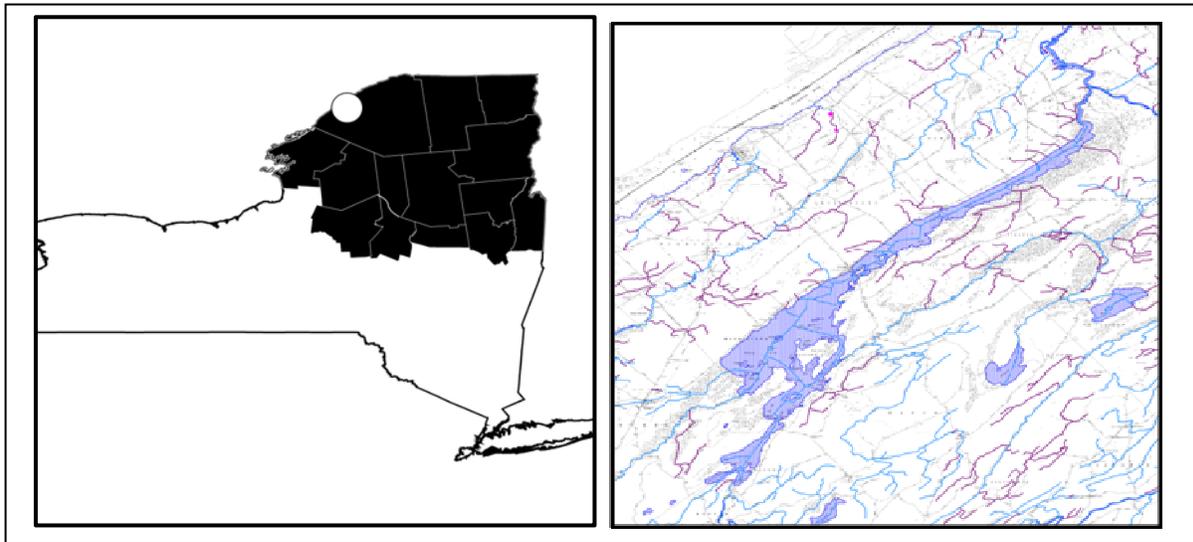


## CSLAP 2011 Lake Water Quality Summary: Black Lake

### General Lake Information

<b>Location</b>	Town of Hammond
<b>County</b>	St. Lawrence
<b>Basin</b>	St. Lawrence River
<b>Size</b>	3,380 hectares (8,349 acres)
<b>Lake Origins</b>	Augmented by dam
<b>Watershed Area</b>	144,400 hectares (356,668 acres)
<b>Retention Time</b>	0.13 years
<b>Mean Depth</b>	2.5 meters
<b>Sounding Depth</b>	4.9 meters
<b>Public Access?</b>	many launches
<b>Major Tributaries</b>	Black Creek, Indian River, Fish Creek, unnamed tribs
<b>Lake Tributary To...</b>	Oswegatchie River to St. Lawrence River
<b>WQ Classification</b>	B (non-contact recreation = boating, angling)
<b>Lake Outlet Latitude</b>	44.622
<b>Lake Outlet Longitude</b>	-75.475
<b>Sampling Years</b>	1988-2011
<b>2011 Samplers</b>	Brian and Denise Caler
<b>Main Contact</b>	Brian Caler

### Lake Map



## **Background**

Black Lake is an 8349 acre, class B lake found in the Town of Hammond in St. Lawrence County, in the St. Lawrence River region of New York State. It has been sampled as part of CSLAP since 1988.

It is one of six CSLAP lakes among the more than 220 lakes found in St. Lawrence County, and one of 16 CSLAP lakes among the more than 465 lakes and ponds in the Oswegatchie/Black Rivers drainage basin.

## **Lake Uses**

Black Lake is a Class B lake; this means that the best intended use for the lake is for contact recreation—swimming and bathing—although the lake also supports non-contact recreation—boating and angling, aquatic life, and aesthetics. The lake is used by lake residents and visitors for a variety of recreational purposes.

Black Lake has been regularly stocked with 30,000 0.5” walleye, although stocking at times is curtailed due to concerns about VHS. It is not known if private stocking efforts also occur. Fish species in the lake include black crappie, bluegill, bowfin, brown bullhead, catfish, largemouth bass, muskellunge, northern pike, smallmouth bass, sunfish, walleye, and yellow perch.

General statewide fishing regulations are applicable in Black Lake. In addition, open season on black bass runs from the 3<sup>rd</sup> Saturday in June to November 30<sup>th</sup>, with a daily take limit of five fish and a minimum length of 15 inches. The open season on walleye lasts from the 1<sup>st</sup> Saturday in May through March 15<sup>th</sup>, with a daily take limit of three fish and a minimum length of 18 inches. Ice fishing for both species is allowed.

## **Historical Water Quality Data**

CSLAP sampling was conducted on Black Lake each year from 1989 to 2011. The CSLAP reports for each of the past several years can be found on the NYSFOLA website at <http://nysfola.mylaketown.com>. The 2009 and 2010 CSLAP reports for Black Lake can also be found on the NYSDEC web page at <http://www.dec.ny.gov/lands/77837.html>.

Black Lake was sampled as part of several previous water quality monitoring programs, primarily those conducted by Clarkson University and other academic institutions in the 1980s. The lake was also sampled as part of the National Eutrophication Survey from 1972. These data have been summarized in previous CSLAP reports.

The lake was also sampled as part of the NYS Conservation Department (the predecessor to the NYSDEC) biological survey of the St. Lawrence River basin in 1931. The biological surveys collected information about the physical, chemical, and biological characteristics of Black Lake and its immediate watershed. Many of the biological indicators collected in this survey are not collected in CSLAP, and are not included here. The Black Lake summary indicated:

*"The upper part of the lake presents wide expanses of water broken up by a number of islands. The shoreline is very irregular, giving rise to many large bays most of which are filled with rank growths of vegetation. The lower part of the lake, from Edwardsville bridge down, is more like a*

*sluggish river than a lake. The channel is narrow and is bordered on both sides by wide margins of emergent vegetation. There are few places in the lake where the water is over fifteen feet deep, which results in its being thoroughly stirred by strong winds. The winds and plants together ensure a high oxygen content for all depths. The shallowness also accounts for the small difference of only one degree between the temperature of the surface and bottom water. The many weed areas not only aid in aeration of the water but furnish spawning grounds for many species of fish. They also provide a nursery for the young fish, protecting them from enemies and supplying large numbers of food organisms. Several large tributary streams enter the lake. Some of them have long been noted for spawning runs of pike-perch, mooneyes and gars.*

*Areas of sand, rubble, boulder and muck bottom are generously distributed in the lake. This, together with the high oxygen content, abundance of food and shallowness of the water results in an abundance of game fish of the warm water varieties"*

Most of the water quality parameters measured through CSLAP were not analyzed in the biological survey. However, it does appear that the data from the Biological Survey indicate that water clarity was higher in 1931, although the lake was still described as "turbid", with a "muddy bottom". By the 1970s and early 1980s, nutrient levels were comparable to those measured in CSLAP, and probably higher than those from the 1930s, given the water transparency readings (although phosphorus was not analyzed in the 1930s samples).

Several tributaries to the lake have been sampled as part of the state Rotating Intensive Basins (RIBS) stream chemistry or the state macroinvertebrate biological monitoring program. The Indian River in Rossie was sampled through the RIBS program. The 2006 St. Lawrence River basin report for this site indicated that:

*"...a biological (macroinvertebrate) assessment of the Indian River at Rossie (at Mill Road) was conducted in 2004 during the RIBS Biological Screening effort in the basin. Sampling results indicated non-impacted water quality conditions. Impact source determination did indicate some influence on the community from siltation and non-point source nutrient enrichment. In spite of these minor impacts aquatic life is considered to be fully supporting in the stream. (DEC/DOW, BWAM/SBU, November 2008)"*

## **Lake Association and Management History**

The Black Lake Association has been involved in a wide variety of lake management activities, including:

- Water quality management
- Route 58 causeway improvement
- Walleye restoration
- Septic tank testing
- Power boat safety
- Fish Creek walleye breeding area restoration

Aquatic weed cutters and harvesters have historically been used on Black Lake, although it is not known if they have been used in the last several years.

The Black Lake Association conducts a variety of lake and watershed management activities to improve lake conditions. Septic management programs have been instituted. Rip rap is used by some individuals to reduce soil erosion.

Fish stocking and management activities at the lake are overseen by the Black Lake Fish and Game Association.

## **Summary of 2011 CSLAP Sampling Results**

### **Evaluation of 2011 Annual and Monthly Results Relative to 2006-2010**

The Lake Condition Summary Table below and Appendix B compare annual and monthly results from 2011 to those measured in previous CSLAP sampling seasons. The pertinent deviations from normal conditions are discussed below.

