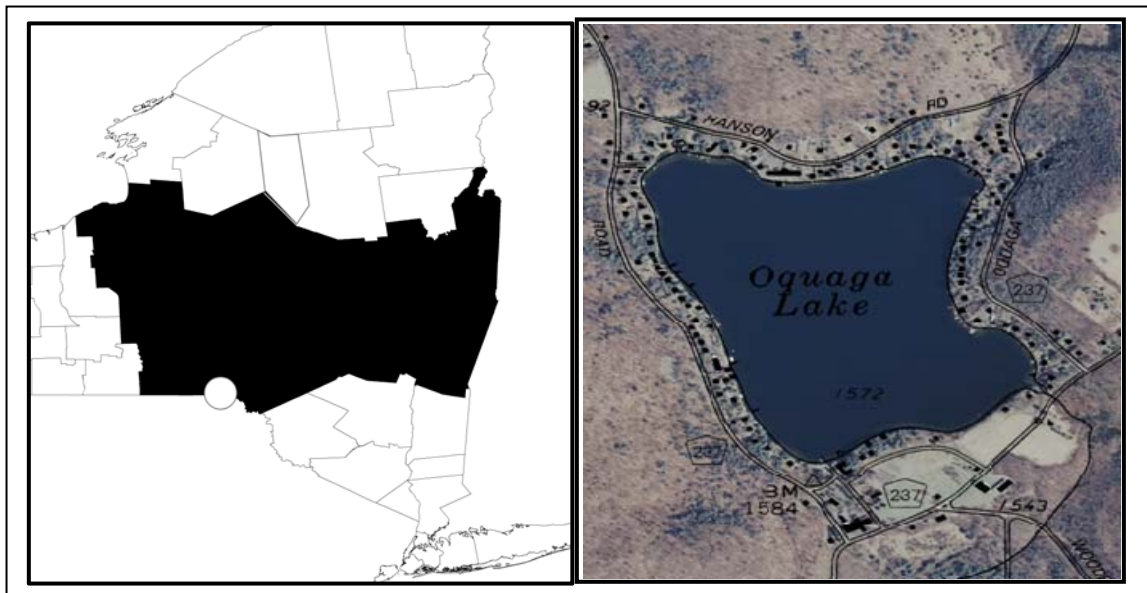


## CSLAP 2013 Lake Water Quality Summary: Oquaga Lake

### General Lake Information

<b>Location</b>	Town of Deposit
<b>County</b>	Broome
<b>Basin</b>	Delaware River
<b>Size</b>	54.4 hectares (134.4 acres)
<b>Lake Origins</b>	Natural
<b>Watershed Area</b>	630 hectares (1,556 acres)
<b>Retention Time</b>	3.3 years
<b>Mean Depth</b>	13.9 meters
<b>Sounding Depth</b>	35 meters
<b>Public Access?</b>	no
<b>Major Tributaries</b>	no named tribs
<b>Lake Tributary To...</b>	Starboard Creek to West Branch Delaware River
<b>WQ Classification</b>	AA (potable water)
<b>Lake Outlet Latitude</b>	42.020
<b>Lake Outlet Longitude</b>	-75.454
<b>Sampling Years</b>	1987-1992, 2002-2013
<b>2013 Samplers</b>	Mark Millspaugh
<b>Main Contact</b>	Mark Millspaugh

### Lake Map



## Background

Oquaga Lake is a 134 acre, class AA lake found in the Town of Deposit in Broome County in the Southern Tier region of New York State. It was first sampled as part of CSLAP in 1987.

It is one of four CSLAP lakes among the more than 25 lakes found in Broome County, and one of 12 CSLAP lakes among the more than 240 lakes and ponds in the Delaware River drainage basin.

## Lake Uses

Oquaga Lake is a Class AA lake; this means that the best intended use for the lake is for potable water—drinking, contact recreation—swimming and bathing, non-contact recreation—boating and angling, aquatic life, and aesthetics. The lake is used by lake residents and invited guests for non-power boating and swimming, through residential shoreline access to the lake. There is no public access to the lake.

It is not known by the report authors if private stocking occurs in Oquaga Lake; the state of New York does not stock fish in the lake. .

General statewide fishing regulations are applicable in Oquaga Lake. In addition, the open season on trout lasts from April 1<sup>st</sup> through October 15<sup>th</sup>, with no size limits and a daily take limit of five trout, with no more than two trout to be greater than 12 inches and no more than five brook trout under eight inches.

There are no lake-specific fish consumption advisories on Oquaga Lake.

## Historical Water Quality Data

CSLAP sampling was conducted on Oquaga Lake from 1987 to 1992, and 2002 to 2013. The CSLAP reports for each of the past several years can be found on the NYSFOLA website at <http://nysfola.mylaketown.com>. The most recent CSLAP report and scorecard for Oquaga Lake can also be found on the NYSDEC web page at <http://www.dec.ny.gov/lands/77884.html>.

Oquaga Lake was sampled by the Conservation Department (the predecessor to the NYSDEC) on August 8<sup>th</sup>, 1935 as part of the Biological Survey of the Delaware River basin. The temperature and oxygen surveys from this study show dissolved oxygen reductions only near the lake bottom (close to 111 feet), and exceeding critical levels for all fish at all depths. Most of the parameters sampled in CSLAP were not analyzed as part of this survey. The results from this survey suggest water quality conditions in 1935 were similar to those measured in 2004.

The field notes from this survey indicate the following:

*“Oquaga Lake is a deep body of water (max. 111ft) with excellent chemical conditions on the bottom. Lake trout are present but those caught average small in size. Lake herring are recommended for stocking. The latter should supply a much needed deep-water forage fish for the lake trout. This species taken by the survey party had been feeding on small perch which are not plentiful judging from the gill-net collection. Rock bass dominate the shallow water. Sunfish are scarce along the shores. Only moderate numbers of large small-mouthed bass are recommended for planting since there is too little shallow water which produces bass food.*”

*Furthermore, rooted aquatic plants are scarce and recreational uses have caused the removal of other shelter.*

*Vegetation is scant.”*

Neither the ephemeral inlets to nor the outlet (Starboard Creek) has been monitored through the NYSDEC Rotating Intensive Basins (RIBS) or stream biomonitoring programs.

## **Lake Association and Management History**

*Oquaga Lake is served by the Oquaga Lake Association, developed “to preserve, improve and protect Oquaga Lake and the lands adjoining the same and bordering thereon, all located in the Town of Sanford, Broome County, New York; to develop and promote the said territory as a summer resort; to prevent the contamination of the waters thereof; to further and advance the social and general welfare of the said territory and the owners and occupants thereof and the members of this Association; to do any and all acts necessary to carry into effect the foregoing objectives, including acquiring and holding title and property rights in and to the said Oquaga Lake, adjoining lands and springs and water courses in the vicinity.”*

The lake association is involved in a variety of activities, including:

- the first lake in the State of New York to prohibit the use of jet skis and other specialty watercraft
- annual well water testing by Benchmark Analytics of Sayre PA
- social activities, including a fishing tournament, opening cocktail party, ring of fire, family day (field games/water sports), annual Meeting

The lake association maintains a web site at <http://www.oquaga.com/> .

## **Summary of 2013 CSLAP Sampling Results**

### **Evaluation of 2013 Annual and Monthly Results Relative to 2006-2012**

The summer (mid-June through mid-September) average readings are compared to historical averages for all CSLAP sampling seasons in the “Lake Condition Summary” table, and are compared to individual historical CSLAP sampling seasons in the “Long Term Data Plots – Oquaga Lake” section in Appendix D.

### **Evaluation of Eutrophication Indicators**

Water clarity readings were slightly higher than normal in 2013 (though not statistically different), and these readings have increased since the late 1980s. This is consistent with a decrease in algae levels over the same period, and algae levels were also slightly (but not statistically) lower than normal in 2013. Phosphorus levels were close to normal in 2013, and these readings have been consistently low since at least the late 1980s. Water transparency readings increase slightly during the typical summer, despite a slight seasonal increase in algae and phosphorus readings. No clear seasonal patterns were apparent in 2013.

The lake can be characterized as *oligotrophic*, or highly unproductive, based on chlorophyll *a*, Secchi disk transparency, and total phosphorus (all typical of *oligotrophic* lakes). These assessments were also appropriate in 2013. The trophic state indices (TSI) evaluation suggests

that each of the trophic indicators is “internally consistent” and could be predicted from the values of the other indicators. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

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

Algae levels are not high enough 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, suggesting no impacts to potable water use from algae. Deepwater phosphorus and ammonia readings are similar to those measured at the lake surface, and deepwater iron, manganese and arsenic levels are low, suggesting that deepwater intakes may also support potable water 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**

Conductivity readings have increased slightly since the late 1980s, but these readings continue to be typical of softwater lakes, and they were close to normal in 2013 (except for slightly lower NOx readings). None of these other limnological indicators has exhibited any clear long-term trends, and each of these indicators was close to normal in 2013. It is likely that the small changes in each of these indicators have been within the normal range of variability in the lake. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

### **Evaluation of Biological Condition**

The 1992 phytoplankton survey indicated relatively low algal biomass dominated by golden-brown algae and dinoflagellates. It is not known if this is representative of the normal distribution of algal communities in the lake. The fluoroprobe screening samples analyzed by SUNY ESF in 2012 and 2013 indicated both very low algae levels and very low blue green algae levels, as expected given the other water quality indicators in the lake.

The fish community is comprised of at least one warmwater fish species, and at least three coldwater fish species, based on incomplete inventory information. This suggests that the lake can most likely be characterized as a coldwater fishery.

Macrophyte, zooplankton, and macroinvertebrates have not been evaluated through CSLAP in Oquaga Lake.

