Appendix A

Water Quality Raw Data Table

Black Lake Management Plan
Black Lake, Town of Oswegatchie
St. Lawrence County, New York

Date	Waypoint	Depth (m)	Temp (°C)	Sp. Cond.	DO (mg/L)	DO (% Sat)
7/18/2021	31	0	25.2	167.1	8.10	99.0
7/18/2021	31	0.5	25.1	167.0	8.10	98.8
7/18/2021	31	1	24.8	167.1	8.11	98.3
7/18/2021	31	1.5	24.5	167.1	8.10	97.8
7/18/2021	31	2	24.4	167.1	8.19	98.8
7/18/2021	31	2.5	24.4	166.6	7.89	95.0
7/18/2021	31	3	24.3	166.5	7.65	93.0
7/18/2021	31	3.5	24.2	167.4	7.50	90.2
7/18/2021	31	4	24.2	167.4	7.48	89.8
7/18/2021	31	4.5	22.3	185.6	0.74	8.6
7/18/2021	31	5	20.7	210.5	0.21	2.3
7/18/2021	31	5.5	19.7	229.0	0.14	1.6
7/18/2021	31	6	18.9	242.0	0.14	1.5
7/18/2021	31	6.5	18.1	310.0	0.12	1.3
7/22/2021	1039	0	25.7	170.2	12.71	156.8
7/22/2021	1039	0.5	25.7	170.1	12.68	156.3
7/22/2021	1039	1	25.3	169.7	11.84	144.9
7/22/2021	1039	1.5	24.8	169.5	9.78	118.5
7/22/2021	1039	2	24.7	169.7	9.18	111.0
7/22/2021	1039	2.5	24.6	169.9	9	108.7
7/22/2021	1039	3	24.5	170.0	8.86	106.9
7/22/2021	1039	3.5	24.5	170.0	8.38	101.1
7/22/2021	1039	4	24.3	171.8	5.41	64.9
7/22/2021	1039	4.5	24.3	172.0	4.74	56.9
7/22/2021	1039	5	24.1	173.3	7.54	54.4
7/22/2021	1039	5.5	24.1	235.0	3.87	46.3
7/22/2021	1039	5.6	24.1	174.4	3.87	46.3
8/16/2021	1039	0	27.3	197.0	12.58	159.4
8/16/2021	1039	0.5	26.4	196.7	13.01	162.1
8/16/2021	1039	1	25.8	196.4	12.01	147.9
8/16/2021	1039	1.5	25.4	196.9	10.86	133.7
8/16/2021	1039	2	25.2	197.6	8.39	102.3
8/16/2021	1039	2.5	25.1	197.9	8.15	99.3
8/16/2021	1039	3	25.0	198.4	7.90	96.0
8/16/2021	1039	3.5	24.9	198.8	7.80	94.7
8/16/2021	1039	4	24.9	200.3	7.52	91.1
8/16/2021	1039	4.5	24.7	199.5	6.56	79.3
8/16/2021	1039	5	24.6	199.6	6.16	74.3
8/16/2021	1039	5.5	24.6	262.0	5.66	68.3
8/20/2021	1805	0	25.5	202.3	7.47	92.2
8/20/2021	1805	1	25.3	203.3	6.51	80.1
8/20/2021	1805	2	25.2	203.2	6.92	85.0
8/20/2021	1805	3	25.1	203.3	6.53	80.2
8/20/2021	1805	4	25.1	203.7	6.30	77.2
8/20/2021	1805	5	24.7	203.1	2.4	29.2
8/20/2021	1805	6	24.4	202.7	1.12	13.5

8/20/2021	1805	6.5	24.2	203.5	0.17	2.0
8/20/2021	1805	7	24.2	204.0	0.14	1.6
8/20/2021	1805	7.3	24.1	215.5	0.11	0.0

Appendix B

Microcystin Lab Report

Black Lake Management Plan
Black Lake, Town of Oswegatchie
St. Lawrence County, New York

Adda Microcystins/Nodularins Report

Project: Northeast Aquatic Research

Submitted to:	Alejandro Reyes
Organization:	Northeast Aquatic Research
Address:	67 North Shore Road, Putnam Valley, NY 10579
Email:	ajreyes1022@gmail.com
Sample Receipt Date:	27 July 2021
Sample Condition:	12.3 ºC upon arrival
Report#	210722_NEAR
Date Prepared:	29 July 2021
Prepared by:	Kamil Cieslik

Table 1: Samples analyzed

Site/Description	Collection Date
Black Lake	22 July 2021

Analytes: Adda Microcystins/Nodularins (MCs/NODs)

Abbreviations

NA	Not Applicable	LFSM	Lab Fortified Sample Matrix
MDL	Method Detection Limit	LFSMD	Lab Fortified Sample Matrix Duplicate
MQL	Method Quantification Limit	LD	Lab Duplicate
ND	Not Detected above the MDL	IS	Internal Standard
Blank	Regent Water free from interferences	—	Not Analyzed
LFB	Lab Fortified Blank	MRL	Method Reporting Limit
CCC	Continued Calibration Check	CV	Low-range calibration verification

Sample Preparation

Water Sample Freeze-Thaw
The sample was inverted for 60 seconds to mix. A subset from the sample was transferred to a 15 mL vial. Three freeze-thaw cycles were employed prior to additional sample preparation and subsequent analysis.

Analytical Techniques

Enzyme-Linked Immunosorbent Assay (ELISA)
MCs/NODs
A microcystins/nodularins Adda ELISA (Abraxis) was utilized for the quantitative and sensitive congener-independent detection of Adda MCs/NODs (US EPA Method 546 & Ohio EPA DES 701.0). The current method reporting limit is 1.5 ng/mL (ppb) based on kit sensitivity (0.15 ng/mL), dilution factor, and initial demonstration of capability.

Qualifier	Flag
CL	Analytical result is estimated due to ineffective quenching.
J	Analyte was positively identified; the associated numerical value is estimated.
PT	The reported result is estimated because the sample was not analyzed within required holding time.
B	Analytical result is estimated. Analyte was detected in associated reagent blank as well as the samples.
E	Analytical result is estimated. Values achieved were outside calibration range.
N	Spiked sample control was outside limits
T	The reported result is estimated because the sample exceeded temperature threshold when received

Quality Control

Table 2: Raw ELISA Data

Sample ID	Analyte	Dilution Factor	Assay Values (ng/mL)	%CV	Concentration (ng/mL)	Average (ng/mL)
Black Lake	MCs/NODs	10	1.90	1.6	19.0	**18.8**
		10	1.85		18.5	

Table 3: Adda MC-ELISA Quality Control Value Table

Date Analyzed:	**29 July 2021**	**Requirement**	**Pass/Fail**
R^2 value:	0.999	≥0.98	PASS
%CV range STDs:	0.4-8.5%	≤15%	PASS
LFB (1 ppb) recovery:	124%	±40% True Value	PASS
%CV range LFB:	5.8%	<20%	PASS
Low CCC (0.15 ppb) recovery:	97%	±50% True Value	PASS
LRB	<0.08	<0.08	PASS

Summary of Results

Table 4: Summary of results in ng/mL

Sample ID	MCs/NODs (ng/mL)
Black Lake	**18.8**
MRL (ng/mL):	*1.5*
Analyst Initials:	*KC*
Date Analyzed:	*7/29/2021*

Interpretations:
The levels of Adda MCs/NODs detected in the submitted sample (**18.8 ppb**) exceeds the current 'Draft EPA Recommended Value for Recreational Criteria and Swimming Advisory', which is currently 8 ng/mL (ppb) total microcystins. The WHO recreational guidance value for microcystin is currently 24 ng/mL (ppb) (World Health Organization (WHO), 2020a).

World Health Organization (WHO), 2020a. Cyanobacterial toxins: microcystins. Guidel. Drink. Qual. Guidel. Safe Recreat. Water Environ. 63.

Submitted by: Mark T. Aubel, Ph.D.
Lab Director

Date: July 30, 2021

The results in this report relate only to the samples listed above.
This report shall not be reproduced except in full without written approval of the laboratory.