### **Evaluation of Eutrophication Indicators**

Each of the trophic indicators (water clarity, chlorophyll *a* or total phosphorus) were close to normal in 2011. Chlorophyll *a* readings in Black Lake have decreased slightly since the late 1980s. Lake productivity increased through late summer, as in most years, but decreased in the fall of 2011. The lake continues to be characterized as *eutrophic*, based on the typical Secchi disk transparency, chlorophyll *a*, and total phosphorus readings. The trophic state indices (TSI) analysis indicates that all three trophic indicators are generally “in balance”—water clarity, chlorophyll *a*, and total phosphorus readings are all within the expected range and “internally” consistent. Overall trophic conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

### **Evaluation of Potable Water Indicators**

No water quality indicators related specifically to potable water usage have been collected through CSLAP in Black Lake. Algae levels are sufficiently high to render the lake susceptible to taste and odor compounds or elevated DBP (disinfection by product) compounds that could affect the potability of the water. However, the lake is not classified for this use. Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

### **Evaluation of Limnological Indicators**

NO<sub>x</sub>, total nitrogen, conductivity and color readings were higher than normal in 2011, particularly NO<sub>x</sub> readings in mid summer, but of these limnological indicators, only conductivity (increasing slightly) has exhibited any long-term trends. Each of the other non-trophic indicators was close to normal in 2011, and none of these other indicators has exhibited any clear long-term trends. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

## **Evaluation of Biological Condition**

The 1992 CSLAP phytoplankton data showed high algae levels dominated by cyanobacteria (blue-green algae), and it is likely (based on phycocyanin readings, described below) that blue-green algae continue to be common in the lake.

The CSLAP macrophyte surveys show a fairly diverse aquatic plant community, and identified 16 different aquatic plant species at the lake, including one protected plant (*Armoracia aquatica*, or lake cress) and two exotic plants (*Myriophyllum spicatum*, Eurasian watermilfoil; and *Potamogeton crispus*, curly-leafed pondweed). The modified floristic quality index (FQI) rating indicates that the quality of the aquatic plant community is “fair.”

Zebra mussels were verified in the lake in 2004. The fish community was comprised of at least 16 fish species, including both coolwater (at least seven species) and warmwater species (at least nine). It is likely that the lake is primarily a coolwater fishery. The 1982 SUNY ESF study looked at fishery community response to mechanical weed harvesting. The 1982 fish community was dominated by yellow perch, and the application of the Minnesota fish IBI (index of biotic integrity) to the gill net fish counts indicates that the quality of the fisheries is “good”.

Zooplankton and macroinvertebrates have not been evaluated through CSLAP at Black Lake. The 1931 biological survey found that the zooplankton community was dominated by copepods.

Biological conditions in the lake are summarized in the Lake Scorecard and Lake Condition Summary Table.

## **Evaluation of Lake Perception**

Water quality assessments, aquatic plant coverage, and recreational assessments in 2011 were close to normal, and although recreational assessments have generally been more favorable in recent years, this change may not be statistically significant. Lake perception generally degrades seasonally, and continues to follow seasonal changes in water quality (and seasonal increases in aquatic plant coverage). Overall lake perception is summarized in the Lake Scorecard and Lake Condition Summary Table.

## **Evaluation of Local Climate Change**

Both air temperature and water temperature readings were higher than normal in 2010 and 2011 (particularly in mid-summer), and water temperatures during the summer index period have increased slightly since the late 1980s. It is not known if this represents normal variability or an inadequate measure of local climate change.

## **Evaluation of Algal Toxins**

Algal toxin levels can vary significantly within blooms and from shoreline to lake, and the absence of toxins in a sample does not indicate safe swimming conditions. Phycocyanin readings at times indicate high susceptibility for harmful algal blooms (HABs), suggesting blue green algae are commonly found in the lake. An analysis of algae samples show microcystin readings below the levels needed to support safe swimming in open water, but close to this threshold in bloom samples. Lake residents are advised not to swim near blooms or discolored water.

# Lake Condition Summary

Category	Indicator	Min	88-11 Avg	Max	2011 Avg	Classification	2011 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.50	1.53	3.72	1.79	Eutrophic	Within Normal Range	No Change
	Chlorophyll <i>a</i>	0.10	25.04	91.42	20.66	Eutrophic	Within Normal Range	Decreasing Slightly
	Total Phosphorus	0.007	0.040	0.099	0.049	Eutrophic	Within Normal Range	No Change
Potable Water Indicators	Hypolimnetic NH4					Lake not consistently thermally stratified		
	Hypolimnetic As					Lake not consistently thermally stratified		
	Hypolimnetic Iron					Lake not consistently thermally stratified		
	Hypolimnetic Mn					Lake not consistently thermally stratified		
Limnological Indicators	Hypolimnetic TP					Lake not consistently thermally stratified		
	Nitrate + Nitrite	0.00	0.02	0.22	0.04	Low NOx	Higher than Normal	No Change
	Ammonia	0.00	0.03	0.12	0.04	Low Ammonia	Within Normal Range	No Change
	Total Nitrogen	0.22	0.61	1.08	0.78	Intermediate Total Nitrogen	Higher than Normal	No Change
	pH	6.53	8.05	9.61	7.98	Alkaline	Within Normal Range	No Change
	Specific Conductance	81	158	227	182	Intermediate Hardness	Higher than Normal	Increasing Slightly
	True Color	15	32	78	42	Intermediate Color	Higher than Normal	No Change
	Calcium	17.3	20.3	26.8	20.0	Highly Susceptible to Zebra Mussels	Within Normal Range	No Change
Lake Perception	WQ Assessment	1	2.3	5	2.1	Not Quite Crystal Clear	Within Normal Range	No Change
	Plant Coverage	1	2.6	5	2.0	Surface Plant Growth	Within Normal Range	No Change
	Rec. Assessment	1	2.5	4	2.4	Excellent	Within Normal Range	No Change
Biological Condition	Phytoplankton					High algae levels with much cyanobacteria	Not known	Not known
	Macrophytes					Fair quality of the aquatic plant community	Not known	Not known
	Zooplankton					Not measured through CSLAP	Not known	Not known
	Macroinvertebrates					Not measured through CSLAP	Not known	Not known
	Fish					Coolwater fishery?	Not known	Not known
	Invasive Species					Zebra mussels, Eurasian watermilfoil, Curly leaf pondweed, purple loosestrife	Not known	Not known
Local Climate Change	Air Temperature	10	21.4	34	23.9		Higher Than Normal	No Change
	Water Temperature	16	22.3	30	26.1		Higher Than Normal	Increasing Slightly
Harmful Algal Blooms	Open Water Phycocyanin	12	96	386	98	Some readings indicate high risk of BGA	Not known	Not known
	Open Water Microcystis	0.0	0.4	0.9	0.6	All readings indicate low lakewide toxins	Not known	Not known
	Shoreline Phycocyanin					Some shoreline BGA blooms likely	Not known	Not known
	Shoreline Microcystis	17.3	17.3	17.3	17.3	Shoreline bloom toxins above drinking water criteria but below swimming criteria	Not known	Not known
	Other Toxins					Low anatoxin-a and cylindrospermopsin	Not known	Not known

## **Evaluation of Lake Condition Impacts to Lake Uses**

The 2009 NYSDEC Priority Waterbody Listings (PWL) for the St. Lawrence River drainage basin indicate that public bathing and recreation are *impaired*, and aesthetics are *stressed* by excessive algae, weeds and nutrients. The PWL listing for the lake is in Appendix C.

### **Potable Water (Drinking Water)**

The CSLAP dataset at Black Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water, and the lake is not classified for this purpose. The limited CSLAP data indicate that "unofficial" use of the lake for this purpose would be impacted by excessive algae, particularly for intakes near shoreline blooms.

### **Contact Recreation (Swimming)**

The CSLAP dataset at Black Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that swimming and contact recreation may be *impaired* by excessive algae and poor water clarity, and stressed by excessive weeds. Additional information about bacteria levels is needed to determine if pathogens impact swimming.

### **Non-Contact Recreation (Boating and Fishing)**

The CSLAP dataset on Black Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that non-contact recreation may be *threatened* by excessive weeds. Additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

### **Aquatic Life**

The CSLAP dataset on Black Lake, including water chemistry data and physical measurements, suggest that aquatic life may be *stressed* by zebra mussels and invasive plants, and *threatened* by occasionally elevated pH readings, depressed oxygen levels.

### **Aesthetics**

The CSLAP dataset on Black Lake, including volunteer samplers' perception data, suggest that aesthetics may be *threatened* by excessive weeds and algae, but aesthetics have not been identified by the sampling volunteers as impacted.

### **Fish Consumption**

Fish consumption advisories are not posted for Black Lake.

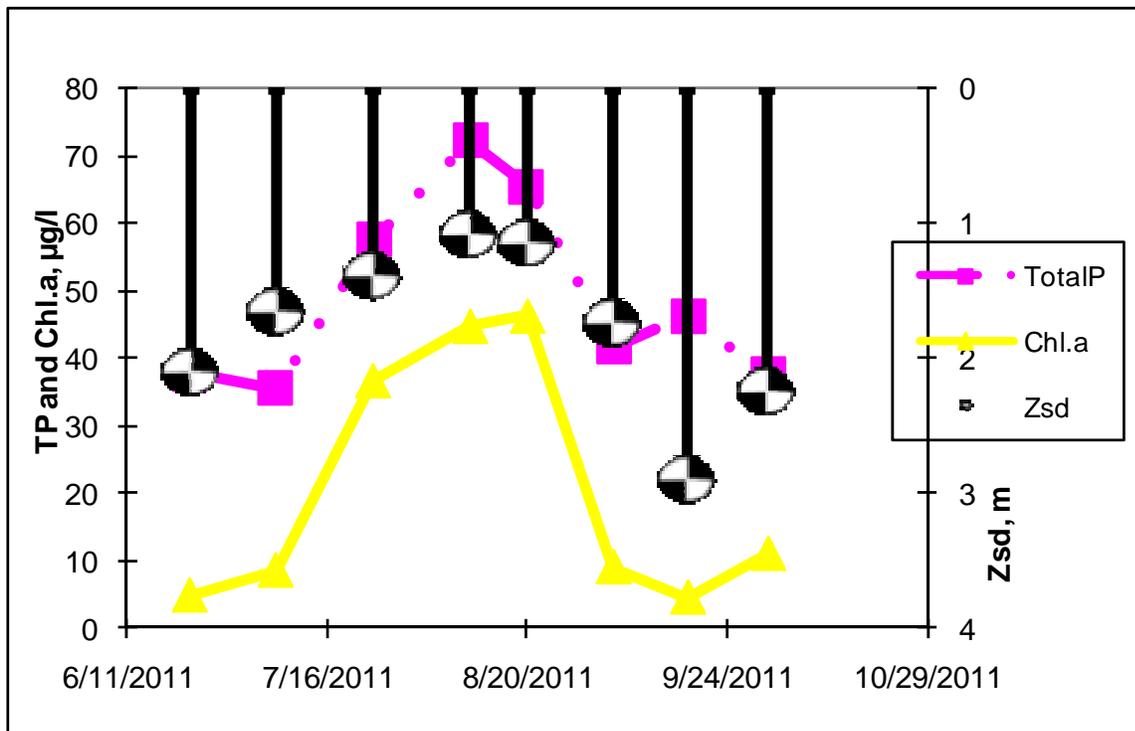
## **Additional Comments and Recommendations**

Phytoplankton (algae) and macroinvertebrate data may help to enhance the biological evaluation of the lake, although it is not known if this information has been collected recently in the lake.

