Chemical Analysis Report

WQAP-2021-09-08-01

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

Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2021-07-19-34**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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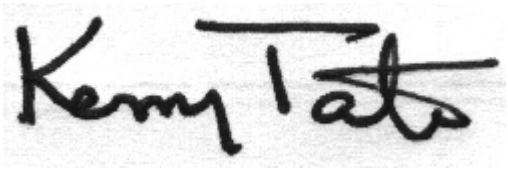
Date Certified: 28-SEP-2021 12:57



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: Boynton Beach **Collection Date/Time: 09/07/2021 10:50**

Field ID: SEHAB0065 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2273984	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P403413	
		Cylindrospermopsin	0.10	U	ug/L	P403413	
		Desmethyl microcystin LR	0.25	U	ug/L	P403413	
		Microcystin HilR**	0.25	U	ug/L	P403413	
		Microcystin HtyR**	0.25	U	ug/L	P403413	
		Microcystin LA	0.10	U	ug/L	P403413	
		Microcystin LF	0.10	U	ug/L	P403413	
		Microcystin LR	0.25	U	ug/L	P403413	
		Microcystin LW	0.25	U	ug/L	P403413	
		Microcystin LY	0.10	U	ug/L	P403413	
		Microcystin RR	0.10	U	ug/L	P403413	
		Microcystin WR	0.50	U	ug/L	P403413	
		Microcystin YR	0.25	U	ug/L	P403413	
		Nodularin-R**	0.10	U	ug/L	P403413	
2273985	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P403641	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	3.0		mg N/L	P403513	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.007	I	mg N/L	P403575	
	EPA 365.1 Rev. 2.0	Total-P	0.28		mg P/L	P403502	
2273986	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P403473	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403641

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403513

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403575

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403502

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403473

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

Reference Method: EPA 8321B
Batch ID: P403413

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: P403641

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403513

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403575

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403502

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: P403473

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

Reference Method: EPA 8321B
Batch ID: P403413

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	74.2		P	40 - 150
Cylindrospermopsin	107		P	40 - 150
Desmethyl microcystin LR	88.7		P	40 - 150
Microcystin HilR	97.5		P	40 - 150
Microcystin HtyR	98.2		P	40 - 150
Microcystin LA	124		P	40 - 150
Microcystin LF	139		P	40 - 150
Microcystin LR	106		P	40 - 150
Microcystin LW	126		P	40 - 150
Microcystin LY	126		P	40 - 150
Microcystin RR	104		P	40 - 150
Microcystin WR	92.6		P	40 - 150
Microcystin YR	91.9		P	40 - 150
Nodularin-R	109		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403641

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2273985	Ammonia-N	97.6	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403513

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2273870	Kjeldahl Nitrogen	108	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403575

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2273817	NO2NO3-N	99.5	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403502

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2273985	Total-P	101	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403473

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2273751	O-Phosphate-P	103	102	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P403413

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2273407	Anatoxin-a	65.0	66.9	P/P	40 - 150
2273407	Cylindrospermopsin	72.7	76.1	P/P	40 - 150
2273407	Desmethyl microcystin LR	63.2	61.2	P/P	40 - 150
2273407	Microcystin HilR	69.4	71.8	P/P	40 - 150
2273407	Microcystin HtyR	71.5	72.4	P/P	40 - 150
2273407	Microcystin LA	84.6	86.4	P/P	40 - 150
2273407	Microcystin LF	88.6	79.3	P/P	40 - 150
2273407	Microcystin LR	70.2	64.6	P/P	40 - 150
2273407	Microcystin LW	80.2	72.0	P/P	40 - 150
2273407	Microcystin LY	91.4	81.7	P/P	40 - 150
2273407	Microcystin RR	78.7	76.1	P/P	40 - 150
2273407	Microcystin WR	72.3	65.4	P/P	40 - 150
2273407	Microcystin YR	69.2	68.1	P/P	40 - 150
2273407	Nodularin-R	84.5	86.6	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403641

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2273985	Ammonia-N	0.157	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403513

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2273870	Kjeldahl Nitrogen	2.68	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403575

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2273817	NO2NO3-N	1.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403502

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2273985	Total-P	1.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403473

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2273751	O-Phosphate-P	0.791	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P403413

