Chemical Analysis Report

WQAP-2021-05-20-01

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-2021-05-17-68**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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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: Orange River - Orange Harbor RV **Collection Date/Time: 05/17/2021 09:20**

Field ID: HAB-SD-051721-01 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2248735	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P398352	
		Cylindrospermopsin	0.10	U	ug/L	P398352	
		Desmethyl microcystin LR	0.25	U	ug/L	P398352	
		Microcystin HilR**	0.25	U	ug/L	P398352	
		Microcystin HtyR**	0.25	U	ug/L	P398352	
		Microcystin LA	0.10	U	ug/L	P398352	
		Microcystin LF	0.10	U	ug/L	P398352	
		Microcystin LR	1.1		ug/L	P398352	
		Microcystin LW	0.25	U	ug/L	P398352	
		Microcystin LY	0.10	U	ug/L	P398352	
		Microcystin RR	0.10	U	ug/L	P398352	
		Microcystin WR	0.50	U	ug/L	P398352	
		Microcystin YR	0.25	U	ug/L	P398352	
		Nodularin-R**	0.10	U	ug/L	P398352	
2248736	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P398994	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P398682	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.013		mg N/L	P398399	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P398542	
2248737	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.057		mg P/L	P398368	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398994

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398682

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398399

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398542

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398368

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

Reference Method: EPA 8321B
Batch ID: P398352

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: P398994

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398682

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398399

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: P398542

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398368

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

Reference Method: EPA 8321B
Batch ID: P398352

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	98.7		P	40 - 150
Cylindrospermopsin	101		P	40 - 150
Desmethyl microcystin LR	88.7		P	40 - 150
Microcystin HilR	94.1		P	40 - 150
Microcystin HtyR	96.3		P	40 - 150
Microcystin LA	97.5		P	40 - 150
Microcystin LF	92.5		P	40 - 150
Microcystin LR	91.1		P	40 - 150
Microcystin LW	95.2		P	40 - 150
Microcystin LY	102		P	40 - 150
Microcystin RR	111		P	40 - 150
Microcystin WR	91.7		P	40 - 150
Microcystin YR	99.3		P	40 - 150
Nodularin-R	107		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398994

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247848	Ammonia-N	93.8	98.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398682

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248492	Kjeldahl Nitrogen	103	110	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398399

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247813	NO2NO3-N	99.0	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398542

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247507	Total-P	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247790	O-Phosphate-P	95.2	95.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P398352

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247820	Anatoxin-a	92.5	91.3	P/P	40 - 150
2247820	Cylindrospermopsin	95.2	94.5	P/P	40 - 150
2247820	Desmethyl microcystin LR	88.8	92.7	P/P	40 - 150
2247820	Microcystin HilR	96.0	95.5	P/P	40 - 150
2247820	Microcystin HtyR	92.8	97.8	P/P	40 - 150
2247820	Microcystin LA	92.1	95.9	P/P	40 - 150
2247820	Microcystin LF	94.1	92.4	P/P	40 - 150
2247820	Microcystin LR	93.2	100	P/P	40 - 150
2247820	Microcystin LW	89.8	97.8	P/P	40 - 150
2247820	Microcystin LY	99.2	104	P/P	40 - 150
2247820	Microcystin RR	108	108	P/P	40 - 150
2247820	Microcystin WR	91.4	92.2	P/P	40 - 150
2247820	Microcystin YR	99.1	97.4	P/P	40 - 150
2247820	Nodularin-R	105	110	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398994

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247848	Ammonia-N	4.08	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398682

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248492	Kjeldahl Nitrogen	5.80	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398399

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247813	NO2NO3-N	0.418	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398542

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247507	Total-P	1.02	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398368

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247790	O-Phosphate-P	0.0641	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P398352

