# Chemical Analysis Report

**WQAP-2021-01-29-01**

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

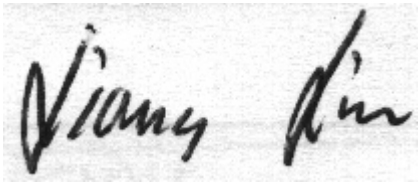
Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2021-02-01-39**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd Ste 232
Orlando, FL 32803
Attn: Natalie Ayala

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: Liang Lin, Environmental Administrator

Date Certified: 19-FEB-2021 13:30



## 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 $1.3 \times 10^3$ 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 Ivanhoe @ 200ft from boat ramp** **Collection Date/Time: 01/28/2021 10:33**

**Field ID: HABCE00065_Lakelvanhoe** Matrix: W-SURF-FRH

| Sample ID | Ref. Method | Component | Result | Code | Units | Batch ID | QC Codes |
|---|---|---|---|---|---|---|---|
| 2222341 | EPA 8321B | Anatoxin-a | 0.25 | U | ug/L | P393133 | |
| | | Cylindrospermopsin | 0.25 | U | ug/L | P393133 | |
| | | Desmethyl microcystin LR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HilR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HtyR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LA | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LF | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LR | 0.30 | I | ug/L | P393133 | |
| | | Microcystin LW | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LY | 0.25 | U | ug/L | P393133 | |
| | | Microcystin RR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin WR | 0.50 | U | ug/L | P393133 | |
| | | Microcystin YR | 0.25 | U | ug/L | P393133 | |
| 2222345 | EPA 350.1 Rev. 2.0 | Ammonia-N | 0.022 | | mg N/L | P393515 | |
| | EPA 351.2 Rev. 2.0 | Kjeldahl Nitrogen | 0.50 | | mg N/L | P393180 | |
| | EPA 353.2 Rev. 2.0 | NO2NO3-N | 0.079 | | mg N/L | P393194 | |
| | EPA 365.1 Rev. 2.0 | Total-P | 0.024 | | mg P/L | P393150 | |
| 2222349 | EPA 365.1 Rev. 2.0 dissolved | O-Phosphate-P | 0.004 | U | mg P/L | P393159 | |

**Sample Location: Lake Willisara @ Center** **Collection Date/Time: 01/28/2021 13:58**

**Field ID: HABCE00064_LakeWillisara** Matrix: W-SURF-FRH

| Sample ID | Ref. Method | Component | Result | Code | Units | Batch ID | QC Codes |
|---|---|---|---|---|---|---|---|
| 2222342 | EPA 8321B | Anatoxin-a | 0.25 | U | ug/L | P393133 | |
| | | Cylindrospermopsin | 0.25 | U | ug/L | P393133 | |
| | | Desmethyl microcystin LR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HilR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HtyR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LA | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LF | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LR | 0.46 | I | ug/L | P393133 | |
| | | Microcystin LW | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LY | 0.25 | U | ug/L | P393133 | |
| | | Microcystin RR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin WR | 0.50 | U | ug/L | P393133 | |
| | | Microcystin YR | 0.25 | U | ug/L | P393133 | |
| 2222346 | EPA 350.1 Rev. 2.0 | Ammonia-N | 0.007 | | mg N/L | P393515 | |
| | EPA 351.2 Rev. 2.0 | Kjeldahl Nitrogen | 1.2 | | mg N/L | P393180 | |
| | EPA 353.2 Rev. 2.0 | NO2NO3-N | 0.12 | | mg N/L | P393194 | |
| | EPA 365.1 Rev. 2.0 | Total-P | 0.058 | | mg P/L | P393150 | |
| 2222350 | EPA 365.1 Rev. 2.0 dissolved | O-Phosphate-P | 0.004 | U | mg P/L | P393159 | |