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2273407	Anatoxin-a	2.89	Spike	P	0 - 30
2273407	Cylindrospermopsin	4.47	Spike	P	0 - 30
2273407	Desmethyl microcystin LR	3.15	Spike	P	0 - 30
2273407	Microcystin HilR	3.41	Spike	P	0 - 30
2273407	Microcystin HtyR	1.29	Spike	P	0 - 30
2273407	Microcystin LA	2.18	Spike	P	0 - 30
2273407	Microcystin LF	11.2	Spike	P	0 - 30
2273407	Microcystin LR	8.26	Spike	P	0 - 30
2273407	Microcystin LW	10.9	Spike	P	0 - 30
2273407	Microcystin LY	11.2	Spike	P	0 - 30
2273407	Microcystin RR	3.29	Spike	P	0 - 30
2273407	Microcystin WR	9.98	Spike	P	0 - 30
2273407	Microcystin YR	1.59	Spike	P	0 - 30
2273407	Nodularin-R	2.41	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: 2273984
Field Sample ID: SEHAB0065

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	137	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	153	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A107681
Included Lab Sample IDs: 2273986

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

Reference Method: EPA 8321B
Run ID: A107710
Included Lab Sample IDs: 2273984

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	84.1	74.3	P/P	50 - 160
Cylindrospermopsin	103	104	P/P	50 - 160
Desmethyl microcystin LR	89.2	87.7	P/P	50 - 160
Microcystin HilR	106	112	P/P	50 - 160
Microcystin HtyR	105	104	P/P	50 - 160
Microcystin LA	138	142	P/P	50 - 160
Microcystin LF	139	136	P/P	50 - 160
Microcystin LR	105	110	P/P	50 - 160
Microcystin LW	126	126	P/P	50 - 160
Microcystin LY	136	139	P/P	50 - 160
Microcystin RR	110	109	P/P	50 - 160
Microcystin WR	95.6	101	P/P	50 - 160
Microcystin YR	97.2	102	P/P	50 - 160
Nodularin-R	118	119	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A107723
Included Lab Sample IDs: 2273985

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.4	98.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A107728
Included Lab Sample IDs: 2273985

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A107739
Included Lab Sample IDs: 2273985

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	109	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A107757
Included Lab Sample IDs: 2273985

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	98.3	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	100	97.6	97.8			0.157
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	108	104			2.68
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	99.5	98.5			1.01
EPA 365.1 Rev. 2.0	Total-P	105	101	103			1.54
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	103	102			0.791
EPA 8321B	Anatoxin-a	74.2	65.0	66.9			2.89
	Cylindrospermopsin	107	72.7	76.1			4.47
	Desmethyl microcystin LR	88.7	63.2	61.2			3.15
	Microcystin HilR	97.5	69.4	71.8			3.41
	Microcystin HtyR	98.2	71.5	72.4			1.29
	Microcystin LA	124	84.6	86.4			2.18
	Microcystin LF	139	88.6	79.3			11.2
	Microcystin LR	106	70.2	64.6			8.26
	Microcystin LW	126	80.2	72.0			10.9
	Microcystin LY	126	91.4	81.7			11.2
	Microcystin RR	104	78.7	76.1			3.29
	Microcystin WR	92.6	72.3	65.4			9.98
	Microcystin YR	91.9	69.2	68.1			1.59
	Nodularin-R	109	84.5	86.6			2.41

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2273985
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2273985
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2273985
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2273985
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2273986
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2273984

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	09/08/2021			09/13/2021 11:47	Ping Hua	2273985
EPA 351.2 Rev. 2.0	09/08/2021	09/09/2021 12:35	Benjamin T. Nordmann	09/10/2021 12:56	Virginia P. Brown	2273985
EPA 353.2 Rev. 2.0	09/08/2021			09/10/2021 09:47	Beverly Y. Sanders	2273985
EPA 365.1 Rev. 2.0	09/08/2021	09/09/2021 13:50	Simonne.V. Calhoun	09/10/2021 09:49	Lipi Saha	2273985
EPA 365.1 Rev. 2.0 dissolved	09/08/2021			09/08/2021 15:33	James L Waggerby	2273986
EPA 8321B	09/08/2021	09/09/2021 08:00	Juyoung Kim	09/09/2021 14:51	Juyoung Kim	2273984