Chemical Analysis Report

WQAP-2022-07-19-01

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

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

Send Reports to:
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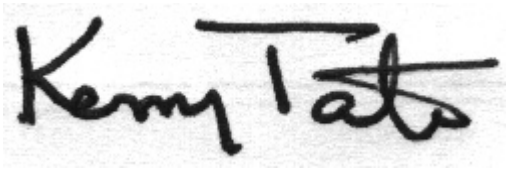
Date Certified: 01-AUG-2022 13:08



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: Highlands County **Collection Date/Time: 07/18/2022 09:49**

Field ID: Lake Sebring Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2342163	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P416811	
		Cylindrospermopsin	0.10	U	ug/L	P416810	
		Desmethyl microcystin LR	0.25	U	ug/L	P416810	
		Microcystin HilR	0.25	U	ug/L	P416810	
		Microcystin HtyR	0.25	U	ug/L	P416810	
		Microcystin LA	0.10	U	ug/L	P416810	
		Microcystin LF	0.10	U	ug/L	P416810	
		Microcystin LR	0.25	U	ug/L	P416810	
		Microcystin LW	0.25	U	ug/L	P416810	
		Microcystin LY	0.10	U	ug/L	P416810	
		Microcystin RR	0.10	U	ug/L	P416810	
		Microcystin WR	0.50	U	ug/L	P416810	
		Microcystin YR	0.25	U	ug/L	P416810	
		Nodularin-R	0.10	U	ug/L	P416810	
2342166	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P417265	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P416991	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P417033	
	EPA 365.1 Rev. 2.0	Total-P	0.046		mg P/L	P416950	
2342167	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P416861	

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: P417265

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416991

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417033

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416950

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416861

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

Reference Method: EPA 8321B
Batch ID: P416810

Component	Result	Code	Units
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

Reference Method: EPA 8321B
Batch ID: P416811

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417265

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416991

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417033

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416950

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416861

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

Reference Method: EPA 8321B
Batch ID: P416810

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	91.9		P	40 - 150
Desmethyl microcystin LR	96.7		P	40 - 150
Microcystin HilR	96.3		P	40 - 150
Microcystin HtyR	96.9		P	40 - 150
Microcystin LA	74.3		P	40 - 150
Microcystin LF	73.7		P	40 - 150
Microcystin LR	93.3		P	40 - 150
Microcystin LW	86.7		P	40 - 150
Microcystin LY	97.0		P	40 - 150
Microcystin RR	95.0		P	40 - 150
Microcystin WR	96.3		P	40 - 150
Microcystin YR	101		P	40 - 150
Nodularin-R	95.2		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P416811

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	95.3		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417265

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342007	Ammonia-N	99.2	97.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417033

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342122	NO2NO3-N	99.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416950

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342091	Total-P	103	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416861

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342178	O-Phosphate-P	99.8	99.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P416810

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342153	Cylindrospermopsin	99.1	98.6	P/P	40 - 150
2342153	Desmethyl microcystin LR	132	132	P/P	40 - 150
2342153	Microcystin HilR	140	133	P/P	40 - 150
2342153	Microcystin HtyR	129	127	P/P	40 - 150
2342153	Microcystin LA	105	94.0	P/P	40 - 150
2342153	Microcystin LF	113	111	P/P	40 - 150
2342153	Microcystin LR	128	130	P/P	40 - 150
2342153	Microcystin LW	96.1	96.2	P/P	40 - 150
2342153	Microcystin LY	108	126	P/P	40 - 150
2342153	Microcystin RR	113	119	P/P	40 - 150
2342153	Microcystin WR	129	119	P/P	40 - 150
2342153	Microcystin YR	141	138	P/P	40 - 150
2342153	Nodularin-R	119	122	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P416811

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2342153	Anatoxin-a	99.4	101	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417265

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342007	Ammonia-N	1.23	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416991

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342669	Kjeldahl Nitrogen	1.28	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417033

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342122	NO2NO3-N	0.962	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342091	Total-P	1.84	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416861

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342178	O-Phosphate-P	0.603	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P416810

