Chemical Analysis Report

WQAP-2021-07-21-05

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

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2021-06-14-21**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 16-AUG-2021 11:23

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: Caloosahatchee-Jaycee Park, Cape Coral **Collection Date/Time: 07/20/2021 10:10**

Field ID: HAB-SD-07202021-001 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2263903	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P401276	
		Cylindrospermopsin	0.10	U	ug/L	P401276	
		Desmethyl microcystin LR	0.25	U	ug/L	P401276	
		Microcystin HilR**	0.25	U	ug/L	P401276	
		Microcystin HtyR**	0.25	U	ug/L	P401276	
		Microcystin LA	0.10	U	ug/L	P401276	
		Microcystin LF	0.10	U	ug/L	P401276	
		Microcystin LR	0.50	I	ug/L	P401276	
		Microcystin LW	0.25	U	ug/L	P401276	
		Microcystin LY	0.10	U	ug/L	P401276	
		Microcystin RR	0.10	U	ug/L	P401276	
		Microcystin WR	0.50	U	ug/L	P401276	
		Microcystin YR	0.25	U	ug/L	P401276	
		Nodularin-R**	0.10	U	ug/L	P401276	
2263904	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P401706	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.89		mg N/L	P402206	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.020		mg N/L	P401475	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P401640	
2263905	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.074		mg P/L	P401307	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401706

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402206

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401475

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401640

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401307

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

Reference Method: EPA 8321B
Batch ID: P401276

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: P401706

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402206

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401475

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: P401640

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: P401307

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

Reference Method: EPA 8321B
Batch ID: P401276

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	107		P	40 - 150
Cylindrospermopsin	107		P	40 - 150
Desmethyl microcystin LR	87.8		P	40 - 150
Microcystin HilR	95.2		P	40 - 150
Microcystin HtyR	91.0		P	40 - 150
Microcystin LA	90.5		P	40 - 150
Microcystin LF	78.4		P	40 - 150
Microcystin LR	95.3		P	40 - 150
Microcystin LW	82.6		P	40 - 150
Microcystin LY	78.7		P	40 - 150
Microcystin RR	96.9		P	40 - 150
Microcystin WR	89.8		P	40 - 150
Microcystin YR	94.2		P	40 - 150
Nodularin-R	95.4		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401706

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263493	Ammonia-N	104	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402206

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263229	Kjeldahl Nitrogen	111	106	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401475

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263904	NO2NO3-N	97.4	96.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401640

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2264025	Total-P	102	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263795	O-Phosphate-P	101	99.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P401276

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2263799	Anatoxin-a	80.9	75.3	P/P	40 - 150
2263799	Cylindrospermopsin	69.7	66.8	P/P	40 - 150
2263799	Desmethyl microcystin LR	66.1	63.4	P/P	40 - 150
2263799	Microcystin HilR	72.3	69.2	P/P	40 - 150
2263799	Microcystin HtyR	73.9	69.0	P/P	40 - 150
2263799	Microcystin LA	66.8	60.9	P/P	40 - 150
2263799	Microcystin LF	48.8	40.8	P/P	40 - 150
2263799	Microcystin LR	69.0	77.9	P/P	40 - 150
2263799	Microcystin LW	46.7	46.0	P/P	40 - 150
2263799	Microcystin LY	54.8	51.7	P/P	40 - 150
2263799	Microcystin RR	83.9	75.8	P/P	40 - 150
2263799	Microcystin WR	71.8	65.8	P/P	40 - 150
2263799	Microcystin YR	75.6	68.1	P/P	40 - 150
2263799	Nodularin-R	80.0	74.7	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401706

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263493	Ammonia-N	0.852	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402206

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263229	Kjeldahl Nitrogen	3.91	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401475

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263904	NO2NO3-N	0.467	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P401640

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2264025	Total-P	2.44	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263795	O-Phosphate-P	0.799	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P401276

