Chemical Analysis Report

WQAP-2021-07-02-01

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-2021-07-05-64**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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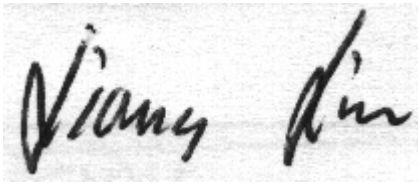
Date Certified: 26-JUL-2021 12:42



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 - S. Olga Dr **Collection Date/Time: 07/01/2021 08:40**

Field ID: HAB-SD-07012021-001 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2259579	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P400548	
		Cylindrospermopsin	0.10	U	ug/L	P400548	
		Desmethyl microcystin LR	0.25	U	ug/L	P400548	
		Microcystin HilR**	0.25	U	ug/L	P400548	
		Microcystin HtyR**	0.25	U	ug/L	P400548	
		Microcystin LA	0.10	U	ug/L	P400548	
		Microcystin LF	0.10	U	ug/L	P400548	
		Microcystin LR	0.33	I	ug/L	P400548	
		Microcystin LW	0.25	U	ug/L	P400548	
		Microcystin LY	0.10	U	ug/L	P400548	
		Microcystin RR	0.10	U	ug/L	P400548	
		Microcystin WR	0.50	U	ug/L	P400548	
		Microcystin YR	0.25	U	ug/L	P400548	
		Nodularin-R**	0.10	U	ug/L	P400548	
2259581	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P400946	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P400642	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.13		mg N/L	P400563	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P400579	
2259583	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.068		mg P/L	P400537	

Ref. Method and Comment:
EPA 8321B: MS accuracy for Microcystin LR could not be assessed due to a high concentration of parameter in the spiked sample.

Sample Location: Orange River - Manatee Park **Collection Date/Time: 07/01/2021 08:05**

Field ID: HAB-SD-07012021-002 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2259580	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P400548	
		Cylindrospermopsin	0.10	U	ug/L	P400548	
		Desmethyl microcystin LR	0.25	U	ug/L	P400548	
		Microcystin HilR**	0.25	U	ug/L	P400548	
		Microcystin HtyR**	0.25	U	ug/L	P400548	
		Microcystin LA	0.10	U	ug/L	P400548	
		Microcystin LF	0.10	U	ug/L	P400548	
		Microcystin LR	0.25	U	ug/L	P400548	
		Microcystin LW	0.25	U	ug/L	P400548	
		Microcystin LY	0.10	U	ug/L	P400548	
		Microcystin RR	0.10	U	ug/L	P400548	
		Microcystin WR	0.50	U	ug/L	P400548	
		Microcystin YR	0.25	U	ug/L	P400548	
		Nodularin-R**	0.10	U	ug/L	P400548	
2259582	EPA 350.1 Rev. 2.0	Ammonia-N	0.080		mg N/L	P400946	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.99		mg N/L	P400642	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.16		mg N/L	P400563	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P400579	
2259584	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.076		mg P/L	P400537	

Ref. Method and Comment:
EPA 8321B: MS accuracy for Microcystin LR could not be assessed due to a high concentration of parameter in the spiked sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400946

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400642

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400563

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400579

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400537

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

Reference Method: EPA 8321B
Batch ID: P400548

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: P400946

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400642

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400563

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400579

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400537

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

Reference Method: EPA 8321B
Batch ID: P400548

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	102		P	40 - 150
Cylindrospermopsin	116		P	40 - 150
Desmethyl microcystin LR	127		P	40 - 150
Microcystin HilR	114		P	40 - 150
Microcystin HtyR	132		P	40 - 150
Microcystin LA	119		P	40 - 150
Microcystin LF	134		P	40 - 150
Microcystin LR	121		P	40 - 150
Microcystin LW	132		P	40 - 150
Microcystin LY	133		P	40 - 150
Microcystin RR	121		P	40 - 150
Microcystin WR	124		P	40 - 150
Microcystin YR	120		P	40 - 150
Nodularin-R	124		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400946

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2259577	Ammonia-N	93.8	94.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400642

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2259577	Kjeldahl Nitrogen	101	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400563

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2259581	NO2NO3-N	98.0	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400579

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2259582	Total-P	107	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400537

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2259583	O-Phosphate-P	96.3	98.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P400548

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2259362	Anatoxin-a	108	101	P/P	40 - 150
2259362	Cylindrospermopsin	109	105	P/P	40 - 150
2259362	Desmethyl microcystin LR	130	125	P/P	40 - 150
2259362	Microcystin HilR	119	114	P/P	40 - 150
2259362	Microcystin HtyR	133	131	P/P	40 - 150
2259362	Microcystin LA	113	109	P/P	40 - 150
2259362	Microcystin LF	116	123	P/P	40 - 150
2259362	Microcystin LW	123	118	P/P	40 - 150
2259362	Microcystin LY	124	116	P/P	40 - 150
2259362	Microcystin RR	115	116	P/P	40 - 150
2259362	Microcystin WR	126	120	P/P	40 - 150
2259362	Microcystin YR	127	122	P/P	40 - 150
2259362	Nodularin-R	124	123	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400946

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2259577	Ammonia-N	0.339	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P400642

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2259577	Kjeldahl Nitrogen	4.19	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400563

