Chemical Analysis Report

WQAP-2022-07-01-02

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

Event Description: **Algal Bloom Response -SOROC- Highlands**
Request ID: **RQ-2022-05-23-30**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 25-JUL-2022 11:19

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: Little Red Water Lake Avon Park **Collection Date/Time: 06/30/2022 13:05**

Field ID: HAB-HL-0630221305 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2338540	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P416123	
		Cylindrospermopsin	0.10	U	ug/L	P416123	
		Desmethyl microcystin LR	0.25	U	ug/L	P416123	
		Microcystin HilR	0.25	U	ug/L	P416123	
		Microcystin HtyR	0.25	U	ug/L	P416123	
		Microcystin LA	1.2		ug/L	P416123	
		Microcystin LF	0.10	U	ug/L	P416123	
		Microcystin LR	0.62	I	ug/L	P416123	
		Microcystin LW	0.25	U	ug/L	P416123	
		Microcystin LY	0.10	U	ug/L	P416123	
		Microcystin RR	0.22	I	ug/L	P416123	
		Microcystin WR	0.50	U	ug/L	P416123	
		Microcystin YR	0.25	U	ug/L	P416123	
		Nodularin-R	0.10	U	ug/L	P416123	
2338541	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P416346	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P416122	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P416432	
	EPA 365.1 Rev. 2.0	Total-P	0.045		mg P/L	P416185	
2338542	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P416096	

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: P416346

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416122

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416432

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416185

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416096

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

Reference Method: EPA 8321B
Batch ID: P416123

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: P416346

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416122

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416432

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: P416185

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416096

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

Reference Method: EPA 8321B
Batch ID: P416123

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	99.0		P	40 - 150
Cylindrospermopsin	86.5		P	40 - 150
Desmethyl microcystin LR	97.8		P	40 - 150
Microcystin HilR	97.0		P	40 - 150
Microcystin HtyR	96.6		P	40 - 150
Microcystin LA	99.6		P	40 - 150
Microcystin LF	123		P	40 - 150
Microcystin LR	100		P	40 - 150
Microcystin LW	88.5		P	40 - 150
Microcystin LY	74.1		P	40 - 150
Microcystin RR	102		P	40 - 150
Microcystin WR	91.4		P	40 - 150
Microcystin YR	96.5		P	40 - 150
Nodularin-R	91.5		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416346

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2338507	Ammonia-N	97.8	96.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416432

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2338420	NO2NO3-N	99.4	98.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416185

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2338416	Total-P	99.3	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416096

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2338575	O-Phosphate-P	97.7	96.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P416123

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2338525	Anatoxin-a	115	108	P/P	40 - 150
2338525	Cylindrospermopsin	89.6	81.9	P/P	40 - 150
2338525	Desmethyl microcystin LR	119	110	P/P	40 - 150
2338525	Microcystin HilR	116	105	P/P	40 - 150
2338525	Microcystin HtyR	109	105	P/P	40 - 150
2338525	Microcystin LA	91.9	87.9	P/P	40 - 150
2338525	Microcystin LF	131	110	P/P	40 - 150
2338525	Microcystin LR	117	118	P/P	40 - 150
2338525	Microcystin LW	134	115	P/P	40 - 150
2338525	Microcystin LY	83.2	88.7	P/P	40 - 150
2338525	Microcystin RR	109	107	P/P	40 - 150
2338525	Microcystin WR	111	115	P/P	40 - 150
2338525	Microcystin YR	114	109	P/P	40 - 150
2338525	Nodularin-R	109	104	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416346

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338507	Ammonia-N	0.944	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416122

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338606	Kjeldahl Nitrogen	0.821	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416432

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338420	NO2NO3-N	0.749	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416185

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338416	Total-P	2.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416096

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338575	O-Phosphate-P	1.13	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P416123

