Chemical Analysis Report

WQAP-2021-07-01-02

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

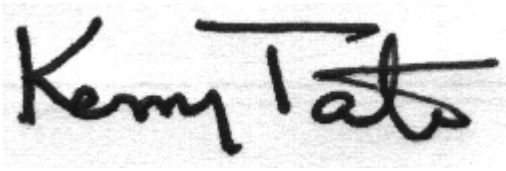
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2021-05-10-70**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 26-JUL-2021 11:56



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: Mayberrys RV Park **Collection Date/Time: 06/30/2021 12:45**

Field ID: SEHAB0061 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2258463	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P400439	
		Cylindrospermopsin	0.10	U	ug/L	P400439	
		Desmethyl microcystin LR	0.25	U	ug/L	P400439	
		Microcystin HilR**	0.25	U	ug/L	P400439	
		Microcystin HtyR**	0.25	U	ug/L	P400439	
		Microcystin LA	0.10	U	ug/L	P400439	
		Microcystin LF	0.10	U	ug/L	P400439	
		Microcystin LR	0.25	U	ug/L	P400439	
		Microcystin LW	0.25	U	ug/L	P400439	
		Microcystin LY	0.10	U	ug/L	P400439	
		Microcystin RR	0.10	U	ug/L	P400439	
		Microcystin WR	0.50	U	ug/L	P400439	
		Microcystin YR	0.25	U	ug/L	P400439	
		Nodularin-R**	0.10	U	ug/L	P400439	
2258464	EPA 350.1 Rev. 2.0	Ammonia-N	0.19		mg N/L	P400874	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P401334	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P400512	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P400529	
2258465	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.080		mg P/L	P400464	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400874

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401334

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400512

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400529

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400464

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

Reference Method: EPA 8321B
Batch ID: P400439

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: P400874

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401334

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400512

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: P400529

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400464

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

Reference Method: EPA 8321B
Batch ID: P400439

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	84.8		P	40 - 150
Cylindrospermopsin	93.8		P	40 - 150
Desmethyl microcystin LR	82.4		P	40 - 150
Microcystin HilR	86.3		P	40 - 150
Microcystin HtyR	86.3		P	40 - 150
Microcystin LA	91.6		P	40 - 150
Microcystin LF	85.5		P	40 - 150
Microcystin LR	79.0		P	40 - 150
Microcystin LW	88.9		P	40 - 150
Microcystin LY	83.9		P	40 - 150
Microcystin RR	94.5		P	40 - 150
Microcystin WR	83.1		P	40 - 150
Microcystin YR	86.4		P	40 - 150
Nodularin-R	85.2		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400874

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2257754	Ammonia-N	94.6	94.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2258442	Kjeldahl Nitrogen	94.3	98.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2258433	NO2NO3-N	98.8	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400529

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2258094	Total-P	102	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400464

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2258434	O-Phosphate-P	96.1	97.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P400439

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2258432	Anatoxin-a	86.4	88.0	P/P	40 - 150
2258432	Cylindrospermopsin	96.8	94.8	P/P	40 - 150
2258432	Desmethyl microcystin LR	86.9	93.2	P/P	40 - 150
2258432	Microcystin HilR	89.6	93.0	P/P	40 - 150
2258432	Microcystin HtyR	89.1	94.8	P/P	40 - 150
2258432	Microcystin LA	95.7	98.6	P/P	40 - 150
2258432	Microcystin LF	84.3	95.6	P/P	40 - 150
2258432	Microcystin LR	88.8	80.6	P/P	40 - 150
2258432	Microcystin LW	82.6	84.5	P/P	40 - 150
2258432	Microcystin LY	88.5	90.1	P/P	40 - 150
2258432	Microcystin RR	99.9	101	P/P	40 - 150
2258432	Microcystin WR	89.5	90.4	P/P	40 - 150
2258432	Microcystin YR	93.9	92.3	P/P	40 - 150
2258432	Nodularin-R	92.7	94.3	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400874

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2258433	Ammonia-N	0.694	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401334

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2258442	Kjeldahl Nitrogen	3.27	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2258433	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400529

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2258094	Total-P	2.22	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400464

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2258434	O-Phosphate-P	1.04	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P400439

