

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A105983
Included Lab Sample IDs: 2252223

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	103	P/P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A105993
Included Lab Sample IDs: 2252223

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.0	96.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A106075
Included Lab Sample IDs: 2252223

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

* 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	97.4	95.0	101			5.55
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.6	104	106			1.61
EPA 353.2 Rev. 2.0	NO2NO3-N	101	101	101			0.407
EPA 365.1 Rev. 2.0	Total-P	102	102	101			1.22
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.0	100			1.40
EPA 8321B	Anatoxin-a	109	114	107			6.13
	Cylindrospermopsin	122	114	111			2.46
	Desmethyl microcystin LR	109	103	96.5			6.07
	Microcystin HilR	113	114	102			10.7
	Microcystin HtyR	107	108	109			0.511
	Microcystin LA	124	117	117			0.716
	Microcystin LF	118	108	106			2.21
	Microcystin LR	98.5	102	104			1.83
	Microcystin LW	116	110	108			2.31
	Microcystin LY	132	119	116			2.45
	Microcystin RR	127	119	119			0.0402
	Microcystin WR	105	110	106			4.24
	Microcystin YR	108	115	113			1.65
	Nodularin-R	120	120	111			7.43

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2252223
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2252223
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2252223
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2252223
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2252224
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2252222

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	06/04/2021			06/10/2021 13:57	Roberta Tatti	2252223
EPA 351.2 Rev. 2.0	06/04/2021	06/11/2021 14:03	Benjamin T. Nordmann	06/14/2021 14:59	Virginia P. Brown	2252223
EPA 353.2 Rev. 2.0	06/04/2021			06/07/2021 11:00	Beverly Y. Sanders	2252223
EPA 365.1 Rev. 2.0	06/04/2021	06/09/2021 14:02	Yen Ta	06/10/2021 12:26	Shengyu Ding	2252223
EPA 365.1 Rev. 2.0 dissolved	06/04/2021			06/04/2021 16:57	Ping Hua	2252224
EPA 8321B	06/04/2021	06/04/2021 11:00	Pramila Ghimire	06/04/2021 16:32	Pramila Ghimire	2252222