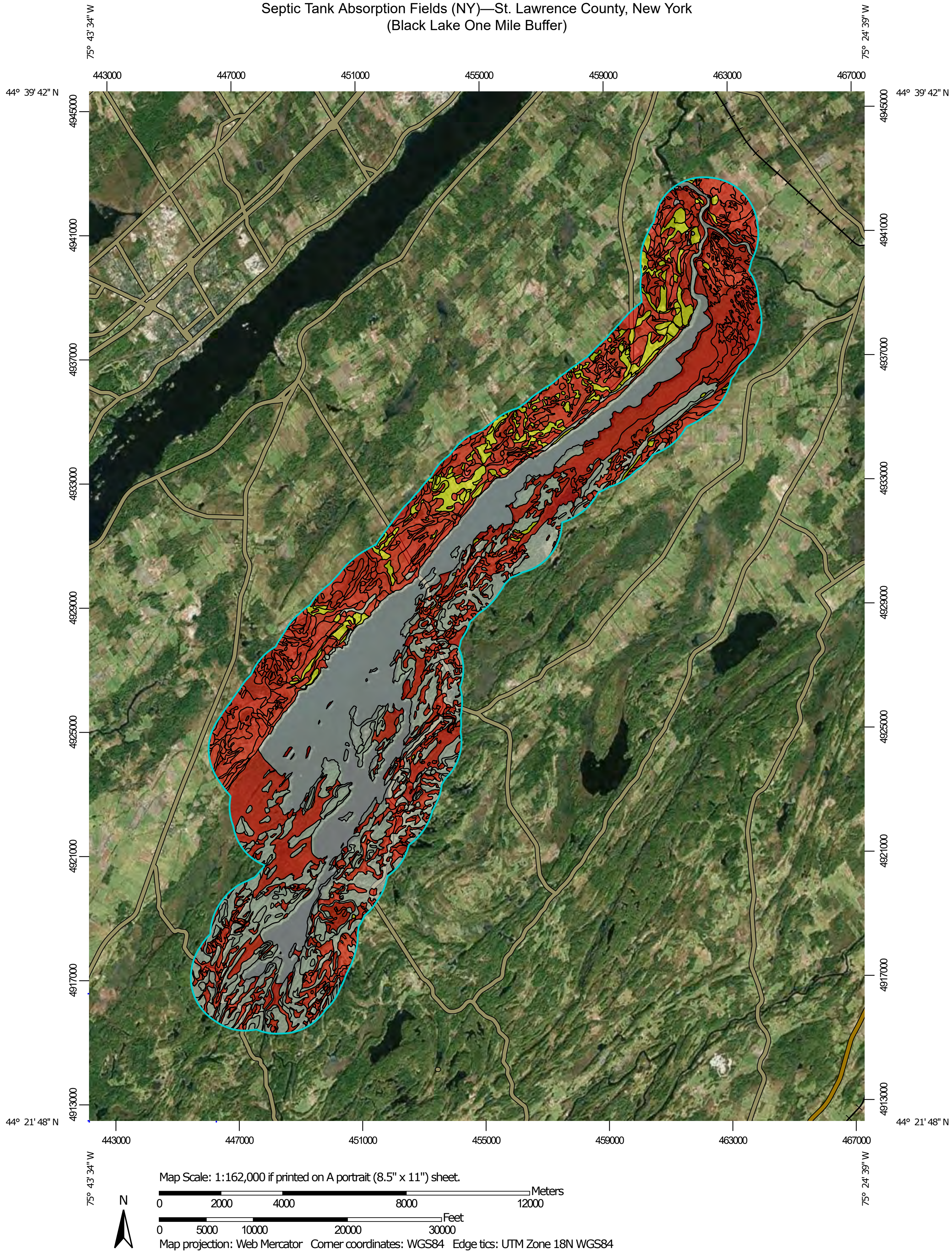
Appendix C

NRCS Web Soil Survey (Edited)

Black Lake Management Plan
Black Lake, Town of Oswegatchie
St. Lawrence County, New York

GEI Consultants

Septic Tank Absorption Fields (NY)—St. Lawrence County, New York
(Black Lake One Mile Buffer)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

Very limited

Somewhat limited

Not limited

Not rated or not available

Soil Rating Lines

Very limited

Somewhat limited

Not limited

Not rated or not available

Soil Rating Points

Very limited

Somewhat limited

Not limited

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: St. Lawrence County, New York
Survey Area Data: Version 22, Sep 1, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Description

Septic tank absorption fields are subsurface systems of perforated pipe or similar devices that distribute effluent from a septic tank into the soil. New York State Department of Health regulations allow installation of septic system absorption fields of varying designs, depending upon the depth of suitable soil material above any limitation in the natural soil at a site (New York State Department of Health, 1990). Where necessary, imported fill material may be used to elevate absorption trenches to at least the minimum distance of 24 inches above limiting soil horizons. The depth ranges of suitable material and corresponding types of absorption systems allowed are as follows:

Less than 12 inches-no system allowed

12 to 24 inches-alternative raised trench

24 to 48 inches-conventional shallow trench

More than 48 inches-conventional system

The ratings in this interpretation are based on evaluation of the soil between depths of 12 and 48 inches. In addition, the bottom layer of the soil is evaluated for risk of seepage. This interpretation does not evaluate bedrock below the soil. The soil properties and site features considered are those that affect absorption of the effluent, construction and maintenance of the system, and public health.

The soil properties and qualities that affect the absorption and effective treatment of wastewater effluent are saturated hydraulic conductivity (Ksat), depth to a seasonal high water table, depth to bedrock, depth to dense material, and susceptibility to flooding. Stones and boulders and a shallow depth to bedrock or dense material interfere with installation. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas. In addition, the hazards of erosion and sedimentation increase as slope increases.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 2 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, ground water may be contaminated.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen, which is displayed on the report. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the Selected Soil Interpretations report with this interpretation included from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

The information in this interpretation is based on criteria developed specifically for soils in New York. The information is not site specific and does not eliminate the need for onsite investigation of the soils.

Reference:

New York State Department of Health. 1990. Appendix 75-A of Part 75, Section 201(1)(1) of New York Public Health Law. Nassau and Suffolk Counties have a waiver from this portion of New York State Department of Health regulations.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Rating	Acres in AOI	Percent of AOI
Very limited	18,996.9	50.6%
Somewhat limited	2,103.6	5.6%
Null or Not Rated	16,457.7	43.8%
Totals for Area of Interest	**37,558.2**	**100.0%**

Appendix D: iMap Observations within BLW

Scientific Name	Common Name	Latitude	Longitude	iMap ID	Date Observed
Cipangopaludina spp (species unknown)	Mystery snail (species unknown)	44.1113	-75.7823	445400	4/20/2015
Cyprinus carpio	Common Carp	44.27222	-75.7249	426583	10/10/2013
Cyprinus carpio	Common Carp	44.50562	-75.5943	426584	10/8/2013
Cyprinus carpio	Common Carp	44.50396	-75.5998	426585	10/8/2013
Cyprinus carpio	Common Carp	44.5199	-75.5912	426586	10/8/2013
Cyprinus carpio	Common Carp	44.4682	-75.603	426597	6/5/2013
Cyprinus carpio	Common Carp	44.4814	-75.5815	426600	5/30/2013
Cyprinus carpio	Common Carp	44.41055	-75.6511	426616	9/27/2012
Cyprinus carpio	Common Carp	44.39465	-75.6544	426617	9/27/2012
Cyprinus carpio	Common Carp	44.4034	-75.6515	426618	9/27/2012
Cyprinus carpio	Common Carp	44.2694	-75.746	426635	9/11/2012
Cyprinus carpio	Common Carp	44.4087	-75.645	426654	8/24/2012
Cyprinus carpio	Common Carp	44.61394	-75.4806	426657	8/23/2012
Cyprinus carpio	Common Carp	44.37915	-75.6534	426747	5/24/2010
Cyprinus carpio	Common Carp	44.51328	-75.5934	426836	7/17/2008
Cyprinus carpio	Common Carp	44.50391	-75.6073	427226	6/10/1999
Cyprinus carpio	Common Carp	44.50391	-75.6073	427227	6/10/1999
Cyprinus carpio	Common Carp	44.50391	-75.6073	427228	6/10/1999
Cyprinus carpio	Common Carp	44.50391	-75.6073	427340	9/28/1995
Cyprinus carpio	Common Carp	44.40555	-75.6502	427367	6/30/1995
Cyprinus carpio	Common Carp	44.50391	-75.6073	427368	6/13/1995
Cyprinus carpio	Common Carp	44.50391	-75.6073	427369	6/13/1995
Cyprinus carpio	Common Carp	44.49686	-75.611	478397	6/13/1995
Cyprinus carpio	Common Carp	44.49686	-75.611	478398	6/30/1995
Cyprinus carpio	Common Carp	44.49686	-75.611	478399	9/28/1995
Cyprinus carpio	Common Carp	44.49686	-75.611	478439	6/10/1999
Cyprinus carpio	Common Carp	44.51327	-75.5934	478514	7/17/2008
Cyprinus carpio	Common Carp	44.49999	-75.6	478697	6/10/1999
Cyprinus carpio	Common Carp	44.49999	-75.6	478737	6/13/1995
Cyprinus carpio	Common Carp	44.49999	-75.6	479125	9/28/1995
Cyprinus carpio	Common Carp	44.29411	-75.6199	1169592	7/17/2016
Cyprinus carpio	Common Carp	44.44849	-75.6172	1169597	7/6/2015
Dreissena polymorpha	Zebra Mussel	44.51017	-75.6107	333578	6/8/2012
Dreissena polymorpha	Zebra Mussel	44.48257	-75.6446	333580	6/8/2012

Scientific Name	Common Name	Latitude	Longitude	iMap ID	Date Observed
Dreissena polymorpha	Zebra Mussel	44.46991	-75.5993	333752	8/8/2012
Dreissena polymorpha	Zebra Mussel	44.47206	-75.5973	333753	8/8/2012
Dreissena polymorpha	Zebra Mussel	44.51017	-75.6107	333759	8/8/2012
Dreissena polymorpha	Zebra Mussel	44.5089	-75.6119	333762	8/8/2012
Dreissena polymorpha	Zebra Mussel	44.48257	-75.6446	333763	8/8/2012
Dreissena polymorpha	Zebra Mussel	44.4812	-75.6468	333953	8/8/2012
Dreissena polymorpha	Zebra Mussel	44.47899	-75.6125	477591	10/5/2004
Dreissena polymorpha	Zebra Mussel	44.30711	-75.7789	528076	7/6/2018
Dreissena polymorpha	Zebra Mussel	44.32579	-75.7668	532511	7/17/2018
Dreissena polymorpha	Zebra Mussel	44.46966	-75.6	1164616	7/16/2020
Dreissena polymorpha	Zebra Mussel	44.47267	-75.6097	1164618	7/16/2020
Dreissena polymorpha	Zebra Mussel	44.48178	-75.6456	1164619	7/16/2020
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.48628	-75.5771	336000	6/4/2013
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.49131	-75.5727	336001	6/4/2013
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.51651	-75.5287	336002	6/4/2013
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.52197	-75.526	336004	6/4/2013
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.3091	-75.6146	437935	8/2/2007
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.30883	-75.6143	437936	8/2/2007
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.33062	-75.7467	442207	6/26/2004
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.29638	-75.8019	449069	7/29/2015
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.28781	-75.8129	449081	7/29/2015
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.48094	-75.5839	494968	8/25/2016

Scientific Name	Common Name	Latitude	Longitude	iMap ID	Date Observed
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.48092	-75.5832	494969	8/25/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.47454	-75.5933	494985	8/22/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.12595	-75.6244	521291	7/7/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.12414	-75.6351	521366	7/14/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.14006	-75.6312	521367	7/21/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.14604	-75.6361	521368	7/21/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.2411	-75.5329	521374	8/8/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.31089	-75.7863	526960	6/17/2018
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.31096	-75.7864	526961	6/17/2018
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.299	-75.7958	532510	9/11/2018
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.39618	-75.6672	1031513	7/21/2019
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.37054	-75.5971	1031514	7/29/2019
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.33536	-75.8288	1073324	7/21/2016
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.48277	-75.4673	1073371	7/20/2018
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.48692	-75.4614	1073372	7/20/2018
Hydrocharis morsus-ranae	European Frogbit; Common Frogbit	44.52879	-75.5751	1152042	7/21/2021
Myriophyllum heterophyllum	Variable Watermilfoil; Broadleaf Watermilfoil	44.14582	-75.4449	441939	8/15/2012
Myriophyllum spicatum	Eurasian Water-milfoil	44.31155	-75.7862	330753	7/20/2010
Myriophyllum spicatum	Eurasian Water-milfoil	44.4812	-75.6468	333567	6/8/2012
Myriophyllum spicatum	Eurasian Water-milfoil	44.48257	-75.6446	333576	6/8/2012
Myriophyllum spicatum	Eurasian Water-milfoil	44.5089	-75.6119	333579	6/8/2012
Myriophyllum spicatum	Eurasian Water-milfoil	44.51017	-75.6107	333760	8/8/2012

