Chemical Analysis Report

WQAP-2019-08-29-01

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

Event Description: **Algal Bloom Response - As needed**
Request ID: **RQ-2019-08-26-47**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2295 Victoria AVE
Suite 364
Fort Myers, FL 33901
Attn: Kirby Wolfe

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: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 12-SEP-2019 16:11

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: Pahokee Marina **Collection Date/Time: 08/28/2019 10:55**

Field ID: SD082819-01 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2115529	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P369814	MS
		Cylindrospermopsin**	0.25	U	ug/L	P369814	
		Microcystin LA**	0.25	U	ug/L	P369814	
		Microcystin LF**	0.25	U	ug/L	P369814	
		Microcystin LR**	1.1		ug/L	P369814	
		Microcystin LY**	0.25	U	ug/L	P369814	
		Microcystin RR**	0.25	U	ug/L	P369814	
		Microcystin YR**	0.25	U	ug/L	P369814	
2115546	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P370321	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1	J	mg N/L	P370088	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.022		mg N/L	P370181	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P370288	
2115548	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.044		mg P/L	P369960	

Ref. Method and Comment:
EPA 351.2 Rev. 2.0: Refer to the narrative for an explanation of QC Codes.

Sample Location: S East **Collection Date/Time: 08/28/2019 11:30**

Field ID: SD082819-02 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2115530	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P369814	MS
		Cylindrospermopsin**	0.25	U	ug/L	P369814	
		Microcystin LA**	2.9		ug/L	P369814	
		Microcystin LF**	0.25	U	ug/L	P369814	
		Microcystin LR**	190		ug/L	P369814	
		Microcystin LY**	0.25	U	ug/L	P369814	
		Microcystin RR**	0.25	U	ug/L	P369814	
		Microcystin YR**	0.25	U	ug/L	P369814	
2115547	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P370237	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.98		mg N/L	P370088	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.020		mg N/L	P370064	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P370288	
2115549	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.055		mg P/L	P369960	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370237

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370321

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P370088

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370064

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370181

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P370288

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P369960

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

Reference Method: EPA 8321B
Batch ID: P369814

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin YR	0.25	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370237

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370321

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P370088

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.4		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370064

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370181

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P370288

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P369960

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

Reference Method: EPA 8321B
Batch ID: P369814

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	127		P	40 - 140
Cylindrospermopsin	112		P	40 - 140
Microcystin LA	101		P	40 - 140
Microcystin LF	93.0		P	40 - 140
Microcystin LR	108		P	40 - 140
Microcystin LY	93.8		P	40 - 140
Microcystin RR	121		P	40 - 140
Microcystin YR	107		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370237

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115536	Ammonia-N	99.3	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370321

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115191	Ammonia-N	91.9	91.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P370088

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115546	Kjeldahl Nitrogen	89.1	94.7	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370064

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115494	NO2NO3-N	94.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370181

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115546	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P370288

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115322	Total-P	93.9	95.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P369960

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115538	O-Phosphate-P	99.0	99.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P369814

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2115072	Anatoxin-a	145	134	F/P	40 - 140
2115072	Cylindrospermopsin	109	103	P/P	40 - 140
2115072	Microcystin LA	76.9	73.0	P/P	40 - 140
2115072	Microcystin LF	86.4	80.2	P/P	40 - 140
2115072	Microcystin LR	110	117	P/P	40 - 140
2115072	Microcystin LY	78.8	67.1	P/P	40 - 140
2115072	Microcystin RR	127	112	P/P	40 - 140
2115072	Microcystin YR	96.4	106	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370237

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115536	Ammonia-N	0.986	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370321

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115191	Ammonia-N	0.481	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P370088

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115546	Kjeldahl Nitrogen	3.12	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370064

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115494	NO2NO3-N	0.181	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370181

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115546	NO2NO3-N	0.445	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P370288

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115322	Total-P	1.70	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P369960

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115538	O-Phosphate-P	0.751	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P369814

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115072	Anatoxin-a	8.44	Spike	P	0 - 30
2115072	Cylindrospermopsin	5.82	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P369814