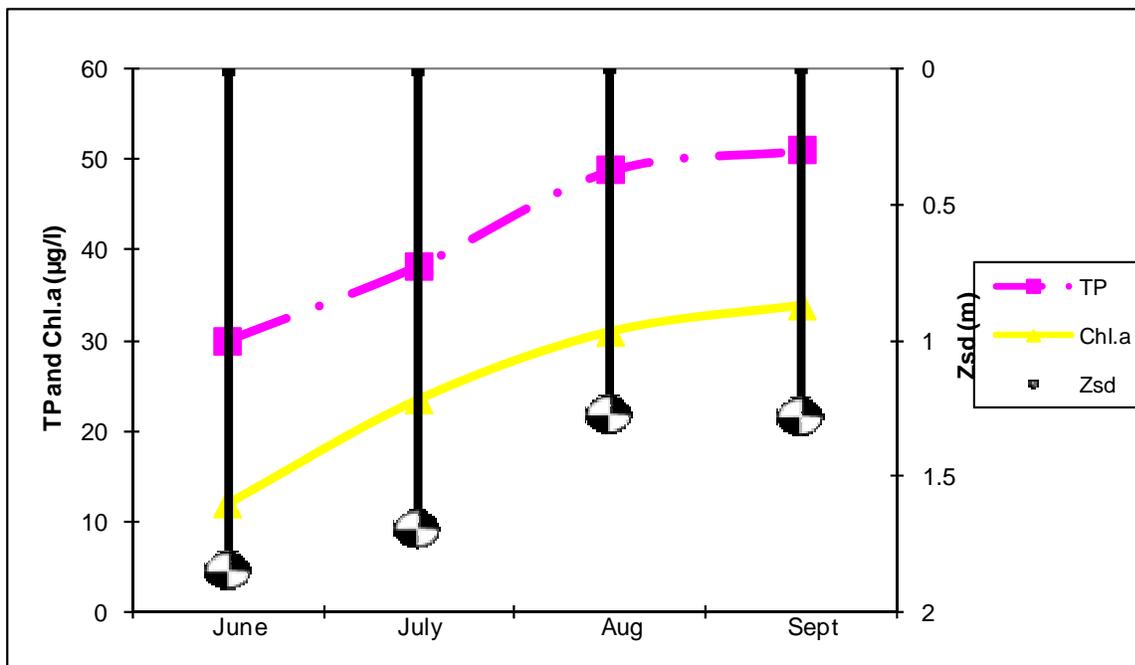
### **Aquatic Plant IDs-2011**

None submitted for identification

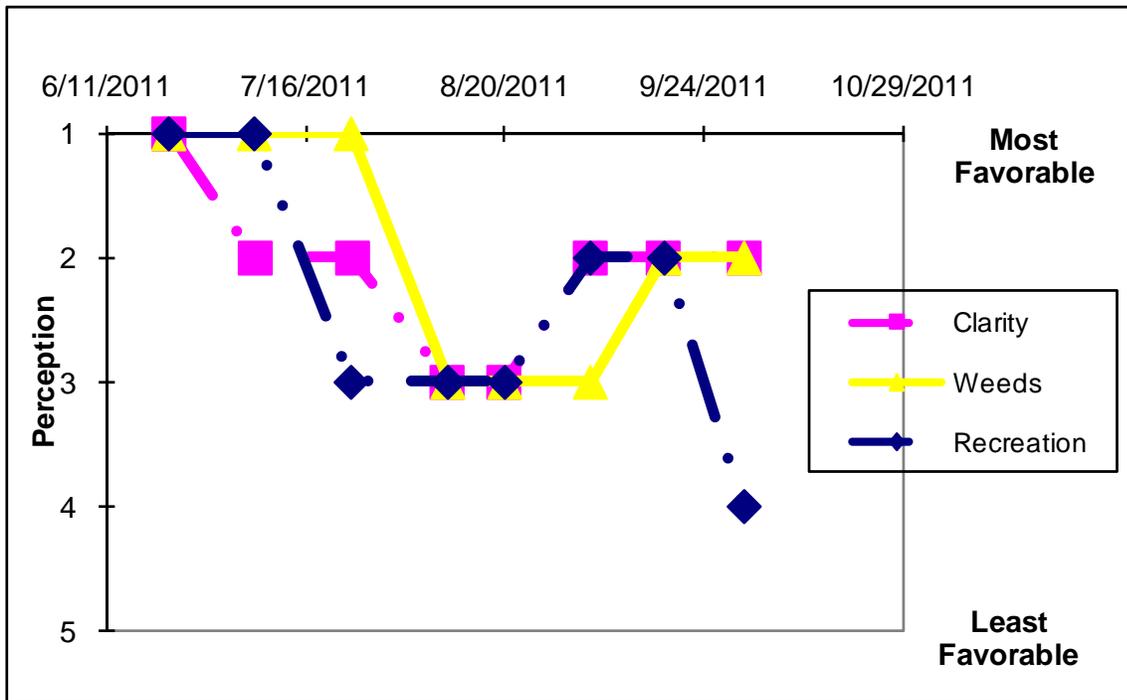
### Time Series: Trophic Indicators, 2011



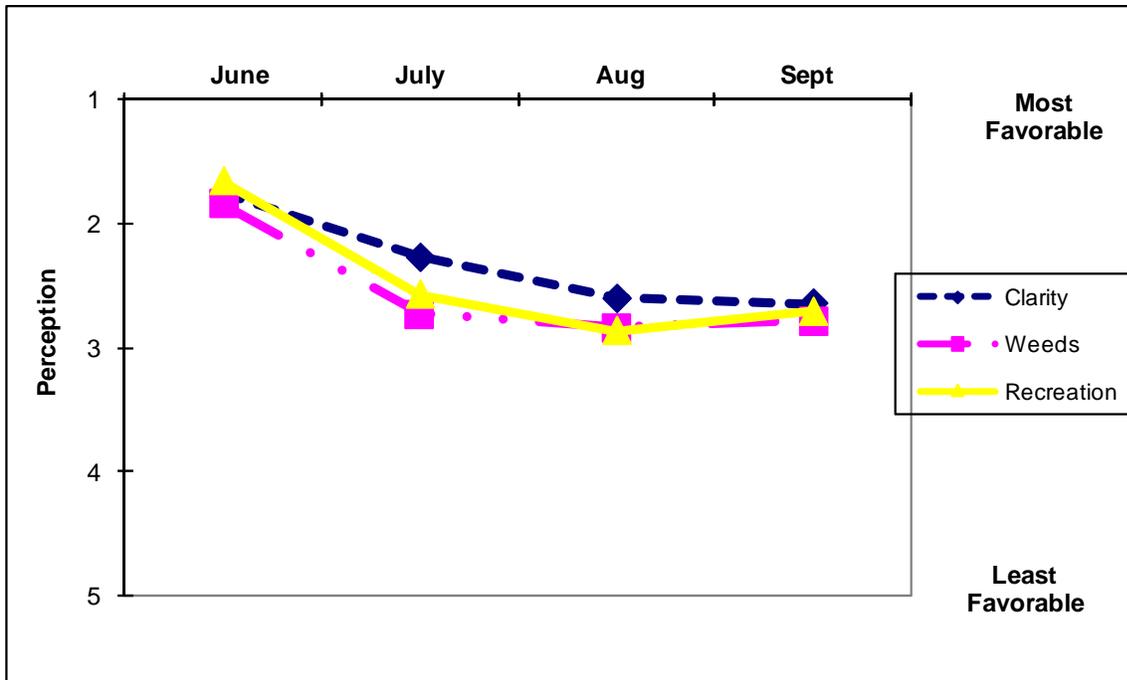
### Time Series: Trophic Indicators, Typical Year (1988-2011)



