Chemical Analysis Report

WQAP-2021-08-06-03

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-2021-06-21-09**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 31-AUG-2021 12:07

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 Weir - Carney Island Swim Beach **Collection Date/Time: 08/05/2021 12:15**

Field ID: HABCE0084_LakeWeir4 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2267931	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P402171	
		Cylindrospermopsin	0.10	U	ug/L	P402171	
		Desmethyl microcystin LR	0.25	U	ug/L	P402171	
		Microcystin HilR**	0.25	U	ug/L	P402171	
		Microcystin HtyR**	0.25	U	ug/L	P402171	
		Microcystin LA	0.10	U	ug/L	P402171	
		Microcystin LF	0.10	UJ	ug/L	P402171	LCS
		Microcystin LR	0.25	U	ug/L	P402171	
		Microcystin LW	0.25	U	ug/L	P402171	
		Microcystin LY	0.10	U	ug/L	P402171	MS
		Microcystin RR	0.10	U	ug/L	P402171	
		Microcystin WR	0.50	U	ug/L	P402171	
		Microcystin YR	0.25	U	ug/L	P402171	
		Nodularin-R**	0.10	U	ug/L	P402171	
2267932	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P402387	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.79		mg N/L	P402474	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P402232	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P402326	
2267933	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P402137	

Ref. Method and Comment:
EPA 8321B: Refer to the Lab Analysis Report for an explanation of QC Codes.
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: P402387

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402474

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402232

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402326

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402137

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

Reference Method: EPA 8321B
Batch ID: P402171

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: P402387

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: P402474

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402232

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: P402326

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402137

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

Reference Method: EPA 8321B
Batch ID: P402171

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	105		P	40 - 150
Cylindrospermopsin	122		P	40 - 150
Desmethyl microcystin LR	77.0		P	40 - 150
Microcystin HilR	88.5		P	40 - 150
Microcystin HtyR	83.4		P	40 - 150
Microcystin LA	129		P	40 - 150
Microcystin LF	161		F	40 - 150
Microcystin LR	74.2		P	40 - 150
Microcystin LW	139		P	40 - 150
Microcystin LY	132		P	40 - 150
Microcystin RR	103		P	40 - 150
Microcystin WR	80.7		P	40 - 150
Microcystin YR	100		P	40 - 150
Nodularin-R	103		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402387

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267898	Ammonia-N	99.8	98.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402232

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267840	NO2NO3-N	97.5	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402326

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267930	Total-P	105	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402137

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267901	O-Phosphate-P	91.6	90.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P402171

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2267875	Anatoxin-a	94.6	102	P/P	40 - 150
2267875	Cylindrospermopsin	102	114	P/P	40 - 150
2267875	Desmethyl microcystin LR	68.2	74.3	P/P	40 - 150
2267875	Microcystin HilR	76.3	83.5	P/P	40 - 150
2267875	Microcystin HtyR	72.2	77.4	P/P	40 - 150
2267875	Microcystin LA	107	118	P/P	40 - 150
2267875	Microcystin LF	117	113	P/P	40 - 150
2267875	Microcystin LR	69.3	72.4	P/P	40 - 150
2267875	Microcystin LW	117	116	P/P	40 - 150
2267875	Microcystin LY	126	157	P/F	40 - 150
2267875	Microcystin RR	85.4	93.8	P/P	40 - 150
2267875	Microcystin WR	69.4	69.9	P/P	40 - 150
2267875	Microcystin YR	85.1	87.5	P/P	40 - 150
2267875	Nodularin-R	91.3	98.9	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402387

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267898	Ammonia-N	1.19	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402474

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267233	Kjeldahl Nitrogen	4.85	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402232

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267840	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402326

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267930	Total-P	1.58	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402137

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267901	O-Phosphate-P	1.10	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P402171