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342153	Cylindrospermopsin	0.485	Spike	P	0 - 30
2342153	Desmethyl microcystin LR	0.129	Spike	P	0 - 30
2342153	Microcystin HilR	4.64	Spike	P	0 - 30
2342153	Microcystin HtyR	1.54	Spike	P	0 - 30
2342153	Microcystin LA	10.6	Spike	P	0 - 30
2342153	Microcystin LF	2.22	Spike	P	0 - 30
2342153	Microcystin LR	0.935	Spike	P	0 - 30
2342153	Microcystin LW	0.110	Spike	P	0 - 30
2342153	Microcystin LY	15.8	Spike	P	0 - 30
2342153	Microcystin RR	4.78	Spike	P	0 - 30
2342153	Microcystin WR	8.03	Spike	P	0 - 30
2342153	Microcystin YR	2.49	Spike	P	0 - 30
2342153	Nodularin-R	2.19	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P416811

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2342153	Anatoxin-a	2.08	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Surrogates

Lab Sample ID: 2342163
Field Sample ID: Lake Sebring

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	103	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	81.5	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A113586
Included Lab Sample IDs: 2342167

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A113623
Included Lab Sample IDs: 2342163

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	109	98.9	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A113639
Included Lab Sample IDs: 2342163

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	96.7	88.3	P/P	50 - 160
Desmethyl microcystin LR	95.5	92.2	P/P	50 - 160
Microcystin HilR	106	94.7	P/P	50 - 160
Microcystin HtyR	102	97.6	P/P	50 - 160
Microcystin LA	90.9	85.6	P/P	50 - 160
Microcystin LF	71.2	82.3	P/P	50 - 160
Microcystin LR	94.0	92.4	P/P	50 - 160
Microcystin LW	84.0	83.1	P/P	50 - 160
Microcystin LY	82.4	88.9	P/P	50 - 160
Microcystin RR	95.4	85.4	P/P	50 - 160
Microcystin WR	94.6	85.9	P/P	50 - 160
Microcystin YR	105	92.8	P/P	50 - 160
Nodularin-R	98.2	88.6	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113662
Included Lab Sample IDs: 2342166

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113693
Included Lab Sample IDs: 2342166

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113720
Included Lab Sample IDs: 2342166

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.7	99.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A113739
Included Lab Sample IDs: 2342166

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

* 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	98.0	99.2	97.0			1.23
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	110					1.28
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.2				0.962
EPA 365.1 Rev. 2.0	Total-P	99.8	103	101			1.84
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.5	99.8	99.2			0.603
EPA 8321B	Anatoxin-a	95.3	99.4	101			2.08
	Cylindrospermopsin	91.9	99.1	98.6			0.485
	Desmethyl microcystin LR	96.7	132	132			0.129
	Microcystin HilR	96.3	140	133			4.64
	Microcystin HtyR	96.9	129	127			1.54
	Microcystin LA	74.3	105	94.0			10.6
	Microcystin LF	73.7	113	111			2.22
	Microcystin LR	93.3	128	130			0.935
	Microcystin LW	86.7	96.1	96.2			0.110
	Microcystin LY	97.0	108	126			15.8
	Microcystin RR	95.0	113	119			4.78
	Microcystin WR	96.3	129	119			8.03
	Microcystin YR	101	141	138			2.49
	Nodularin-R	95.2	119	122			2.19

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2342166
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2342166
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2342166
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2342166
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2342167
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2342163
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2342163

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	07/19/2022			07/27/2022 15:43	Judith K. Clark	2342166
EPA 351.2 Rev. 2.0	07/19/2022	07/25/2022 15:00	Simonne.V. Calhoun	07/26/2022 15:34	Samantha L Bates	2342166
EPA 353.2 Rev. 2.0	07/19/2022			07/22/2022 10:48	Beverly Y. Sanders	2342166
EPA 365.1 Rev. 2.0	07/19/2022	07/22/2022 16:03	Adam P Silver	07/25/2022 15:23	James L Waggerby	2342166
EPA 365.1 Rev. 2.0 dissolved	07/19/2022			07/19/2022 14:57	Chandler E Cox	2342167
EPA 8321B	07/19/2022	07/20/2022 10:00	Manjita Shrestha	07/20/2022 15:04	Manjita Shrestha	2342163
	07/19/2022	07/20/2022 10:00	Manjita Shrestha	07/21/2022 02:53	Manjita Shrestha	2342163