## Time Series: Lake Perception Indicators, 2011



## Time Series: Lake Perception Indicators, Typical Year (1988-2011)



## Appendix A- CSLAP Water Quality Sampling Results for Black Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
51	Black L	6/20/1988	2.5	2.13	1.5	0.007	0.01				26	8.06	141		11.80
51	Black L	6/29/1988	4.6	1.74	1.5	0.028	0.01				28	7.79	149		8.02
51	Black L	7/6/1988	4.8	3.08	1.5	0.019	0.01				25	8.02	142		3.26
51	Black L	7/13/1988	4.4	3.72	1.5	0.013	0.01				21	7.86	145		4.22
51	Black L	7/20/1988	4.7	1.95	1.5	0.018	0.01				22	8.22	148		14.20
51	Black L	7/27/1988	4.9	1.81	1.5	0.026	0.01				21	7.67	145		19.20
51	Black L	8/3/1988	4.9	1.30	1.5	0.027	0.01				23	7.88	147		22.20
51	Black L	8/8/1988	4.8	1.34	1.5	0.034	0.01				22	8.42	166		37.00
51	Black L	8/17/1988	4.9	1.07	1.5	0.037	0.01				22	7.90	151		51.80
51	Black L	8/26/1988	4.9	0.99	1.5	0.034	0.01				27	8.20	156		34.80
51	Black L	8/31/1988	4.9	1.22	1.5	0.035	0.01				23	8.19	148		31.80
51	Black L	9/7/1988	5.0	0.88	1.5	0.044	0.01				21	8.21	150		24.40
51	Black L	9/14/1988	5.1	1.04	1.5	0.046	0.01				23	7.79	154		31.80
51	Black L	9/22/1988	5.0	1.43	1.5	0.039	0.01				22	7.65	153		21.40
51	Black L	9/27/1988	5.0	1.31	1.5	0.039	0.01				22	7.97	159		25.90
51	Black L	6/27/1989	5.3	2.36	1.5	0.034	0.01				50	8.03	148		6.51
51	Black L	7/3/1989	5.2	1.43	1.5	0.031					45	7.83	148		8.57
51	Black L	7/12/1989	5.2	2.09	1.5	0.035					45	7.79	149		8.14
51	Black L	7/20/1989	5.1	1.52	1.5	0.036					40	8.09	149		23.80
51	Black L	7/24/1989	5.0	1.83	1.5	0.040					40	8.93	147		17.60
51	Black L	7/28/1989	5.0	1.97	1.5	0.046					32	7.83	163		21.50
51	Black L	8/2/1989	5.0	1.28	1.5	0.049					35	7.96	153		25.90
51	Black L	8/8/1989	4.9	1.04	1.5	0.053					34	7.70	156		50.90
51	Black L	8/14/1989	4.6	1.04	1.5	0.043					32	7.40	156		45.10
51	Black L	8/21/1989	5.2	1.08	1.5	0.053					27	8.16	150		56.80
51	Black L	8/28/1989	5.1	0.91	1.5	0.066					30	9.29	149		29.60
51	Black L	8/31/1989	5.1	0.98	1.5	0.060					30	8.26	149		34.40
51	Black L	9/6/1989	5.1	0.91	1.5	0.073					27	8.36	153		23.70
51	Black L	9/12/1989	5.1	0.90	1.5	0.064					27	8.25	152		26.60
51	Black L	9/18/1989	5.1	1.07	1.5	0.065					30	8.07	154		28.90
51	Black L	7/5/1990	5.0	1.61	1.5	0.044	0.01				35	7.78	140		23.70
51	Black L	7/16/1990	4.9	1.64	1.5	0.036					35	7.74	143		31.30
51	Black L	8/5/1990	4.9	1.22	1.5	0.063	0.01				33	8.70	118		42.40
51	Black L	8/15/1990	5.1	1.52	1.5	0.050					30	7.97	145		25.10
51	Black L	8/29/1990	4.9	1.36	1.5	0.047	0.01				29	8.11	148		28.10
51	Black L	9/12/1990	4.9	1.04	1.5	0.007					24	8.24	147		38.10
51	Black L	6/17/1991	5.0	1.98	1.5	0.035	0.01				34	7.96	144		39.50
51	Black L	7/2/1991	4.7	1.68	1.5	0.036	0.01				30	7.81	148		23.70
51	Black L	7/17/1991	4.8	1.72	1.5	0.045					27	7.81	149		38.10
51	Black L	7/29/1991	4.9	1.14	1.5	0.054	0.01				23	8.20	144		89.30
51	Black L	8/12/1991	5.1	1.07	1.5	0.067					29	8.26	149		74.40
51	Black L	8/27/1991	5.1	0.79	1.5	0.087					21	8.25	148		75.30
51	Black L	9/9/1991	5.0	1.04	1.5	0.057	0.01				22	8.15	151		2.96
51	Black L	6/9/1992	5.3	1.94	1.5	0.015	0.01					8.03	130		23.50
51	Black L	6/23/1992	5.0	1.33	1.5	0.044	0.09				34	7.75	138		40.20
51	Black L	7/7/1992	4.6	1.49	1.5	0.047					30	7.92	138		32.30
51	Black L	7/11/1992	4.9	1.52	1.5	0.044	0.01				29	8.00	139		22.30
51	Black L	8/4/1992	4.6	1.10	1.5	0.049					26	8.04	143		51.30
51	Black L	8/20/1992	4.5	1.16	1.5	0.034	0.01					8.13	147		25.00
51	Black L	9/1/1992	4.6	0.91	1.5	0.064					15	7.94	148		48.10
51	Black L	7/8/1993	4.5	1.45	1.5	0.025					33	8.18	144		64.20
51	Black L	7/31/1993	4.5	0.67	1.5	0.051					28	8.66	145		82.90
51	Black L	8/18/1993	5.0	0.61	1.5	0.058					50	7.93	148		11.00
51	Black L	9/8/1993	4.8	0.76	1.5	0.064	0.02				26	8.12	155		71.80
51	Black L	6/16/1994	5.0	2.70	1.5	0.021					26	7.79	133		2.18
51	Black L	7/19/1994	5.0	1.30	1.5	0.032					23	8.47	135		22.80
51	Black L	8/20/1994	4.6	0.75	1.5	0.066	0.01				26	7.92	145		42.90
51	Black L	9/7/1994	5.0	0.70	1.5	0.067					22	7.63	146		45.60
51	Black L	6/6/1995	4.6	1.45	1.5	0.027					21	7.65	150		8.76
51	Black L	7/3/1995	4.6	1.06	1.5	0.039					20	8.65	156		41.40
51	Black L	7/31/1995	4.6	0.61	1.5	0.099	0.01				20	9.51	152		79.50
51	Black L	8/28/1995	4.7	0.75	1.5	0.012					20	9.61	155		42.60
51	Black L	6/17/1996	5.4	1.75	1.5	0.017					40	8.01	144		2.10