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2115072	Microcystin LA	5.14	Spike	P	0 - 30
2115072	Microcystin LF	7.48	Spike	P	0 - 30
2115072	Microcystin LR	6.58	Spike	P	0 - 30
2115072	Microcystin LY	16.1	Spike	P	0 - 30
2115072	Microcystin RR	12.3	Spike	P	0 - 30
2115072	Microcystin YR	9.16	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Surrogates

Lab Sample ID: 2115529
Field Sample ID: SD082819-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	105	P	30 - 165

Lab Sample ID: 2115530
Field Sample ID: SD082819-02

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	104	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A93880
Included Lab Sample IDs: 2115529, 2115530

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	115	116	P/P	50 - 160
Cylindrospermopsin	91.7	102	P/P	60 - 160
Microcystin LA	67.5	94.3	P/P	50 - 160
Microcystin LF	72.6	101	P/P	60 - 160
Microcystin LR	97.2	99.9	P/P	60 - 160
Microcystin LY	64.2	86.2	P/P	60 - 160
Microcystin RR	111	95.1	P/P	60 - 160
Microcystin YR	104	94.7	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A93904
Included Lab Sample IDs: 2115548, 2115549

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A93955
Included Lab Sample IDs: 2115547

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A93984
Included Lab Sample IDs: 2115546, 2115547

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.6	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A93999
Included Lab Sample IDs: 2115546

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A94019
Included Lab Sample IDs: 2115547

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A94059
Included Lab Sample IDs: 2115546

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	92.8	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A94092
Included Lab Sample IDs: 2115546, 2115547

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.3	97.7	P/P	90 - 110
Total-P	98.6	98.3	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
EPA 350.1 Rev. 2.0	Ammonia-N	101	99.3	101			0.986
	Ammonia-N	99.9	91.9	91.3			0.481
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.4	89.1	94.7			3.12
EPA 353.2 Rev. 2.0	NO2NO3-N	100	94.5				0.181
	NO2NO3-N	102	101	101			0.445
EPA 365.1 Rev. 2.0	Total-P	96.4	93.9	95.7			1.70
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.0	99.8			0.751
EPA 8321B	Anatoxin-a	127	145	134			8.44
	Cylindrospermopsin	112	109	103			5.82
	Microcystin LA	101	76.9	73.0			5.14
	Microcystin LF	93.0	86.4	80.2			7.48
	Microcystin LR	108	110	117			6.58
	Microcystin LY	93.8	78.8	67.1			16.1
	Microcystin RR	121	127	112			12.3
	Microcystin YR	107	96.4	106			9.16

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2115546, 2115547
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2115546, 2115547
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2115546, 2115547
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2115546, 2115547
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2115548, 2115549
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2115529, 2115530

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	08/29/2019			09/05/2019 13:20	Ping Hua	2115547
	08/29/2019			09/06/2019 11:26	Ping Hua	2115546
EPA 351.2 Rev. 2.0	08/29/2019	09/03/2019 16:50	Jhamieka S. Greenwood	09/04/2019 16:21	Julia Storbeck	2115546
	08/29/2019	09/03/2019 16:50	Jhamieka S. Greenwood	09/04/2019 16:26	Julia Storbeck	2115547
EPA 353.2 Rev. 2.0	08/29/2019			09/03/2019 12:56	Beverly Y. Sanders	2115547
	08/29/2019			09/05/2019 09:39	Beverly Y. Sanders	2115546
EPA 365.1 Rev. 2.0	08/29/2019	09/06/2019 13:30	Lipi Saha	09/09/2019 14:02	Rosalyn Ballman	2115546
	08/29/2019	09/06/2019 13:30	Lipi Saha	09/09/2019 14:05	Rosalyn Ballman	2115547
EPA 365.1 Rev. 2.0 dissolved	08/29/2019			08/29/2019 18:07	Jhamieka S. Greenwood	2115548
	08/29/2019			08/29/2019 18:08	Jhamieka S. Greenwood	2115549
EPA 8321B	08/29/2019	08/29/2019 12:30	Juyoung Kim	08/29/2019 15:36	Juyoung Kim	2115529
	08/29/2019	08/29/2019 12:30	Juyoung Kim	08/29/2019 15:53	Juyoung Kim	2115530
	08/29/2019	08/29/2019 12:30	Juyoung Kim	08/29/2019 16:43	Juyoung Kim	2115530