CSLAP 2010 Lake Water Quality Summary: Roaring Brook Lake

General Lake Information

Location	Town of Putnam Valley
County	Putnam
Basin	Lower Hudson River
Size	46.6 hectares (115.1 acres)
Lake Origins	Augmented by Dam
Watershed Area	466.4 hectares (1,152 acres)
Retention Time	0.3 years
Mean Depth	2.0 meters
Sounding Depth	4.3 meters
Public Access?	private beach
Major Tributaries	Roaring Brook
Lake Tributary To…	Roaring Brook to Peekskill Hollow Creek to Annsville Creek to Hudson River
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	41.433
Lake Outlet Longitude	-73.806
Sampling Years	2009-2010
2010 Samplers	Bill Brigham, Friedel Muller-Landau, Ernst Demms, and Marion B. Clifford
Main Contact	Ernst Demms

Lake Map

Background

Roaring Brook Lake is a 115 acre, class B lake found in the town of Putnam Valley in Putnam County in the southern Hudson River basin. The lake was first sampled as part of CSLAP in 2009.

It is one of 12 CSLAP lakes among the more than 75 lakes found in Putnam County, and one of 43 CSLAP lakes among the more than 360 lakes and ponds in the Lower Hudson River drainage basin.

Lake Uses

Roaring Brook Lake is a Class B lake; this means that the best intended use for the lake is for contact recreation—swimming and bathing, non-contact recreation—boating and angling, aquatic life, and aesthetics. The lake is used by lake residents for swimming, passive boating and other recreation via shoreline properties; the lake does not have public access.

It is not known whether Roaring Brook Lake has been stocked through any state fisheries stocking programs, or if any private stocking has occurred.

General statewide fishing regulations are applicable in Roaring Brook Lake.

Fish species identified in the lake include black crappie, golden shiner, largemouth bass, pumpkinseed sunfish, white catfish, white perch, white sucker and yellow perch.

Historical Water Quality Data

CSLAP sampling was conducted on Roaring Brook Lake from 2009 to 2010. The CSLAP reports for Roaring Brook Lake will be posted on the NYSFOLA website at www.nysfola.org, under NYS Lake Association Lake List.

Roaring Brook Lake was sampled as part of the DEC Lake Classification and Inventory (LCI) survey in 2003. These results indicated lower lake productivity in the LCI survey than exhibited in the CSLAP dataset—water clarity readings were higher, due to lower phosphorus and chlorophyll *a* readings.

There are no NYSDEC RIBS monitoring or stream biomonitoring sites near Roaring Brook Lake.

Lake Association and Management History

Roaring Brook Lake is served by the Roaring Brook Property Owners Association. Most of the management of the lake is conducted by the Roaring Brook Lake Preservation Committee. The lake has no public access, and does not support power boats. The invasive weeds in the lake have been the subject of much discussion, including proposals to stock grass carp, conduct hand harvesting, and an evaluation of other plant management actions.

The Roaring Brook Property Owners Association maintains a website at http://rblpoa.com/.

Summary of 2009 CSLAP Sampling Results

Evaluation of Eutrophication Indicators

Secchi disk transparency readings were higher than expected in 2010, due to lower than expected chlorophyll *a* readings. Total phosphorus readings were similar in 2009 and 2010, and it is premature to speculate if any of these trophic indicators has exhibited any significant long-term trends. This may become apparent with additional data. The lake can be characterized as *mesotrophic,* or moderately productive, based on total phosphorus, chlorophyll *a*, and water clarity readings. The trophic state index (TSI) evaluation suggests that each of these trophic indicators is "internally consistent"—each of these indicators is in the expected range given the readings of the other indicators. Phycocyanin levels were below the levels indicating susceptibility for harmful algal blooms (HABs) in 2009; these levels were not measured in 2010, Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Algae levels are not 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, although the lake is not classified for use for potable water. Roaring Brook Lake is not thermally stratified, at least on a consistent basis, so deepwater samples have not been collected in the lake (and deepwater intakes to avoid surface algae-enriched waters are not possible). Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Limnological Indicators

Ammonia and calcium levels in Roaring Brook Lake were lower in 2010 than in 2009, but each of the other limnological indicators was similar in both years. It is not yet known whether either year represents normal conditions, and it is premature to determine if any long-term changes in these indicators have occurred. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Biological Condition

Macrophyte surveys conducted through the LCI showed a small number of aquatic plants, and at least three exotic plant species (*Cabomba caroliniana,* fanwort; *Myriophyllum spicatum,* Eurasian watermilfoil, and *Phragmites* sp.) were found in the lake. The modified floristic quality indices (FQI) data indicate that the quality of the aquatic plant community is "poor," although it is likely that a detailed aquatic plant survey would identify additional plant species. The fish community in the lake is comprised of a mix of coolwater (at least two species) and warmwater (at least five species) fish, suggesting a warmwater fisheries.