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
51	Black L	7/17/1996	4.6	1.15	1.5	0.044					35	7.93	152		31.00
51	Black L	8/13/1996	4.8	0.60	1.5	0.064					35	8.38	158		35.00
51	Black L	9/4/1996	4.6	0.88	1.5	0.066					30	9.06	154		71.00
51	Black L	6/16/1997	4.6	1.99	1.5	0.034					30	7.63			19.20
51	Black L	7/15/1997	5.0	1.00	1.5	0.046					25	7.68	152		51.50
51	Black L	8/14/1997	4.8	0.70	1.5	0.086					27	8.50	148		53.10
51	Black L	9/4/1997	5.0	0.60	1.5	0.017					18	9.28	145		33.70
51	Black L	6/1/1998	5.3	0.81	1.5	0.054	0.01				25	7.37	144		14.20
51	Black L	6/15/1998	5.5	0.90	1.5	0.045	0.01				18	7.80	142		22.90
51	Black L	6/30/1998	5.0	0.70	1.5		0.01				22	7.98	149		45.00
51	Black L	7/13/1998					0.02				23	7.96	154		43.80
51	Black L	7/27/1998	4.8	0.50	1.5		0.01				25	7.74	157		79.70
51	Black L	8/10/1998	4.7	0.95	1.5						29	8.57	153		35.40
51	Black L	8/24/1998	4.8	0.95	1.5						25	8.57	156		45.40
51	Black L	9/8/1998	4.6	0.95	1.5	0.081					34	8.67	157		42.00
51	Black L	6/1/1999	4.8	1.65	1.5	0.019	0.01				25	7.79	133		6.45
51	Black L	6/14/1999	4.7	1.20	1.5	0.031	0.01				25	7.80	136		15.10
51	Black L	6/29/1999	4.7	0.90	1.5	0.040	0.01				19	7.43	139		34.60
51	Black L	7/12/1999	4.7	0.70	1.5	0.062	0.01				23	7.97	135		53.50
51	Black L	7/26/1999	4.9	0.65	1.5	0.071	0.02				18	8.84	142		64.50
51	Black L	8/9/1999	4.5	0.69	1.5	0.088	0.01				20	9.17	139		65.00
51	Black L	8/23/1999	4.7	0.70	1.5	0.060	0.01				17	9.15	139		0.99
51	Black L	9/7/1999	4.6	2.85	1.5	0.044	0.01				23	8.70	144		23.20
51	Black L	6/12/2000	4.9	1.20	1.5	0.032	0.01				56	7.92	152		20.20
51	Black L	6/26/2000	4.9	1.20	1.5	0.032	0.01				47	7.77	152		15.40
51	Black L	7/11/2000	4.9	1.20	1.5	0.032	0.01				37	7.93	158		21.10
51	Black L	7/24/2000	5.3	0.75	1.5	0.041	0.01				34	7.72	159		22.40
51	Black L	7/31/2000	4.7	1.85	1.5	0.024	0.01				33	7.12	163		11.10
51	Black L	8/7/2000	5.4	1.10	1.5	0.044					29	7.99	164		28.60
51	Black L	8/21/2000	5.4	1.15	1.5	0.033					33	7.30	165		26.20
51	Black L	9/5/2000	4.9	1.25	1.5	0.032					35	8.05	168		31.90
51	Black L	6/6/2001	5.2	2.25	1.5	0.020	0.01				30	7.95	131		8.00
51	Black L	6/18/2001	5.0	2.52	1.5	0.020	0.01				28	7.44	137		6.05
51	Black L	7/2/2001	5.4	1.59	1.5	0.023	0.01				22	6.53	155		10.20
51	Black L	7/16/2001	4.8	1.52	1.5	0.019	0.01				17	7.29	143		15.90
51	Black L	7/30/2001	4.6	1.71	1.5	0.021					23	6.69	154		10.97
51	Black L	8/13/2001	4.6	1.42	1.5	0.023					19	7.53	148		5.87
51	Black L	8/27/2001	4.9	0.70	1.5	0.014					33	8.66	146		31.88
51	Black L	9/10/2001	4.9	0.90	1.5	0.046					35	8.35	140		61.91
51	Black L	06/03/02	5.3	1.90	1.5	0.017	0.03	0.06	0.78	47.01	43	7.84	161		
51	Black L	06/17/02	5.2	2.15	1.5	0.015	0.03	0.10	0.70	46.94		7.79	160		2.33
51	Black L	07/01/02	5.0	1.40	1.5	0.012	0.02	0.08	0.64	53.27		7.74	163		8.85
51	Black L	07/15/02	4.9	1.20	1.5	0.029					43	8.16	166		15.72
51	Black L	07/29/02	4.7	0.85	1.5	0.037						8.13	160		33.04
51	Black L	08/12/02	4.6	0.70	1.5	0.046					38	8.74	172		70.58
51	Black L	08/26/02	4.7	0.60	1.5	0.061					34	9.00	172		91.42
51	Black L	09/09/02	4.9	0.70	1.5	0.048	0.02	0.01	1.08	22.55	25	8.60	175		43.07
51	Black L	6/2/2003	5.9	2.40	1.5	0.017	0.04	0.05	0.42	25.21	36	7.52	175	18	3.2
51	Black L	6/16/2003	5.5	1.63	1.5	0.037	0.07	0.00	0.44	12.01	54	7.99	171.4		19.2
51	Black L	7/14/2003	4.8	1.80	1.5										
51	Black L	7/28/2003	4.9	1.15	1.5	0.027	0.07	0.01	0.45	16.93	32	7.86	167.1	20	16.5
51	Black L	8/11/2003	4.9	1.50	1.5	0.022	0.00	0.00	0.43	19.34	33	8.27	168.9		20.2
51	Black L	8/25/2003	4.8	2.06	1.5	0.032	0.00	0.02	0.63	19.99	40	8.22	176.2		9.5
51	Black L	9/8/2003	4.7	0.75	1.5	0.047	0.02	0.03	0.86	18.27	33	8.10	184.1		43.1
51	Black L	6/7/2004	5.2	2.00	1.5	0.020	0.02	0.03			29	7.08	206	19.988	2.3
51	Black L	6/28/2004	5.0	1.70	1.5	0.011	0.01	0.01	0.26	24.15	38	7.12	174		2.3
51	Black L	7/5/2004	4.7	1.90	1.5	0.010	0.08	0.01	0.99	96.78	30	6.65	183		0.1
51	Black L	7/19/2004	5.3	2.00	1.5	0.016	0.02	0.01	0.67	41.81	25	7.14	175		7.3
51	Black L	8/2/2004	5.2	1.90	1.5	0.029	0.02	0.01	0.36	12.37	26	8.19	181	17.94	7.4
51	Black L	8/16/2004	4.9	2.40	1.5	0.053	0.01	0.01			31	8.2	182		9.6
51	Black L	8/23/2004	5.0	1.40	1.5	0.032	0.01	0.02	0.69	21.41	38	8.2	191		8.7
51	Black L	8/30/2004	4.7	2.00	1.5	0.026					24	7.91	114		6.1
51	Black L	6/7/2005	4.7	2.70	1.5	0.032	0.03	0.04	0.25	7.86	33	7.63	159	18.1	5.5
51	Black L	6/20/2005	5.0	2.25	1.5	0.047	0.01	0.09	0.44	9.46	20	7.92	169		13.7
51	Black L	7/4/2005	5.0	1.95	1.5	0.042	0.03	0.02	0.22	5.31	18	7.92	167		4.5
51	Black L	7/18/2005	5.1	2.00	1.5	0.031	0.02	0.01	0.42	13.47	19	8.27	157		11.3

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
51	Black L	8/1/2005	4.9	1.33	1.5	0.044	0.02	0.02	0.35	8.10	42	8.50	190	17.6	27.5
51	Black L	8/15/2005	5.0	1.25	1.5	0.056	0.12	0.01	0.44	7.91	37	8.79	139		27.5
51	Black L	8/29/2005	5.1	1.60	1.5	0.049	0.01	0.02	0.47	9.60	33	8.34	164		32.9
51	Black L	9/5/2005	5.0	0.75	1.5	0.079	0.13	0.01	0.43	5.46	24	8.38	163		77.9
51	Black L	6/5/2006	5.2	3.20	3.5	0.024	0.04	0.05			22		81	17.32	0.83
51	Black L	6/19/2006	5.3	2.28	1.5	0.022	0.04	0.02			17	7.38	151		1.22
51	Black L	6/30/2006	4.9	2.80	1.5	0.031					22	8.34	143		5.00
51	Black L	7/17/2006	4.9	3.12	1.5	0.023	0.01	0.02			66	7.83	157		5.33
51	Black L	7/30/2006	4.6	2.74	1.5	0.032	0.01	0.01			65	8.45	137	17.48	4.47
51	Black L	8/13/2006	5.0	2.00	1.5	0.022	0.02	0.05			27	7.93	149		12.47
51	Black L	8/26/2006	4.6	2.30	1.5	0.028	0.02	0.04			24	8.5	176		12.12
51	Black L	9/2/2006	4.6	2.75	1.5	0.035					17	8.85	150		6.02
51	Black L	7/8/2007	4.8	3.20	1.5	0.030	0.04	0.05	0.95	70.25	15	8.05	174	17.6	6.09
51	Black L-2	7/16/2007	4.0	3.50	1.5	0.030	0.03	0.05	0.59	43.70	20	7.72	194	18.0	1.20
51	Black L-2	7/23/2007	4.3	3.55	1.5	0.034	0.02	0.03	0.57	37.60	25	7.79	176		4.59
51	Black L-2	7/29/2007	4.3	2.59	1.5	0.031	0.01	0.01	0.86	60.06	28	8.36	184		7.58
51	Black L-2	8/5/2007	4.2	2.60	1.5	0.020	0.01	0.03	0.78	87.00	37	8.72	171		12.41
51	Black L-2	8/12/2007	4.1	1.56	1.5	0.041	0.01	0.02	0.85	45.53	27	8.10	216	22.0	10.25
51	Black L-2	8/20/2007	4.2	1.10	1.5	0.071	0.00	0.03	0.76	23.38	38	9.17	187		38.16
51	Black L-2	8/26/2007	4.0	1.26	1.5	0.058	0.01	0.02	0.92	34.89		8.69	213		50.56
51	Black L-2	6/2/2008	4.3	1.95	1.5	0.043	0.02	0.02	0.46	23.57	30	7.85	216	21.8	5.45
51	Black L-2	6/16/2008	4.4	2.33	1.5	0.044	0.02	0.03			33	7.68	147		6.62
51	Black L-2	6/30/2008	4.4	1.83	1.5	0.045	0.01	0.01	0.98	48.17	39	7.39	164		11.64
51	Black L-2	7/14/2008	4.3	1.50	1.5	0.049	0.04	0.04	0.57	25.45	38	7.60	202		3.35
51	Black L-2	7/27/2008	4.9	2.10	1.5	0.087	0.04	0.05	0.44	11.06	33	7.92	159	23.3	9.74
51	Black L-2	8/11/2008	4.8	1.52	1.5	0.072	0.02	0.03	0.83	25.58	52	7.56	189		10.75
51	Black L-2	8/17/2008	4.8	1.21	1.5	0.064	0.01	0.10	0.54	18.48	53	7.22	150		19.18
51	Black L-2	8/31/2008	4.4	1.45	1.5	0.063	0.01	0.04	0.54	18.71	68	7.55	170		0.67
51	Black L-2	06/10/2009	4.4	1.56	1.5	0.047	0.01	0.08	0.53		64	7.65	148	20.0	26.18
51	Black L-2	06/17/2009	4.4	1.56	1.5	0.039	0.01	0.02	0.49		72	7.87	116		11.50
51	Black L-2	07/02/2009	4.3	1.60	1.5	0.034	0.01	0.01			58	7.92	147		18.97
51	Black L-2	07/15/2009	4.6	1.62	1.5	0.046	0.00	0.01			39	8.08	135		0.83
51	Black L-2	07/28/2009	4.6	1.01	1.5	0.038	0.02	0.02			78	7.99	154	24.0	1.58
51	Black L-2	08/12/2009	4.7	2.13	1.5	0.029	0.02	0.01			49	7.82	159		8.60
51	Black L-2	08/26/2009	4.0	2.00	1.5	0.041	0.01	0.01			65	8.09	177		10.90
51	Black L-2	09/02/2009	4.3	2.95	1.5	0.037	0.01	0.12			49	8.19	146		8.10
51	Black L-2	5/31/2010	2.9	2.30	1.5	0.025	0.22	0.08			26	7.69	227	26.1	8.50
51	Black L-2	6/14/2010	4.0	1.25	1.5	0.031	0.01	0.02			25	8.14	225		0.50
51	Black L-2	7/5/2010	4.5	1.50	1.5	0.033	0.02	0.01	0.41	27.17	28	8.11	218		10.20
51	Black L-2	7/12/2010	4.4	1.56	1.5	0.029	0.01	0.02	0.57	42.28	31	8.08	213		10.10
51	Black L-2	7/26/2010	4.6	1.60	1.5	0.049	0.02	0.03	0.59	26.55	30	8.19	221	26.8	24.70
51	Black L-2	8/9/2010	4.3	1.40	1.5	0.039	0.01	0.01	0.66	37.59	43	8.29	219		17.60
51	Black L-2	8/15/2010	4.0	1.53	1.5	0.044	0.01	0.03	0.61	30.34	52	8.15	219		18.20
51	Black L-2	8/24/2010				0.049	0.04	0.06	0.63	28.11	66	7.89	223		1.20
51	Black L-2	6/22/2011	4.8	2.10	1.5	0.038	0.03	0.05	0.54	31.69	46	7.80	183	20.3	4.80
51	Black L-2	7/7/2011	4.4	1.65	1.5	0.036	0.01	0.01	0.69	42.52	51	7.71	197		8.50
51	Black L-2	7/24/2011	3.8	1.40	1.5	0.058	0.09	0.06	0.91	34.78	42	8.17	171		36.60
51	Black L-2	8/10/2011	4.4	1.10	1.5	0.072	0.03	0.08	1.23	37.56	41	8.70	175		44.70
51	Black L-2	8/20/2011	4.4	1.15	1.5	0.065	0.09	0.05	0.91	30.58	40	8.03	183	19.6	46.20
51	Black L-2	8/20/2011				bloom									
51	Black L-2	9/4/2011	4.4	1.75	1.5	0.042	0.01	0.03	0.68	35.75	43	8.09	174		9.00
51	Black L-2	9/17/2011	4.2	2.90	1.5	0.046	0.05	0.04	0.70	33.48	40	7.92	187		4.50
51	Black L-2	9/17/2011				bloom									
51	Black L-2	10/1/2011	4.0	2.25	1.5	0.038	0.01	0.03	0.61	35.93	36	7.43	188		11.00
51.1	Black L-2	12/8/1989	1.5	1.50	1.5	0.033	0.12				36	8.04	165		8.61
51.1	Black L-2	12/8/1989	1.5	1.50	1.5	0.028	0.14				36	8.04	164		9.32
51.1	Black L-2	6/29/1991	2.7	1.17	1.5	0.047					24	8.06	144		23.30
51.1	Black L-2	7/22/1991	2.3	0.63	1.5	0.063					39	8.64	147		351.00
51.1	Black L-2	8/12/1991	2.8	0.49	1.5	0.086					22	7.38	143		87.80
51.1	Black L-2	9/3/1991	2.7	0.60	1.5	0.076					22	7.63	167		178.00
51.1	Black L-2	7/11/1992	2.5	1.13	1.5	0.044					29	8.14	138		16.80
51.1	Black L-2	8/2/1992	3.0	1.00	1.5	0.043					24	7.81	138		73.40
51.1	Black L-2	8/26/1992	3.0	0.75	1.5	0.059					26	7.97	149		68.80
51.1	Black L-2	9/15/1992	3.0	1.25	1.5	0.037					33	7.62	151		22.00
51	Black L-2	7/8/2007	4.3	4.20	1.5	0.044	0.01	0.02	0.88	43.88	30	8.88	184		36.80