**Sample Location: Lake Sue @ SW Lobe** **Collection Date/Time: 01/28/2021 10:50**

**Field ID: HABCE00062_LakeSue** Matrix: W-SURF-FRH

| Sample ID | Ref. Method | Component | Result | Code | Units | Batch ID | QC Codes |
|---|---|---|---|---|---|---|---|
| 2222343 | EPA 8321B | Anatoxin-a | 0.25 | U | ug/L | P393133 | |
| | | Cylindrospermopsin | 0.25 | U | ug/L | P393133 | |
| | | Desmethyl microcystin LR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HilR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HtyR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LA | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LF | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LW | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LY | 0.25 | U | ug/L | P393133 | |
| | | Microcystin RR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin WR | 0.50 | U | ug/L | P393133 | |
| | | Microcystin YR | 0.25 | U | ug/L | P393133 | |
| 2222347 | EPA 350.1 Rev. 2.0 | Ammonia-N | 0.009 | | mg N/L | P393515 | |
| | EPA 351.2 Rev. 2.0 | Kjeldahl Nitrogen | 0.50 | | mg N/L | P393180 | |
| | EPA 353.2 Rev. 2.0 | NO2NO3-N | 0.036 | | mg N/L | P393195 | |
| | EPA 365.1 Rev. 2.0 | Total-P | 0.021 | | mg P/L | P393150 | |
| 2222351 | EPA 365.1 Rev. 2.0 dissolved | O-Phosphate-P | 0.004 | U | mg P/L | P393159 | |

**Sample Location: Lake Copeland @ N of Center** **Collection Date/Time: 01/28/2021 13:05**

**Field ID: HABCE00063_LakeCopeland** Matrix: W-SURF-FRH

| Sample ID | Ref. Method | Component | Result | Code | Units | Batch ID | QC Codes |
|---|---|---|---|---|---|---|---|
| 2222344 | EPA 8321B | Anatoxin-a | 0.25 | U | ug/L | P393133 | |
| | | Cylindrospermopsin | 0.25 | U | ug/L | P393133 | |
| | | Desmethyl microcystin LR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HilR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin HtyR** | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LA | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LF | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LR | 0.30 | I | ug/L | P393133 | |
| | | Microcystin LW | 0.25 | U | ug/L | P393133 | |
| | | Microcystin LY | 0.25 | U | ug/L | P393133 | |
| | | Microcystin RR | 0.25 | U | ug/L | P393133 | |
| | | Microcystin WR | 0.50 | U | ug/L | P393133 | |
| | | Microcystin YR | 0.25 | U | ug/L | P393133 | |
| 2222348 | EPA 350.1 Rev. 2.0 | Ammonia-N | 0.009 | | mg N/L | P393515 | |
| | EPA 351.2 Rev. 2.0 | Kjeldahl Nitrogen | 0.79 | | mg N/L | P393180 | |
| | EPA 353.2 Rev. 2.0 | NO2NO3-N | 0.004 | U | mg N/L | P393195 | |
| | EPA 365.1 Rev. 2.0 | Total-P | 0.032 | | mg P/L | P393150 | |
| 2222352 | EPA 365.1 Rev. 2.0 dissolved | O-Phosphate-P | 0.004 | U | mg P/L | P393159 | |

# Quality Assurance Report
# Method Blank Results

**Reference Method: EPA 350.1 Rev. 2.0**
**Batch ID: P393515**

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

**Reference Method: EPA 351.2 Rev. 2.0**
**Batch ID: P393180**

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

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393194**

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

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393195**

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

**Reference Method: EPA 365.1 Rev. 2.0**
**Batch ID: P393150**

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

**Reference Method: EPA 365.1 Rev. 2.0 dissolved**
**Batch ID: P393159**

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

**Reference Method: EPA 8321B**
**Batch ID: P393133**

| 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 HilR | 0.25 | U | ug/L |
| Microcystin HtyR | 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: P393515**

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

**Reference Method: EPA 351.2 Rev. 2.0**
**Batch ID: P393180**

| Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|
| Kjeldahl Nitrogen | 106 | | P | 90 - 110 |

