Chemical Analysis Report

CEN-DIST-2023-10-03-01

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2023-07-03-19**
Customer: **CEN-DIST**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 18-OCT-2023 09:49

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: Lake Rowena-near NE corner **Collection Date/Time: 10/02/2023 11:02**

Field ID: HABCE0057 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2441959	DEP SOP: NU-094-1	Color (true)	11		PCU	P435888	
2441960	EPA 350.1 Rev. 2.0	Ammonia-N	0.13		mg N/L	P436055	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.71		mg N/L	P436151	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P436311	
	EPA 365.1 Rev. 2.0	Total-P	0.037		mg P/L	P436349	
2441961	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P435881	
2441964	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P435924	
		Cylindrospermopsin	0.13	I	ug/L	P435923	
		Desmethyl microcystin LR	0.25	U	ug/L	P435923	
		Microcystin HilR	0.25	U	ug/L	P435923	
		Microcystin HtyR	0.25	U	ug/L	P435923	
		Microcystin LA	0.10	U	ug/L	P435923	
		Microcystin LF	0.10	U	ug/L	P435923	
		Microcystin LR	0.25	U	ug/L	P435923	
		Microcystin LW	0.25	U	ug/L	P435923	
		Microcystin LY	0.10	U	ug/L	P435923	
		Microcystin RR	0.10	U	ug/L	P435923	
		Microcystin WR	0.50	U	ug/L	P435923	
		Neosaxitoxin	0.50	U	ug/L	P435924	
		Microcystin YR	0.25	U	ug/L	P435923	
		Saxitoxin	0.50	U	ug/L	P435924	
		Nodularin-R	0.10	U	ug/L	P435923	

Quality Assurance Report
Method Blank Results

Reference Method: DEP SOP: NU-094-1
Batch ID: P435888

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P436055

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P436151

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P436311

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P436349

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P435881

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

Reference Method: EPA 8321B
Batch ID: P435923

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
Method Blank Results

Reference Method: EPA 8321B
Batch ID: P435924

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: DEP SOP: NU-094-1
Batch ID: P435888

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P436055

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P436151

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: P436311

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: P436349

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P435881

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P435923

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	80.7		P	40 - 160
Desmethyl microcystin LR	116		P	40 - 160
Microcystin HilR	102		P	40 - 160
Microcystin HtyR	98.0		P	40 - 160
Microcystin LA	104		P	40 - 160
Microcystin LF	99.1		P	40 - 160
Microcystin LR	98.8		P	40 - 160
Microcystin LW	107		P	40 - 160
Microcystin LY	88.6		P	40 - 160
Microcystin RR	102		P	40 - 160
Microcystin WR	104		P	40 - 160
Microcystin YR	88.5		P	40 - 160
Nodularin-R	94.2		P	40 - 160

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P435924

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	109		P	40 - 150
Neosaxitoxin	98.3		P	40 - 150
Saxitoxin	103		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P436055

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2441882	Ammonia-N	99.6	99.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P436151

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2441847	Kjeldahl Nitrogen	100	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P436311

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2441960	NO2NO3-N	98.0	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P436349

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2441985	Total-P	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P435881

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2441883	O-Phosphate-P	96.7	96.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P435923

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2441950	Cylindrospermopsin	76.8	79.5	P/P	40 - 160
2441950	Desmethyl microcystin LR	116	112	P/P	40 - 160
2441950	Microcystin HilR	109	98.8	P/P	40 - 160
2441950	Microcystin HtyR	99.3	95.7	P/P	40 - 160
2441950	Microcystin LA	97.5	98.3	P/P	40 - 160
2441950	Microcystin LF	105	113	P/P	40 - 160
2441950	Microcystin LR	102	94.8	P/P	40 - 160
2441950	Microcystin LW	106	107	P/P	40 - 160
2441950	Microcystin LY	82.2	74.4	P/P	40 - 160
2441950	Microcystin RR	106	98.5	P/P	40 - 160
2441950	Microcystin WR	105	102	P/P	40 - 160
2441950	Microcystin YR	84.0	84.6	P/P	40 - 160
2441950	Nodularin-R	94.4	97.9	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P435924

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2441950	Anatoxin-a	108	107	P/P	40 - 150
2441950	Neosaxitoxin	74.5	79.0	P/P	40 - 150
2441950	Saxitoxin	91.0	93.3	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P435888

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441881	Color (true)	2.18	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P436055

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441882	Ammonia-N	0.0	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P436151

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441847	Kjeldahl Nitrogen	1.10	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P436311

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441960	NO2NO3-N	1.97	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P436349

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441985	Total-P	0.334	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P435881