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Anatoxin-a	Cyclin
51	Black L	6/20/1988	epi													
51	Black L	6/29/1988	epi	15	19											
51	Black L	7/6/1988	epi	24	20											
51	Black L	7/13/1988	epi	23	25											
51	Black L	7/20/1988	epi	24	24											
51	Black L	7/27/1988	epi	24	24											
51	Black L	8/3/1988	epi	29	26											
51	Black L	8/8/1988	epi	31	26											
51	Black L	8/17/1988	epi	24	25											
51	Black L	8/26/1988	epi	20	20											
51	Black L	8/31/1988	epi	16	19											
51	Black L	9/7/1988	epi	17	17											
51	Black L	9/14/1988	epi	15	17											
51	Black L	9/22/1988	epi	14	17											
51	Black L	9/27/1988	epi	14	16											
51	Black L	6/27/1989	epi	25	24											
51	Black L	7/3/1989	epi	24	22											
51	Black L	7/12/1989	epi	22	24											
51	Black L	7/20/1989	epi	20	22											
51	Black L	7/24/1989	epi	24	24											
51	Black L	7/28/1989	epi	18	24											
51	Black L	8/2/1989	epi	23	23											
51	Black L	8/8/1989	epi	16	20											
51	Black L	8/14/1989	epi	24	23											
51	Black L	8/21/1989	epi	21	22											
51	Black L	8/28/1989	epi	18	20											
51	Black L	8/31/1989	epi	18	20											
51	Black L	9/6/1989	epi	19	19											
51	Black L	9/12/1989	epi	17	20											
51	Black L	9/18/1989	epi	14	17											
51	Black L	7/5/1990	epi	19	21											
51	Black L	7/16/1990	epi	23	22											
51	Black L	8/5/1990	epi	25	25											
51	Black L	8/15/1990	epi	22	22											
51	Black L	8/29/1990	epi	24	24											
51	Black L	9/12/1990	epi													
51	Black L	6/17/1991	epi	18	19											
51	Black L	7/2/1991	epi	17	21											
51	Black L	7/17/1991	epi	24	23											
51	Black L	7/29/1991	epi	22	24											
51	Black L	8/12/1991	epi	21	22											
51	Black L	8/27/1991	epi	24	21											
51	Black L	9/9/1991	epi	17	20											
51	Black L	6/9/1992	epi	20	19											
51	Black L	6/23/1992	epi	15	19											
51	Black L	7/7/1992	epi	19	20											
51	Black L	7/11/1992	epi	19	20											
51	Black L	8/4/1992	epi	18	20											
51	Black L	8/20/1992	epi	14	19											
51	Black L	9/1/1992	epi	14	17											
51	Black L	7/8/1993	epi	30	25	3	3	3	12							
51	Black L	7/31/1993	epi	27	24	3	4	4	1234							
51	Black L	8/18/1993	epi	21	23	3	1	4	12							
51	Black L	9/8/1993	epi	23	22	3	3	3	123							
51	Black L	6/16/1994	epi	34	24	2	1	1								
51	Black L	7/19/1994	epi	24	23	3	3	4	13							
51	Black L	8/20/1994	epi	25	23	2	2	2								
51	Black L	9/7/1994	epi	15	18	5	3	4	135							
51	Black L	6/6/1995	epi	22	20	2	2	1								
51	Black L	7/3/1995	epi	19	24	3	3	4	134							
51	Black L	7/31/1995	epi	24	25	3	1	3	1							

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Anatoxin-a	Cyclin
51	Black L	8/28/1995	epi	11	20	3	1	3	13							
51	Black L	6/17/1996	epi	23	24	2	2	2								
51	Black L	7/17/1996	epi	23	22	2	2	2	5							
51	Black L	8/13/1996	epi	21	23	2	2	3	5							
51	Black L	9/4/1996	epi	30	24	3	3	4	134							
51	Black L	6/16/1997	epi	22	20	2	2	1	5							
51	Black L	7/15/1997	epi	26	24	2	3	2	15							
51	Black L	8/14/1997	epi	21	21	4	1	4	12							
51	Black L	9/4/1997	epi	17	19	3	2	2	1							
51	Black L	6/1/1998	epi	10	17	2	2	2	5							
51	Black L	6/15/1998	epi	19	19	3	3	3	5							
51	Black L	6/30/1998	epi	21	23	2	2	1								
51	Black L	7/13/1998	epi													
51	Black L	7/27/1998	epi	23	24	3	2	3	1							
51	Black L	8/10/1998	epi	24	25	3	2	3	15							
51	Black L	8/24/1998	epi	23	22	3	2	2	1							
51	Black L	9/8/1998	epi	14	20	3	2	3	5							
51	Black L	6/1/1999	epi	20	20	1	1	1								
51	Black L	6/14/1999	epi	28	24	2	2	2								
51	Black L	6/29/1999	epi	25	25	2	3	2	5							
51	Black L	7/12/1999	epi	23	22	3	3	3	1							
51	Black L	7/26/1999	epi	22	26	3	3	3	1							
51	Black L	8/9/1999	epi	19	20	3	3	4	3							
51	Black L	8/23/1999	epi	21	23	3	3	3								
51	Black L	9/7/1999	epi	23	23	2	3	2	5							
51	Black L	6/12/2000	epi	15	17	1	2	2	5							
51	Black L	6/26/2000	epi	23	22	2	3	2	25							
51	Black L	7/11/2000	epi	20	21	2	3	2	5							
51	Black L	7/24/2000	epi	21	21	2	3	2	25							
51	Black L	7/31/2000	epi	24	25	2	3	2	5							
51	Black L	8/7/2000	epi	23	23	3	3	3	5							
51	Black L	8/21/2000	epi	18	21	3	3	3	25							
51	Black L	9/5/2000	epi	13	20	2	3	3								
51	Black L	6/6/2001	epi	20	17	2	1	1								
51	Black L	6/18/2001	epi	22	23	1	2	1								
51	Black L	7/2/2001	epi	15	22	1	1	1	5							
51	Black L	7/16/2001	epi	22	23	2	2	2								
51	Black L	7/30/2001	epi	23	23	2	3	3	2							
51	Black L	8/13/2001	epi	21	26	3	2	2	1							
51	Black L	8/27/2001	epi	18	23	2	3	2								
51	Black L	9/10/2001	epi	23	23	3	3	3								
51	Black L	06/03/02	epi	13	17	2	2	1	58							
51	Black L	06/17/02	epi	14	18	1	3	3	5							
51	Black L	07/01/02	epi	26	24	2	2	2	5							
51	Black L	07/15/02	epi	26	24	2	3	2	8							
51	Black L	07/29/02	epi	25	24	2	3	2	8							
51	Black L	08/12/02	epi	26	25											
51	Black L	08/26/02	epi	21	23	3	3	3	134							
51	Black L	09/09/02	epi	25	24											
51	Black L	6/2/2003	epi	17	17	2	1	1	58							
51	Black L	6/16/2003	epi	18	19	1	1	1	5							
51	Black L	7/14/2003	epi	23	23	2	2	1	5							
51	Black L	7/28/2003	epi	21	23	2	2	2	5							
51	Black L	8/11/2003	epi	24	26	2	2	2	5							
51	Black L	8/25/2003	epi	21	24	2	2	2	56							
51	Black L	9/8/2003	epi	18	20	2	2	2	58							
51	Black L	6/7/2004	epi	20	20	2	1	1	5							
51	Black L	6/28/2004	epi	18	21	2	2	1	5							
51	Black L	7/5/2004	epi	23	22	2	2	2	8							
51	Black L	7/19/2004	epi	23	25	2	2	2	5							
51	Black L	8/2/2004	epi	24	25	2	2	2	5							