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

### **Evaluation of Lake Perception**

Aquatic plant coverage has increased in recent years, particularly since 2004, and this was apparent in 2012 and 2013. It is not known if the increase in plant coverage is due to an increase in native or exotic plants; no exotic plants have been verified in the lake. Recreational assessments were less favorable than normal in 2013, but the slightly less favorable assessments have not been attributed to aquatic plants or water quality “problems”. Water quality assessments were close to normal (and highly favorable) in 2013, consistent with higher water transparency readings. Lake perception usually does not change seasonally, despite a small seasonal increase in plant coverage. No clear seasonal trends were apparent in 2013, despite recreational

assessments that were slightly less favorable during parts of the summer. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

### **Evaluation of Local Climate Change**

Water temperature readings in the summer index period were lower than normal in 2011 and 2012, but higher than normal in 2013, and both air and water temperatures have decreased since the late 1980s. It is not known if this is an indication of the local climate change or if it represents normal variability.

### **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 have been well below the levels indicating susceptibility for harmful algal blooms (HABs), and the fluoroprobe data from 2012 and 2013 indicate low susceptibility to blue green algae blooms. An analysis of algae samples indicate microcystin readings below the levels needed to support safe swimming and potable water use. No shoreline blooms have been reported or sampled.

## Lake Condition Summary

Category	Indicator	Min	87-13 Avg	Max	2013 Avg	Classification	2013 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	1.75	7.35	12.30	8.26	Oligotrophic	Within Normal Range	Increasing Significantly
	Chlorophyll <i>a</i>	0.05	2.00	23.80	0.80	Oligotrophic	Within Normal Range	Decreasing Slightly
	Total Phosphorus	0.002	0.006	0.016	0.005	Oligotrophic	Within Normal Range	No Change
Potable Water Indicators	Hypolimnetic Ammonia	0.00	0.03	0.17	0.03	Close to Surface NH4 Readings	Higher than Normal	Not known
	Hypolimnetic Arsenic	0.34	0.76	1.30		Low Deepwater Arsenic Levels		Not known
	Hypolimnetic Iron	0.01	0.06	0.19		Low Iron Levels		Not known
	Hypolimnetic Manganese	0.01	0.03	0.10		Low Manganese Levels		Not known
Limnological Indicators	Hypolimnetic Phosphorus	0.001	0.008	0.018	0.011	Close to Surface TP Readings	Higher than Normal	Not known
	Nitrate + Nitrite	0.00	0.02	0.18	0.01	Low NOx	Lower Than Normal	No Change
	Ammonia	0.00	0.02	0.13	0.01	Low Ammonia	Within Normal Range	No Change
	Total Nitrogen	0.01	0.25	0.71	0.24	Low Total Nitrogen	Within Normal Range	No Change
	pH	5.78	7.40	9.08	7.54	Circumneutral	Within Normal Range	No Change
	Specific Conductance	22	66	127	75	Softwater	Within Normal Range	Increasing Slightly
	True Color	1	6	45	6	Uncolored	Within Normal Range	No Change
	Calcium	4.4	5.7	7.0		Not Susceptible to Zebra Mussels		No Change
Lake Perception	WQ Assessment	1	1.2	2	1.1	Crystal Clear	Within Normal Range	No Change
	Aquatic Plant Coverage	1	2.1	3	2.6	Subsurface Plant Growth	More Extensive Than Normal?	Highly Increasing
	Recreational Assessment	1	1.2	3	1.6	Could Not Be Nicer	Less Favorable than Normal	No Change
Biological Condition	Phytoplankton					Open water-low blue green algae biomass	Not known	Not known
	Macrophytes					Excellent quality of the aquatic plant community	Not known	Not known
	Zooplankton					Not evaluated through CSLAP	Not known	Not known
	Macroinvertebrates					High diversity and typical of good water quality conditions	Not known	Not known
	Fish					Coolwater fishery?	Not known	Not known
	Invasive Species					None observed	Not known	Not known
Local Climate Change	Air Temperature	3	18.6	31	18.2		Within Normal Range	Decreasing Slightly
	Water Temperature	5	18.2	26	22.3		Higher Than Normal	Decreasing Slightly

Category	Indicator	Min	87-13 Avg	Max	2013 Avg	Classification	2013 Change?	Long-term Change?
Harmful Algal Blooms	Open Water Phycocyanin	0	5	33	2	No readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	0	1	2	0	No readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	0	1	0	No readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	<DL	0.2	0.5	0.2	Mostly undetectable open water MC-LR	Not known	Not known
	Open Water Anatoxin a	<DL	<DL	<DL	<DL	Open water Anatoxin-a consistently not detectable	Not known	Not known
	Shoreline Phycocyanin					No shoreline blooms sampled for PC	Not known	Not known
	Shoreline FP Chl.a					No shoreline blooms sampled for FP	Not known	Not known
	Shoreline FP BG Chl.a					No shoreline blooms sampled for FP	Not known	Not known
	Shoreline Microcystis					No shoreline bloom MC-LR data	Not known	Not known
	Shoreline Anatoxin a					No shoreline bloom anatoxin data	Not known	Not known

## Evaluation of Lake Condition Impacts to Lake Uses

Oquaga Lake is among the lakes listed on the 2002 Delaware River drainage basin Priority Waterbody List (PWL) as “unassessed”.

### Potable Water (Drinking Water)

The CSLAP dataset at Oquaga Lake, including water chemistry data, physical measurements, and volunteer samplers’ perception data, is inadequate to evaluate the use of the lake for potable water. The low algae levels and lack of deepwater anoxia suggest that potable water use should be supported, although deepwater arsenic levels are measureable (if very low; these were not analyzed in 2013 due to laboratory instrumentation problems).

### Contact Recreation (Swimming)

The CSLAP dataset at Oquaga Lake, including water chemistry data, physical measurements, and volunteer samplers’ perception data, suggests that swimming and contact recreation should be fully supported, although additional information about bacterial levels is needed to evaluate the safety of the water for swimming.

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

The CSLAP dataset on Oquaga Lake, including water chemistry data, physical measurements, and volunteer samplers’ perception data, suggest that non-contact recreation should be fully supported.

### Aquatic Life

The CSLAP dataset on Oquaga Lake, including water chemistry data, physical measurements, and volunteer samplers’ perception data, suggest that aquatic life should be fully supported, although additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

### Aesthetics

The CSLAP dataset on Oquaga Lake, including water chemistry data, physical measurements, and volunteer samplers’ perception data, suggest that aesthetics should be fully supported.

**Fish Consumption**

There are no fish consumption advisories posted for Oquaga Lake.

**Additional Comments and Recommendations**

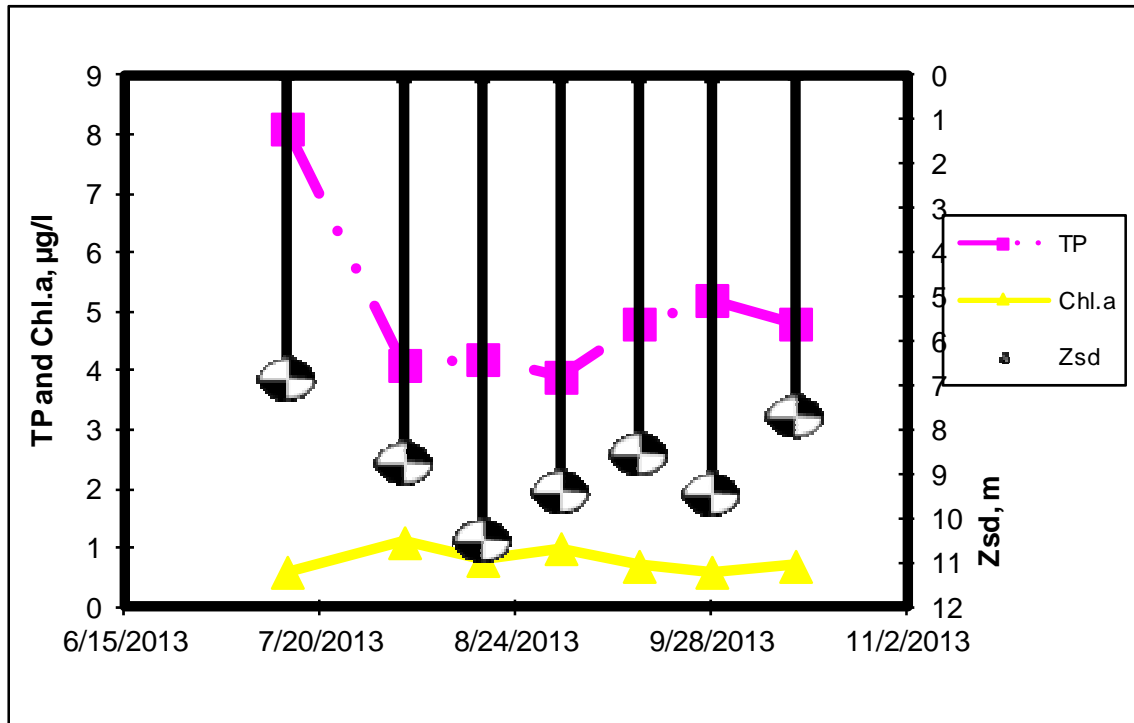
Aquatic plant survey data may help to determine if the increase in aquatic plant coverage is associated with nuisance or exotic plants.

