Chemical Analysis Report

WQAP-2022-06-28-01

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-2022-06-27-20**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 19-JUL-2022 10:30

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: Caloosahatchee River - Moody Canal at Del Prado Blvd **Collection Date/Time: 06/27/2022 12:55**

Field ID: HAB-SD-062722-1255 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2337457	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P415861	
		Cylindrospermopsin	0.10	U	ug/L	P415861	
		Desmethyl microcystin LR	0.25	U	ug/L	P415861	
		Microcystin HilR	0.25	U	ug/L	P415861	
		Microcystin HtyR	0.25	U	ug/L	P415861	
		Microcystin LA	0.10	U	ug/L	P415861	
		Microcystin LF	0.10	U	ug/L	P415861	
		Microcystin LR	0.25	U	ug/L	P415861	
		Microcystin LW	0.25	U	ug/L	P415861	
		Microcystin LY	0.10	U	ug/L	P415861	
		Microcystin RR	0.10	U	ug/L	P415861	
		Microcystin WR	0.50	U	ug/L	P415861	
		Microcystin YR	0.25	U	ug/L	P415861	
		Nodularin-R	0.10	U	ug/L	P415861	
2337466	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P416091	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P416110	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P416406	
	EPA 365.1 Rev. 2.0	Total-P	0.092		mg P/L	P416024	
2337467	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.010		mg P/L	P415888	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416091

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416110

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416406

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416024

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415888

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

Reference Method: EPA 8321B
Batch ID: P415861

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: P416091

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416110

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416406

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416024

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415888

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.1		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P415861

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	105		P	40 - 150
Cylindrospermopsin	94.1		P	40 - 150
Desmethyl microcystin LR	99.0		P	40 - 150
Microcystin HilR	96.5		P	40 - 150
Microcystin HtyR	104		P	40 - 150
Microcystin LA	103		P	40 - 150
Microcystin LF	149		P	40 - 150
Microcystin LR	100		P	40 - 150
Microcystin LW	137		P	40 - 150
Microcystin LY	101		P	40 - 150
Microcystin RR	104		P	40 - 150
Microcystin WR	102		P	40 - 150
Microcystin YR	97.4		P	40 - 150
Nodularin-R	98.2		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416091

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337011	Ammonia-N	102	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416110

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337378	Kjeldahl Nitrogen	112	114	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416406

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337512	NO2NO3-N	108	110	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337399	Total-P	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415888

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337482	O-Phosphate-P	97.2	97.7	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P415861

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337412	Anatoxin-a	119	119	P/P	40 - 150
2337412	Cylindrospermopsin	95.7	95.0	P/P	40 - 150
2337412	Desmethyl microcystin LR	115	113	P/P	40 - 150
2337412	Microcystin HilR	115	120	P/P	40 - 150
2337412	Microcystin HtyR	111	110	P/P	40 - 150
2337412	Microcystin LA	92.5	84.9	P/P	40 - 150
2337412	Microcystin LF	121	131	P/P	40 - 150
2337412	Microcystin LR	121	124	P/P	40 - 150
2337412	Microcystin LW	114	116	P/P	40 - 150
2337412	Microcystin LY	88.8	101	P/P	40 - 150
2337412	Microcystin RR	112	111	P/P	40 - 150
2337412	Microcystin WR	123	116	P/P	40 - 150
2337412	Microcystin YR	122	117	P/P	40 - 150
2337412	Nodularin-R	110	106	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416091

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337011	Ammonia-N	2.25	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416110

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337378	Kjeldahl Nitrogen	1.03	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416406

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337512	NO2NO3-N	1.38	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337399	Total-P	0.0227	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415888

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337482	O-Phosphate-P	0.513	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P415861