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Anatoxin-a	Cyclin
51	Black L	8/16/2004	epi	21	24	2	4	1	58							
51	Black L	8/23/2004	epi	21	22	2	4	2	58							
51	Black L	8/30/2004	epi	19	22	1	4	4	28							
51	Black L	6/7/2005	epi	24	23	2	2	1	8							
51	Black L	6/20/2005	epi	23	22	2	3	4	5							
51	Black L	7/4/2005	epi	25	24	2	2	1	28							
51	Black L	7/18/2005	epi	26	26	2	2	3	58							
51	Black L	8/1/2005	epi	23	25	2	3	2	28							
51	Black L	8/15/2005	epi	30	26	5	4	4	234							
51	Black L	8/29/2005	epi	23	24	5	4	4	2468							
51	Black L	9/5/2005	epi	16	23	3	4	3	12348							
51	Black L	6/5/2006	epi	20	22	1	2	1	0							
51	Black L	6/19/2006	epi	23	22	2	3	2	5							
51	Black L	6/30/2006	epi	21	23	2	3	1	8							
51	Black L	7/17/2006	epi	30	27	2	5	4	2							
51	Black L	7/30/2006	epi	26	27	1	5	4	28							
51	Black L	8/13/2006	epi	26	24	1	5	4	248							
51	Black L	8/26/2006	epi	24	23	2	4	3	2348							
51	Black L	9/2/2006	epi	19		3	4	4	248							
51	Black L	7/8/2007	epi	21	22	4	4	4	2456							
51	Black L-2	7/16/2007	epi	22	23	2	5	4	2458							
51	Black L-2	7/23/2007	epi	22	23	2	5	4	2458							
51	Black L-2	7/29/2007	epi	23	26	3	5	4	2468							
51	Black L-2	8/5/2007	epi	19	24	2	5	4	2468							
51	Black L-2	8/12/2007	epi	23	24	3	4	4	123468							
51	Black L-2	8/20/2007	epi	19	22	3	4	4	123468							
51	Black L-2	8/26/2007	epi	20	21	4	4	4	123468							
51	Black L-2	6/2/2008	epi	21	20	1	1	1	5							
51	Black L-2	6/16/2008	epi	21	24	1	1	1	8							
51	Black L-2	6/30/2008	epi	27	25	2	1	2	58							
51	Black L-2	7/14/2008	epi	20	23	2	2	1	58							
51	Black L-2	7/27/2008	epi	26	25	2	2	2	5							
51	Black L-2	8/11/2008	epi	21	23	2	1	2	5							
51	Black L-2	8/17/2008	epi	21	24	2	3	2	5							
51	Black L-2	8/31/2008	epi	22	23	2	2	1	2							
51	Black L-2	06/10/2009	epi	18	18	2	1	4	5							
51	Black L-2	06/17/2009	epi	21	21	2	1	2	5							
51	Black L-2	07/02/2009	epi	21	24	2	2	2	5							
51	Black L-2	07/15/2009	epi	26	24	2	2	2	58							
51	Black L-2	07/28/2009	epi	23	23	2	2	2	5							
51	Black L-2	08/12/2009	epi	24	24	2	2	3	5					0.00		
51	Black L-2	08/26/2009	epi	22	25	2	1	2	58							
51	Black L-2	09/02/2009	epi	24	22	1	2	1	58			80.60				
51	Black L-2	5/31/2010	epi	20	23	2	2	2	0	0	0			0.05		
51	Black L-2	6/14/2010	epi	20	22	2	2	3	5	0	0					
51	Black L-2	7/5/2010	epi	29	27					47	4					
51	Black L-2	7/12/2010	epi	32	30	3	3	4	123	4	4					
51	Black L-2	7/26/2010	epi	25	28	3	3	2	28	0	0					
51	Black L-2	8/9/2010	epi	26	27	2	3	2	25	4	4					
51	Black L-2	8/15/2010	epi	25	27	3	4	4	23456	34	4					
51	Black L-2	8/24/2010	epi	25	25											
51	Black L-2	6/22/2011	epi	27	29	1	1	1	0	0	0	99.42				
51	Black L-2	7/7/2011	epi	27	30	2	1	1	0	0	0	24.60	8.80			
51	Black L-2	7/24/2011	epi	22	27	2	1	3	0	0		15.50	7.00			
51	Black L-2	8/10/2011	epi	28	28	3	3	3	12	4	4	291.20	10.25	0.78	<0.5	<0.1
51	Black L-2	8/20/2011	epi			3	3	3	1	4	4	12.80	12.00			
51	Black L-2	8/20/2011	bloom	27	26							386.20	13.10	0.91	<0.9	<0.1
51	Black L-2	9/4/2011	epi	22	23	2	3	2	5	0	0			17.31	<0.9	<0.1
51	Black L-2	9/17/2011	epi			2	2	2	0	0	0	28.20	10.80			
51	Black L-2	9/17/2011	bloom	14	21							11.60	5.80	0.15	<0.4	<0.1
51	Black L-2	10/1/2011	epi	25	25	2	2	4	5	0	0					

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Anatoxin-a	Cyclin
51.1	Black L-2	12/8/1989	epi	7												
51.1	Black L-2	12/8/1989	epi	7												
51.1	Black L-2	6/29/1991	epi	19	23											
51.1	Black L-2	7/22/1991	epi	24	25											
51.1	Black L-2	8/12/1991	epi	26	23											
51.1	Black L-2	9/3/1991	epi	20	20											
51.1	Black L-2	7/11/1992	epi	20	21	3	4	4	1234							
51.1	Black L-2	8/2/1992	epi	24	20											
51.1	Black L-2	8/26/1992	epi	25	24											
51.1	Black L-2	9/15/1992	epi	24	20											
51	Black L-2	7/8/2007	epi	21	22	4	4	4	2456							

## Legend Information

<i>Indicator</i>	<i>Description</i>	<i>Detection Limit</i>	<i>Standard (S) / Criteria (C)</i>
<b>General Information</b>			
<b>Lnum</b>	lake number (unique to CSLAP)		
<b>Lname</b>	name of lake (as it appears in the Gazetteer of NYS Lakes)		
<b>Date</b>	sampling date		
<b>Field Parameters</b>			
<b>Zbot</b>	lake depth at sampling point, meters (m)		
<b>Zsd</b>	Secchi disk transparency or clarity	0.1m	1.2m ( C)
<b>Zsamp</b>	water sample depth (m) (epi = surface, hypo = bottom)	0.1m	none
<b>Tair</b>	air temperature ( C)	-10C	none
<b>TH20</b>	water temperature ( C)	-10C	none
<b>Laboratory Parameters</b>			
<b>Tot.P</b>	total phosphorus (mg/l)	0.003 mg/l	0.020 mg/l ( C)
<b>NOx</b>	nitrate + nitrite (mg/l)	0.01 mg/l	10 mg/l NO3 (S), 2 mg/l NO2 (S)
<b>NH4</b>	total ammonia (mg/l)	0.01 mg/l	2 mg/l NH4 (S)
<b>TN</b>	total nitrogen (mg/l)	0.01 mg/l	none
<b>TN/TP</b>	nitrogen to phosphorus (molar) ratio, = (TKN + NOx)*2.2/TP		none
<b>TCOLOR</b>	true (filtered) color (ptu, platinum color units)	1 ptu	none
<b>pH</b>	powers of hydrogen (S.U., standard pH units)	0.1 S.U.	6.5, 8.5 S.U. (S)
<b>Cond25</b>	specific conductance, corrected to 25C (umho/cm)	1 umho/cm	none
<b>Ca</b>	calcium (mg/l)	1 mg/l	none
<b>Chl.a</b>	chlorophyll a (ug/l)	0.01 ug/l	none
<b>Fe</b>	iron (mg/l)	0.1 mg/l	1.0 mg/l (S)
<b>Mn</b>	manganese (mg/l)	0.01 mg/l	0.3 mg/l (S)
<b>As</b>	arsenic (ug/l)	1 ug/l	10 ug/l (S)
<b>AQ-PC</b>	Phycocyanin (aquafior) (unitless)	1 unit	none
<b>AQ-Chl</b>	Chlorophyll a (aquafior) (ug/l)	1 ug/l	none
<b>MC-LR</b>	Microcystis-LR (ug/l)	0.01 ug/l	1 ug/l potable (C) 20 ug/l swimming (C)
<b>Ana</b>	Anatoxin-a (ug/l)	0.3 ug/l	none
<b>Cyl</b>	Cylindrospermopsis (ug/l)	0.1 ug/l	none
<b>Lake Assessment</b>			
<b>QA</b>	water quality assessment; 1 = crystal clear, 2 = not quite crystal clear, 3 = definite algae greenness, 4 = high algae levels, 5 = severely high algae levels		
<b>QB</b>	aquatic plant assessment; 1 = no plants visible, 2 = plants below surface, 3 = plants at surface, 4 = plants dense at surface, 5 = surface plant coverage		
<b>QC</b>	recreational assessment; 1 = could not be nicer, 2 = excellent, 3 = slightly impaired, 4 = substantially impaired, 5 = lake not usable		
<b>QD</b>	reasons for recreational assessment; 1 = poor water clarity, 2 = excessive weeds, 3 = too much algae, 4 = lake looks bad, 5 = poor weather, 6 = litter/surface debris, 7 = too many lake users, 8 = other		
<b>QF, QG</b>	Health and safety issues today (QF) and past week (QG); 0 = none, 1 = taste/odor, 2 = GI illness humans/animals, 3 = swimmers itch, 4 = algae blooms, 5 = dead fish, 6 = unusual animals, 7 = other		