**Aquatic Plant IDs-2013**

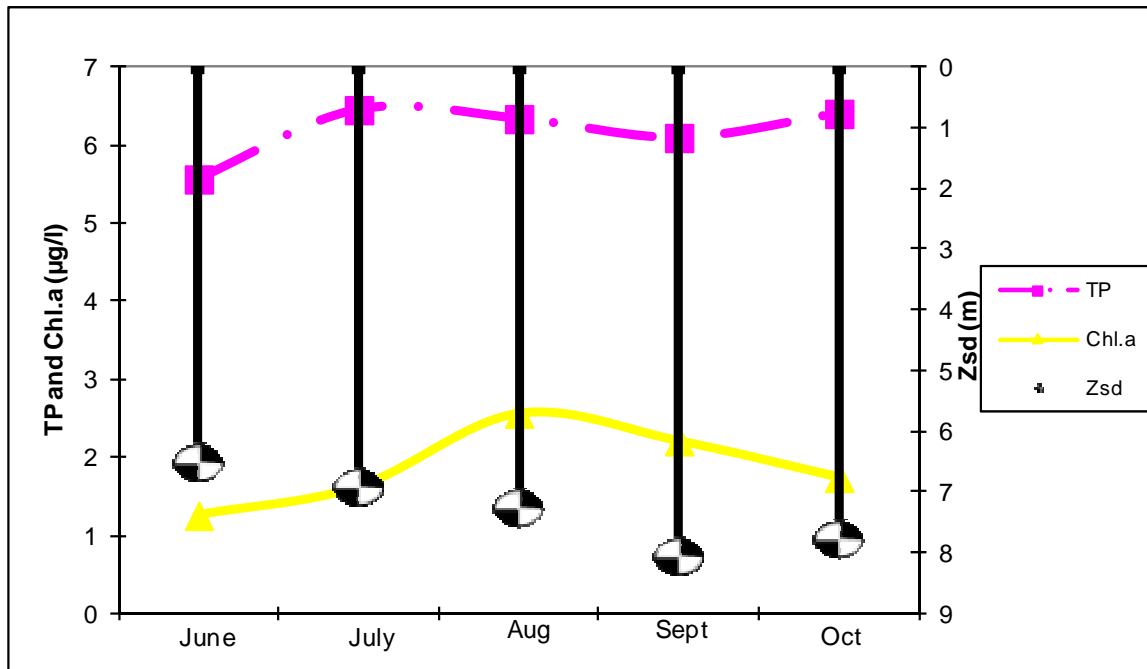
None submitted for identification in 2013.



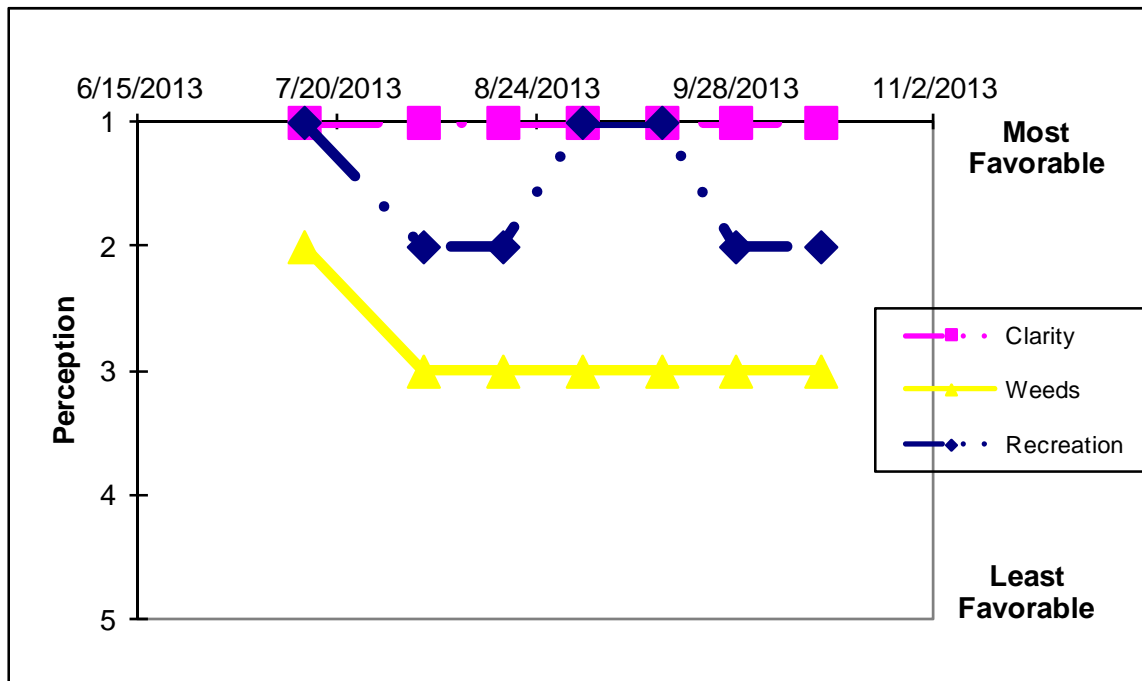
## Time Series: Trophic Indicators, 2013



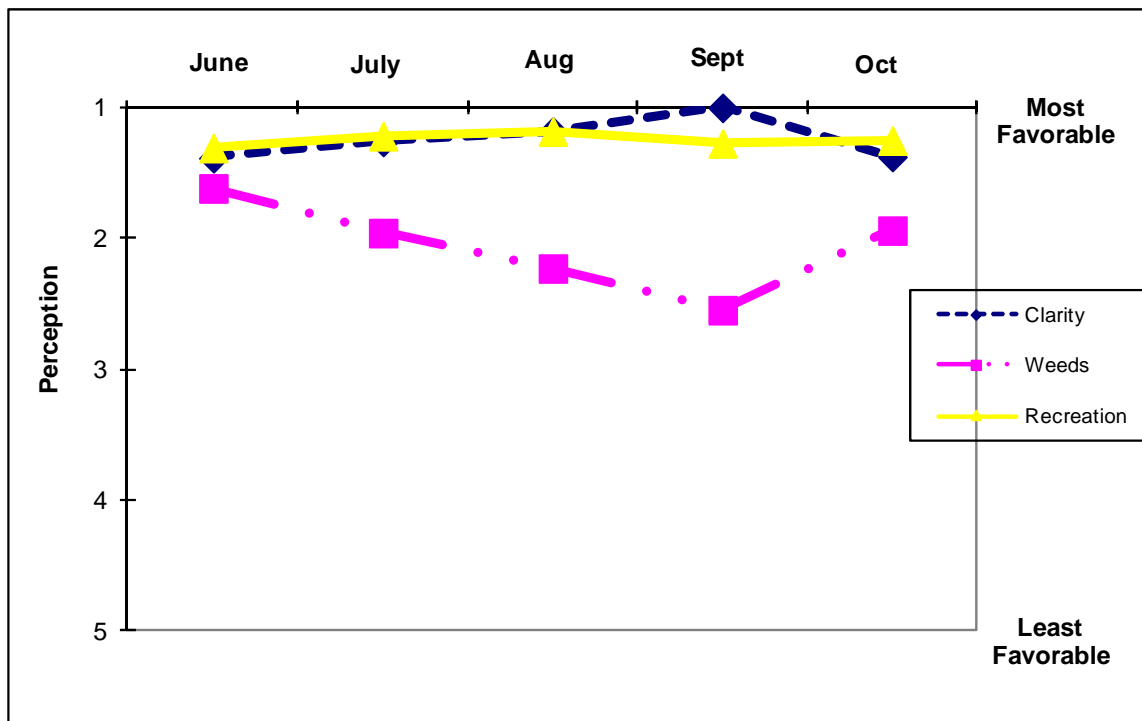
## Time Series: Trophic Indicators, Typical Year (1987-2013)