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337412	Anatoxin-a	0.250	Spike	P	0 - 30
2337412	Cylindrospermopsin	0.701	Spike	P	0 - 30
2337412	Desmethyl microcystin LR	1.55	Spike	P	0 - 30
2337412	Microcystin HilR	4.38	Spike	P	0 - 30
2337412	Microcystin HtyR	1.14	Spike	P	0 - 30
2337412	Microcystin LA	8.50	Spike	P	0 - 30
2337412	Microcystin LF	7.62	Spike	P	0 - 30
2337412	Microcystin LR	2.90	Spike	P	0 - 30
2337412	Microcystin LW	1.48	Spike	P	0 - 30
2337412	Microcystin LY	13.0	Spike	P	0 - 30
2337412	Microcystin RR	0.334	Spike	P	0 - 30
2337412	Microcystin WR	5.88	Spike	P	0 - 30
2337412	Microcystin YR	4.36	Spike	P	0 - 30
2337412	Nodularin-R	3.35	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: 2337457
Field Sample ID: HAB-SD-062722-1255

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	128	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A113139
Included Lab Sample IDs: 2337467

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A113173
Included Lab Sample IDs: 2337457

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	104	107	P/P	50 - 160
Cylindrospermopsin	93.1	92.6	P/P	50 - 160
Desmethyl microcystin LR	101	101	P/P	50 - 160
Microcystin HilR	97.9	102	P/P	50 - 160
Microcystin HtyR	97.9	105	P/P	50 - 160
Microcystin LA	90.4	94.0	P/P	50 - 160
Microcystin LF	127	129	P/P	50 - 160
Microcystin LR	105	104	P/P	50 - 160
Microcystin LW	111	124	P/P	50 - 160
Microcystin LY	106	94.2	P/P	50 - 160
Microcystin RR	101	104	P/P	50 - 160
Microcystin WR	107	111	P/P	50 - 160
Microcystin YR	101	102	P/P	50 - 160
Nodularin-R	94.8	99.3	P/P	50 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A113275
Included Lab Sample IDs: 2337466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	98.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113278
Included Lab Sample IDs: 2337466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113333
Included Lab Sample IDs: 2337466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.0	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113410
Included Lab Sample IDs: 2337466

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	109	110	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	99.0	102	106			2.25
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	112	114			1.03
EPA 353.2 Rev. 2.0	NO2NO3-N	110	108	110			1.38
EPA 365.1 Rev. 2.0	Total-P	105	103	103			0.0227
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	97.2	97.7			0.513
EPA 8321B	Anatoxin-a	105	119	119			0.250
	Cylindrospermopsin	94.1	95.7	95.0			0.701
	Desmethyl microcystin LR	99.0	115	113			1.55
	Microcystin HilR	96.5	115	120			4.38
	Microcystin HtyR	104	111	110			1.14
	Microcystin LA	103	92.5	84.9			8.50
	Microcystin LF	149	121	131			7.62
	Microcystin LR	100	121	124			2.90
	Microcystin LW	137	114	116			1.48
	Microcystin LY	101	88.8	101			13.0
	Microcystin RR	104	112	111			0.334
	Microcystin WR	102	123	116			5.88
	Microcystin YR	97.4	122	117			4.36
	Nodularin-R	98.2	110	106			3.35

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2337466
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2337466
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2337466
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2337466
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2337467
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2337457

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	06/28/2022			07/01/2022 10:58	Judith K. Clark	2337466
EPA 351.2 Rev. 2.0	06/28/2022	07/05/2022 14:05	Simonne.V. Calhoun	07/07/2022 12:18	Alexandra J Mattheus	2337466
EPA 353.2 Rev. 2.0	06/28/2022			07/08/2022 17:42	Touraj Touran	2337466
EPA 365.1 Rev. 2.0	06/28/2022	07/01/2022 16:41	Simonne.V. Calhoun	07/05/2022 11:50	James L Waggerby	2337466
EPA 365.1 Rev. 2.0 dissolved	06/28/2022			06/28/2022 13:39	James L Waggerby	2337467
EPA 8321B	06/28/2022	06/29/2022 10:00	Manjita Shrestha	06/29/2022 14:21	Manjita Shrestha	2337457