## Appendix B- Monthly Evaluation of Black Lake Data, 2006-2011

### June Data

	2006	2007	2008	2009	2010	2011
<i>Zsd</i>	HIGH		NORMAL	NORMAL	NORMAL	NORMAL
<i>TP</i>	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
<i>Chl.a</i>	NORMAL		NORMAL	NORMAL	LOW	NORMAL
<i>NOx</i>	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
<i>NH4</i>	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
<i>TN</i>	NORMAL		NORMAL	NORMAL		NORMAL
<i>pH</i>	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
<i>SpCond</i>	LOW		NORMAL	LOW	HIGH	NORMAL
<i>Color</i>	LOW		NORMAL	HIGH	NORMAL	NORMAL
<i>Ca</i>	LOW		NORMAL	NORMAL		NORMAL
<i>QA</i>	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
<i>QB</i>	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
<i>QC</i>	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
<i>TH20</i>	NORMAL		NORMAL	LOW	NORMAL	NORMAL

High = average monthly reading > 90<sup>th</sup> percentile reading for lake, 2000-2010

Low = average monthly reading < 10<sup>th</sup> percentile reading for lake, 2000-2010

Normal = average monthly reading between 10<sup>th</sup> and 90<sup>th</sup> percentile reading for lake, 2000-2010

### July Data

	2006	2007	2008	2009	2010	2011
<i>Zsd</i>	HIGH	HIGH	NORMAL	NORMAL	NORMAL	NORMAL
<i>TP</i>	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL
<i>Chl.a</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>NOx</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH
<i>NH4</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>TN</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>pH</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>SpCond</i>	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL
<i>Color</i>	HIGH	LOW	NORMAL	NORMAL	NORMAL	NORMAL
<i>Ca</i>	LOW	NORMAL	NORMAL	NORMAL	HIGH	
<i>QA</i>	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL
<i>QB</i>	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>QC</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>TH20</i>	HIGH	NORMAL	NORMAL	NORMAL	HIGH	HIGH

High = average monthly reading > 90<sup>th</sup> percentile reading for lake, 2000-2010

Low = average monthly reading < 10<sup>th</sup> percentile reading for lake, 2000-2010

Normal = average monthly reading between 10<sup>th</sup> and 90<sup>th</sup> percentile reading for lake, 2000-2010

## August Data

	2006	2007	2008	2009	2010	2011
Zsd	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
TP	NORMAL		HIGH	NORMAL	NORMAL	HIGH
Chl.a	NORMAL		NORMAL	NORMAL	NORMAL	HIGH
NOx	NORMAL		NORMAL	NORMAL	NORMAL	HIGH
NH4	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
TN	HIGH		NORMAL	NORMAL	NORMAL	HIGH
pH	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
SpCond	NORMAL		NORMAL	NORMAL	HIGH	NORMAL
Color	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
Ca						NORMAL
QA	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
QB	HIGH		NORMAL	NORMAL	NORMAL	NORMAL
QC	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL
TH20	NORMAL		NORMAL	NORMAL	HIGH	HIGH

High = average monthly reading > 90<sup>th</sup> percentile reading for lake, 2000-2010

Low = average monthly reading < 10<sup>th</sup> percentile reading for lake, 2000-2010

Normal = average monthly reading between 10<sup>th</sup> and 90<sup>th</sup> percentile reading for lake, 2000-2010

## September Data

	2006	2007	2008	2009	2010	2011
Zsd	HIGH			HIGH		NORMAL
TP	NORMAL			NORMAL		NORMAL
Chl.a	NORMAL			NORMAL		NORMAL
NOx				NORMAL		NORMAL
NH4				HIGH		NORMAL
TN	NORMAL			NORMAL		NORMAL
pH	HIGH			NORMAL		NORMAL
SpCond	NORMAL			NORMAL		NORMAL
Color	LOW			NORMAL		NORMAL
Ca						
QA	NORMAL			NORMAL		NORMAL
QB	NORMAL			NORMAL		NORMAL
QC	NORMAL			NORMAL		NORMAL
TH20				NORMAL		NORMAL

High = average monthly reading > 90<sup>th</sup> percentile reading for lake, 2000-2010

Low = average monthly reading < 10<sup>th</sup> percentile reading for lake, 2000-2010

Normal = average monthly reading between 10<sup>th</sup> and 90<sup>th</sup> percentile reading for lake, 2000-2010

# Black Lake Outlet/Black Lake ( 0906-0001)

Impaired Seg

## Waterbody Location Information

Revised: 12/08/2008

**Water Index No:** SL-25- 7/P1  
**Hydro Unit Code:** 04150303/080      **Str Class:** B  
**Waterbody Type:** Lake  
**Waterbody Size:** 7753.5 Acres  
**Seg Description:** entire lake and outlet

**Drain Basin:** Saint Lawrence River  
Indian River  
**Reg/County:** 6/St.Lawrence Co. (45)  
**Quad Map:** HEUVELTON (C-19-4)

## Water Quality Problem/Issue Information (CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
PUBLIC BATHING	Impaired	Known
RECREATION	Impaired	Known
Aesthetics	Stressed	Known

### Type of Pollutant(s)

Known: ALGAL/WEED GROWTH, NUTRIENTS (phosphorus)  
Suspected: ---  
Possible: ---

### Source(s) of Pollutant(s)

Known: ---  
Suspected: AGRICULTURE  
Possible: Habitat Modification, On-Site/Septic Syst

## Resolution/Management Information

**Issue Resolvability:** 1 (Needs Verification/Study (see STATUS))  
**Verification Status:** 4 (Source Identified, Strategy Needed)  
**Lead Agency/Office:** ext/WQCC  
**TMDL/303d Status:** 3a->1\*      **Resolution Potential:** Medium

## Further Details

### Overview

Public bathing and recreational uses in Black Lake are impaired due to aquatic weed growth and elevated nutrient loadings from nonpoint sources in the watershed. Water Quality Sampling Black Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 1988 and continuing through 2006. An Interpretive Summary report of the findings of this sampling was published in 2007. These data indicate that the lake continues to be best characterized as eutrophic, or highly productive. However in more recent years the lake reflected improved mesoeutrophic conditions. Lake productivity generally increases as the summer progresses, driven primarily by a seasonal increase in phosphorus readings. Phosphorus levels in the lake consistently exceed the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements rarely meet what is the recommended minimum for swimming beaches. Measurements of pH typically fall within the state water quality range of 6.5 to 8.5, though high pH values occasionally occur. The lake water is highly colored, but this is considered to be reflective of natural conditions for this waterbody. Color does not limit water transparency, as algae and water depth are more limiting. (DEC/DOW, BWAM/CSLAP, May 2007)

### Recreational Assessment

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. This assessment indicates recreational suitability of the lake continues to be unfavorable in spite of improved water clarity in recent years. The recreational suitability of the lake is described most frequently as "excellent." The lake itself is most often described as "not quite crystal clear," an assessment that is much more favorable than lakes with similar water quality characteristics. Assessments have noted that aquatic plants regularly grow to the lake surface and are typically dense. Aquatic weed harvesting effort had been used in the lake in the past but have been discontinued. The lake is reported to be a productive warmwater fishery. (DEC/DOW, BWAM/CSLAP, May 2007)

### Lake Uses

This lake waterbody is designated class B, suitable for use as a public bathing beach, general recreation and aquatic life support, but not as a water supply. Water quality monitoring by NYSDEC focuses primarily on support of general recreation and aquatic life. Samples to evaluate the bacteriological condition and bathing use of the lake or to evaluate contamination from organic compounds, metals or other inorganic pollutants have not been collected as part of the CSLAP monitoring program. Monitoring to assess potable water supply and public bathing use is generally the responsibility of state and/or local health departments.

### Section 303d Listing

Lake Lake is included on the NYS 2008 Section 303(d) List of Impaired Waters. The lake is included on Part 3a of the List as an Impaired Water for which TMDL Development May be Deferred due to the need to verify the impairment. However this updated assessment suggests that the suspected impairments are confirmed and the lake be moved to Part 1 of the List as Waterbody Requiring TMDL Development (or other strategy to attain water quality standards). This waterbody was first listed on the 1998 Section 303(d) List.