Chemical Analysis Report

WQAP-2022-05-18-08

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

Event Description: **Algal Bloom Response- NEROC**
Request ID: **RQ-2022-04-11-48**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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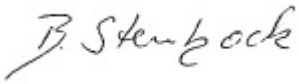
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 10-JUN-2022 14:49



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: Doctor's Lake @ Mill Cove **Collection Date/Time: 05/17/2022 13:15**

Field ID: NEHAB0057 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2327787	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P414009	MS
		Cylindrospermopsin	0.10	U	ug/L	P414020	
		Desmethyl microcystin LR	0.25	U	ug/L	P414020	
		Microcystin HilR**	0.25	U	ug/L	P414020	
		Microcystin HtyR**	0.25	U	ug/L	P414020	
		Microcystin LA	0.10	U	ug/L	P414020	
		Microcystin LF	0.10	U	ug/L	P414020	
		Microcystin LR	0.49	I	ug/L	P414020	
		Microcystin LW	0.25	U	ug/L	P414020	
		Microcystin LY	0.10	U	ug/L	P414020	
		Microcystin RR	0.10	U	ug/L	P414020	
		Microcystin WR	0.50	U	ug/L	P414020	
		Neosaxitoxin**	0.50	U	ug/L	P414009	MS
		Microcystin YR	0.25	U	ug/L	P414020	
		Saxitoxin	0.50	U	ug/L	P414009	MS
		Nodularin-R**	0.10	U	ug/L	P414020	
2327792	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P414097	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P414284	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P414279	
	EPA 365.1 Rev. 2.0	Total-P	0.065		mg P/L	P414061	
2327793	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P414046	

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. Batch relative percent difference is unavailable because of analytical dificulties.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414097

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414284

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414279

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414061

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414046

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

Reference Method: EPA 8321B
Batch ID: P414009

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Neosaxitoxin	0.50	U	ug/L
Saxitoxin	0.50	U	ug/L

Reference Method: EPA 8321B
Batch ID: P414020

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414097

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P414284

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414279

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	96.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414061

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: P414046

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

Reference Method: EPA 8321B
Batch ID: P414009

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	96.8		P	40 - 150
Neosaxitoxin	62.0		P	30 - 150
Saxitoxin	65.1		P	30 - 160

Reference Method: EPA 8321B
Batch ID: P414020

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	92.9		P	40 - 150
Desmethyl microcystin LR	102		P	40 - 150
Microcystin HilR	95.7		P	40 - 150
Microcystin HtyR	99.5		P	40 - 150
Microcystin LA	110		P	40 - 150
Microcystin LF	90.3		P	40 - 150
Microcystin LR	101		P	40 - 150
Microcystin LW	120		P	40 - 150
Microcystin LY	102		P	40 - 150
Microcystin RR	90.1		P	40 - 150
Microcystin WR	108		P	40 - 150
Microcystin YR	104		P	40 - 150
Nodularin-R	108		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414097

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327733	Ammonia-N	97.8	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414279

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327792	NO2NO3-N	95.0	95.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414061

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327759	Total-P	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414046

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327559	O-Phosphate-P	98.4	98.5	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P414009

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2326817	Anatoxin-a	35.9	35.2	F/F	40 - 150
2326817	Neosaxitoxin	11.3	10.9	F/F	30 - 150
2326817	Saxitoxin	19.2	19.0	F/F	30 - 160

Reference Method: EPA 8321B
Batch ID: P414020

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2327720	Cylindrospermopsin	97.9	103	P/P	40 - 150
2327720	Desmethyl microcystin LR	121	132	P/P	40 - 150
2327720	Microcystin HilR	105	113	P/P	40 - 150
2327720	Microcystin HtyR	110	108	P/P	40 - 150
2327720	Microcystin LA	102	111	P/P	40 - 150
2327720	Microcystin LF	129	130	P/P	40 - 150
2327720	Microcystin LR	116	115	P/P	40 - 150
2327720	Microcystin LW	131	135	P/P	40 - 150
2327720	Microcystin LY	96.4	117	P/P	40 - 150
2327720	Microcystin RR	93.4	95.3	P/P	40 - 150
2327720	Microcystin WR	116	118	P/P	40 - 150
2327720	Microcystin YR	123	121	P/P	40 - 150
2327720	Nodularin-R	113	117	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P414097

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2327733	Ammonia-N	1.21	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414279

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2327792	NO2NO3-N	0.525	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414061

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2327759	Total-P	0.518	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414046

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2327559	O-Phosphate-P	0.0919	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P414009

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2326817	Anatoxin-a	1.78	Spike	P	0 - 30
2326817	Neosaxitoxin	3.31	Spike	P	0 - 30
2326817	Saxitoxin	1.19	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P414020

