Chemical Analysis Report

WQAP-2022-06-24-02

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

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2022-06-27-20**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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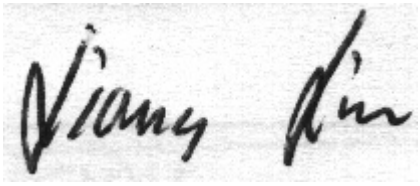
Certified by: Liang Lin, Environmental Administrator

Date Certified: 15-JUL-2022 10:36



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 - River Forest Dr **Collection Date/Time: 06/23/2022 08:40**

Field ID: HAB-SD062322-0840 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2337094	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P415715	
		Cylindrospermopsin	0.10	U	ug/L	P415715	
		Desmethyl microcystin LR	0.25	U	ug/L	P415715	
		Microcystin HilR	0.25	U	ug/L	P415715	
		Microcystin HtyR	0.25	U	ug/L	P415715	
		Microcystin LA	0.10	U	ug/L	P415715	
		Microcystin LF	0.10	U	ug/L	P415715	
		Microcystin LR	0.25	U	ug/L	P415715	
		Microcystin LW	0.25	U	ug/L	P415715	
		Microcystin LY	0.10	U	ug/L	P415715	
		Microcystin RR	0.10	U	ug/L	P415715	
		Microcystin WR	0.50	U	ug/L	P415715	
		Microcystin YR	0.25	U	ug/L	P415715	
		Nodularin-R	0.10	U	ug/L	P415715	
2337097	EPA 350.1 Rev. 2.0	Ammonia-N	0.076		mg N/L	P416045	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P415875	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.14		mg N/L	P416000	
	EPA 365.1 Rev. 2.0	Total-P	0.18		mg P/L	P415810	
2337098	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P415733	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416045

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415875

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416000

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415810

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415733

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

Reference Method: EPA 8321B
Batch ID: P415715

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: P416045

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415875

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416000

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: P415810

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: P415733

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	102		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P415715

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	73.7		P	40 - 150
Cylindrospermopsin	89.0		P	40 - 150
Desmethyl microcystin LR	99.7		P	40 - 150
Microcystin HilR	87.5		P	40 - 150
Microcystin HtyR	74.1		P	40 - 150
Microcystin LA	86.0		P	40 - 150
Microcystin LF	93.6		P	40 - 150
Microcystin LR	91.5		P	40 - 150
Microcystin LW	108		P	40 - 150
Microcystin LY	79.3		P	40 - 150
Microcystin RR	84.7		P	40 - 150
Microcystin WR	78.9		P	40 - 150
Microcystin YR	88.3		P	40 - 150
Nodularin-R	84.1		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416045

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337008	Ammonia-N	99.8	99.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415875

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336754	Kjeldahl Nitrogen	105	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416000

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334559	NO2NO3-N	96.5	92.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415810

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335351	Total-P	104	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415733

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2337098	O-Phosphate-P	103	103	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P415715

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336956	Anatoxin-a	80.1	81.9	P/P	40 - 150
2336956	Cylindrospermopsin	93.7	92.8	P/P	40 - 150
2336956	Desmethyl microcystin LR	105	100	P/P	40 - 150
2336956	Microcystin HilR	92.5	88.5	P/P	40 - 150
2336956	Microcystin HtyR	85.8	83.1	P/P	40 - 150
2336956	Microcystin LA	77.5	68.9	P/P	40 - 150
2336956	Microcystin LF	113	119	P/P	40 - 150
2336956	Microcystin LR	98.4	94.7	P/P	40 - 150
2336956	Microcystin LW	95.9	102	P/P	40 - 150
2336956	Microcystin LY	90.2	92.4	P/P	40 - 150
2336956	Microcystin RR	85.1	88.6	P/P	40 - 150
2336956	Microcystin WR	80.7	84.9	P/P	40 - 150
2336956	Microcystin YR	91.8	94.2	P/P	40 - 150
2336956	Nodularin-R	85.9	85.8	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416045

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337008	Ammonia-N	0.375	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415875

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336754	Kjeldahl Nitrogen	2.21	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416000

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334559	NO2NO3-N	2.44	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415810

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335351	Total-P	0.959	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415733

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2337098	O-Phosphate-P	0.631	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P415715