### Time Series: Lake Perception Indicators, 2013



### Time Series: Lake Perception Indicators, Typical Year (1987-2013)



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

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	TKN	TN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
30	Oquaga L	6/13/1987	30.0	3.63	1.5	0.005	0.02				8	7.15	55		
30	Oquaga L	6/21/1987	30.0	5.75	1.5	0.007	0.02				9	7.16	54		1.20
30	Oquaga L	7/5/1987	30.0	5.25	1.5	0.009	0.01				5	7.08	54		2.70
30	Oquaga L	7/11/1987	30.0	5.75	1.5	0.006	0.01				2	7.04	54		
30	Oquaga L	7/19/1987	27.0	5.50	1.5	0.003	0.01				6	7.07	54		2.70
30	Oquaga L	7/26/1987	30.0	3.88	1.5	0.006	0.01				5	6.95	54		6.40
30	Oquaga L	8/3/1987	30.0	2.75	1.5	0.009	0.01				5	6.88	55		19.20
30	Oquaga L	8/10/1987	30.0	3.38	1.5	0.008	0.01				5	6.85	55		14.40
30	Oquaga L	8/17/1987	30.0	5.25	1.5	0.005	0.01				6	7.13	56		1.70
30	Oquaga L	8/23/1987	30.0	5.25	1.5	0.005	0.01				4	7.07	53		3.90
30	Oquaga L	8/30/1987	30.0	4.50	1.5	0.005	0.01				6	7.49	53		
30	Oquaga L	9/7/1987	30.0	5.25	1.5	0.012	0.18				3	7.16	56		9.90
30	Oquaga L	9/16/1987	30.0	6.00	1.5	0.005	0.02				2	7.39	63		5.00
30	Oquaga L	10/10/1987	30.0	4.25	1.5	0.007	0.01				6	7.11	54		10.60
30	Oquaga L	10/23/1987	30.0	4.63	1.5										
30	Oquaga L	7/1/1988	30.0	5.75	1.5	0.007	0.01				5	6.33	61		3.25
30	Oquaga L	7/13/1988	30.0	6.50	1.5	0.009					4	8.06	66		4.66
30	Oquaga L	7/21/1988	30.0	5.00	1.5	0.011	0.01				5	7.39	57		2.74
30	Oquaga L	7/28/1988	30.0	6.25	1.5	0.006					5	7.55	57		1.06
30	Oquaga L	8/4/1988	30.0	6.00	1.5	0.005	0.01				3	7.98	60		1.37
30	Oquaga L	8/11/1988	30.0	5.50	1.5	0.006					8				1.63
30	Oquaga L	8/18/1988	30.0	5.50	1.5	0.006	0.01				7	7.14	56		2.07
30	Oquaga L	8/25/1988	30.0	4.75	1.5	0.006					7				2.15
30	Oquaga L	9/2/1988	30.0	5.50	1.5	0.008	0.01				3	7.78	57		2.00
30	Oquaga L	9/15/1988	30.0	5.75	1.5	0.005	0.01				3	7.62	60		3.18
30	Oquaga L	7/10/1989	30.0	4.88	1.5	0.005	0.01				3	7.85	57		2.33
30	Oquaga L	8/2/1989	30.0	4.25	1.5	0.007					2	7.40	58		1.20
30	Oquaga L	8/9/1989	30.0	4.25	1.5	0.009					2	7.89	55		
30	Oquaga L	8/19/1989	30.0	5.25	1.5	0.010	0.01				4	7.83	56		0.43
30	Oquaga L	8/26/1989	30.0	5.13	1.5	0.013					2	7.44			2.22
30	Oquaga L	9/4/1989	30.0	4.75	1.5	0.008					2	7.36	56		4.11
30	Oquaga L	9/13/1989	30.0	5.63	1.5	0.007	0.01				2	7.54	58		3.05
30	Oquaga L	7/14/1990	30.0	4.25	1.5	0.011	0.01				5	7.23	64		3.01
30	Oquaga L	7/20/1990	30.0	5.25	1.5	0.007					3	7.54	57		0.63
30	Oquaga L	8/3/1990	30.0	5.25	1.5	0.008	0.01				1	7.89	56		2.08
30	Oquaga L	8/20/1990	30.0	5.75	1.5	0.006					3	7.29	79		2.43
30	Oquaga L	9/1/1990	30.0	6.25	1.5	0.004	0.01				2	6.60	57		1.34
30	Oquaga L	9/11/1990	30.0	6.50	1.5	0.012					1	6.75	57		2.21
30	Oquaga L	9/27/1990	30.0	6.25	1.5	0.008	0.01				3	7.74	57		2.75
30	Oquaga L	7/1/1991	30.0	6.50	1.5	0.008	0.01				2	7.61	59		1.26
30	Oquaga L	7/15/1991	30.0	6.25	1.5	0.007					3	7.52	59		2.41
30	Oquaga L	7/28/1991	30.0	5.75	1.5	0.007	0.01				2	7.63	57		2.90
30	Oquaga L	8/13/1991	30.0	4.50	1.5	0.010					2	7.29	58		6.88
30	Oquaga L	8/26/1991	30.0	2.75	1.5	0.011	0.01				4	6.95	58		13.40
30	Oquaga L	9/9/1991	30.0	1.75	1.5	0.012					45	7.60	59		23.80
30	Oquaga L	6/25/1992	30.0	5.75	1.5	0.008					2	7.69	60		1.98
30	Oquaga L	7/24/1992	30.0	4.45	1.5	0.011					4	7.75	59		4.48
30	Oquaga L	10/4/1992	30.0	3.50	1.5	0.014	0.01				5	7.68	60		6.97
30	Oquaga L	06/23/02	16.0	5.45	1.5	0.007	0.00	0.02	0.40	129.58	8	7.52	72		1.17
30	Oquaga L	07/07/02	30.0	6.45	1.5	0.003	0.00	0.05	0.26	165.55	9				0.95
30	Oquaga L	07/21/02	30.0	8.15	1.5	0.007	0.01	0.05	0.29	93.72	6	7.47	73		0.56
30	Oquaga L	08/05/02	30.0	9.85	1.5	0.005	0.00	0.06	0.40	168.44	3	7.37	73		0.64
30	Oquaga L	08/18/02	30.0	10.20	1.5	0.005	0.01	0.03	0.40	163.73	3	6.90	74		0.97
30	Oquaga L	09/02/02	30.0	12.30	1.5	0.003	0.00	0.01	0.37	238.35	2	7.21	74		1.25
30	Oquaga L	09/25/02	26.0	9.58		0.006	0.00	0.02	0.53	206.89					
30	Oquaga L	10/06/02		6.85			0.01	0.03	0.26		7	7.46	73		0.48
30	Oquaga L	10/20/02	30.0	7.55		0.006	0.01	0.05	0.37	128.89	5	7.26	72		0.41
30	Oquaga L	6/30/2003	30.0	5.50	1.0	0.007	0.01	0.01	0.19	61.36	7	7.16	73	6.1	
30	Oquaga L	7/13/2003	30.0	5.05		0.006	0.00	0.00	0.16	60.51	10	7.20	72		1.72
30	Oquaga L	7/27/2003	30.0	5.90		0.011	0.00	0.00	0.03	5.15		7.08	70		1.19
30	Oquaga L	8/12/2003	30.0	9.70	1.5	0.004	0.01	0.00	0.18	100.44	11	6.41	78		1.58
30	Oquaga L	8/25/2003	30.0	9.50		0.003	0.03	0.01	0.23	151.53		7.14	72	6.2	0.23
30	Oquaga L	9/2/2003	30.0	6.90		0.005	0.00	0.00	0.18	83.53	8	7.15	72		0.13

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	TKN	TN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
30	Oquaga L	9/28/2003	30.0	9.45		0.006	0.00	0.01	0.23	85.30	7	6.68	69		0.50
30	Oquaga L	10/13/2003	30.0	9.35		0.007	0.00	0.00	0.22	72.49	6	7.18	74		1.12
30	Oquaga L	6/13/2004	30+	6.10	1.0	0.004	0.01	0.02			16	6.54	74		3.22
30	Oquaga L	6/29/2004	30+	10.20	1.0	0.003	0.01	0.01	0.27	214.45	9	5.78	80		0.10
30	Oquaga L	7/2/2004	30+	8.90	1.0										
30	Oquaga L	7/11/2004	30+	8.40	1.0	0.002	0.01	0.01	0.32		7	6.75	81		1.40
30	Oquaga L	7/25/2004				0.006	0.01	0.01	0.34	130.81	2	6.55	75		0.05
30	Oquaga L	8/10/2004	30+	9.40	1.0	0.007	0.02	0.02	0.36	122.79	2	6.80	76	5.0	1.80
30	Oquaga L	8/22/2004	30+	11.30	1.0	0.004	0.02	0.01	0.32	183.57	27	7.49	84		1.00
30	Oquaga L	9/6/2004		9.10		0.004	0.02	0.02	0.39	206.50	1	7.95	57		0.30
30	Oquaga L	9/26/2004	30+	7.40	1.5	0.003	0.02	0.01	0.48	299.97	2	7.08	50		0.70
30	Oquaga L	6/19/2005	30+	6.60	1.5	0.007	0.01	0.01	0.14	46.55	1	6.80	49	5.7	1.4
30	Oquaga L	7/9/2005	30+	5.50	1.5	0.004	0.07	0.01	0.10	54.86	1	7.40	68		0.7
30	Oquaga L	7/24/2005	30+	6.80	1.5	0.004	0.01	0.01	0.01	2.53	6	7.54	60		0.1
30	Oquaga L	8/9/2005	30+	6.10	1.5	0.005	0.01	0.01	0.11	48.53	1	7.42	70		0.8
30	Oquaga L	9/5/2005				0.006	0.01	0.01	0.19	65.71	9	7.86	56	7.0	0.3
30	Oquaga L	9/17/2005	30+	6.35		0.007	0.09	0.01	0.12	36.94	7	7.59	78		0.2
30	Oquaga L	10/9/2005	30+	6.75		0.005	0.01	0.01	0.10	45.14	4	7.82	35		0.2
30	Oquaga L	10/22/05	30+	4.73		0.009	0.01	0.01	0.06	16.31	6	7.37	22		1.2
30	Oquaga L	6/25/2006				0.004	0.03	0.02	0.42	209.99	27	8.07	127	5.8	0.67
30	Oquaga L	7/9/2006	30+	5.60	1.5	0.006	0.01	0.01	0.26	100.28	19	7.10	54		0.24
30	Oquaga L	7/23/2006	30+	5.70	1.5	0.007	0.03	0.02	0.47	157.57	18	7.52	66		1.62
30	Oquaga L	8/6/2006	30+	7.30	1.5	0.006	0.02	0.02	0.43	153.96		7.38	76		0.53
30	Oquaga L	8/20/2006	30+	9.25		0.004	0.02	0.03	0.64	352.26	5	8.28	55	5.8	0.69
30	Oquaga L	9/4/2006	30+	8.95		0.006			0.40	137.65	6	7.56	62		0.90
30	Oquaga L	9/17/2006	30+	10.80		0.005	0.02	0.05	0.47	229.64	10	6.68	66		0.44
30	Oquaga L	10/8/2006	30+	11.65	1.5	0.006	0.03	0.02	0.41	140.40	12	7.33	72		0.66
30	Oquaga L	7/8/2007	30+	10.80	1.0	0.005	0.06	0.02	0.51	218.19	1	7.17	75	5.1	1.06
30	Oquaga L	7/21/2007	30+	10.10	1.0	0.006	0.01	0.01	0.23	81.73	5	8.10	57		0.96
30	Oquaga L	8/8/2007	30+	8.85	1.0	0.005	0.00	0.01	0.44	215.91	2	7.67	60		0.68
30	Oquaga L	8/19/2007	30+	8.40	1.0	0.009	0.01	0.01	0.39	91.64	1	7.65	37		1.23
30	Oquaga L	9/3/2007	30+	8.25	12.0	0.006	0.00	0.02	0.45	156.93	6	8.20	68	6.5	0.44
30	Oquaga L	9/16/2007	30+	7.95		0.004	0.01	0.01	0.41	206.88	6	8.26	55		0.66
30	Oquaga L	10/7/2007	30+	9.05	1.5	0.009	0.06	0.11	0.71	174.26	3	7.50	62		0.77
30	Oquaga L	10/20/2007	30+	7.45	1.5		0.09	0.03	0.57		4	7.78	56		1.27
30	Oquaga L	6/15/2008	30+	6.55	1.0	0.007	0.03	0.02	0.33	108.82	2	7.60	86	5.8	
30	Oquaga L	6/30/2008	~20	6.75		0.004	0.01	0.04	0.21	111.81	4	7.34	75		1.26
30	Oquaga L	7/13/2008	30+	6.55	1.0	0.004	0.01	0.10	0.20	121.02	8	7.46	70		1.24
30	Oquaga L	8/3/2008	30+	10.20	1.0	0.002	0.01	0.03	0.17	195.29	3	7.51	64		1.03
30	Oquaga L	8/16/2008	30+	8.90	1.0	0.006	0.01	0.01	0.20	74.93		7.43	69	5.4	0.95
30	Oquaga L	9/1/2008		9.65	1.0	0.004	0.01	0.01	0.29	174.83	5	7.43	69		0.41
30	Oquaga L	9/20/2008	20.0	9.25	1.0	0.007	0.01	0.09	0.31	105.71	5	7.39	69		0.74
30	Oquaga L	10/11/2008	30+	8.35		0.008	0.01	0.05	0.37	107.99	6	8.43	59		0.62
30	Oquaga L	06/29/2009	18.5	5.25	1.5	0.004	0.01	0.01	0.08	44.18	8	7.25	59	5.4	0.95
30	Oquaga L	07/12/2009	30.0	9.15	1.5	0.002	0.01	0.00	0.12	170.50	14	6.29	67		0.74
30	Oquaga L	08/02/2009	30.0	8.20	1.5	0.006	0.05	0.03	0.16	56.22	8	8.89	33		0.53
30	Oquaga L	08/16/2009	30.0	8.25	1.5	0.005	0.02	0.02	0.18	83.42	7	6.81	51		0.60
30	Oquaga L	09/07/2009	33.0	10.25		0.005	0.02	0.01	0.16	79.20	8	7.16	55	4.4	0.70
30	Oquaga L	09/20/2009	30.0	8.85	1.0	0.005	0.01	0.03	0.11	49.15	4	7.74	56		0.90
30	Oquaga L	10/04/2009	33.0	10.40	1.0	0.004	0.01	0.01	0.10	52.00	6	7.21	63		0.79
30	Oquaga L	10/17/2009	33.0	7.28	1.5	0.006	0.01	0.01	0.13	45.75	2	7.79	67		1.00
30	Oquaga L	6/13/2010		10.40		0.004	0.02	0.02			1	8.17	64	5.8	0.10
30	Oquaga L	7/5/2010	30+	11.00		0.004	0.02	0.02	0.20	111.65	4	7.02	67		0.50
30	Oquaga L	7/18/2010	30+	10.25	1.0	0.004	0.02	0.02	0.18	94.29	6	7.31	90		0.80
30	Oquaga L	7/31/2010	30+	11.65	1.0	0.004	0.02	0.03	0.23	126.50	4	8.45	94		0.80
30	Oquaga L	8/16/2010	30+	10.80	1.5	0.004	0.01	0.01	0.23	141.17	7	7.36	66	4.8	1.00
30	Oquaga L	9/5/2010	30.0	10.75		0.004	0.02	0.02	0.05	31.26	6	7.52	70		0.90
30	Oquaga L	9/26/2010	30+	11.15		0.005	0.11	0.09	0.27	115.92	7	7.43	90		1.00
30	Oquaga L	10/10/2010	30+	7.90	1.0	0.006	0.03	0.03	0.29	104.87	10	6.99	90		1.80
30	Oquaga L	6/12/2011	30+	7.95		0.008	0.01	0.03	0.01	1.39	1	7.79	87	6.2	2.00
30	Oquaga L	7/10/2011	30+	8.78	1.0	0.016	0.01	0.02	0.17	22.96	1	6.96	95		0.80
30	Oquaga L	7/24/2011	33.5	7.05	1.0	0.009	0.01	0.01	0.15	36.83	7	8.14	58		0.50
30	Oquaga L	8/7/2011	30+	8.95	1.0	0.009	0.01	0.02	0.25	60.92	8	8.14	90		1.00
30	Oquaga L	8/21/2011	30+	9.90	1.0	0.011	0.01	0.01	0.01	1.05	4			6.0	0.80
30	Oquaga L	9/4/2011	30+	8.85	1.0		0.01	0.01	0.19	11.99	13	9.08	94		0.60
30	Oquaga L	9/19/2011	30+	8.85	1.0	0.007	0.02	0.03	0.10	31.78	11	7.70	79		1.50