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2327720	Cylindrospermopsin	5.49	Spike	P	0 - 30
2327720	Desmethyl microcystin LR	8.23	Spike	P	0 - 30
2327720	Microcystin HilR	7.33	Spike	P	0 - 30
2327720	Microcystin HtyR	1.39	Spike	P	0 - 30
2327720	Microcystin LA	8.94	Spike	P	0 - 30
2327720	Microcystin LF	0.597	Spike	P	0 - 30
2327720	Microcystin LR	0.951	Spike	P	0 - 30
2327720	Microcystin LW	2.63	Spike	P	0 - 30
2327720	Microcystin LY	19.6	Spike	P	0 - 30
2327720	Microcystin RR	2.06	Spike	P	0 - 30
2327720	Microcystin WR	1.73	Spike	P	0 - 30
2327720	Microcystin YR	1.51	Spike	P	0 - 30
2327720	Nodularin-R	3.54	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: 2327787
Field Sample ID: NEHAB0057

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	87.7	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	36.1	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A112231
Included Lab Sample IDs: 2327793

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	99.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A112261
Included Lab Sample IDs: 2327792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.5	97.7	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A112273
Included Lab Sample IDs: 2327787

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	103	80.7	P/P	50 - 160
Desmethyl microcystin LR	98.3	86.2	P/P	50 - 160
Microcystin HilR	95.5	79.3	P/P	50 - 160
Microcystin HtyR	96.5	87.2	P/P	50 - 160
Microcystin LA	110	82.8	P/P	50 - 160
Microcystin LF	110	102	P/P	50 - 160
Microcystin LR	93.0	84.8	P/P	50 - 160
Microcystin LW	99.3	99.7	P/P	50 - 160
Microcystin LY	103	74.2	P/P	50 - 160
Microcystin RR	91.9	81.0	P/P	50 - 160
Microcystin WR	109	91.7	P/P	50 - 160
Microcystin YR	96.6	84.8	P/P	50 - 160
Nodularin-R	106	88.9	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A112308
Included Lab Sample IDs: 2327787

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.4	90.4	P/P	50 - 160
Neosaxitoxin	61.1	58.8	P/P	50 - 160
Saxitoxin	63.4	61.6	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A112335
Included Lab Sample IDs: 2327792

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A112355
Included Lab Sample IDs: 2327792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	96.5	96.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A112559
Included Lab Sample IDs: 2327792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.7	91.0	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	97.8	97.8	100			1.21
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.6					
EPA 353.2 Rev. 2.0	NO2NO3-N	96.0	95.0	95.5			0.525
EPA 365.1 Rev. 2.0	Total-P	104	105	104			0.518
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	98.4	98.5			0.0919
EPA 8321B	Anatoxin-a	96.8	35.9	35.2			1.78
	Cylindrospermopsin	92.9	97.9	103			5.49
	Desmethyl microcystin LR	102	121	132			8.23
	Microcystin HilR	95.7	105	113			7.33
	Microcystin HtyR	99.5	110	108			1.39
	Microcystin LA	110	102	111			8.94
	Microcystin LF	90.3	129	130			0.597
	Microcystin LR	101	116	115			0.951
	Microcystin LW	120	131	135			2.63
	Microcystin LY	102	96.4	117			19.6
	Microcystin RR	90.1	93.4	95.3			2.06
	Microcystin WR	108	116	118			1.73
	Microcystin YR	104	123	121			1.51
	Neosaxitoxin	62.0	11.3	10.9			3.31
	Nodularin-R	108	113	117			3.54
	Saxitoxin	65.1	19.2	19.0			1.19

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2327792
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2327792
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2327792
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2327792
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2327793
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2327787
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2327787

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	05/18/2022			05/19/2022 12:30	Ping Hua	2327792
EPA 351.2 Rev. 2.0	05/18/2022	05/25/2022 12:30	Samantha L Bates	06/01/2022 11:57	Alexandra J Mattheus	2327792
EPA 353.2 Rev. 2.0	05/18/2022			05/24/2022 10:46	Beverly Y. Sanders	2327792
EPA 365.1 Rev. 2.0	05/18/2022	05/20/2022 15:00	Simonne.V. Calhoun	05/23/2022 13:10	Sarah A Nixon	2327792
EPA 365.1 Rev. 2.0 dissolved	05/18/2022			05/18/2022 16:49	Nathaniel J Jones	2327793
EPA 8321B	05/18/2022	05/19/2022 09:00	Manjita Shrestha	05/19/2022 13:09	Manjita Shrestha	2327787
	05/18/2022	05/19/2022 11:00	Manjita Shrestha	05/20/2022 14:44	Manjita Shrestha	2327787