Phytoplankton, zooplankton and macroinvertebrate surveys have not been conducted through CSLAP at Roaring Brook Lake.

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

Evaluation of Lake Perception

Water quality assessments were slightly more favorable in 2010 than in 2009, consistent with the slightly higher water clarity and slightly lower chlorophyll *a* readings. Aquatic plant coverage and recreational assessments were similar in the last two years, and it is premature to evaluate any long-term trends in lake perception. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

Water and air temperature readings in the summer index period were higher in 2010 than in 2009, and these readings can be compared to future temperature readings to evaluate local climate change in the lake.

Lake Condition Summary

Category	Indicator	Min	09-10 Avg	Max	2010 Avg	Classification	2010 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	1.25	2.39	3.45	2.57	Mesotrophic	Higher Than Normal	Not yet known
	Chlorophyll *a*	0.70	2.81	6.70	2.35	Mesotrophic	Lower Than Normal	Not yet known
	Total Phosphorus	0.011	0.015	0.028	0.015	Mesotrophic	Within Normal Range	Not yet known
Potable Water Indicators	Hypolimnetic NH4							
	Hypolimnetic As							
	Hypolimnetic Iron							
	Hypolimnetic Mn							
Limnological Indicators	Hypolimnetic TP							
	Nitrate + Nitrite	0.01	0.03	0.05	0.02	Low NOx	Within Normal Range	Not yet known
	Ammonia	0.00	0.03	0.10	0.03	Low Ammonia	Lower Than Normal	Not yet known
	Total Nitrogen	0.19	0.34	0.75	0.38	Low Total Nitrogen	Within Normal Range	Not yet known
	pH	7.13	7.65	8.82	7.65	Alkaline	Within Normal Range	Not yet known
	Specific Conductance	173	263	328	314	Hardwater	Within Normal Range	Not yet known
	True Color	1	26	63	15	Intermediate Color	Within Normal Range	Not yet known
	Calcium	8.1	12.5	14.6	10.5	May be Susceptible to Zebra Mussels	Lower Than Normal	Not yet known
Lake Perception	WQ Assessment	1	1.6	3	1.5	Not Quite Crystal Clear	More Favorable Than Normal	Not yet known
	Plant Coverage	1	2.1	3	1.9	Subsurface Plant Growth	Within Normal Range	Not yet known
	Rec. Assessment	1	1.6	3	1.4	Excellent	Within Normal Range	Not yet known
Biological Condition	Phytoplankton					Not measured through CSLAP	Not known	Not known
	Macrophytes					Poor 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					Warmwater fishery	Not known	Not known
	Invasive Species					Eurasian watermilfoil, Fanwort, Phragmites	Not known	Not known
Local Climate Change	Air Temperature	13	23.4	31	25.5		Higher Than Normal	Not yet known
	Water Temperature	12	22.6	28	24.1		Higher Than Normal	Not yet known

Evaluation of Lake Condition Impacts to Lake Uses

The 2008 NYSDEC Priority Waterbody Listings (PWL) for the Lower Hudson River drainage basin indicate that recreation is *stressed* in Roaring Brook Lake. The PWL listing for Roaring Brook Lake is provided in Appendix B.

Potable Water (Drinking Water)

The CSLAP dataset at Roaring Brook 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 used for this purpose.

Contact Recreation (Swimming)

The CSLAP dataset at Roaring Brook Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that swimming and contact recreation should be fully supported, although additional water quality data may be needed to confirm this assessment, and 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 Roaring Brook Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that non-contact recreation should be fully supported, although this use may be threatened by fanwort, Eurasian watermilfoil, and Phragmites, although additional data may be needed to verify these assessments.

Aquatic Life

The CSLAP dataset on Roaring Brook Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life may be *threatened* by the presence of fanwort and Eurasian watermilfoil, although additional data may be needed to verify this assessment. Additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake.

Aesthetics

The CSLAP dataset on Roaring Brook 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 Roaring Brook Lake.