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	TKN	TN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
30	Oquaga L	10/9/2011	30+	8.65		0.006	0.01	0.02	0.33	117.21	7	6.76	83		1.10
30	Oquaga L	6/24/2012	30+	7.10	1.5	0.004	0.02	0.03	0.16	82.37	4	7.85	81	4.8	1.40
30	Oquaga L	7/15/2012	30+	7.90	1.5	0.005	0.01	0.13	0.14	66.96	5	7.60	85		0.60
30	Oquaga L	7/29/2012	30+	8.40	1.5	0.005	0.01	0.13	0.15	70.68	4	8.12	81		0.70
30	Oquaga L	8/12/2012	30+	9.95	1.5	0.006	0.02	0.03	0.16	61.75	4	6.71	82		0.90
30	Oquaga L	8/27/2012	30+	9.15	1.5	0.005	0.01	0.13	0.09	43.06	1	6.72	79	6.1	1.00
30	Oquaga L	9/16/2012		10.48	1.5	0.008	0.01	0.02	0.13	35.75	4	7.05	81		0.70
30	Oquaga L	10/7/2012	30+	11.55	1.5	0.004	0.01	0.02	0.15	74.19	5	6.62	63		0.60
30	Oquaga L	10/20/2012	30.0	10.28	1.5	0.007	0.03	0.02	0.18	58.67	5	7.38	73		1.10
30	Oquaga L	6/30/2013	33.0	4.85	1.5	0.006	0.01	0.01	0.13	48.40	6	7.99	82		0.90
30	Oquaga L	7/14/2013	30+	6.85	1.0	0.008			0.20	53.16	5	7.42	70		0.60
30	Oquaga L	8/4/2013	30+	8.75	1.5	0.004	0.01	0.02	0.12	66.54	4	7.45	83		1.10
30	Oquaga L	8/18/2013	30+	10.50	1.5	0.004			0.31	162.65	7	7.97	72		0.80
30	Oquaga L	9/1/2013	30+	9.40	1.5	0.004	0.01	0.02	0.23	129.96	6	7.45	83		1.00
30	Oquaga L	9/15/2013	30+	8.55	1.5	0.005			0.30	135.57	11	7.49	74		0.70
30	Oquaga L	9/28/2013	30+	9.45	1.5	0.005	0.01	0.02	0.29	123.11	4	7.33	57		0.60
30	Oquaga L	10/13/2013	30+	7.70		0.005			0.32	147.41	6	7.18	82		0.70
30	Oquaga L	06/23/02	16.0			0.008	0.01	0.02	0.39	46.14					
30	Oquaga L	07/07/02	30.0			0.006	0.00	0.04	0.29	48.10					
30	Oquaga L	07/21/02	30.0			0.017	0.01	0.08	0.48	28.53					
30	Oquaga L	08/05/02	30.0			0.008	0.00	0.04	0.39	48.65					2.58
30	Oquaga L	08/18/02	30.0			0.007	0.02	0.04	0.46	65.00					
30	Oquaga L	09/02/02	30.0	8.15			0.00	0.01	0.37						
30	Oquaga L	09/25/02	26.0	9.58	24.0	0.008	0.00	0.04	0.37	46.20					
30	Oquaga L	10/06/02		6.85	20.0		0.01	0.05	0.34						
30	Oquaga L	10/20/02	30.0	7.55	15.0		0.01	0.05	0.33						
30	Oquaga L	6/30/2003				0.006	0.01	0.02	0.16	24.91					
30	Oquaga L	7/13/2003				0.005	0.00	0.00	0.14	28.54					
30	Oquaga L	7/27/2003			13.0	0.016	0.00	0.00	0.03	1.53					
30	Oquaga L	8/12/2003				0.010	0.00	0.00	0.19	19.31					
30	Oquaga L	8/25/2003			12.5	0.006	0.01	0.00	0.09	14.86					
30	Oquaga L	9/2/2003				0.005	0.01	0.04	0.16	30.09					
30	Oquaga L	9/28/2003				0.006	0.00	0.01	0.19	33.44					
30	Oquaga L	10/13/2003				0.006	0.00	0.00	0.11	16.95					
30	Oquaga L	6/13/2004				0.013	0.01	0.02							
30	Oquaga L	6/29/2004				0.007	0.01	0.01	0.27	41.04					
30	Oquaga L	7/11/2004				0.003	0.01	0.01	0.25	97.70					
30	Oquaga L	7/25/2004				0.012	0.01	0.03	0.17	14.87					
30	Oquaga L	8/10/2004				0.005	0.01	0.02	0.13	26.07					
30	Oquaga L	8/22/2004				0.008	0.02	0.02	0.01	0.61					
30	Oquaga L	9/6/2004				0.007	0.02	0.03							
30	Oquaga L	6/19/2005				0.009									
30	Oquaga L	7/9/2005				0.007									
30	Oquaga L	7/24/2005				0.005									
30	Oquaga L	8/9/2005				0.005									
30	Oquaga L	9/5/2005				0.012									
30	Oquaga L	9/17/2005			13.0	0.011									
30	Oquaga L	10/9/2005			10.0	0.009									
30	Oquaga L	10/22/05				0.008									
30	Oquaga L	6/25/2006				0.007									
30	Oquaga L	7/9/2006	30+			0.009									
30	Oquaga L	7/23/2006	30+			0.010									
30	Oquaga L	8/6/2006	30+			0.014									
30	Oquaga L	8/20/2006	30+		15.0	0.008									
30	Oquaga L	9/4/2006	30+		20.0	0.006									
30	Oquaga L	9/17/2006	30+		12.0	0.006									
30	Oquaga L	10/8/2006	30+			0.008									
30	Oquaga L	7/8/2007				0.009									
30	Oquaga L	7/21/2007				0.008									
30	Oquaga L	8/8/2007				0.008									
30	Oquaga L	8/19/2007				0.010									
30	Oquaga L	9/3/2007				0.010									
30	Oquaga L	9/16/2007				0.006									
30	Oquaga L	10/7/2007				0.018									
30	Oquaga L	10/20/2007				0.007									
30	Oquaga L	6/15/2008	30+			0.011									