Scientific Name	Common Name	Latitude	Longitude	iMap ID	Date Observed
Myriophyllum spicatum	Eurasian Water-milfoil	44.5089	-75.6119	333761	8/8/2012
Myriophyllum spicatum	Eurasian Water-milfoil	44.48257	-75.6446	333951	8/8/2012
Myriophyllum spicatum	Eurasian Water-milfoil	44.4812	-75.6468	333952	8/8/2012
Myriophyllum spicatum	Eurasian Water-milfoil	44.28944	-75.6369	334956	6/16/2010
Myriophyllum spicatum	Eurasian Water-milfoil	44.25553	-75.7352	334958	6/16/2010
Myriophyllum spicatum	Eurasian Water-milfoil	44.29605	-75.8027	336011	9/3/2013
Myriophyllum spicatum	Eurasian Water-milfoil	44.28735	-75.8085	336012	9/3/2013
Myriophyllum spicatum	Eurasian Water-milfoil	44.29167	-75.8065	336013	9/3/2013
Myriophyllum spicatum	Eurasian Water-milfoil	44.28797	-75.8132	336014	9/3/2013
Myriophyllum spicatum	Eurasian Water-milfoil	44.28656	-75.8088	336015	9/3/2013
Myriophyllum spicatum	Eurasian Water-milfoil	44.49944	-75.6124	404137	1/1/2000
Myriophyllum spicatum	Eurasian Water-milfoil	44.31827	-75.7749	404169	1/1/2010
Myriophyllum spicatum	Eurasian Water-milfoil	44.24319	-75.833	404374	1/1/2000
Myriophyllum spicatum	Eurasian Water-milfoil	44.14926	-75.3927	404409	1/1/2000
Myriophyllum spicatum	Eurasian Water-milfoil	44.3155	-75.7271	404442	1/1/1999
Myriophyllum spicatum	Eurasian Water-milfoil	44.29093	-75.7758	404554	1/1/2001
Myriophyllum spicatum	Eurasian Water-milfoil	44.25246	-75.7378	404562	1/1/2000
Myriophyllum spicatum	Eurasian Water-milfoil	44.28312	-75.6455	404618	1/1/2007
Myriophyllum spicatum	Eurasian Water-milfoil	44.26915	-75.7363	404649	1/1/2007
Myriophyllum spicatum	Eurasian Water-milfoil	44.29612	-75.8027	449068	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.29445	-75.8115	449070	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.29373	-75.8136	449074	7/29/2015

Scientific Name	Common Name	Latitude	Longitude	iMap ID	Date Observed
Myriophyllum spicatum	Eurasian Water-milfoil	44.29155	-75.8155	449076	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.29389	-75.8025	449078	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.29386	-75.8046	449079	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.29184	-75.8067	449080	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.28903	-75.8142	449084	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.2893	-75.8147	449085	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.28656	-75.8087	449086	7/29/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.31477	-75.7788	477696	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.24353	-75.833	477698	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.31487	-75.7291	477700	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.29107	-75.7751	477701	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.25255	-75.7374	477702	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.15135	-75.3934	477704	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.25255	-75.7374	477705	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.49686	-75.611	477741	1/1/2002
Myriophyllum spicatum	Eurasian Water-milfoil	44.24319	-75.833	488331	1/1/2000
Myriophyllum spicatum	Eurasian Water-milfoil	44.14926	-75.3927	488351	1/1/2000
Myriophyllum spicatum	Eurasian Water-milfoil	44.3155	-75.7271	488371	1/1/1999
Myriophyllum spicatum	Eurasian Water-milfoil	44.28312	-75.6455	488404	1/1/2007
Myriophyllum spicatum	Eurasian Water-milfoil	44.26915	-75.7363	488418	1/1/2007
Myriophyllum spicatum	Eurasian Water-milfoil	44.27977	-75.7762	488446	1/1/2015
Myriophyllum spicatum	Eurasian Water-milfoil	44.49943	-75.6124	488506	1/1/2000

Scientific Name	Common Name	Latitude	Longitude	iMap ID	Date Observed
Myriophyllum spicatum	Eurasian Water-milfoil	44.31827	-75.7749	488519	1/1/2010
Myriophyllum spicatum	Eurasian Water-milfoil	44.29093	-75.7758	488663	1/1/2001
Myriophyllum spicatum	Eurasian Water-milfoil	44.25246	-75.7378	488669	1/1/2000
Myriophyllum spicatum	Eurasian Water-milfoil	44.28655	-75.8088	488672	1/1/2013
Myriophyllum spicatum	Eurasian Water-milfoil	44.46956	-75.5997	1164615	7/16/2020
Myriophyllum spicatum	Eurasian Water-milfoil	44.47279	-75.6098	1164617	7/16/2020
Myriophyllum spicatum	Eurasian Water-milfoil	44.48185	-75.6457	1164620	7/16/2020
Myriophyllum spicatum	Eurasian Water-milfoil	44.48256	-75.6444	1164621	7/16/2020
Myriophyllum spicatum	Eurasian Water-milfoil	44.51884	-75.5893	1164623	7/16/2020
Myriophyllum spicatum	Eurasian Water-milfoil	44.47308	-75.5978	1164624	7/16/2020
Myriophyllum spicatum	Eurasian Water-milfoil	44.47311	-75.5979	1164625	7/16/2020
Myriophyllum spicatum	Eurasian Water-milfoil	44.51014	-75.6111	1164626	7/16/2020
Nitellopsis obtusa	Starry Stonewort	44.14039	-75.3792	488931	1/1/2014
Nitellopsis obtusa	Starry Stonewort	44.31679	-75.6097	488932	1/1/2014
Nitellopsis obtusa	Starry Stonewort	44.1404	-75.3792	492055	8/12/2014
Potamogeton crispus	Curly Pondweed	44.4812	-75.6468	333568	6/8/2012
Potamogeton crispus	Curly Pondweed	44.48257	-75.6446	333575	6/8/2012
Potamogeton crispus	Curly Pondweed	44.28944	-75.6369	334724	6/16/2010
Potamogeton crispus	Curly Pondweed	44.25553	-75.7352	334957	6/16/2010
Potamogeton crispus	Curly Pondweed	44.28312	-75.6455	404619	1/1/2007
Potamogeton crispus	Curly Pondweed	44.51879	-75.5894	1164622	7/16/2020
Scardinius erythrophthalmus	Rudd	44.32152	-75.7222	428349	6/18/2013
Scardinius erythrophthalmus	Rudd	44.29544	-75.6954	428397	8/12/1996
Scardinius erythrophthalmus	Rudd	44.29041	-75.7768	428402	4/24/1990
Scardinius erythrophthalmus	Rudd	44.2904	-75.7768	478341	4/24/1990
Scardinius erythrophthalmus	Rudd	44.28999	-75.77	479251	4/24/1990

Scientific Name	Common Name	Latitude	Longitude	iMap ID	Date Observed
Scardinius erythrophthalmus	Rudd	44.28999	-75.69	479252	8/12/1996
Viviparus georgianus	Banded Mysterysnail	44.13332	-75.7947	378986	8/12/1987
Viviparus georgianus	Banded Mysterysnail	44.29115	-75.771	379161	7/29/2008
Viviparus georgianus	Banded Mysterysnail	44.05119	-75.5555	379281	8/4/2009

Appendix E

Photo Documentation

Black Lake Management Plan
Black Lake, Town of Oswegatchie
St. Lawrence County, New York

Photo 1: Filamentous algae on water's surface in northern end of the lake. Photo taken on 7/20/21.

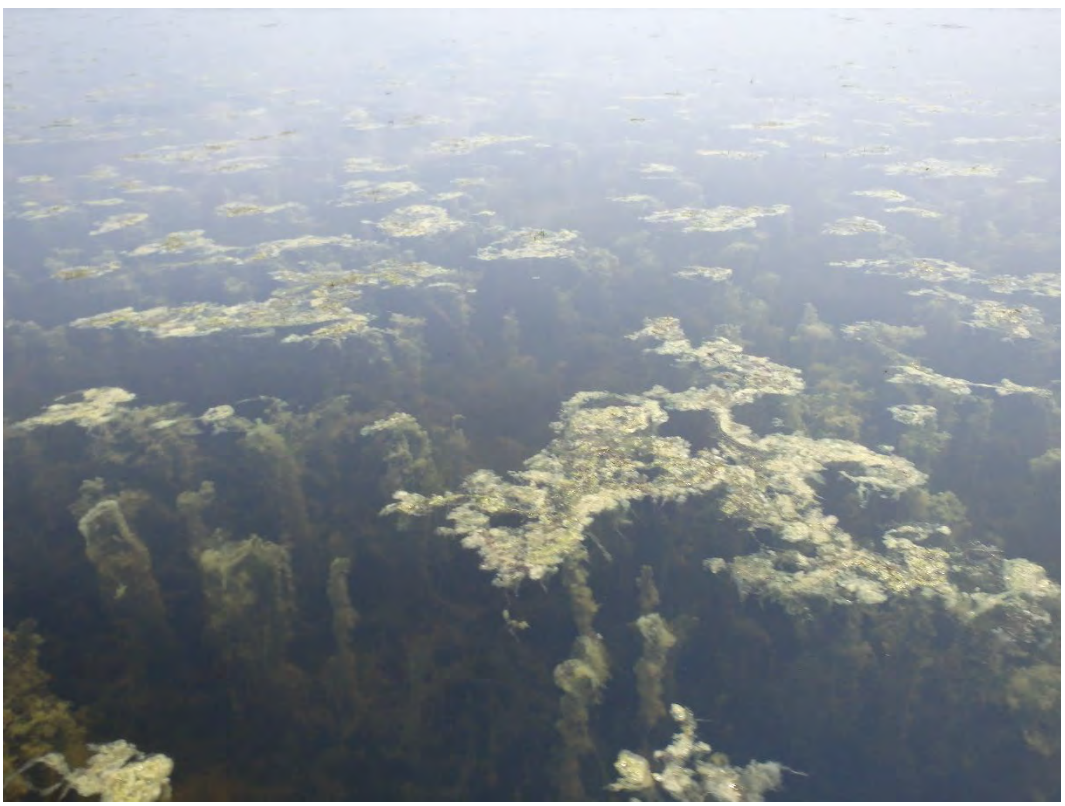


Photo 2: Filamentous algae on water's surface in northern end of the lake. Photo taken on 7/20/21.