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2263799	Anatoxin-a	7.27	Spike	P	0 - 30
2263799	Cylindrospermopsin	4.14	Spike	P	0 - 30
2263799	Desmethyl microcystin LR	4.16	Spike	P	0 - 30
2263799	Microcystin HilR	4.36	Spike	P	0 - 30
2263799	Microcystin HtyR	6.94	Spike	P	0 - 30
2263799	Microcystin LA	9.17	Spike	P	0 - 30
2263799	Microcystin LF	17.7	Spike	P	0 - 30
2263799	Microcystin LR	12.1	Spike	P	0 - 30
2263799	Microcystin LW	1.40	Spike	P	0 - 30
2263799	Microcystin LY	5.71	Spike	P	0 - 30
2263799	Microcystin RR	10.2	Spike	P	0 - 30
2263799	Microcystin WR	8.70	Spike	P	0 - 30
2263799	Microcystin YR	10.5	Spike	P	0 - 30
2263799	Nodularin-R	6.86	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: 2263903
Field Sample ID: HAB-SD-07202021-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	76.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	62.4	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A106743
Included Lab Sample IDs: 2263905

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.4	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A106757
Included Lab Sample IDs: 2263903

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	71.9	102	P/P	50 - 160
Cylindrospermopsin	76.0	95.2	P/P	50 - 160
Desmethyl microcystin LR	70.2	86.5	P/P	50 - 160
Microcystin HilR	66.5	92.9	P/P	50 - 160
Microcystin HtyR	73.3	92.9	P/P	50 - 160
Microcystin LA	68.8	93.3	P/P	50 - 160
Microcystin LF	62.4	74.8	P/P	50 - 160
Microcystin LR	78.6	99.6	P/P	50 - 160
Microcystin LW	61.6	71.7	P/P	50 - 160
Microcystin LY	62.7	83.3	P/P	50 - 160
Microcystin RR	77.7	94.3	P/P	50 - 160
Microcystin WR	79.8	103	P/P	50 - 160
Microcystin YR	76.8	97.7	P/P	50 - 160
Nodularin-R	77.0	98.7	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106795
Included Lab Sample IDs: 2263904

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106910
Included Lab Sample IDs: 2263904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	99.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106917
Included Lab Sample IDs: 2263904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A107152
Included Lab Sample IDs: 2263904

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	99.2	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	99.8	104	105			0.852
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	111	106			3.91
EPA 353.2 Rev. 2.0	NO2NO3-N	100	97.4	96.9			0.467
EPA 365.1 Rev. 2.0	Total-P	104	102	105			2.44
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	101	99.8			0.799
EPA 8321B	Anatoxin-a	107	80.9	75.3			7.27
	Cylindrospermopsin	107	69.7	66.8			4.14
	Desmethyl microcystin LR	87.8	66.1	63.4			4.16
	Microcystin HilR	95.2	72.3	69.2			4.36
	Microcystin HtyR	91.0	73.9	69.0			6.94
	Microcystin LA	90.5	66.8	60.9			9.17
	Microcystin LF	78.4	48.8	40.8			17.7
	Microcystin LR	95.3	69.0	77.9			12.1
	Microcystin LW	82.6	46.7	46.0			1.40
	Microcystin LY	78.7	54.8	51.7			5.71
	Microcystin RR	96.9	83.9	75.8			10.2
	Microcystin WR	89.8	71.8	65.8			8.70
	Microcystin YR	94.2	75.6	68.1			10.5
	Nodularin-R	95.4	80.0	74.7			6.86

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2263904
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2263904
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2263904
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2263904
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2263905
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2263903

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	07/21/2021			07/29/2021 12:54	Ping Hua	2263904
EPA 351.2 Rev. 2.0	07/21/2021	08/09/2021 18:22	Madeline Gruver	08/10/2021 15:13	Virginia P. Brown	2263904
EPA 353.2 Rev. 2.0	07/21/2021			07/23/2021 11:17	Beverly Y. Sanders	2263904
EPA 365.1 Rev. 2.0	07/21/2021	07/28/2021 14:07	Simonne.V. Calhoun	07/29/2021 10:31	Shengyu Ding	2263904
EPA 365.1 Rev. 2.0 dissolved	07/21/2021			07/21/2021 13:50	Lipi Saha	2263905
EPA 8321B	07/21/2021	07/21/2021 12:00	Pramila Ghimire	07/22/2021 00:26	Pramila Ghimire	2263903