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441883	O-Phosphate-P	0.0647	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P435923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441950	Cylindrospermopsin	3.43	Spike	P	0 - 30
2441950	Desmethyl microcystin LR	3.36	Spike	P	0 - 30
2441950	Microcystin HilR	9.56	Spike	P	0 - 30
2441950	Microcystin HtyR	3.68	Spike	P	0 - 30
2441950	Microcystin LA	0.763	Spike	P	0 - 30
2441950	Microcystin LF	7.40	Spike	P	0 - 30
2441950	Microcystin LR	7.02	Spike	P	0 - 30
2441950	Microcystin LW	1.14	Spike	P	0 - 30
2441950	Microcystin LY	10.0	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P435923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441950	Microcystin RR	7.58	Spike	P	0 - 30
2441950	Microcystin WR	2.81	Spike	P	0 - 30
2441950	Microcystin YR	0.703	Spike	P	0 - 30
2441950	Nodularin-R	3.64	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P435924

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2441950	Anatoxin-a	1.14	Spike	P	0 - 30
2441950	Neosaxitoxin	5.96	Spike	P	0 - 30
2441950	Saxitoxin	2.45	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2441964
Field Sample ID: HABCE0057

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	79.9	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	85.0	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A121919
Included Lab Sample IDs: 2441961

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.0	97.6	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1
Run ID: A121921
Included Lab Sample IDs: 2441959

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.6	102	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A121957
Included Lab Sample IDs: 2441964

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	116	136	P/P	50 - 160
Neosaxitoxin	107	142	P/P	50 - 160
Saxitoxin	113	141	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A121958
Included Lab Sample IDs: 2441964

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	86.1	79.7	P/P	60 - 160
Desmethyl microcystin LR	120	107	P/P	50 - 160
Microcystin HilR	110	96.4	P/P	60 - 160
Microcystin HtyR	102	97.5	P/P	60 - 160
Microcystin LA	104	95.4	P/P	50 - 160
Microcystin LF	114	100	P/P	60 - 160
Microcystin LR	107	87.8	P/P	60 - 160
Microcystin LW	112	94.3	P/P	60 - 160
Microcystin LY	88.8	71.2	P/P	60 - 160
Microcystin RR	109	103	P/P	60 - 160
Microcystin WR	106	102	P/P	60 - 160
Microcystin YR	101	80.3	P/P	60 - 160
Nodularin-R	101	89.5	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A121980
Included Lab Sample IDs: 2441960

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	98.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A122047
Included Lab Sample IDs: 2441960

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	99.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A122065
Included Lab Sample IDs: 2441960

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A122149
Included Lab Sample IDs: 2441960

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.2	97.8	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
DEP SOP: NU-094-1	Color (true)	100				2.18	
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	99.6	99.6			0.0
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	100	102			1.10
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	98.0	100			1.97
EPA 365.1 Rev. 2.0	Total-P	103	105	105			0.334
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	96.7	96.6			0.0647
EPA 8321B	Anatoxin-a	109	108	107			1.14
	Cylindrospermopsin	80.7	76.8	79.5			3.43
	Desmethyl microcystin LR	116	116	112			3.36
	Microcystin HilR	102	109	98.8			9.56
	Microcystin HtyR	98.0	99.3	95.7			3.68
	Microcystin LA	104	97.5	98.3			0.763
	Microcystin LF	99.1	105	113			7.40
	Microcystin LR	98.8	102	94.8			7.02
	Microcystin LW	107	106	107			1.14
	Microcystin LY	88.6	82.2	74.4			10.0
	Microcystin RR	102	106	98.5			7.58
	Microcystin WR	104	105	102			2.81
	Microcystin YR	88.5	84.0	84.6			0.703
	Neosaxitoxin	98.3	74.5	79.0			5.96
	Nodularin-R	94.2	94.4	97.9			3.64
	Saxitoxin	103	91.0	93.3			2.45

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2441959
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2441960
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2441960
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2441960
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2441960
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2441961
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2441964
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2441964

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	10/03/2023			10/03/2023 14:54	Samantha L Bates	2441959
EPA 350.1 Rev. 2.0	10/03/2023			10/05/2023 13:13	Ping Hua	2441960
EPA 351.2 Rev. 2.0	10/03/2023	10/09/2023 12:23	Simonne.V. Calhoun	10/10/2023 12:10	Samantha L Bates	2441960
EPA 353.2 Rev. 2.0	10/03/2023			10/10/2023 15:13	Fadila Guebre	2441960
EPA 365.1 Rev. 2.0	10/03/2023	10/11/2023 13:38	Adam P Silver	10/13/2023 13:54	James L Waggerby	2441960
EPA 365.1 Rev. 2.0 dissolved	10/03/2023			10/03/2023 14:42	Elise M. Gillis	2441961
EPA 8321B	10/03/2023	10/04/2023 11:00	Tae K Lee	10/04/2023 14:36	Hana Lee	2441964
	10/03/2023	10/04/2023 11:00	Tae K Lee	10/04/2023 17:28	Hana Lee	2441964