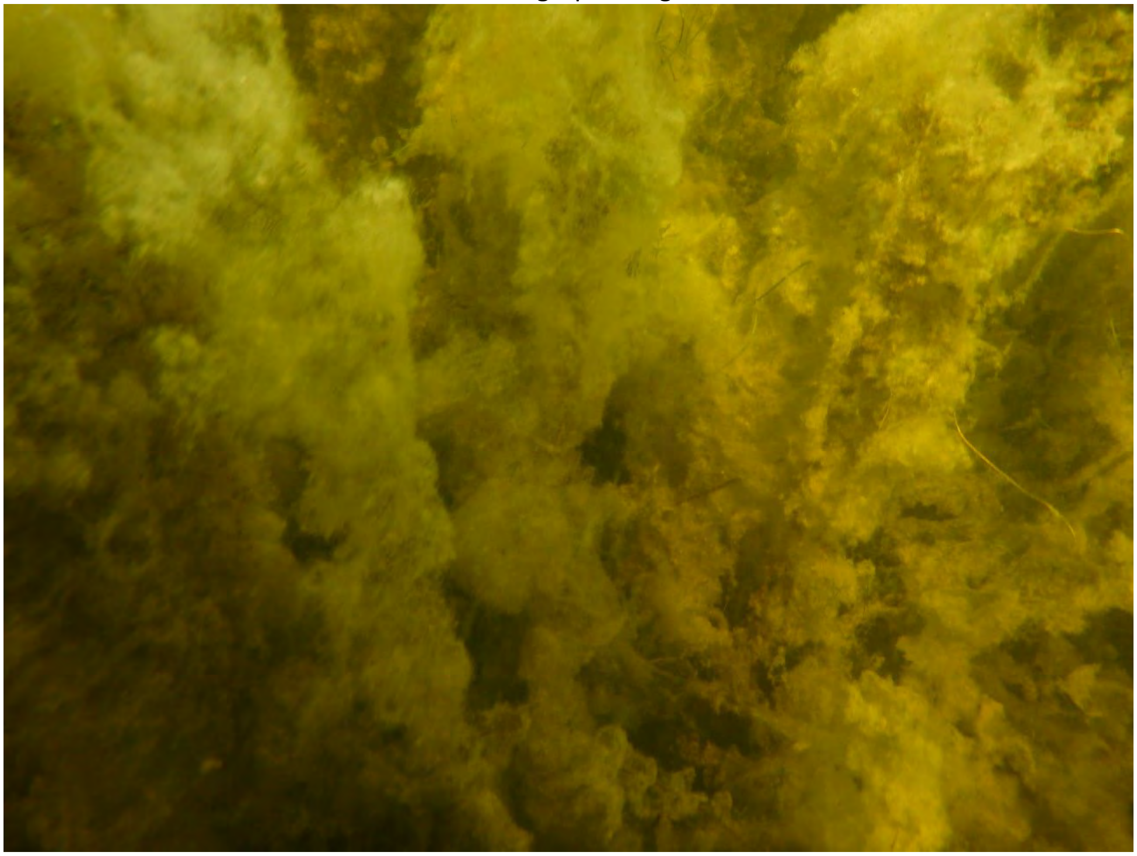


Photo 3: Filamentous algae growing in water column in northern end of the lake. Photo taken on 7/20/21.

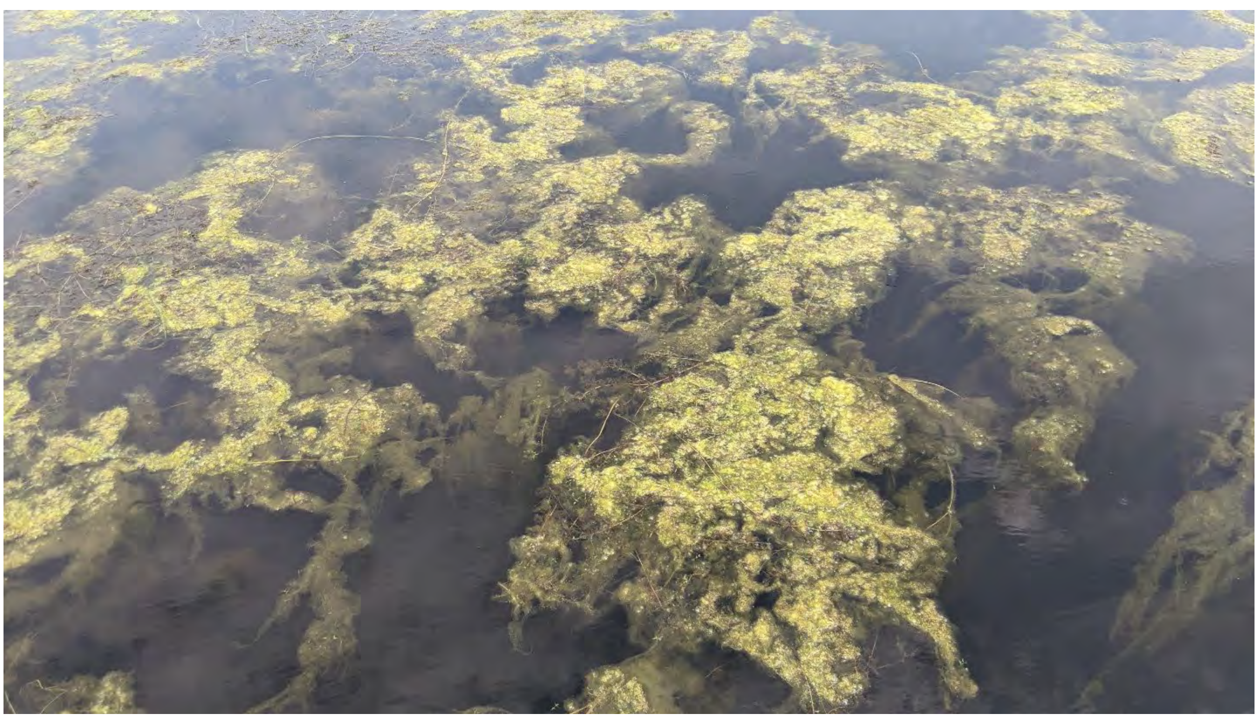


Photo 4: Filamentous algae on water's surface in northern end of the lake. Photo taken on 7/20/21.

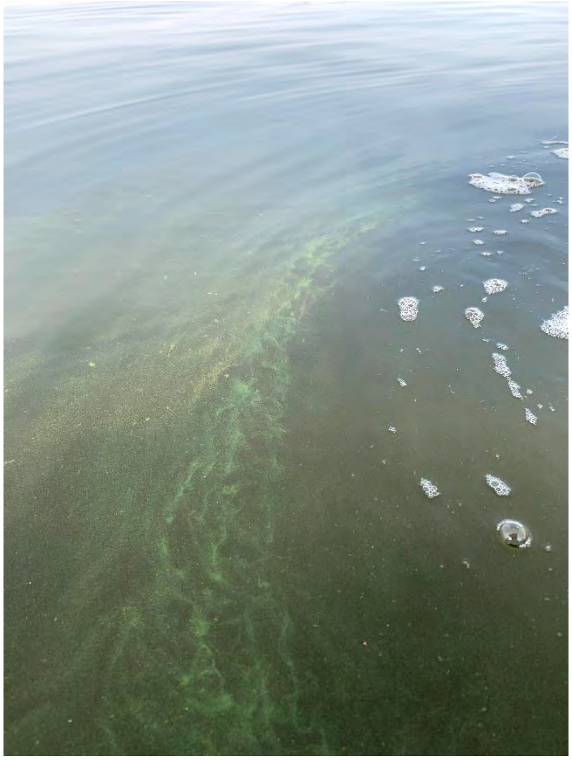


Photo 5: Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

Photo 6: Dense Cyanobacteria bloom on water's surface.
Photo taken on 7/22/21.