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393194**

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

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393195**

| 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: P393150**

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

**Reference Method: EPA 365.1 Rev. 2.0 dissolved**
**Batch ID: P393159**

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

**Reference Method: EPA 8321B**
**Batch ID: P393133**

| Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|
| Anatoxin-a | 99.5 | | P | 40 - 150 |
| Cylindrospermopsin | 108 | | P | 40 - 150 |
| Desmethyl microcystin LR | 106 | | P | 40 - 150 |
| Microcystin HilR | 108 | | P | 40 - 150 |
| Microcystin HtyR | 115 | | P | 40 - 150 |
| Microcystin LA | 109 | | P | 40 - 150 |
| Microcystin LF | 90.6 | | P | 40 - 150 |
| Microcystin LR | 93.7 | | P | 40 - 150 |
| Microcystin LW | 93.1 | | P | 40 - 150 |
| Microcystin LY | 90.6 | | P | 40 - 150 |
| Microcystin RR | 112 | | P | 40 - 150 |
| Microcystin WR | 91.0 | | P | 40 - 150 |
| Microcystin YR | 77.8 | | P | 40 - 150 |

# Quality Assurance Report
# Matrix Spike Accuracy

**Reference Method: EPA 350.1 Rev. 2.0**
**Batch ID: P393515**

| Spiked Sample | Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222314 | Ammonia-N | 103 | 106 | P/P | 90 - 110 |

**Reference Method: EPA 351.2 Rev. 2.0**
**Batch ID: P393180**

| Spiked Sample | Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2220706 | Kjeldahl Nitrogen | 105 | 103 | P/P | 90 - 110 |

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393194**

| Spiked Sample | Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2221989 | NO2NO3-N | 103 | 102 | P/P | 90 - 110 |

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393195**

| Spiked Sample | Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222347 | NO2NO3-N | 103 | 102 | P/P | 90 - 110 |

**Reference Method: EPA 365.1 Rev. 2.0**
**Batch ID: P393150**

| Spiked Sample | Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2220896 | Total-P | 106 | 106 | P/P | 90 - 110 |

**Reference Method: EPA 365.1 Rev. 2.0 dissolved**
**Batch ID: P393159**

| Spiked Sample | Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222264 | O-Phosphate-P | 98.8 | 98.9 | P/P | 90 - 110 |

**Reference Method: EPA 8321B**
**Batch ID: P393133**

| Spiked Sample | Component | % Rec.1 | % Rec.2 | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222273 | Anatoxin-a | 92.7 | 102 | P/P | 40 - 150 |
| 2222273 | Cylindrospermopsin | 103 | 107 | P/P | 40 - 150 |
| 2222273 | Desmethyl microcystin LR | 111 | 116 | P/P | 40 - 150 |
| 2222273 | Microcystin HilR | 114 | 112 | P/P | 40 - 150 |
| 2222273 | Microcystin HtyR | 118 | 119 | P/P | 40 - 150 |
| 2222273 | Microcystin LA | 108 | 114 | P/P | 40 - 150 |
| 2222273 | Microcystin LF | 88.0 | 88.1 | P/P | 40 - 150 |
| 2222273 | Microcystin LR | 104 | 109 | P/P | 40 - 150 |
| 2222273 | Microcystin LW | 81.9 | 90.3 | P/P | 40 - 150 |
| 2222273 | Microcystin LY | 88.7 | 96.4 | P/P | 40 - 150 |
| 2222273 | Microcystin RR | 115 | 123 | P/P | 40 - 150 |
| 2222273 | Microcystin WR | 93.7 | 101 | P/P | 40 - 150 |
| 2222273 | Microcystin YR | 86.7 | 90.2 | P/P | 40 - 150 |

# Quality Assurance Report
# Precision

**Reference Method: EPA 350.1 Rev. 2.0**
**Batch ID: P393515**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222314 | Ammonia-N | 2.68 | Spike | P | 0 - 20 |

**Reference Method: EPA 351.2 Rev. 2.0**
**Batch ID: P393180**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2220706 | Kjeldahl Nitrogen | 0.736 | Spike | P | 0 - 20 |

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393194**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2221989 | NO2NO3-N | 0.976 | Spike | P | 0 - 20 |

**Reference Method: EPA 353.2 Rev. 2.0**
**Batch ID: P393195**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222347 | NO2NO3-N | 0.416 | Spike | P | 0 - 20 |

**Reference Method: EPA 365.1 Rev. 2.0**
**Batch ID: P393150**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2220896 | Total-P | 0.0 | Spike | P | 0 - 20 |

**Reference Method: EPA 365.1 Rev. 2.0 dissolved**
**Batch ID: P393159**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222264 | O-Phosphate-P | 0.0901 | Spike | P | 0 - 20 |

