Chemical Analysis Report

WQAP-2021-07-16-01

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

Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2021-06-28-06**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 12-AUG-2021 09:10

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 Otis @ boat ramp **Collection Date/Time: 07/15/2021 13:58**

Field ID: HABCE0043_Lake Otis Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2262565	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P401153	
		Cylindrospermopsin	0.10	U	ug/L	P401153	
		Desmethyl microcystin LR	0.25	U	ug/L	P401153	
		Microcystin HilR**	0.25	U	ug/L	P401153	
		Microcystin HtyR**	0.25	U	ug/L	P401153	
		Microcystin LA	0.10	U	ug/L	P401153	
		Microcystin LF	0.10	U	ug/L	P401153	
		Microcystin LR	0.25	U	ug/L	P401153	
		Microcystin LW	0.25	U	ug/L	P401153	
		Microcystin LY	0.10	U	ug/L	P401153	
		Microcystin RR	0.10	U	ug/L	P401153	
		Microcystin WR	0.50	U	ug/L	P401153	
		Microcystin YR	0.25	U	ug/L	P401153	
		Nodularin-R**	0.10	U	ug/L	P401153	
2262566	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P401595	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P401999	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P401152	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P401398	
2262567	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P401095	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401595

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401999

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401152

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401398

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401095

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

Reference Method: EPA 8321B
Batch ID: P401153

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: P401595

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: P401999

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401152

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401398

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: P401095

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

Reference Method: EPA 8321B
Batch ID: P401153

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	117		P	40 - 150
Cylindrospermopsin	115		P	40 - 150
Desmethyl microcystin LR	106		P	40 - 150
Microcystin HilR	121		P	40 - 150
Microcystin HtyR	115		P	40 - 150
Microcystin LA	120		P	40 - 150
Microcystin LF	124		P	40 - 150
Microcystin LR	117		P	40 - 150
Microcystin LW	130		P	40 - 150
Microcystin LY	114		P	40 - 150
Microcystin RR	121		P	40 - 150
Microcystin WR	125		P	40 - 150
Microcystin YR	130		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: P401595

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262558	Ammonia-N	95.2	95.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401999

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262520	Kjeldahl Nitrogen	101	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401152

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262520	NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401398

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262482	Total-P	105	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401095

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262567	O-Phosphate-P	95.5	97.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P401153

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2262551	Anatoxin-a	124	118	P/P	40 - 150
2262551	Cylindrospermopsin	110	101	P/P	40 - 150
2262551	Desmethyl microcystin LR	116	104	P/P	40 - 150
2262551	Microcystin HilR	120	119	P/P	40 - 150
2262551	Microcystin HtyR	119	99.4	P/P	40 - 150
2262551	Microcystin LA	119	106	P/P	40 - 150
2262551	Microcystin LF	117	112	P/P	40 - 150
2262551	Microcystin LR	98.3	111	P/P	40 - 150
2262551	Microcystin LW	115	105	P/P	40 - 150
2262551	Microcystin LY	109	103	P/P	40 - 150
2262551	Microcystin RR	108	103	P/P	40 - 150
2262551	Microcystin WR	120	109	P/P	40 - 150
2262551	Microcystin YR	110	111	P/P	40 - 150
2262551	Nodularin-R	117	108	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401595

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262558	Ammonia-N	0.0	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401999

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262520	Kjeldahl Nitrogen	0.308	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401152

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262520	NO2NO3-N	0.985	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401398

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262482	Total-P	2.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401095

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262567	O-Phosphate-P	2.18	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P401153

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2262551	Anatoxin-a	5.05	Spike	P	0 - 30
2262551	Cylindrospermopsin	8.08	Spike	P	0 - 30
2262551	Desmethyl microcystin LR	11.4	Spike	P	0 - 30
2262551	Microcystin HilR	0.696	Spike	P	0 - 30
2262551	Microcystin HtyR	17.8	Spike	P	0 - 30
2262551	Microcystin LA	11.0	Spike	P	0 - 30
2262551	Microcystin LF	4.42	Spike	P	0 - 30
2262551	Microcystin LR	11.8	Spike	P	0 - 30
2262551	Microcystin LW	8.71	Spike	P	0 - 30
2262551	Microcystin LY	5.45	Spike	P	0 - 30
2262551	Microcystin RR	4.58	Spike	P	0 - 30
2262551	Microcystin WR	9.34	Spike	P	0 - 30
2262551	Microcystin YR	0.447	Spike	P	0 - 30
2262551	Nodularin-R	7.86	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: 2262565
Field Sample ID: HABCE0043_Lake Otis

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	103	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	81.7	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A106667
Included Lab Sample IDs: 2262567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	98.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106682
Included Lab Sample IDs: 2262566

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A106717
Included Lab Sample IDs: 2262565

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	105	107	P/P	50 - 160
Cylindrospermopsin	102	101	P/P	50 - 160
Desmethyl microcystin LR	96.8	106	P/P	50 - 160
Microcystin HilR	99.6	93.5	P/P	50 - 160
Microcystin HtyR	99.4	103	P/P	50 - 160
Microcystin LA	106	107	P/P	50 - 160
Microcystin LF	106	105	P/P	50 - 160
Microcystin LR	92.3	96.1	P/P	50 - 160
Microcystin LW	107	107	P/P	50 - 160
Microcystin LY	104	102	P/P	50 - 160
Microcystin RR	100	97.9	P/P	50 - 160
Microcystin WR	107	109	P/P	50 - 160
Microcystin YR	110	104	P/P	50 - 160
Nodularin-R	102	103	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106790
Included Lab Sample IDs: 2262566

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106850
Included Lab Sample IDs: 2262566

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A107072
Included Lab Sample IDs: 2262566

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	101	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	98.4	95.2	95.2			0.0
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	101	102			0.308
EPA 353.2 Rev. 2.0	NO2NO3-N	101	101	102			0.985
EPA 365.1 Rev. 2.0	Total-P	103	105	107			2.01
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.8	95.5	97.6			2.18
EPA 8321B	Anatoxin-a	117	124	118			5.05
	Cylindrospermopsin	115	110	101			8.08
	Desmethyl microcystin LR	106	116	104			11.4
	Microcystin HilR	121	120	119			0.696
	Microcystin HtyR	115	119	99.4			17.8
	Microcystin LA	120	119	106			11.0
	Microcystin LF	124	117	112			4.42
	Microcystin LR	117	98.3	111			11.8
	Microcystin LW	130	115	105			8.71
	Microcystin LY	114	109	103			5.45
	Microcystin RR	121	108	103			4.58
	Microcystin WR	125	120	109			9.34
	Microcystin YR	130	110	111			0.447
	Nodularin-R	124	117	108			7.86

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2262566
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2262566
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2262566
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2262566
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2262567
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2262565

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	07/16/2021			07/27/2021 12:44	Roberta Tatti	2262566
EPA 351.2 Rev. 2.0	07/16/2021	08/04/2021 14:07	Benjamin T. Nordmann	08/05/2021 15:01	Virginia P. Brown	2262566
EPA 353.2 Rev. 2.0	07/16/2021			07/19/2021 10:44	Beverly Y. Sanders	2262566
EPA 365.1 Rev. 2.0	07/16/2021	07/22/2021 12:02	Shengyu Ding	07/23/2021 10:35	Shengyu Ding	2262566
EPA 365.1 Rev. 2.0 dissolved	07/16/2021			07/16/2021 14:37	Ping Hua	2262567
EPA 8321B	07/16/2021	07/20/2021 12:00	Pramila Ghimire	07/20/2021 16:40	Pramila Ghimire	2262565