Photo 7: Dense Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

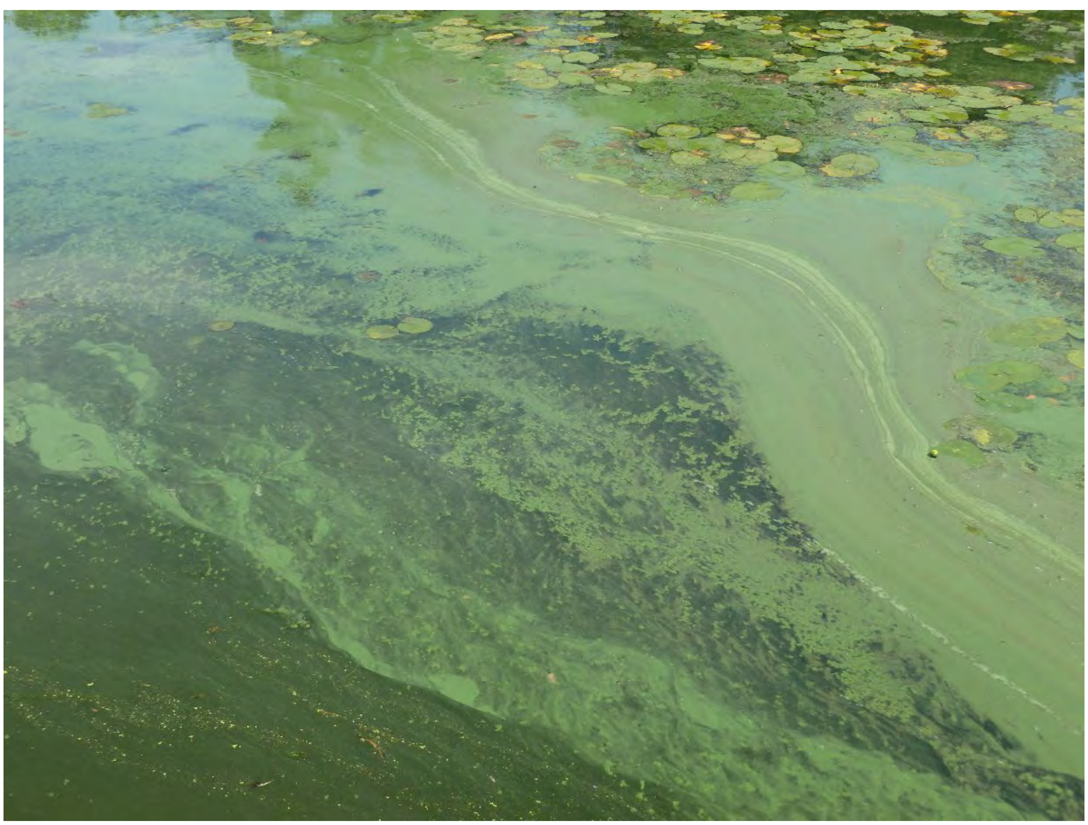


Photo 8: Dense Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

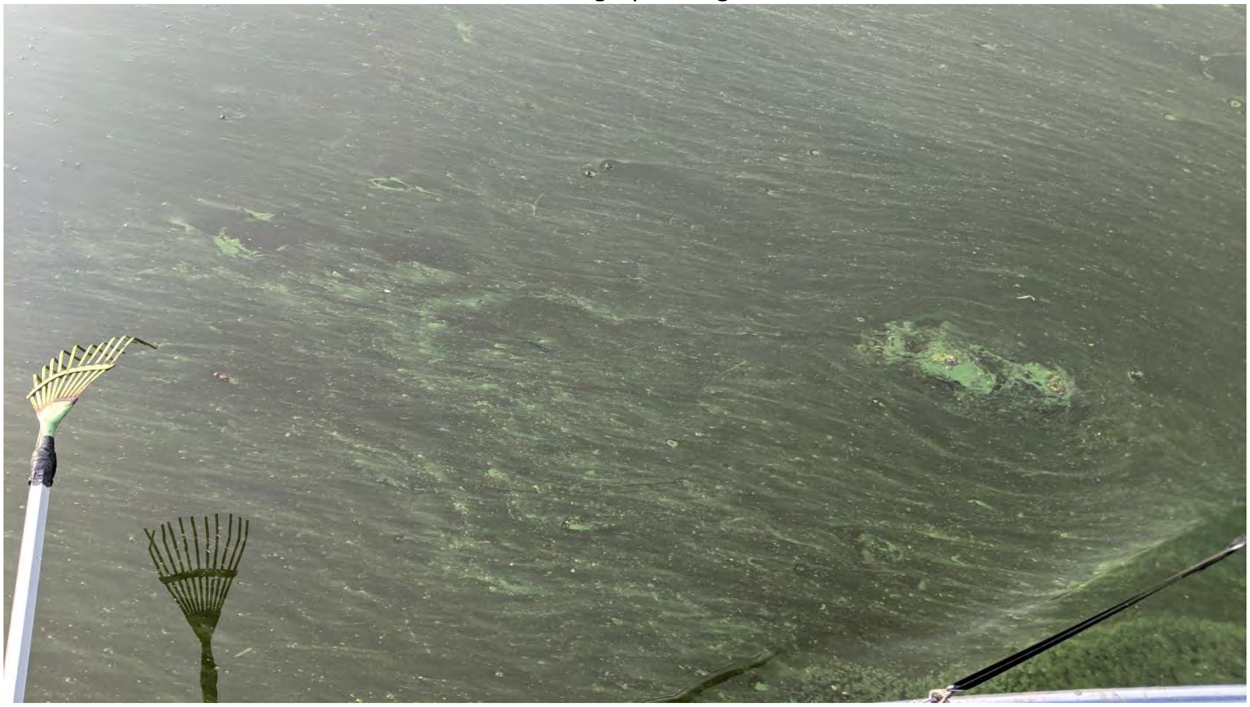


Photo 9: Dense Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

Photo 10: Dense Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

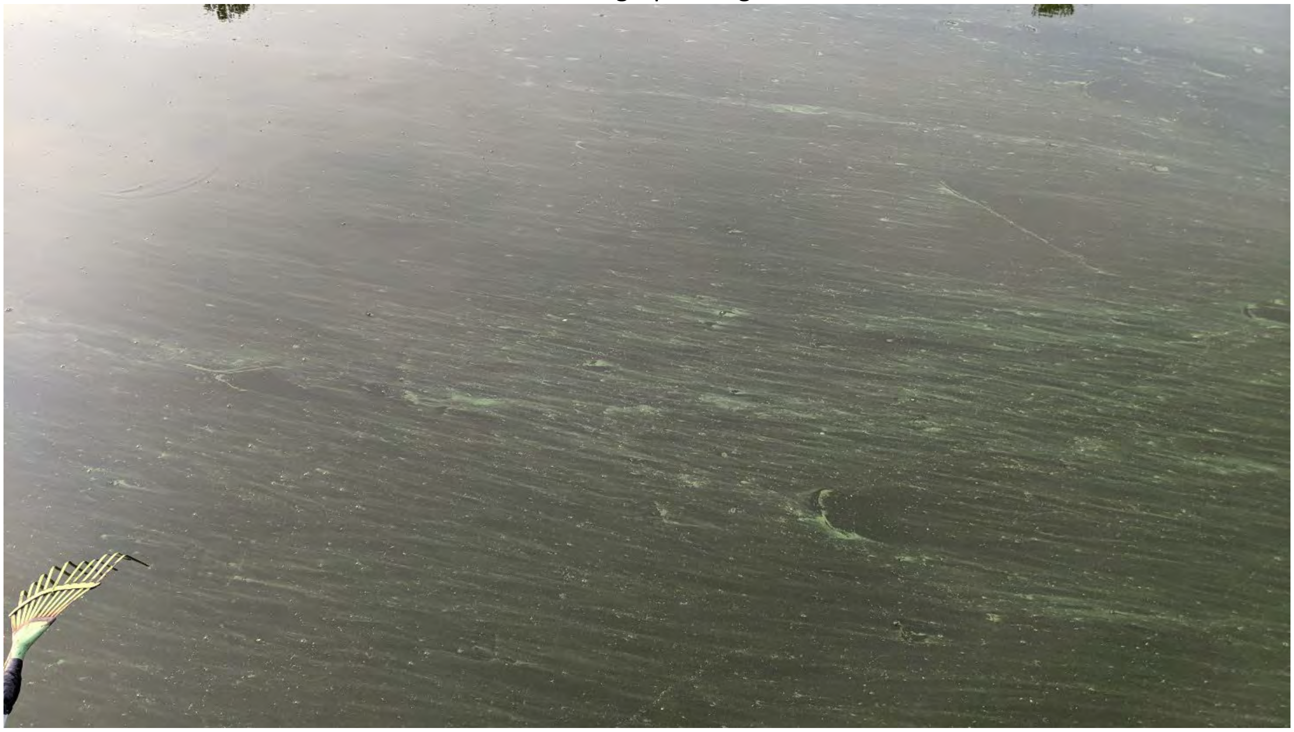


Photo 11: Dense Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

Photo 12: Dense Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

Photo 13: Dense Cyanobacteria bloom on water's surface. Photo taken on 7/22/21.

Photo 14: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/20/21.

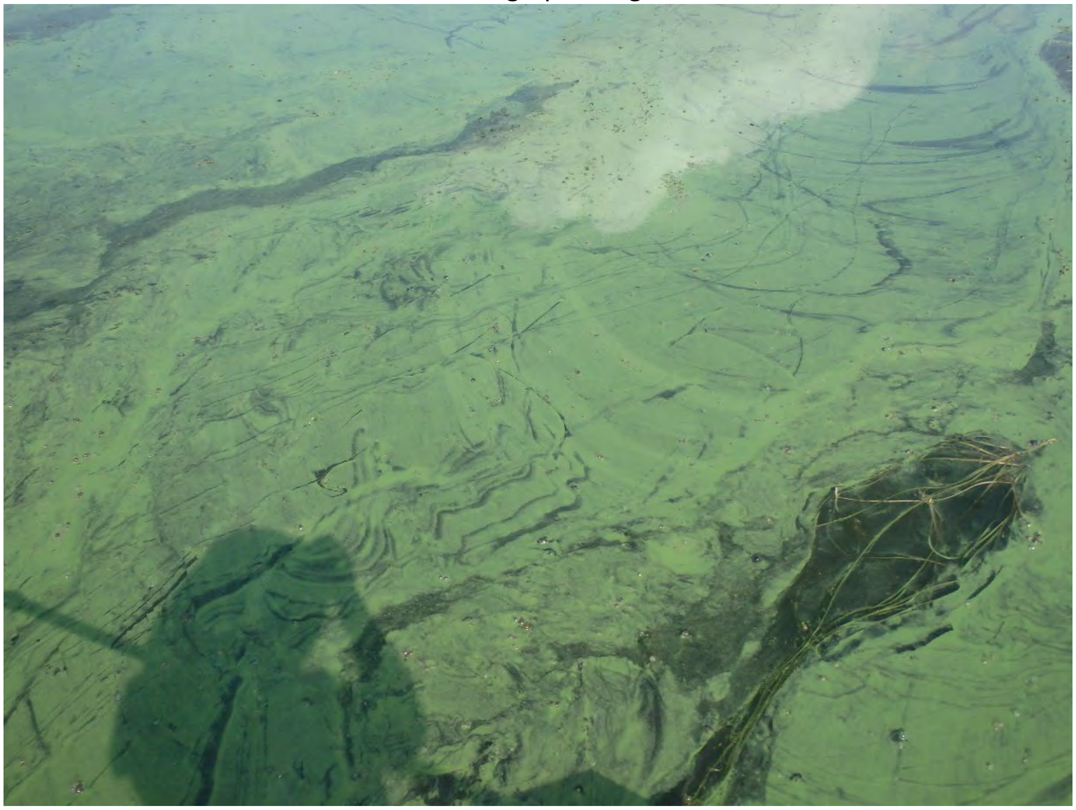


Photo 15: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/20/21.