**Reference Method: EPA 8321B**
**Batch ID: P393133**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222273 | Anatoxin-a | 9.14 | Spike | P | 0 - 30 |
| 2222273 | Cylindrospermopsin | 3.44 | Spike | P | 0 - 30 |
| 2222273 | Desmethyl microcystin LR | 3.78 | Spike | P | 0 - 30 |
| 2222273 | Microcystin HilR | 1.34 | Spike | P | 0 - 30 |
| 2222273 | Microcystin HtyR | 0.610 | Spike | P | 0 - 30 |
| 2222273 | Microcystin LA | 6.02 | Spike | P | 0 - 30 |
| 2222273 | Microcystin LF | 0.179 | Spike | P | 0 - 30 |
| 2222273 | Microcystin LR | 5.17 | Spike | P | 0 - 30 |
| 2222273 | Microcystin LW | 9.79 | Spike | P | 0 - 30 |

# Quality Assurance Report
# Precision

**Reference Method: EPA 8321B**
**Batch ID: P393133**

| Replicated Lab Sample | Component | % RSD/RPD | Sample/Spike/LCS* | Pass/Fail | Control Limits |
|---|---|---|---|---|---|
| 2222273 | Microcystin LY | 8.35 | Spike | P | 0 - 30 |
| 2222273 | Microcystin RR | 6.73 | Spike | P | 0 - 30 |
| 2222273 | Microcystin WR | 7.73 | Spike | P | 0 - 30 |
| 2222273 | Microcystin YR | 3.89 | Spike | P | 0 - 30 |

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

# Quality Assurance Report
# Surrogates

**Lab Sample ID: 2222341**
**Field Sample ID: HABCE00065_Lakelvanhoe**

| Reference Method | Surrogate | % Rec. | Pass/Fail | Control Limits |
|---|---|---|---|---|
| EPA 8321B | Microcystin LR-d7 | 82.5 | P | 30 - 160 |
| EPA 8321B | Microcystin LR ethyl-d5 | 57.3 | P | 30 - 160 |

**Lab Sample ID: 2222342**
**Field Sample ID: HABCE00064_LakeWillisara**

| Reference Method | Surrogate | % Rec. | Pass/Fail | Control Limits |
|---|---|---|---|---|
| EPA 8321B | Microcystin LR-d7 | 75.1 | P | 30 - 160 |
| EPA 8321B | Microcystin LR ethyl-d5 | 66.6 | P | 30 - 160 |

**Lab Sample ID: 2222343**
**Field Sample ID: HABCE00062_LakeSue**

| Reference Method | Surrogate | % Rec. | Pass/Fail | Control Limits |
|---|---|---|---|---|
| EPA 8321B | Microcystin LR-d7 | 69.9 | P | 30 - 160 |
| EPA 8321B | Microcystin LR ethyl-d5 | 53.4 | P | 30 - 160 |

**Lab Sample ID: 2222344**
**Field Sample ID: HABCE00063_LakeCopeland**

| Reference Method | Surrogate | % Rec. | Pass/Fail | Control Limits |
|---|---|---|---|---|
| EPA 8321B | Microcystin LR-d7 | 76.1 | P | 30 - 160 |
| EPA 8321B | Microcystin LR ethyl-d5 | 57.1 | P | 30 - 160 |

# Quality Assurance Report
# Calibration Verification

**Reference Method: EPA 365.1 Rev. 2.0 dissolved**
**Run ID: A103325**
**Included Lab Sample IDs: 2222349, 2222350, 2222351, 2222352**