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	TKN	TN	TN/TP			Fe	Mn	As
30	Oquaga L	6/30/2008	~20		15.0	0.008									
30	Oquaga L	7/13/2008	30+			0.009									
30	Oquaga L	8/3/2008	30+			0.014									
30	Oquaga L	9/1/2008			10.0	0.007									
30	Oquaga L	9/20/2008	20.0		20.0	0.008									
30	Oquaga L	10/11/2008	30+		25.0	0.006									
30	Oquaga L	06/29/2009			12.0	0.008		0.00							
30	Oquaga L	07/12/2009			12.0	0.001									
30	Oquaga L	08/02/2009				0.007		0.01							
30	Oquaga L	08/16/2009			10.0	0.006									
30	Oquaga L	09/07/2009				0.005		0.01					0.10	0.10	1.20
30	Oquaga L	09/20/2009			10.0	0.005									
30	Oquaga L	10/04/2009			12.0	0.009		0.01					0.10	0.10	0.34
30	Oquaga L	10/17/2009			18.0	0.005									
30	Oquaga L	6/13/2010			30.0	0.011		0.01					0.03		
30	Oquaga L	7/18/2010	30+		12.0	0.006		0.17					0.03		
30	Oquaga L	8/16/2010	30+		12.0	0.008		0.02					0.03		1.30
30	Oquaga L	9/26/2010	30+		10.0	0.007		0.02					0.17		
30	Oquaga L	6/12/2011	30+		10.0	0.010		0.03					0.01	0.01	
30	Oquaga L	7/24/2011	33.5		12.0	0.009		0.02					0.01	0.01	
30	Oquaga L	8/21/2011	30+		12.0	0.008		0.02					0.01	0.01	0.50
30	Oquaga L	9/19/2011	30+		12.0	0.008		0.02					0.01	0.01	0.50
30	Oquaga L	6/24/2012			12.0	0.014		0.04							
30	Oquaga L	7/15/2012			10.0								0.03	0.02	
30	Oquaga L	7/29/2012			12.0	0.007		0.03							
30	Oquaga L	8/12/2012			12.0								0.19	0.02	
30	Oquaga L	8/27/2012			12.0	0.006		0.03							
30	Oquaga L	9/16/2012			12.0								0.07	0.02	1.00
30	Oquaga L	10/7/2012			12.0	0.004		0.02							
30	Oquaga L	10/20/2012			12.0								0.11	0.02	0.50
30	Oquaga L	6/30/2013			15.0	0.012		0.01							
30	Oquaga L	7/14/2013			30.0	0.014									
30	Oquaga L	8/4/2013			30.0			0.02							
30	Oquaga L	8/18/2013			15.0										
30	Oquaga L	9/1/2013			15.0	0.006		0.02							
30	Oquaga L	9/15/2013			15.0										
30	Oquaga L	9/28/2013			15.0	0.012		0.09							
30	Oquaga L	10/13/2013													

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB-form	Shore HAB
30	Oquaga L	6/13/1987	epi	23	19															
30	Oquaga L	6/21/1987	epi	21	23															
30	Oquaga L	7/5/1987	epi	24	23															
30	Oquaga L	7/11/1987	epi	85	78															
30	Oquaga L	7/19/1987	epi	29	25															
30	Oquaga L	7/26/1987	epi	30	26															
30	Oquaga L	8/3/1987	epi	25	24															
30	Oquaga L	8/10/1987	epi	25	24															
30	Oquaga L	8/17/1987	epi	29	26															
30	Oquaga L	8/23/1987	epi	16	23															
30	Oquaga L	8/30/1987	epi	26	19															
30	Oquaga L	9/7/1987	epi	22	18															
30	Oquaga L	9/16/1987	epi	22	19															
30	Oquaga L	10/10/1987	epi	13	14															
30	Oquaga L	10/23/1987	epi	17	12															
30	Oquaga L	7/1/1988	epi	19	17															
30	Oquaga L	7/13/1988	epi	28	24															
30	Oquaga L	7/21/1988	epi	18	23															
30	Oquaga L	7/28/1988	epi	26	24															
30	Oquaga L	8/4/1988	epi	25	26															
30	Oquaga L	8/11/1988	epi	27	25															
30	Oquaga L	8/18/1988	epi	21	23															
30	Oquaga L	8/25/1988	epi	20	21															

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB-form	Shore HAB
30	Oquaga L	9/2/1988	epi	23	21															
30	Oquaga L	9/15/1988	epi	14	16															
30	Oquaga L	7/10/1989	epi	20	22															
30	Oquaga L	8/2/1989	epi	22	24															
30	Oquaga L	8/9/1989	epi	20	20															
30	Oquaga L	8/19/1989	epi	21	24															
30	Oquaga L	8/26/1989	epi	21	21															
30	Oquaga L	9/4/1989	epi	18	20															
30	Oquaga L	9/13/1989	epi	21	21															
30	Oquaga L	7/20/1990	epi	30	25															
30	Oquaga L	8/3/1990	epi	27	24															
30	Oquaga L	8/20/1990	epi	15	21															
30	Oquaga L	9/1/1990	epi	25	23															
30	Oquaga L	9/11/1990	epi	20	21															
30	Oquaga L	9/27/1990	epi	21	13															
30	Oquaga L	7/1/1991	epi	18	26															
30	Oquaga L	7/15/1991	epi	25	22															
30	Oquaga L	7/28/1991	epi	23	24															
30	Oquaga L	8/13/1991	epi	24	23															
30	Oquaga L	8/26/1991	epi	18	23															
30	Oquaga L	9/9/1991	epi	20	22															
30	Oquaga L	6/25/1992	epi	23	19	1	1	1												
30	Oquaga L	7/24/1992	epi	17	20	1	1	1	5											
30	Oquaga L	10/4/1992	epi	19	16															
30	Oquaga L	06/23/02	epi	20	17	1	1	1												
30	Oquaga L	07/07/02	epi	25	19	1	1	1												
30	Oquaga L	07/21/02	epi	25	22	1	2	1												
30	Oquaga L	08/05/02	epi	22	24	1	2	1												
30	Oquaga L	08/18/02	epi	24		1	2	1												
30	Oquaga L	09/02/02	epi	23	22	1	2	1												
30	Oquaga L	09/25/02	epi	13																
30	Oquaga L	10/06/02	epi	16		2	1	1	5											
30	Oquaga L	10/20/02	epi	10		1	1	2	5											
30	Oquaga L	6/30/2003	epi	21	22	1	1	1												
30	Oquaga L	7/13/2003	epi	17	21	1	1	1	5											
30	Oquaga L	7/27/2003	epi	24		2	1	2												
30	Oquaga L	8/12/2003	epi			1	1	1												
30	Oquaga L	8/25/2003	epi	16	19	1	2	1												
30	Oquaga L	9/2/2003	epi	16	17	1	1	3	5											
30	Oquaga L	9/28/2003	epi		16	1	1	2	5											
30	Oquaga L	10/13/2003	epi	16	12	1	1	1												
30	Oquaga L	6/13/2004	epi	21	19	2	2	1	5											
30	Oquaga L	6/29/2004	epi	18	19	1	2	1	0											
30	Oquaga L	7/2/2004	epi	19	20	1	2	1	0											
30	Oquaga L	7/11/2004	epi	21	20	1	2	1	0											
30	Oquaga L	8/10/2004	epi	23	18	1	2	1	0											
30	Oquaga L	8/22/2004	epi			1	2	1	0											
30	Oquaga L	9/6/2004	epi	18	17	1	3	1	5											
30	Oquaga L	9/26/2004	epi	17	15	1	2	1	0											
30	Oquaga L	6/19/2005	epi	16	15	1	2	2	5											
30	Oquaga L	7/9/2005	epi	15	17	1	2	2	5											
30	Oquaga L	7/24/2005	epi	20		1	2	1	0											
30	Oquaga L	8/9/2005	epi	22	20	1	2	1	0											
30	Oquaga L	9/17/2005	epi	15	17	1	2	1	5											
30	Oquaga L	10/9/2005	epi		11	1	1	1	5											
30	Oquaga L	10/22/05	epi	7	8	2	1	1	158											
30	Oquaga L	7/9/2006	epi	18		2	2	1	0											
30	Oquaga L	7/23/2006	epi	17	19	2	2	1	5											
30	Oquaga L	8/6/2006	epi	17	20	2	2	1	0											
30	Oquaga L	8/20/2006	epi	18	17	2	2	2	8											
30	Oquaga L	9/4/2006	epi	16	14	1	2	1	5											