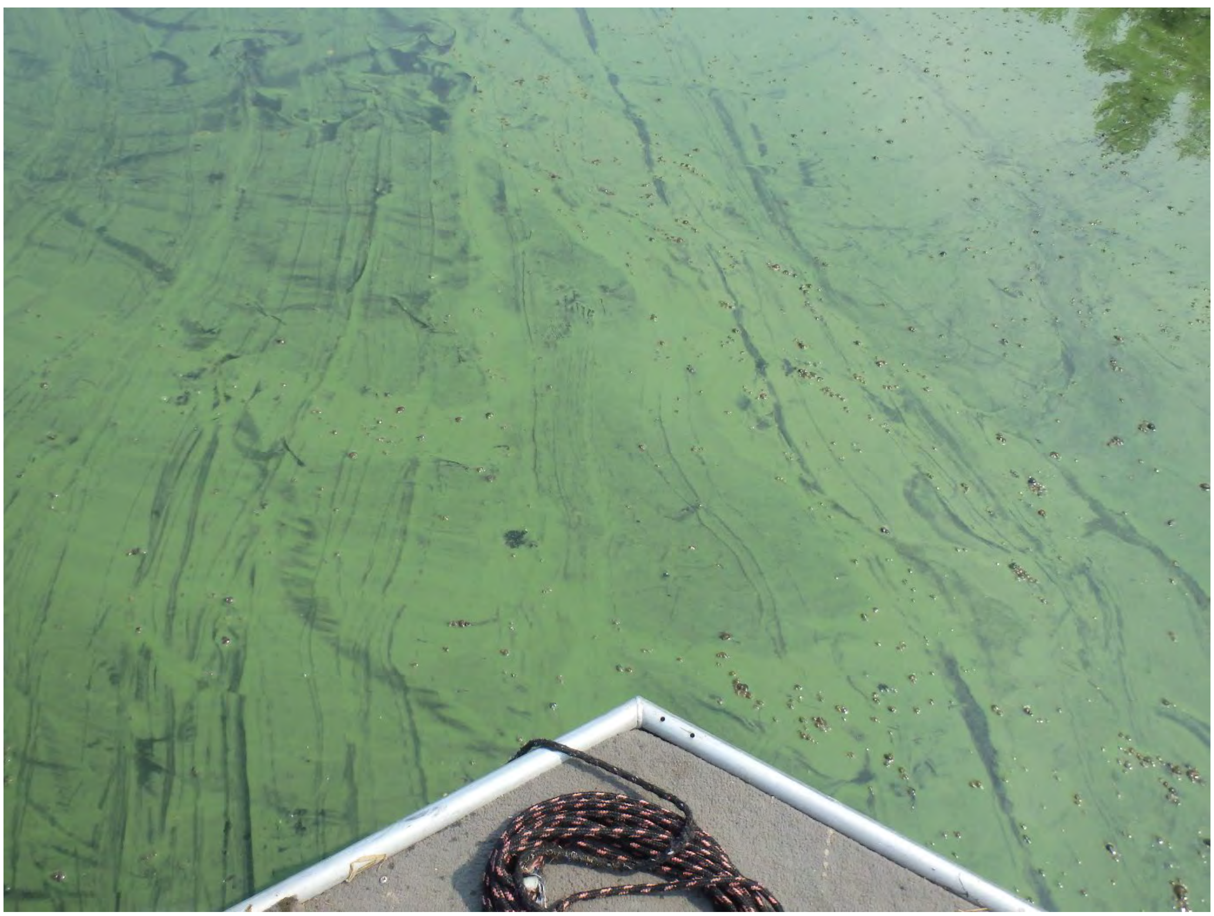


Photo 16: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/20/21.

Photo 17: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/20/21.

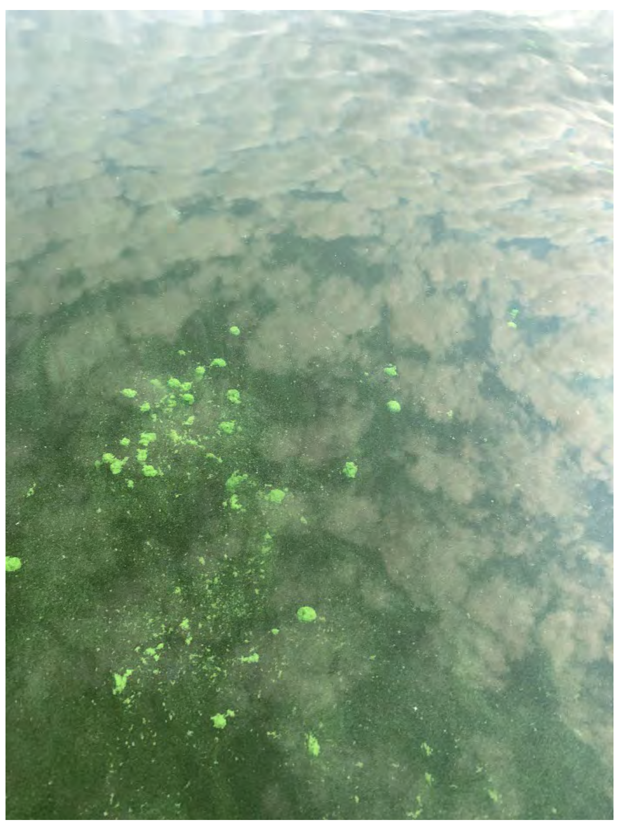


Photo 18: Dense Cyanobacteria (*Microystis*) bloom on water's surface. Photo taken on 7/22/21.

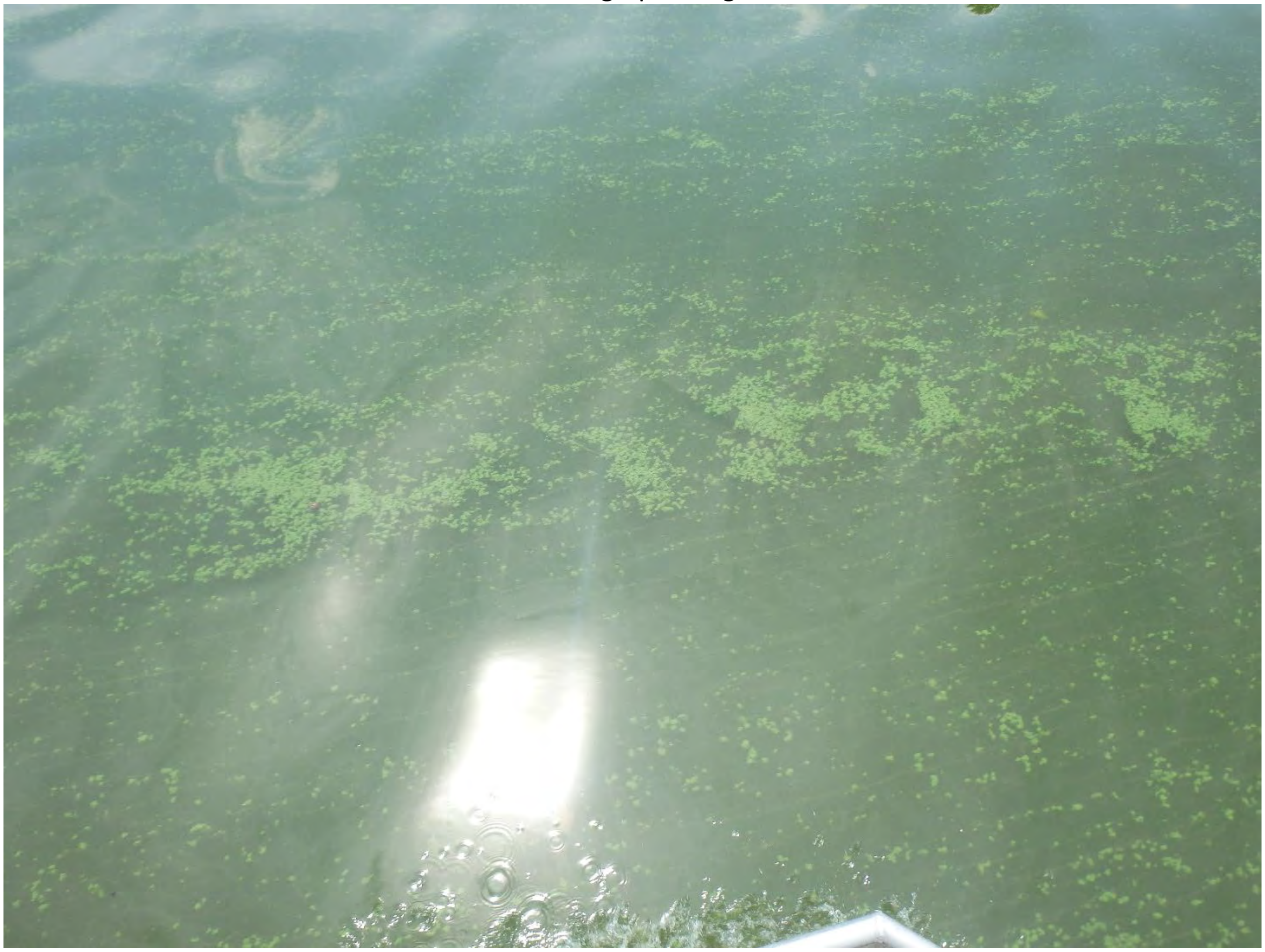


Photo 19: Dense Cyanobacteria (*Microystis*) bloom on water's surface. Photo taken on 7/22/21.

Photo 20: Cyanobacteria (*Microystis*) bloom on water's surface. Photo taken on 7/22/21.

Photo 21: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/18/21.

Photo 22: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/18/21.

Photo 23: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/18/21.

Photo 24: Dense Cyanobacteria bloom on water's surface. Photo taken on 8/18/21.

Photo 25: Cyanobacteria bloom (*Gleotrichia*) bloom observed in the northern end of the lake. Photo taken on 7/19/21.