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2267875	Anatoxin-a	7.79	Spike	P	0 - 30
2267875	Cylindrospermopsin	10.3	Spike	P	0 - 30
2267875	Desmethyl microcystin LR	8.65	Spike	P	0 - 30
2267875	Microcystin HilR	9.04	Spike	P	0 - 30
2267875	Microcystin HtyR	6.93	Spike	P	0 - 30
2267875	Microcystin LA	10.5	Spike	P	0 - 30
2267875	Microcystin LF	3.29	Spike	P	0 - 30
2267875	Microcystin LR	4.50	Spike	P	0 - 30
2267875	Microcystin LW	1.07	Spike	P	0 - 30
2267875	Microcystin LY	21.4	Spike	P	0 - 30
2267875	Microcystin RR	9.30	Spike	P	0 - 30
2267875	Microcystin WR	0.611	Spike	P	0 - 30
2267875	Microcystin YR	2.69	Spike	P	0 - 30
2267875	Nodularin-R	7.97	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: 2267931
Field Sample ID: HABCE0084_LakeWeir4

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	66.2	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	51.1	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A107101
Included Lab Sample IDs: 2267933

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.2	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A107136
Included Lab Sample IDs: 2267932

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

Reference Method: EPA 8321B
Run ID: A107159
Included Lab Sample IDs: 2267931

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	98.9	97.7	P/P	50 - 160
Cylindrospermopsin	109	108	P/P	60 - 160
Desmethyl microcystin LR	78.2	83.4	P/P	60 - 160
Microcystin HilR	82.5	90.6	P/P	60 - 160
Microcystin HtyR	80.1	86.2	P/P	60 - 160
Microcystin LA	118	129	P/P	50 - 160
Microcystin LF	150	154	P/P	60 - 160
Microcystin LR	77.9	79.2	P/P	60 - 160
Microcystin LW	130	143	P/P	60 - 160
Microcystin LY	128	119	P/P	60 - 160
Microcystin RR	93.8	93.3	P/P	60 - 160
Microcystin WR	77.5	78.6	P/P	60 - 160
Microcystin YR	88.9	85.3	P/P	60 - 160
Nodularin-R	97.1	99.5	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A107208
Included Lab Sample IDs: 2267932

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A107211
Included Lab Sample IDs: 2267932

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	98.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A107273
Included Lab Sample IDs: 2267932

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.8	104	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	99.8	98.2			1.19
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108					4.85
EPA 353.2 Rev. 2.0	NO2NO3-N	101	97.5	97.5			0.0
EPA 365.1 Rev. 2.0	Total-P	107	105	108			1.58
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.3	91.6	90.6			1.10
EPA 8321B	Anatoxin-a	105	94.6	102			7.79
	Cylindrospermopsin	122	102	114			10.3
	Desmethyl microcystin LR	77.0	68.2	74.3			8.65
	Microcystin HilR	88.5	76.3	83.5			9.04
	Microcystin HtyR	83.4	72.2	77.4			6.93
	Microcystin LA	129	107	118			10.5
	Microcystin LF	161	117	113			3.29
	Microcystin LR	74.2	69.3	72.4			4.50
	Microcystin LW	139	117	116			1.07
	Microcystin LY	132	126	157			21.4
	Microcystin RR	103	85.4	93.8			9.30
	Microcystin WR	80.7	69.4	69.9			0.611
	Microcystin YR	100	85.1	87.5			2.69
	Nodularin-R	103	91.3	98.9			7.97

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2267932
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2267932
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2267932
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2267932
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2267933
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2267931

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	08/06/2021			08/12/2021 12:46	Roberta Tatti	2267932
EPA 351.2 Rev. 2.0	08/06/2021	08/13/2021 13:07	Madeline Gruver	08/16/2021 15:34	Virginia P. Brown	2267932
EPA 353.2 Rev. 2.0	08/06/2021			08/10/2021 09:13	Beverly Y. Sanders	2267932
EPA 365.1 Rev. 2.0	08/06/2021	08/11/2021 13:55	Simonne.V. Calhoun	08/12/2021 13:05	Shengyu Ding	2267932
EPA 365.1 Rev. 2.0 dissolved	08/06/2021			08/06/2021 15:31	Blanca Fach	2267933
EPA 8321B	08/06/2021	08/10/2021 09:30	Pramila Ghimire	08/10/2021 12:39	Pramila Ghimire	2267931