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB
30	Oquaga L	9/17/2006	epi	18	15	1	2	1	0											
30	Oquaga L	10/8/2006	epi	12	10	1	2	1	0											
30	Oquaga L	7/8/2007	epi	21	15	1	2	1	0											
30	Oquaga L	7/21/2007	epi	19	16	1	2	1	0											
30	Oquaga L	8/8/2007	epi	16	18	1	2	1	0											
30	Oquaga L	8/19/2007	epi	11	16	1	2	1	5											
30	Oquaga L	9/3/2007	epi	18	15	1	3	1	0											
30	Oquaga L	9/16/2007	epi	10	14	1	2	1	5											
30	Oquaga L	10/7/2007	epi	14	13	2	2	1	5											
30	Oquaga L	10/20/2007	epi	13	10	1	1	1	5											
30	Oquaga L	6/15/2008	epi	18	10	1	2	1	0											
30	Oquaga L	6/30/2008	epi	18	15	1	2	1	8											
30	Oquaga L	7/13/2008	epi	16	18	1	2	2	5											
30	Oquaga L	8/3/2008	epi	17	18	1	2	1	0											
30	Oquaga L	8/16/2008	epi	13	15	1	2	1	0											
30	Oquaga L	9/1/2008	epi	26	15	1	3	1	7											
30	Oquaga L	9/20/2008	epi	17	14	1	3	1	8											
30	Oquaga L	10/11/2008	epi	21	10	1	2	1	0											
30	Oquaga L	06/29/2009	epi	21	15	2	2	2	1											
30	Oquaga L	07/12/2009	epi	17	13	1	3	1	8											
30	Oquaga L	08/02/2009	epi	15	16	1	2	1	5											
30	Oquaga L	08/16/2009	epi	27	24	1	3	1	2											
30	Oquaga L	08/24/2009	bloom											0.00						
30	Oquaga L	09/07/2009	epi	18	14	1	3	2	8			11.38		0.00						
30	Oquaga L	09/20/2009	epi	17	13	1	3	1	0			11.26								
30	Oquaga L	10/04/2009	epi	10	9	1	2	1	8			16.13								
30	Oquaga L	10/17/2009	epi	3	5	1	2	1	5					0.00						
30	Oquaga L	6/13/2010	epi	21	20	2	1	2	0	0	0									
30	Oquaga L	7/5/2010	epi	31	22	1	2	1	7	0	0									
30	Oquaga L	7/18/2010	epi	25	23	1	2	1	0	0	0									
30	Oquaga L	7/31/2010	epi	20	21	1	3	1	0	0	0									
30	Oquaga L	8/16/2010	epi	23	18	1	3	1	0	0	0	3.00		0.00						
30	Oquaga L	9/5/2010	epi	9	14	1	3	1	0	0	0									
30	Oquaga L	9/26/2010	epi	6	11	1	3	1	0	0	0	15.00		0.00						
30	Oquaga L	10/10/2010	epi	7	9	2	3	1	1	0	0			0.00						
30	Oquaga L	6/12/2011	epi	12	18	1	1	1	5	0	0	0.80	0.50							
30	Oquaga L	7/10/2011	epi	23	15	2	2	1	0	0	0	1.50	0.30							
30	Oquaga L	7/24/2011	epi	19	19	1	1	1	0	0	0	1.50	0.17	0.90	<0.5	<0.1				
30	Oquaga L	8/7/2011	epi	15	17	1	1	1	0	0	0	32.70	5.80							
30	Oquaga L	8/21/2011	epi	14	15	1	3	1	0	0	0									
30	Oquaga L	9/4/2011	epi	18	15	1	3	1	0	0	0	4.90	3.40							
30	Oquaga L	9/19/2011	epi	9	17	1	3	2	0	3	3	3.00	0.80							
30	Oquaga L	10/9/2011	epi	15	10	2	3	2	0	0	0	4.40	1.20							
30	Oquaga L	6/24/2012	epi	17	14	2	3	1	0	0	0	3.10	0.30	<0.30	<0.428		0.65	0.25	F	
30	Oquaga L	7/15/2012	epi	14	17	2	3	2	8	7	0	0.10	0.20	<0.30	<0.423		0.98	0.31		
30	Oquaga L	7/29/2012	epi	14	16	2	3	2	0	0	0	2.80	0.20	<0.30	<0.292		0.49	0.00		
30	Oquaga L	8/12/2012	epi	12	16	2	3	1	0	0	0	2.40	0.20	<0.30	<0.537		1.61	1.15		
30	Oquaga L	8/27/2012	epi	11	19	2	3	2	0	0	0	0.10	0.20	<0.30	<0.551					
30	Oquaga L	9/16/2012	epi	11	12	1	3	1	0	0	0	0.80	0.10	0.45	<3.299		0.66	0.61		
30	Oquaga L	10/7/2012	epi	4	8	2	3	2	0	0	0	1.40	0.20	<0.30	<3.205		0.56	0.27		
30	Oquaga L	10/20/2012	epi	7	8	1	3	1	0	0	0	1.60	0.20	<0.30	<3.205		0.42	0.00		
30	Oquaga L	6/30/2013	epi	30	19	2	1	2	1	5	0	2.60	1.20	<0.30	<0.610		1.40	0.00	I	I
30	Oquaga L	7/14/2013	epi		25	1	2	1	0	0	0	0.80	1.00	<0.30	<0.490		0.80	0.00	I	I
30	Oquaga L	8/4/2013	epi	16	23	1	3	2	0	3	3	0.90	0.80	0.38	<0.390		0.90	0.00	I	I
30	Oquaga L	8/18/2013	epi	17	24	1	3	2	0	3	3	1.70	0.80	<0.30	<0.390		0.10	0.00	I	I
30	Oquaga L	9/1/2013	epi	19	25	1	3	1	0	0	0	1.70	0.50	<0.30	<1.100		0.10	0.00	I	I
30	Oquaga L	9/15/2013	epi	12	22	1	3	1	0	0	3	1.30	0.40	<0.30	<0.100		0.00	0.00	I	I
30	Oquaga L	9/28/2013	epi	15	18	1	3	2	0	0	0	0.80	0.40	<0.30	<0.100		0.00	0.00	I	I
30	Oquaga L	10/13/2013	epi			1	3	2	0	0	0	2.40	0.50	<0.30	<0.090		0.00	0.00	I	I
30	Oquaga L	09/02/02	hypo	23	10	2	1	2	0	0	0			0.00						
30	Oquaga L	09/25/02	hypo	13	14	1	2	1	7	0	0	11.38		0.00						



LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cylin	FP-Chl	FP-BG	HAB form	Shore HAB
30	Oquaga L	10/06/02	hypo	16	9	1	2	1	0	0	0	11.26								
30	Oquaga L	10/20/02	hypo	10	12	1	3	1	0	0	0	16.13								
30	Oquaga L	9/17/2005	hypo		6															
30	Oquaga L	10/9/2005	hypo		4															
30	Oquaga L	10/22/05	hypo		5															
30	Oquaga L	8/20/2006	hypo		4															
30	Oquaga L	9/4/2006	hypo		4															
30	Oquaga L	9/17/2006	hypo		6															
30	Oquaga L	6/30/2008	hypo		4															
30	Oquaga L	9/20/2008	hypo		5															
30	Oquaga L	10/11/2008	hypo		6															
30	Oquaga L	08/16/2009	hypo		5															
30	Oquaga L	09/07/2009	hypo		5															
30	Oquaga L	10/04/2009	hypo		4															
30	Oquaga L	10/17/2009	hypo		4															
30	Oquaga L	6/13/2010	hypo		15															
30	Oquaga L	7/18/2010	hypo		14															
30	Oquaga L	8/16/2010	hypo		10															
30	Oquaga L	9/26/2010	hypo		6															
30	Oquaga L	6/12/2011	hypo		9															
30	Oquaga L	7/24/2011	hypo		4															
30	Oquaga L	8/21/2011	hypo		4															
30	Oquaga L	9/19/2011	hypo		5															
30	Oquaga L	6/24/2012	hypo		4															
30	Oquaga L	7/15/2012	hypo		4															
30	Oquaga L	7/29/2012	hypo		5															
30	Oquaga L	8/12/2012	hypo		6															
30	Oquaga L	8/27/2012	hypo		5															
30	Oquaga L	9/16/2012	hypo		5															
30	Oquaga L	10/7/2012	hypo		7															
30	Oquaga L	10/20/2012	hypo		3															
30	Oquaga L	6/30/2013	hypo		4															
30	Oquaga L	7/14/2013	hypo		9															
30	Oquaga L	8/4/2013	hypo		5															
30	Oquaga L	8/18/2013	hypo		5															
30	Oquaga L	9/1/2013	hypo		6															
30	Oquaga L	9/15/2013	hypo		5															
30	Oquaga L	9/28/2013	hypo		5															
30	Oquaga L	10/13/2013	hypo																	

## 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 = epilimnion or surface; bot = 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)	variable	none
<b>Cyl</b>	Cylindrospermopsin (ug/l)	0.1 ug/l	none
<b>FP-Chl, FP-BG</b>	Fluoroprobe total chlorophyll, fluoroprobe blue-green chlorophyll (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		
<b>HAB form, Shore HAB</b>	HAB evaluation; A = spilled paint, B = pea soup, C = streaks, D = green dots, E = bubbling scum, F = green/brown tint, G = duckweed, H = other, I = no bloom		

## Appendix B- Monthly Evaluation of Oquaga Lake Data, 2006-2013

### June Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd			NORMAL	LOW	NORMAL	NORMAL	NORMAL	LOW
TP	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Chl.a	NORMAL		NORMAL	NORMAL	LOW	HIGH	NORMAL	NORMAL
NOx	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
NH4	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
TN	NORMAL		NORMAL	LOW		LOW	NORMAL	NORMAL
pH	NORMAL		NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL
SpCond	HIGH		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Color	HIGH		NORMAL	NORMAL	LOW	LOW	NORMAL	NORMAL
Ca	NORMAL		NORMAL	NORMAL	NORMAL	NORMAL	LOW	
QA			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QB			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
TH20			NORMAL	NORMAL	NORMAL	NORMAL	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	2012	2013
Zsd	LOW	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL
TP	NORMAL	NORMAL	NORMAL	LOW	NORMAL	HIGH	NORMAL	NORMAL
Chl.a	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
NOx	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
NH4	NORMAL	NORMAL	HIGH	LOW	NORMAL	NORMAL	HIGH	
TN	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
pH	NORMAL	NORMAL	NORMAL	LOW	NORMAL	NORMAL	NORMAL	NORMAL
SpCond	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Color	HIGH	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL
Ca		NORMAL						
QA	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QB	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
QC	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
TH20	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	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	2012	2013
<i>Zsd</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>TP</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL
<i>Chl.a</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>NOx</i>	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	
<i>NH4</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL
<i>TN</i>	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>pH</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	LOW	NORMAL
<i>SpCond</i>	NORMAL	LOW	NORMAL	LOW	NORMAL	HIGH	NORMAL	NORMAL
<i>Color</i>	NORMAL	LOW	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>Ca</i>	NORMAL		NORMAL		LOW	NORMAL	NORMAL	
<i>QA</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>QB</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>QC</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>TH20</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	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	2012	2013
<i>Zsd</i>	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL
<i>TP</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL
<i>Chl.a</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>NOx</i>	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	
<i>NH4</i>	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL
<i>TN</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>pH</i>	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL
<i>SpCond</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>Color</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL
<i>Ca</i>		HIGH		LOW				
<i>QA</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>QB</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>QC</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
<i>TH20</i>	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH