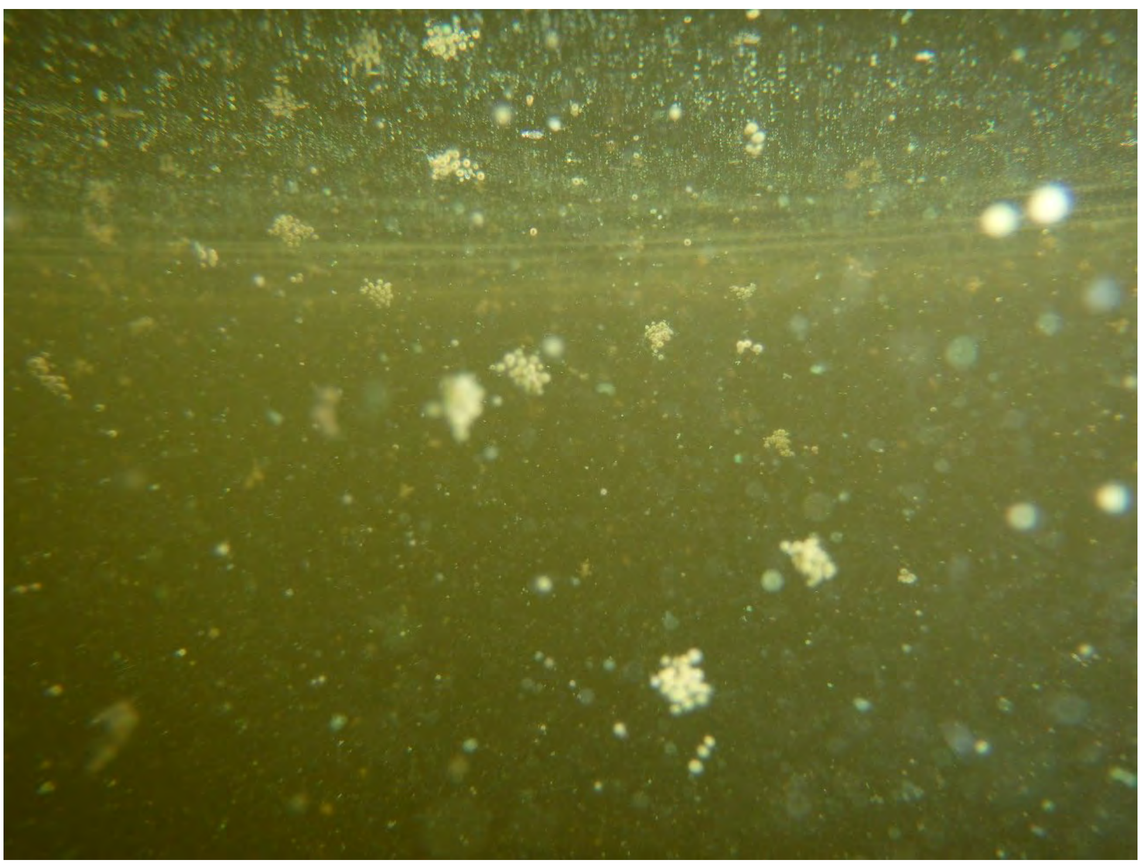


Photo 26: Cyanobacteria bloom (*Gleotrichia*) bloom observed in the northern end of the lake. Photo taken on 7/19/21.

Photo 27: Cyanobacteria bloom (*Gleotrichia*) bloom and a rogue piece of Eurasian watermilfoil observed in the northern end of the lake. Photo taken on 7/19/21.

Photo 28: Floating mat of Eurasian watermilfoil with filamentous algae. Photo taken on 7/19/21.

Photo 29: Eurasian watermilfoil demonstrating adventitious roots that allow the plant to spread via fragmentation. Zebra mussels also growing on sample. Photo taken on 8/19/21.

Photo 30: Cyanobacteria growing on a piece of Eurasian watermilfoil. Photo taken on 7/19/21.

Photo 31: Curly leaf pondweed observed in Black Lake. Photo taken on 7/18/21.

Photo 32: Curly leaf pondweed turion. Photo taken on 7/19/21.

Photo 33: Curly leaf pondweed turion. Photo taken on 7/21/21.

Photo 34: Lone water chestnut plant found at the first visited data point in northern end of lake near the Oswegatchie River (iMap observation: #1151623) Photo taken on 7/18/21.

Photo 35: European frogbit observed in Black Lake. Photo taken on 7/21/21.

Photo 36: European frogbit observed in Black Lake. Photo taken on 7/18/21.

Photo 37: Purple loosestrife growing on a rock outcrop. Photo taken on 7/20/21.

Photo 38: Dense purple loosestrife stand in shores of the northern end of the lake. Photo taken on 7/18/21.

Photo 39: Water marigold, a rare and vulnerable species in NY state, observed in Black Lake (Young 2021). Photo taken on 7/19/21.

Photo 40: Water marigold, a rare and vulnerable species in NY state, observed in Black Lake (Young 2021). Photo taken on 7/19/21.

Photo 41: White water lily subspecies *tuberosa* identified by red stripes on stem. Photo taken on 7/19/21.

Photo 42: Native mussel with dense zebra mussel growth on shell. Photo taken on 7/22/21.

Photo 43: Observation of mass snail die off. Photo taken on 8/20/21.

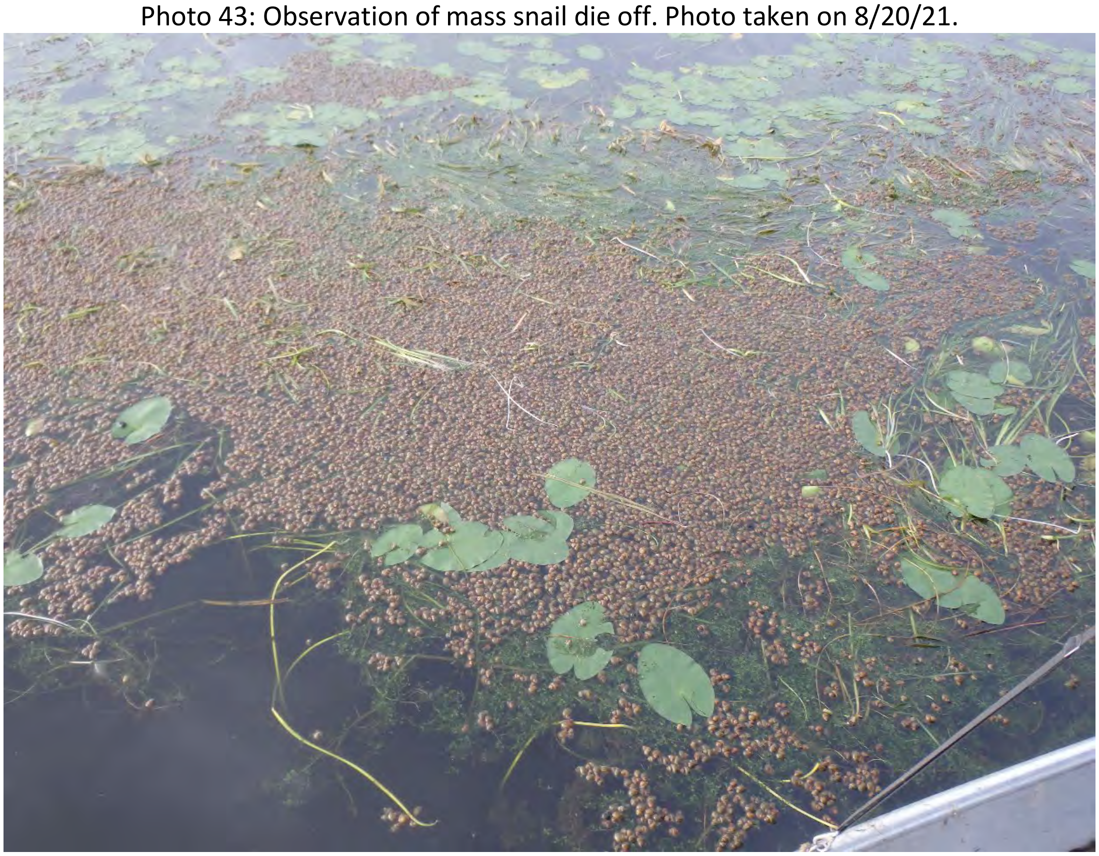


Photo 44: Observation of mass snail die off. Photo taken on 8/20/21.

Photo 45: Observation of mass snail die off. Photo taken on 8/20/21.

Photo 46: Observation of mass snail die off. Photo taken on 8/20/21.

Photo 47: Zebra mussel growing on plant root. Photo taken on 7/19/21.

Photo 48: Zebra mussel growing on most abundant plant in lake, southern naiad. Photo taken on 7/21/21.