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2258432	Anatoxin-a	1.78	Spike	P	0 - 30
2258432	Cylindrospermopsin	1.87	Spike	P	0 - 30
2258432	Desmethyl microcystin LR	6.94	Spike	P	0 - 30
2258432	Microcystin HilR	3.71	Spike	P	0 - 30
2258432	Microcystin HtyR	6.20	Spike	P	0 - 30
2258432	Microcystin LA	2.90	Spike	P	0 - 30
2258432	Microcystin LF	12.6	Spike	P	0 - 30
2258432	Microcystin LR	9.77	Spike	P	0 - 30
2258432	Microcystin LW	2.26	Spike	P	0 - 30
2258432	Microcystin LY	1.85	Spike	P	0 - 30
2258432	Microcystin RR	0.852	Spike	P	0 - 30
2258432	Microcystin WR	0.983	Spike	P	0 - 30
2258432	Microcystin YR	1.77	Spike	P	0 - 30
2258432	Nodularin-R	1.77	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: 2258463
Field Sample ID: SEHAB0061

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	85.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	66.6	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A106399
Included Lab Sample IDs: 2258465

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.9	98.4	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A106402
Included Lab Sample IDs: 2258463

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	89.3	88.2	P/P	50 - 160
Cylindrospermopsin	102	100	P/P	50 - 160
Desmethyl microcystin LR	93.6	93.0	P/P	50 - 160
Microcystin HilR	85.0	88.9	P/P	50 - 160
Microcystin HtyR	92.0	95.1	P/P	50 - 160
Microcystin LA	91.8	97.5	P/P	50 - 160
Microcystin LF	90.3	91.6	P/P	50 - 160
Microcystin LR	84.8	84.7	P/P	50 - 160
Microcystin LW	95.1	93.4	P/P	50 - 160
Microcystin LY	91.0	92.5	P/P	50 - 160
Microcystin RR	101	103	P/P	50 - 160
Microcystin WR	92.6	88.5	P/P	50 - 160
Microcystin YR	93.5	86.9	P/P	50 - 160
Nodularin-R	90.0	91.9	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106426
Included Lab Sample IDs: 2258464

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106455
Included Lab Sample IDs: 2258464

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106584
Included Lab Sample IDs: 2258464

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.0	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A106788
Included Lab Sample IDs: 2258464

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	107	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	99.2	94.6	94.2			0.694
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.7	94.3	98.0			3.27
EPA 353.2 Rev. 2.0	NO2NO3-N	101	98.8	98.8			0.0
EPA 365.1 Rev. 2.0	Total-P	102	102	105			2.22
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.8	96.1	97.1			1.04
EPA 8321B	Anatoxin-a	84.8	86.4	88.0			1.78
	Cylindrospermopsin	93.8	96.8	94.8			1.87
	Desmethyl microcystin LR	82.4	86.9	93.2			6.94
	Microcystin HilR	86.3	89.6	93.0			3.71
	Microcystin HtyR	86.3	89.1	94.8			6.20
	Microcystin LA	91.6	95.7	98.6			2.90
	Microcystin LF	85.5	84.3	95.6			12.6
	Microcystin LR	79.0	88.8	80.6			9.77
	Microcystin LW	88.9	82.6	84.5			2.26
	Microcystin LY	83.9	88.5	90.1			1.85
	Microcystin RR	94.5	99.9	101			0.852
	Microcystin WR	83.1	89.5	90.4			0.983
	Microcystin YR	86.4	93.9	92.3			1.77
	Nodularin-R	85.2	92.7	94.3			1.77

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2258464
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2258464
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2258464
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2258464
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2258465
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2258463

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	07/01/2021			07/13/2021 13:28	Roberta Tatti	2258464
EPA 351.2 Rev. 2.0	07/01/2021	07/21/2021 14:12	Benjamin T. Nordmann	07/22/2021 18:39	Letuzia M De Oliveira	2258464
EPA 353.2 Rev. 2.0	07/01/2021			07/02/2021 08:46	Beverly Y. Sanders	2258464
EPA 365.1 Rev. 2.0	07/01/2021	07/02/2021 14:09	Madeline Gruver	07/06/2021 11:13	Shengyu Ding	2258464
EPA 365.1 Rev. 2.0 dissolved	07/01/2021			07/01/2021 14:54	Ping Hua	2258465
EPA 8321B	07/01/2021	07/01/2021 12:00	Pramila Ghimire	07/01/2021 16:36	Pramila Ghimire	2258463