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2338525	Anatoxin-a	6.18	Spike	P	0 - 30
2338525	Cylindrospermopsin	8.99	Spike	P	0 - 30
2338525	Desmethyl microcystin LR	8.22	Spike	P	0 - 30
2338525	Microcystin HilR	10.5	Spike	P	0 - 30
2338525	Microcystin HtyR	3.31	Spike	P	0 - 30
2338525	Microcystin LA	4.47	Spike	P	0 - 30
2338525	Microcystin LF	17.9	Spike	P	0 - 30
2338525	Microcystin LR	0.643	Spike	P	0 - 30
2338525	Microcystin LW	15.1	Spike	P	0 - 30
2338525	Microcystin LY	6.40	Spike	P	0 - 30
2338525	Microcystin RR	2.06	Spike	P	0 - 30
2338525	Microcystin WR	3.56	Spike	P	0 - 30
2338525	Microcystin YR	4.45	Spike	P	0 - 30
2338525	Nodularin-R	5.04	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: 2338540
Field Sample ID: HAB-HL-0630221305

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	129	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A113240
Included Lab Sample IDs: 2338542

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

Reference Method: EPA 8321B
Run ID: A113283
Included Lab Sample IDs: 2338540

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	98.1	97.7	P/P	50 - 160
Cylindrospermopsin	83.4	82.2	P/P	50 - 160
Desmethyl microcystin LR	90.7	96.9	P/P	50 - 160
Microcystin HilR	86.7	96.6	P/P	50 - 160
Microcystin HtyR	93.1	97.7	P/P	50 - 160
Microcystin LA	90.5	85.4	P/P	50 - 160
Microcystin LF	120	108	P/P	50 - 160
Microcystin LR	94.0	95.9	P/P	50 - 160
Microcystin LW	117	118	P/P	50 - 160
Microcystin LY	98.2	92.9	P/P	50 - 160
Microcystin RR	100	96.5	P/P	50 - 160
Microcystin WR	96.5	96.1	P/P	50 - 160
Microcystin YR	89.6	89.7	P/P	50 - 160
Nodularin-R	96.2	93.2	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113336
Included Lab Sample IDs: 2338541

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A113377
Included Lab Sample IDs: 2338541

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.2	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113416
Included Lab Sample IDs: 2338541

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113420
Included Lab Sample IDs: 2338541

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	102	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	94.6	97.8	96.4			0.944
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103					0.821
EPA 353.2 Rev. 2.0	NO2NO3-N	102	99.4	98.4			0.749
EPA 365.1 Rev. 2.0	Total-P	101	99.3	103			2.54
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.7	96.6			1.13
EPA 8321B	Anatoxin-a	99.0	115	108			6.18
	Cylindrospermopsin	86.5	89.6	81.9			8.99
	Desmethyl microcystin LR	97.8	119	110			8.22
	Microcystin HilR	97.0	116	105			10.5
	Microcystin HtyR	96.6	109	105			3.31
	Microcystin LA	99.6	91.9	87.9			4.47
	Microcystin LF	123	131	110			17.9
	Microcystin LR	100	117	118			0.643
	Microcystin LW	88.5	134	115			15.1
	Microcystin LY	74.1	83.2	88.7			6.40
	Microcystin RR	102	109	107			2.06
	Microcystin WR	91.4	111	115			3.56
	Microcystin YR	96.5	114	109			4.45
	Nodularin-R	91.5	109	104			5.04

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2338541
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2338541
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2338541
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2338541
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2338542
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2338540

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	07/01/2022			07/08/2022 10:46	Ping Hua	2338541
EPA 351.2 Rev. 2.0	07/01/2022	07/06/2022 09:21	Simonne.V. Calhoun	07/07/2022 13:47	Alexandra J Mattheus	2338541
EPA 353.2 Rev. 2.0	07/01/2022			07/11/2022 14:23	Judith K. Clark	2338541
EPA 365.1 Rev. 2.0	07/01/2022	07/07/2022 16:00	Simonne.V. Calhoun	07/11/2022 11:49	Simonne.V. Calhoun	2338541
EPA 365.1 Rev. 2.0 dissolved	07/01/2022			07/01/2022 13:19	Chandler E Cox	2338542
EPA 8321B	07/01/2022	07/05/2022 10:00	Manjita Shrestha	07/05/2022 14:33	Manjita Shrestha	2338540