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336956	Anatoxin-a	2.28	Spike	P	0 - 30
2336956	Cylindrospermopsin	0.967	Spike	P	0 - 30
2336956	Desmethyl microcystin LR	4.57	Spike	P	0 - 30
2336956	Microcystin HilR	4.44	Spike	P	0 - 30
2336956	Microcystin HtyR	3.23	Spike	P	0 - 30
2336956	Microcystin LA	11.7	Spike	P	0 - 30
2336956	Microcystin LF	5.03	Spike	P	0 - 30
2336956	Microcystin LR	3.86	Spike	P	0 - 30
2336956	Microcystin LW	6.51	Spike	P	0 - 30
2336956	Microcystin LY	2.38	Spike	P	0 - 30
2336956	Microcystin RR	4.04	Spike	P	0 - 30
2336956	Microcystin WR	5.14	Spike	P	0 - 30
2336956	Microcystin YR	2.54	Spike	P	0 - 30
2336956	Nodularin-R	0.147	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: 2337094
Field Sample ID: HAB-SD062322-0840

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	123	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A113055
Included Lab Sample IDs: 2337098

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.0	99.0	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A113116
Included Lab Sample IDs: 2337094

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	82.9	82.6	P/P	50 - 160
Cylindrospermopsin	97.8	96.7	P/P	50 - 160
Desmethyl microcystin LR	109	108	P/P	50 - 160
Microcystin HilR	98.3	92.1	P/P	50 - 160
Microcystin HtyR	89.4	88.6	P/P	50 - 160
Microcystin LA	89.7	90.6	P/P	50 - 160
Microcystin LF	127	93.2	P/P	50 - 160
Microcystin LR	101	97.5	P/P	50 - 160
Microcystin LW	105	108	P/P	50 - 160
Microcystin LY	89.8	87.8	P/P	50 - 160
Microcystin RR	87.2	87.2	P/P	50 - 160
Microcystin WR	94.4	87.7	P/P	50 - 160
Microcystin YR	99.6	95.1	P/P	50 - 160
Nodularin-R	93.5	88.8	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113172
Included Lab Sample IDs: 2337097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.0	95.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113200
Included Lab Sample IDs: 2337097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	99.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A113212
Included Lab Sample IDs: 2337097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.5	97.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113232
Included Lab Sample IDs: 2337097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	99.5	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	94.2	99.8	99.4			0.375
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.5	105	101			2.21
EPA 353.2 Rev. 2.0	NO2NO3-N	102	96.5	92.5			2.44
EPA 365.1 Rev. 2.0	Total-P	105	104	102			0.959
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	103	103			0.631
EPA 8321B	Anatoxin-a	73.7	80.1	81.9			2.28
	Cylindrospermopsin	89.0	93.7	92.8			0.967
	Desmethyl microcystin LR	99.7	105	100			4.57
	Microcystin HilR	87.5	92.5	88.5			4.44
	Microcystin HtyR	74.1	85.8	83.1			3.23
	Microcystin LA	86.0	77.5	68.9			11.7
	Microcystin LF	93.6	113	119			5.03
	Microcystin LR	91.5	98.4	94.7			3.86
	Microcystin LW	108	95.9	102			6.51
	Microcystin LY	79.3	90.2	92.4			2.38
	Microcystin RR	84.7	85.1	88.6			4.04
	Microcystin WR	78.9	80.7	84.9			5.14
	Microcystin YR	88.3	91.8	94.2			2.54
	Nodularin-R	84.1	85.9	85.8			0.147

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2337097
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2337097
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2337097
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2337097
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2337098
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2337094

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	06/24/2022			06/30/2022 15:46	Judith K. Clark	2337097
EPA 351.2 Rev. 2.0	06/24/2022	06/29/2022 14:45	Samantha L Bates	07/01/2022 10:52	Alexandra J Mattheus	2337097
EPA 353.2 Rev. 2.0	06/24/2022			06/28/2022 18:06	Touraj Touran	2337097
EPA 365.1 Rev. 2.0	06/24/2022	06/28/2022 16:02	Adam P Silver	06/30/2022 10:45	James L Waggerby	2337097
EPA 365.1 Rev. 2.0 dissolved	06/24/2022			06/24/2022 17:13	Chandler E Cox	2337098
EPA 8321B	06/24/2022	06/27/2022 10:00	Manjita Shrestha	06/27/2022 14:11	Manjita Shrestha	2337094