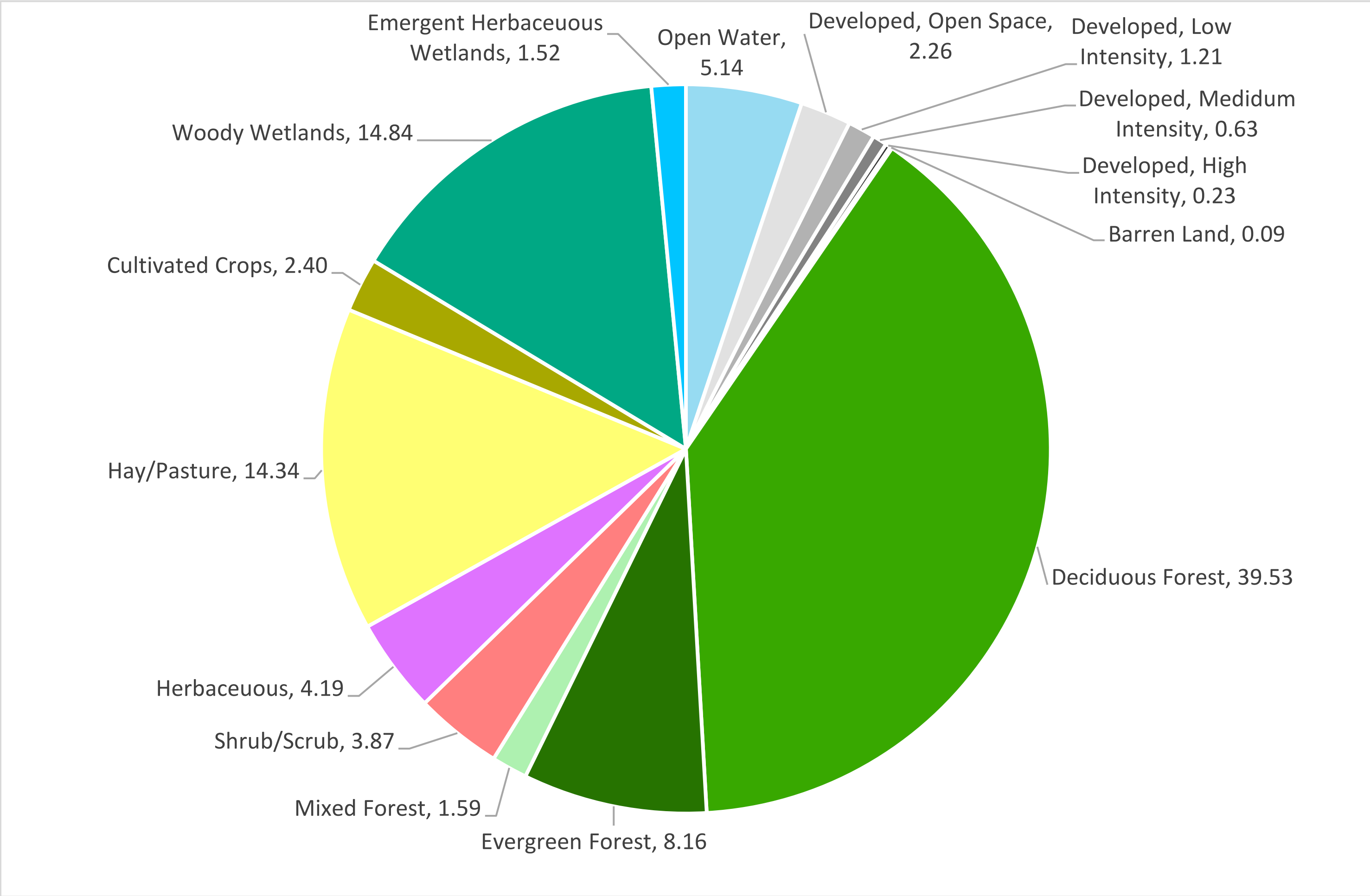
Photo 49: Water stains on shoreline rock demonstrating low water level for 2021. Photo taken on 7/21/21.

Photo 50: Water stains on shoreline rock demonstrating low water level for 2021. Photo taken on 7/21/21.

Photo 51: Water stains on shoreline rock demonstrating low water level for 2021. Photo taken on 8/17/21.

Photo 52: Water stains on shoreline rock demonstrating low water level for 2021. Photo taken on 7/20/21.

Appendix F: Watershed Land Use



Appendix G

HAB Sources of Exposure

Black Lake Management Plan
Black Lake, Town of Oswegatchie
St. Lawrence County, New York

Centers for Disease Control and Prevention

Sources of Exposure

Harmful algal blooms caused by certain types of algae and cyanobacteria (also called blue-green algae) happen in bodies of water around the world. You can be exposed and get sick if you swim, wade, or play in or near them; eat contaminated fish or shellfish; or use contaminated drinking water.

You can be exposed to harmful algae and cyanobacteria and their toxins through:

Skin Contact

Breathing in Toxins

Swallowing Contaminated Water

Eating Contaminated Food

Your symptoms and how sick you get can vary depending on the type of exposure, the type of harmful algae or cyanobacteria that are present, and the type of toxin (poison) involved. In some cases, more than one toxin may be present. People are mainly exposed through:

- **Skin contact** through activities like swimming
- **Breathing in** tiny airborne droplets or mist that contain toxins
- **Swallowing** water that contains toxins
- **Eating** food or supplements containing toxins

Skin contact

Anyone who visits a body of water that has harmful algae, cyanobacteria, or their toxins can be exposed through skin contact with the water.

Skin irritation and other reactions in people and animals can vary depending on how long they were in contact with the contaminated water. It can also depend on the type and amount of toxins in the water.

Breathing in toxins

People can be exposed to algal or cyanobacterial toxins by breathing in tiny water droplets, mist, or sea spray from a contaminated body of water. You can breathe in toxins even if you do not go into the water. More research is needed to better understand the effects of breathing in toxins over a long period of time, especially for those who regularly work on or near water, such as boaters or lifeguards.

People who have been on the beach or on a boat in salt water have reported breathing difficulties after inhaling air or water particles contaminated with toxins.

Did you know?

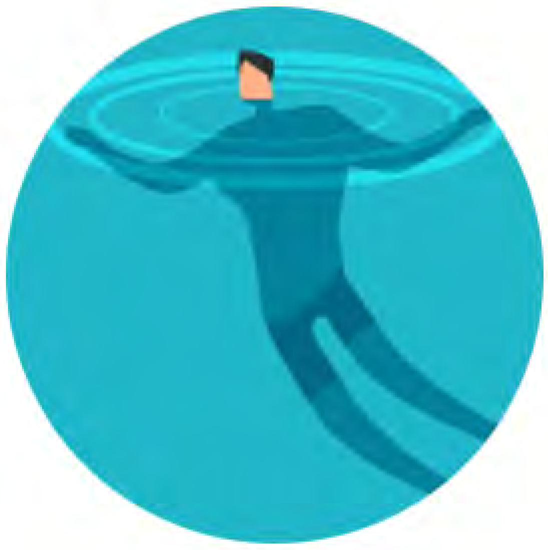
A study conducted during a *Karenia brevis* red tide (a type of harmful algal bloom) in Florida found that algal toxins could be **transported in the air almost 4 miles inland** from the water source. Harmful algal blooms may cover hundreds of square miles of ocean and affect boaters across the entire area.

Swallowing contaminated water

People and animals can be exposed to algal or cyanobacterial toxins when they drink contaminated water. This can happen during recreational activities (such as accidentally drinking water while swimming) and by drinking contaminated tap water.

Recreational activities

People can swallow water contaminated with algae, cyanobacteria, or their toxins while they are swimming or playing in the water.



- Active water sports (like water-skiing) pose a higher risk of accidentally swallowing water.
- Swimmers may swallow up to 16–200 mL of water (the equivalent of 0.5 – 6.8 ounces of water) during one swim.

Drinking water

Though uncommon, people and pets might be exposed to cyanobacterial toxins if the tap water supply contains cyanobacteria. The marine (saltwater) algae that form harmful algal blooms are not found in fresh water, so their toxins would not be in drinking water. Whether there are cyanobacterial toxins in drinking water can depend on the level of toxins in untreated or raw source water. It can also depend on how effective the water treatment methods are in removing the toxins.

Some public drinking water systems use surface water from lakes. Water treatment facilities have options to remove cyanobacteria and their toxins from water during treatment; however, these methods are not always a part of a water utility's standard treatment processes. In June 2015, the U.S. Environmental Protection Agency (EPA) issued drinking water health advisory levels for toxins made by cyanobacteria. Health advisories are not regulations, but guidance for health officials and the public that help to protect people's health.

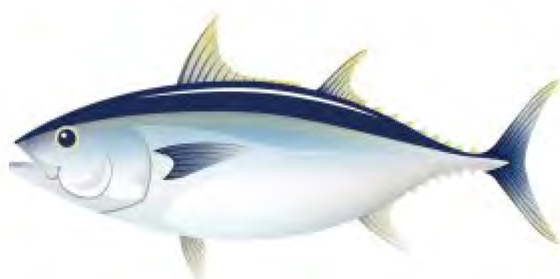
You can find out more about your local drinking water on EPA's website.

Dialysis

Rarely, people have been exposed to cyanobacterial toxins during dialysis. This can happen if the source of the dialysis water contains toxins which are not removed by the water treatment system. In 1974, 23 dialysis patients in Washington, DC became ill. In 1996, 116 dialysis patients became ill or died in Brazil.

Eating contaminated food

People and animals can be exposed to algal or cyanobacterial toxins when they eat contaminated seafood or take contaminated nutritional supplements.



Seafood

People and animals can be exposed to toxins when they eat seafood.

Fresh Water	Marine (Salt) Water

Freshwater fish can become contaminated with cyanobacterial toxins by eating other animals that already have toxins in their bodies. More research is needed to better understand how often people come in contact with toxins by eating freshwater fish.

Shellfish can become contaminated with algal toxins when they filter and concentrate water that contains toxins. Reef fish can become contaminated by eating other animals that already have toxins in their bodies. This is called bioaccumulation.

For more information on illnesses caused by eating seafood contaminated with marine toxins, visit Illness and Symptoms: Marine (Saltwater) Algal Blooms or the CDC's Yellow Book, Chapter 2: Food Poisoning from Marine Toxins.

Bioaccumulation: Fish and other aquatic animals may eat algae or cyanobacteria, building up the toxins in their bodies. When other animals eat these animals (for example, when small fish are eaten by larger fish), the toxins can build up, or bioaccumulate. Top predators, including large fish and people, can be poisoned when they eat fish that have accumulated toxins.

Nutritional supplements

Nutritional supplements that have blue-green algae (cyanobacteria) can also pose a risk for exposure to cyanobacterial toxins. When algae are harvested to produce supplements, a toxin-producing cyanobacteria (such as *Microcystis*) might accidentally be collected as well.

Many supplements have good safety records, but federal law does not require companies that make nutritional supplements to prove they are safe to FDA's standards before they are marketed. Find more information about supplement safety on FDA's website.

Animals can be exposed to harmful algal and cyanobacterial toxins

Animals, including pets and livestock, can become sick when they:

- **Drink water** containing algal or cyanobacterial toxins.
- **Swim or play in water** containing algal or cyanobacterial toxins.
- **Eat or lick toxic algae** or cyanobacteria that is in the water, on the shore, on their fur, or in supplements.
- **Eat fish, shellfish, or dead animals** on the shore that contain algal or cyanobacterial toxins.

In fact, animals are more likely than people to swallow water containing algal or cyanobacterial toxins because they do not avoid water that is discolored or smells bad.

Learn how to protect your pets and livestock.

Page last reviewed: April 1, 2021