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

**Reference Method: EPA 8321B**
**Run ID: A103327**
**Included Lab Sample IDs: 2222341, 2222342, 2222343, 2222344**

| Component | % Rec.1 | % Rec.2 | Pass/Fail* | Control Limits |
|---|---|---|---|---|
| Anatoxin-a | 101 | 99.3 | P/P | 50 - 160 |
| Cylindrospermopsin | 110 | 109 | P/P | 60 - 160 |
| Desmethyl microcystin LR | 109 | 107 | P/P | 60 - 160 |
| Microcystin HilR | 101 | 106 | P/P | 60 - 160 |
| Microcystin HtyR | 104 | 106 | P/P | 60 - 160 |
| Microcystin LA | 107 | 113 | P/P | 50 - 160 |
| Microcystin LF | 100 | 98.8 | P/P | 50 - 160 |
| Microcystin LR | 98.8 | 95.6 | P/P | 60 - 160 |
| Microcystin LW | 99.4 | 92.7 | P/P | 60 - 160 |
| Microcystin LY | 95.3 | 95.2 | P/P | 60 - 160 |
| Microcystin RR | 117 | 113 | P/P | 60 - 160 |
| Microcystin WR | 91.2 | 89.5 | P/P | 60 - 160 |
| Microcystin YR | 81.6 | 77.4 | P/P | 60 - 160 |

**Reference Method: EPA 353.2 Rev. 2.0**
**Run ID: A103338**
**Included Lab Sample IDs: 2222345, 2222346, 2222347, 2222348**

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

**Reference Method: EPA 365.1 Rev. 2.0**
**Run ID: A103346**
**Included Lab Sample IDs: 2222345, 2222347, 2222348**

| Component | % Rec.1 | % Rec.2 | Pass/Fail* | Control Limits |
|---|---|---|---|---|
| Total-P | 97.5 | 97.8 | P/P | 90 - 110 |
| Total-P | 98.0 | 97.5 | P/P | 90 - 110 |

**Reference Method: EPA 365.1 Rev. 2.0**
**Run ID: A103350**
**Included Lab Sample IDs: 2222346**

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

**Reference Method: EPA 351.2 Rev. 2.0**
**Run ID: A103356**
**Included Lab Sample IDs: 2222345, 2222346, 2222347, 2222348**

| Component | % Rec.1 | % Rec.2 | Pass/Fail* | Control Limits |
|---|---|---|---|---|
| Kjeldahl Nitrogen | 99.8 | 96.2 | P/P | 90 - 110 |

# Quality Assurance Report
# Calibration Verification

**Reference Method: EPA 350.1 Rev. 2.0**
**Run ID: A103478**
**Included Lab Sample IDs: 2222345, 2222346, 2222347, 2222348**

| Component | % Rec.1 | % Rec.2 | Pass/Fail* | Control Limits |
|---|---|---|---|---|
| Ammonia-N | 103 | 103 | 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 | 102 | 103 | 106 | | | 2.68 |
| EPA 351.2 Rev. 2.0 | Kjeldahl Nitrogen | 106 | 105 | 103 | | | 0.736 |
| EPA 353.2 Rev. 2.0 | NO2NO3-N | 102 | 103 | 102 | | | 0.976 |
| | NO2NO3-N | 102 | 103 | 102 | | | 0.416 |
| EPA 365.1 Rev. 2.0 | Total-P | 103 | 106 | 106 | | | 0.0 |
| EPA 365.1 Rev. 2.0 dissolved | O-Phosphate-P | 100 | 98.8 | 98.9 | | | 0.0901 |
| EPA 8321B | Anatoxin-a | 99.5 | 92.7 | 102 | | | 9.14 |
| | Cylindrospermopsin | 108 | 103 | 107 | | | 3.44 |
| | Desmethyl microcystin LR | 106 | 111 | 116 | | | 3.78 |
| | Microcystin HilR | 108 | 114 | 112 | | | 1.34 |
| | Microcystin HtyR | 115 | 118 | 119 | | | 0.610 |
| | Microcystin LA | 109 | 108 | 114 | | | 6.02 |
| | Microcystin LF | 90.6 | 88.0 | 88.1 | | | 0.179 |
| | Microcystin LR | 93.7 | 104 | 109 | | | 5.17 |
| | Microcystin LW | 93.1 | 81.9 | 90.3 | | | 9.79 |
| | Microcystin LY | 90.6 | 88.7 | 96.4 | | | 8.35 |
| | Microcystin RR | 112 | 115 | 123 | | | 6.73 |
| | Microcystin WR | 91.0 | 93.7 | 101 | | | 7.73 |
| | Microcystin YR | 77.8 | 86.7 | 90.2 | | | 3.89 |