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

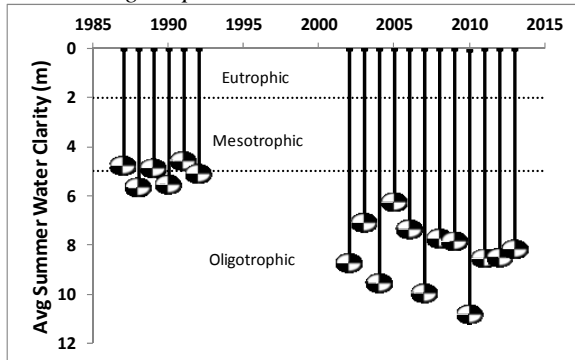
Low = average monthly reading < 10<sup>th</sup> percentile reading for lake, 2000-2010

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

## Appendix D- Long Term Trends: Oquaga Lake

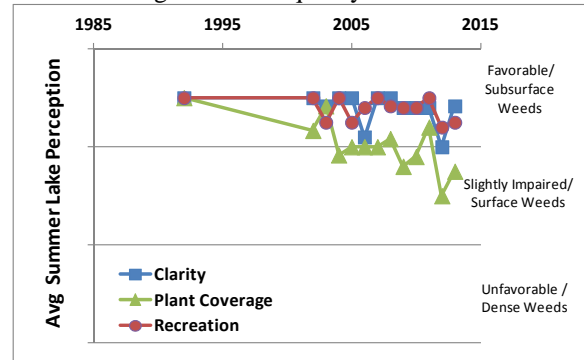
### Long Term Trends: Water Clarity

- Water clarity increased over last 25 years
- Most readings now consistently typical of *oligotrophic* lakes



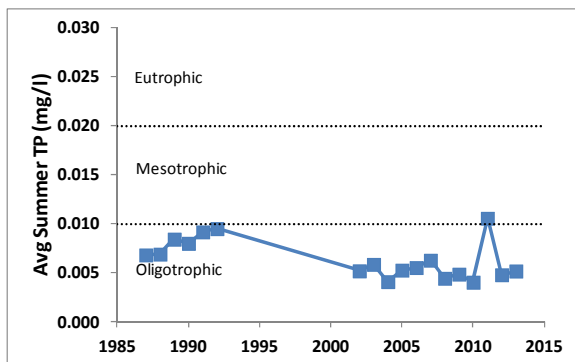
### Long Term Trends: Lake Perception

- Plant coverage increasing slightly
- Recreational perception not closely linked to changes in water quality or weeds



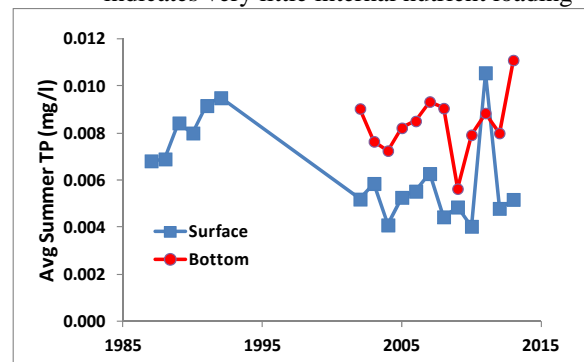
### Long Term Trends: Phosphorus

- No trends apparent
- Most readings typical of *oligotrophic* lakes



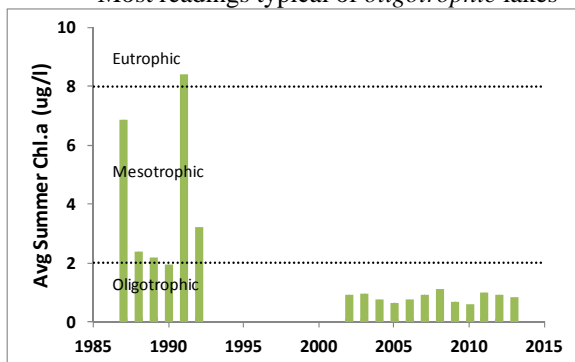
### Long Term Trends: Bottom Phosphorus

- Deepwater TP similar to surface TP
- Low deepwater TP and temperature indicates very little internal nutrient loading



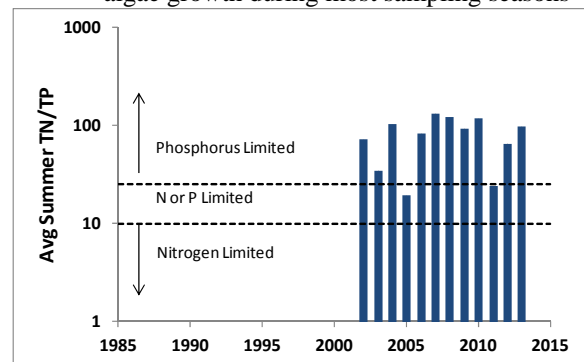
### Long Term Trends: Chlorophyll a

- Algae levels decreased since early 1990s, consistent with rise in water clarity
- Most readings typical of *oligotrophic* lakes



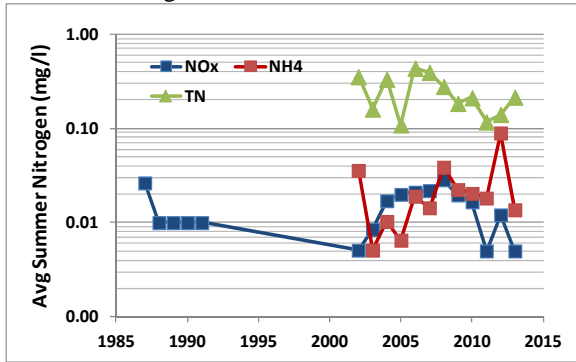
### Long Term Trends: N:P Ratio

- No apparent trends
- Most readings indicate phosphorus limits algae growth during most sampling seasons



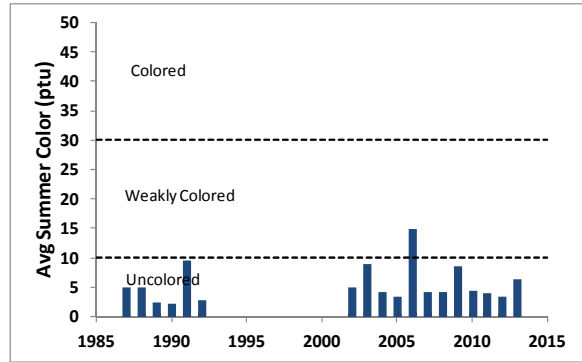
### Long Term Trends: Nitrogen

- No trends apparent; slight TN drop
- Low NOx, ammonia, and total nitrogen readings



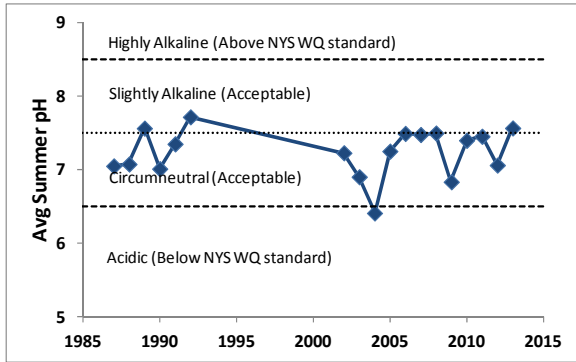
### Long Term Trends: Color

- No trends apparent
- Most readings typical of *uncolored* lakes



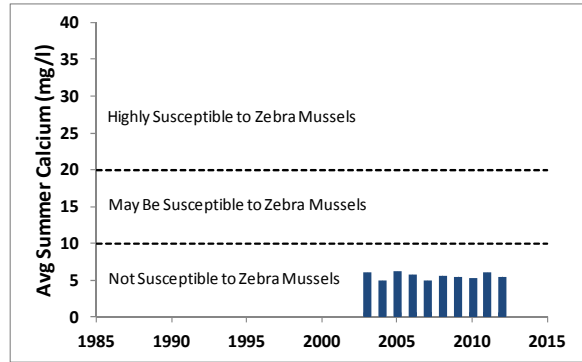
### Long Term Trends: pH

- No trends apparent
- Most readings indicative of *slightly alkaline* to *circumneutral* lakes



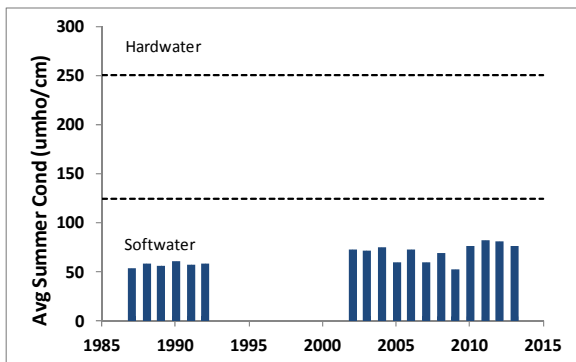
### Long Term Trends: Calcium

- No trends yet apparent
- Data indicates low susceptibility to zebra mussels



### Long Term Trends: Conductivity

- Conductivity increasing slightly
- Most readings typical of *softwater* lakes



### Long Term Trends: Water Temperature

- Surface readings decreasing long term
- Large difference in surface and bottom temperatures indicate strong stratification