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247820	Anatoxin-a	1.30	Spike	P	0 - 30
2247820	Cylindrospermopsin	0.772	Spike	P	0 - 30
2247820	Desmethyl microcystin LR	4.33	Spike	P	0 - 30
2247820	Microcystin HilR	0.473	Spike	P	0 - 30
2247820	Microcystin HtyR	5.20	Spike	P	0 - 30
2247820	Microcystin LA	4.01	Spike	P	0 - 30
2247820	Microcystin LF	1.81	Spike	P	0 - 30
2247820	Microcystin LR	6.45	Spike	P	0 - 30
2247820	Microcystin LW	8.53	Spike	P	0 - 30
2247820	Microcystin LY	5.04	Spike	P	0 - 30
2247820	Microcystin RR	0.280	Spike	P	0 - 30
2247820	Microcystin WR	0.872	Spike	P	0 - 30
2247820	Microcystin YR	1.75	Spike	P	0 - 30
2247820	Nodularin-R	4.34	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: 2248735
Field Sample ID: HAB-SD-051721-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	89.3	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	94.5	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A105506
Included Lab Sample IDs: 2248737

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.5	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A105523
Included Lab Sample IDs: 2248736

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

Reference Method: EPA 8321B
Run ID: A105538
Included Lab Sample IDs: 2248735

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	98.8	89.0	P/P	50 - 160
Cylindrospermopsin	106	99.1	P/P	60 - 160
Desmethyl microcystin LR	87.6	104	P/P	60 - 160
Microcystin HilR	96.3	112	P/P	60 - 160
Microcystin HtyR	98.7	112	P/P	60 - 160
Microcystin LA	99.2	108	P/P	50 - 160
Microcystin LF	96.6	93.0	P/P	60 - 160
Microcystin LR	83.4	115	P/P	60 - 160
Microcystin LW	107	107	P/P	60 - 160
Microcystin LY	106	124	P/P	60 - 160
Microcystin RR	110	124	P/P	60 - 160
Microcystin WR	91.4	121	P/P	60 - 160
Microcystin YR	104	115	P/P	60 - 160
Nodularin-R	100	116	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A105588
Included Lab Sample IDs: 2248736

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A105725
Included Lab Sample IDs: 2248736

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.7	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A105765
Included Lab Sample IDs: 2248736

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	98.1	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	98.2	93.8	98.6			4.08
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	103	110			5.80
EPA 353.2 Rev. 2.0	NO2NO3-N	101	99.0	99.6			0.418
EPA 365.1 Rev. 2.0	Total-P	106	106	105			1.02
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.3	95.2	95.1			0.0641
EPA 8321B	Anatoxin-a	98.7	92.5	91.3			1.30
	Cylindrospermopsin	101	95.2	94.5			0.772
	Desmethyl microcystin LR	88.7	88.8	92.7			4.33
	Microcystin HilR	94.1	96.0	95.5			0.473
	Microcystin HtyR	96.3	92.8	97.8			5.20
	Microcystin LA	97.5	92.1	95.9			4.01
	Microcystin LF	92.5	94.1	92.4			1.81
	Microcystin LR	91.1	93.2	100			6.45
	Microcystin LW	95.2	89.8	97.8			8.53
	Microcystin LY	102	99.2	104			5.04
	Microcystin RR	111	108	108			0.280
	Microcystin WR	91.7	91.4	92.2			0.872
	Microcystin YR	99.3	99.1	97.4			1.75
	Nodularin-R	107	105	110			4.34

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2248736
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2248736
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2248736
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2248736
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2248737
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2248735

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	05/18/2021			05/28/2021 12:45	Roberta Tatti	2248736
EPA 351.2 Rev. 2.0	05/18/2021	05/24/2021 12:55	Benjamin T. Nordmann	05/26/2021 14:24	Virginia P. Brown	2248736
EPA 353.2 Rev. 2.0	05/18/2021			05/19/2021 09:30	Beverly Y. Sanders	2248736
EPA 365.1 Rev. 2.0	05/18/2021	05/20/2021 14:05	Yen Ta	05/21/2021 11:14	Shengyu Ding	2248736
EPA 365.1 Rev. 2.0 dissolved	05/18/2021			05/18/2021 15:17	Lipi Saha	2248737
EPA 8321B	05/18/2021	05/19/2021 08:30	Pramila Ghimire	05/19/2021 09:57	Pramila Ghimire	2248735