

Chemical Analysis Report

WQAP-2020-11-04-02

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

Event Description: **Lake O Release SD**
Request ID: **RQ-2020-10-19-58**
Customer: **WQAP**
Project ID: **LKORELEASE**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399-2400
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Certified by: Colin Wright, Program Administrator

Date Certified: 12-NOV-2020 09:25

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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: Upstream of S-77 Lake Okeechobee

Collection Date/Time: 11/03/2020 09:40

Field ID: HAB-SD110320-01

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2206270	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P389748	
		Cylindrospermopsin**	0.25	U	ug/L	P389748	
		Desmethyl microcystin LR**	0.25	U	ug/L	P389748	
		Microcystin LA**	0.25	U	ug/L	P389748	
		Microcystin LF**	0.25	U	ug/L	P389748	
		Microcystin LR**	0.41	I	ug/L	P389748	
		Microcystin LW**	0.25	U	ug/L	P389748	
		Microcystin LY**	0.25	U	ug/L	P389748	
		Microcystin RR**	0.25	U	ug/L	P389748	
		Microcystin WR**	0.50	U	ug/L	P389748	
		Microcystin YR**	0.25	U	ug/L	P389748	
2206274	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P389892	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P389838	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.072		mg N/L	P389860	
	EPA 365.1 Rev. 2.0	Total-P	0.072		mg P/L	P389800	
2206275	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.028		mg P/L	P389764	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389892

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389838

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389860

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389800

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P389764

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

Reference Method: EPA 8321B
Batch ID: P389748

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Desmethyl microcystin LR	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 LW	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin WR	0.50	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: P389892

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389838

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389860

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389800

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: P389764

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

Reference Method: EPA 8321B
Batch ID: P389748

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	105		P	40 - 150
Cylindrospermopsin	102		P	40 - 150
Desmethyl microcystin LR	104		P	40 - 150
Microcystin LA	120		P	40 - 150
Microcystin LF	114		P	40 - 150
Microcystin LR	109		P	40 - 150
Microcystin LW	91.1		P	40 - 150
Microcystin LY	108		P	40 - 150
Microcystin RR	105		P	40 - 150
Microcystin WR	99.4		P	40 - 150
Microcystin YR	84.5		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389892

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2206252	Ammonia-N	102	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389838

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2206280	Kjeldahl Nitrogen	99.9	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389860

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2206226	NO2NO3-N	96.7	98.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389800

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2206156	Total-P	106	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P389764

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2206163	O-Phosphate-P	97.0	97.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P389748

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2205555	Anatoxin-a	82.4	78.7	P/P	40 - 150
2205555	Cylindrospermopsin	81.3	82.1	P/P	40 - 150
2205555	Desmethyl microcystin LR	103	95.7	P/P	40 - 150
2205555	Microcystin LA	103	103	P/P	40 - 150
2205555	Microcystin LF	90.5	87.8	P/P	40 - 150
2205555	Microcystin LR	87.9	82.9	P/P	40 - 150
2205555	Microcystin LW	71.1	71.0	P/P	40 - 150
2205555	Microcystin LY	92.1	91.8	P/P	40 - 150
2205555	Microcystin RR	94.8	94.3	P/P	40 - 150
2205555	Microcystin WR	83.7	83.0	P/P	40 - 150
2205555	Microcystin YR	75.9	73.6	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P389892

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2206252	Ammonia-N	0.941	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P389838

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2206280	Kjeldahl Nitrogen	3.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P389860

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2206226	NO2NO3-N	1.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P389800

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2206156	Total-P	3.71	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P389764

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2206163	O-Phosphate-P	0.821	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P389748

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2205555	Anatoxin-a	4.60	Spike	P	0 - 30
2205555	Cylindrospermopsin	1.02	Spike	P	0 - 30
2205555	Desmethyl microcystin LR	7.03	Spike	P	0 - 30
2205555	Microcystin LA	0.287	Spike	P	0 - 30
2205555	Microcystin LF	3.06	Spike	P	0 - 30
2205555	Microcystin LR	5.59	Spike	P	0 - 30
2205555	Microcystin LW	0.188	Spike	P	0 - 30
2205555	Microcystin LY	0.420	Spike	P	0 - 30
2205555	Microcystin RR	0.483	Spike	P	0 - 30
2205555	Microcystin WR	0.788	Spike	P	0 - 30
2205555	Microcystin YR	3.04	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Surrogates

Lab Sample ID: 2206270

Field Sample ID: HAB-SD110320-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	87.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	51.7	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A101961

Included Lab Sample IDs: 2206275

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

Reference Method: EPA 8321B

Run ID: A101973

Included Lab Sample IDs: 2206270

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	96.2	96.2	P/P	50 - 160
Cylindrospermopsin	103	103	P/P	60 - 160
Desmethyl microcystin LR	106	115	P/P	60 - 160
Microcystin LA	114	121	P/P	50 - 160
Microcystin LF	92.4	80.2	P/P	50 - 160
Microcystin LR	109	94.2	P/P	60 - 160
Microcystin LW	78.7	86.9	P/P	60 - 160
Microcystin LY	98.3	100	P/P	60 - 160
Microcystin RR	101	102	P/P	60 - 160
Microcystin WR	97.0	92.8	P/P	60 - 160
Microcystin YR	72.3	63.5	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A102010

Included Lab Sample IDs: 2206274

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A102017

Included Lab Sample IDs: 2206274

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A102027

Included Lab Sample IDs: 2206274

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	98.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A102028

Included Lab Sample IDs: 2206274

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	104	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		LCS	Precision SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	101	102	104			0.941
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	99.9	106			3.73
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	96.7	98.2			1.54
EPA 365.1 Rev. 2.0	Total-P	102	106	102			3.71
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.2	97.0	97.8			0.821
EPA 8321B	Anatoxin-a	105	82.4	78.7			4.60
	Cylindrospermopsin	102	81.3	82.1			1.02
	Desmethyl microcystin LR	104	103	95.7			7.03
	Microcystin LA	120	103	103			0.287
	Microcystin LF	114	90.5	87.8			3.06
	Microcystin LR	109	87.9	82.9			5.59
	Microcystin LW	91.1	71.1	71.0			0.188
	Microcystin LY	108	92.1	91.8			0.420
	Microcystin RR	105	94.8	94.3			0.483
	Microcystin WR	99.4	83.7	83.0			0.788
	Microcystin YR	84.5	75.9	73.6			3.04

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2206274
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2206274
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2206274
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2206274
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2206275
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2206270

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	11/04/2020			11/07/2020 11:44	Ping Hua	2206274
EPA 351.2 Rev. 2.0	11/04/2020	11/05/2020 14:28	David Boose	11/07/2020 16:00	Elliott Rodriguez	2206274
EPA 353.2 Rev. 2.0	11/04/2020			11/06/2020 10:17	Beverly Y. Sanders	2206274
EPA 365.1 Rev. 2.0	11/04/2020	11/05/2020 12:58	Yen Ta	11/06/2020 13:14	Benjamin T. Nordmann	2206274
EPA 365.1 Rev. 2.0 dissolved	11/04/2020			11/04/2020 17:47	Ping Hua	2206275
EPA 8321B	11/04/2020	11/05/2020 06:30	Juyoung Kim	11/05/2020 10:21	Pramila Ghimire	2206270