# Reference Method Descriptions

| Method | Description | Associated Samples |
|---|---|---|
| EPA 350.1 Rev. 2.0 | Ammonia in aqueous matrices as mg N/L | 2222345, 2222346, 2222347, 2222348 |
| EPA 351.2 Rev. 2.0 | Total Kjeldahl Nitrogen in aqueous matrices | 2222345, 2222346, 2222347, 2222348 |
| EPA 353.2 Rev. 2.0 | Nitrite/Nitrate in aqueous matrices as mg N/L | 2222345, 2222346, 2222347, 2222348 |
| EPA 365.1 Rev. 2.0 | Total Phosphorus in aqueous matrices as mg P/L | 2222345, 2222346, 2222347, 2222348 |
| EPA 365.1 Rev. 2.0 dissolved | Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L | 2222349, 2222350, 2222351, 2222352 |
| EPA 8321B | Microcystins in water matrices by HPLC/MS/MS | 2222341, 2222342, 2222343, 2222344 |

# 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 | 01/29/2021 | | | 02/08/2021 18:18 | Ping Hua | 2222345 |
| | 01/29/2021 | | | 02/08/2021 18:20 | Ping Hua | 2222346 |
| | 01/29/2021 | | | 02/08/2021 18:21 | Ping Hua | 2222347 |
| | 01/29/2021 | | | 02/08/2021 18:23 | Ping Hua | 2222348 |
| EPA 351.2 Rev. 2.0 | 01/29/2021 | 02/01/2021 09:53 | Yen Ta | 02/01/2021 20:47 | Julia Storbeck | 2222345 |
| | 01/29/2021 | 02/01/2021 09:53 | Yen Ta | 02/01/2021 20:49 | Julia Storbeck | 2222346 |
| | 01/29/2021 | 02/01/2021 09:53 | Yen Ta | 02/01/2021 20:50 | Julia Storbeck | 2222347 |
| | 01/29/2021 | 02/01/2021 09:53 | Yen Ta | 02/01/2021 20:52 | Julia Storbeck | 2222348 |
| EPA 353.2 Rev. 2.0 | 01/29/2021 | | | 02/01/2021 11:00 | Beverly Y. Sanders | 2222345 |
| | 01/29/2021 | | | 02/01/2021 11:01 | Beverly Y. Sanders | 2222346 |
| | 01/29/2021 | | | 02/01/2021 11:08 | Beverly Y. Sanders | 2222347 |
| | 01/29/2021 | | | 02/01/2021 11:23 | Beverly Y. Sanders | 2222348 |
| EPA 365.1 Rev. 2.0 | 01/29/2021 | 01/29/2021 17:05 | Shengyu Wang | 02/01/2021 15:17 | Shengyu Wang | 2222345 |
| | 01/29/2021 | 01/29/2021 17:05 | Shengyu Wang | 02/01/2021 15:25 | Shengyu Wang | 2222347 |
| | 01/29/2021 | 01/29/2021 17:05 | Shengyu Wang | 02/01/2021 15:26 | Shengyu Wang | 2222348 |
| | 01/29/2021 | 01/29/2021 17:05 | Shengyu Wang | 02/01/2021 15:52 | Shengyu Wang | 2222346 |
| EPA 365.1 Rev. 2.0 dissolved | 01/29/2021 | | | 01/29/2021 16:28 | Ping Hua | 2222350 |
| | 01/29/2021 | | | 01/29/2021 16:33 | Ping Hua | 2222351 |
| | 01/29/2021 | | | 01/29/2021 16:34 | Ping Hua | 2222352 |
| | 01/29/2021 | | | 01/29/2021 16:35 | Ping Hua | 2222349 |
| EPA 8321B | 01/29/2021 | 01/29/2021 13:00 | Pramila Ghimire | 01/30/2021 02:57 | Pramila Ghimire | 2222341 |
| | 01/29/2021 | 01/29/2021 13:00 | Pramila Ghimire | 01/30/2021 03:14 | Pramila Ghimire | 2222342 |
| | 01/29/2021 | 01/29/2021 13:00 | Pramila Ghimire | 01/30/2021 03:30 | Pramila Ghimire | 2222343 |
| | 01/29/2021 | 01/29/2021 13:00 | Pramila Ghimire | 01/30/2021 03:47 | Pramila Ghimire | 2222344 |