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2259581	NO2NO3-N	0.306	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400579

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2259582	Total-P	0.368	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400537

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2259583	O-Phosphate-P	1.09	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P400548

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2259362	Anatoxin-a	6.51	Spike	P	0 - 30
2259362	Cylindrospermopsin	3.99	Spike	P	0 - 30
2259362	Desmethyl microcystin LR	4.28	Spike	P	0 - 30
2259362	Microcystin HilR	3.89	Spike	P	0 - 30
2259362	Microcystin HtyR	1.52	Spike	P	0 - 30
2259362	Microcystin LA	3.82	Spike	P	0 - 30
2259362	Microcystin LF	5.61	Spike	P	0 - 30
2259362	Microcystin LR	1.03	Spike	P	0 - 30
2259362	Microcystin LW	4.20	Spike	P	0 - 30
2259362	Microcystin LY	6.40	Spike	P	0 - 30
2259362	Microcystin RR	1.01	Spike	P	0 - 30
2259362	Microcystin WR	4.42	Spike	P	0 - 30
2259362	Microcystin YR	4.11	Spike	P	0 - 30
2259362	Nodularin-R	0.942	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: 2259579
Field Sample ID: HAB-SD-07012021-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	123	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	69.1	P	30 - 160

Lab Sample ID: 2259580
Field Sample ID: HAB-SD-07012021-002

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	117	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	80.6	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A106433
Included Lab Sample IDs: 2259583, 2259584

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	99.1	P/P	90 - 110
O-Phosphate-P	99.1	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106453
Included Lab Sample IDs: 2259581, 2259582

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A106465
Included Lab Sample IDs: 2259579, 2259580

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	89.0	90.3	P/P	50 - 160
Cylindrospermopsin	102	109	P/P	50 - 160
Desmethyl microcystin LR	117	117	P/P	50 - 160
Microcystin HilR	109	117	P/P	50 - 160
Microcystin HtyR	115	123	P/P	50 - 160
Microcystin LA	111	119	P/P	50 - 160
Microcystin LF	116	127	P/P	50 - 160
Microcystin LR	110	122	P/P	50 - 160
Microcystin LW	109	119	P/P	50 - 160
Microcystin LY	118	124	P/P	50 - 160
Microcystin RR	114	114	P/P	50 - 160
Microcystin WR	112	129	P/P	50 - 160
Microcystin YR	112	123	P/P	50 - 160
Nodularin-R	119	121	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106471
Included Lab Sample IDs: 2259581, 2259582

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A106518
Included Lab Sample IDs: 2259581, 2259582

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	98.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106612
Included Lab Sample IDs: 2259581, 2259582

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	98.9	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	99.8	93.8	94.2			0.339
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	101	107			4.19
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	98.0	97.5			0.306
EPA 365.1 Rev. 2.0	Total-P	104	107	107			0.368
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	96.3	98.1			1.09
EPA 8321B	Anatoxin-a	102	108	101			6.51
	Cylindrospermopsin	116	109	105			3.99
	Desmethyl microcystin LR	127	130	125			4.28
	Microcystin HilR	114	119	114			3.89
	Microcystin HtyR	132	133	131			1.52
	Microcystin LA	119	113	109			3.82
	Microcystin LF	134	116	123			5.61
	Microcystin LR	121					1.03
	Microcystin LW	132	123	118			4.20
	Microcystin LY	133	124	116			6.40
	Microcystin RR	121	115	116			1.01
	Microcystin WR	124	126	120			4.42
	Microcystin YR	120	127	122			4.11
	Nodularin-R	124	124	123			0.942

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2259581, 2259582
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2259581, 2259582
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2259581, 2259582
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2259581, 2259582
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2259583, 2259584
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2259579, 2259580

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	07/02/2021			07/14/2021 12:27	Roberta Tatti	2259581
	07/02/2021			07/14/2021 12:37	Roberta Tatti	2259582
EPA 351.2 Rev. 2.0	07/02/2021	07/07/2021 13:18	Benjamin T. Nordmann	07/08/2021 17:04	Letuzia M De Oliveira	2259581
	07/02/2021	07/07/2021 13:18	Benjamin T. Nordmann	07/08/2021 17:06	Letuzia M De Oliveira	2259582
EPA 353.2 Rev. 2.0	07/02/2021			07/06/2021 09:14	Beverly Y. Sanders	2259581
	07/02/2021			07/06/2021 09:27	Beverly Y. Sanders	2259582
EPA 365.1 Rev. 2.0	07/02/2021	07/06/2021 15:49	Madeline Gruver	07/07/2021 09:29	Shengyu Ding	2259581
	07/02/2021	07/06/2021 15:49	Madeline Gruver	07/07/2021 09:30	Shengyu Ding	2259582
EPA 365.1 Rev. 2.0 dissolved	07/02/2021			07/02/2021 15:10	Ping Hua	2259583
	07/02/2021			07/02/2021 15:21	Ping Hua	2259584
EPA 8321B	07/02/2021	07/06/2021 08:30	Pramila Ghimire	07/07/2021 01:21	Pramila Ghimire	2259579
	07/02/2021	07/06/2021 08:30	Pramila Ghimire	07/07/2021 01:38	Pramila Ghimire	2259580