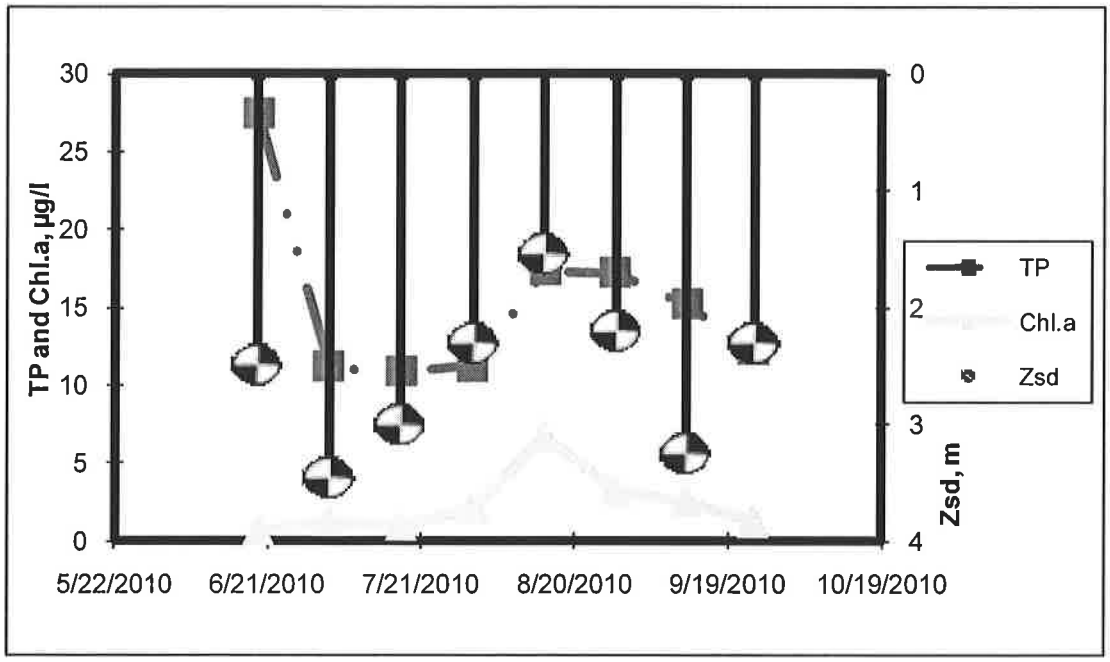
Additional Comments and Recommendations

Additional water quality data should be collected to determine the extent to which water quality conditions, aquatic plant coverage, and recreational assessments measured in 2009 and 2010 are indicative of normal conditions in the lake.

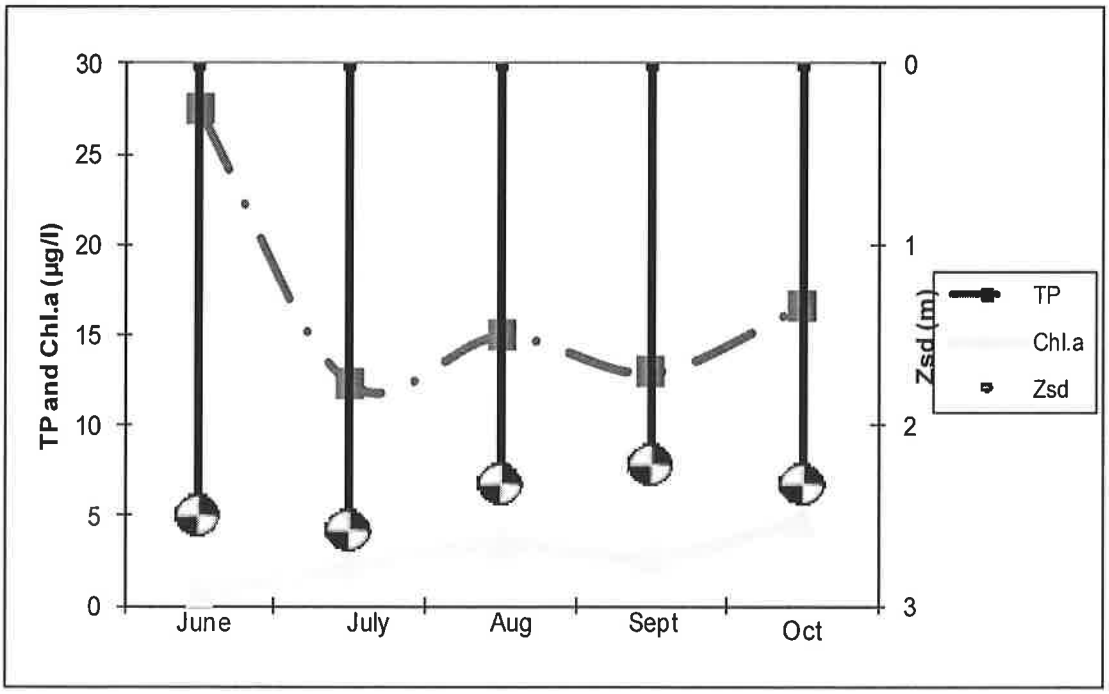
Aquatic Plant IDs-2010

None submitted for identification.

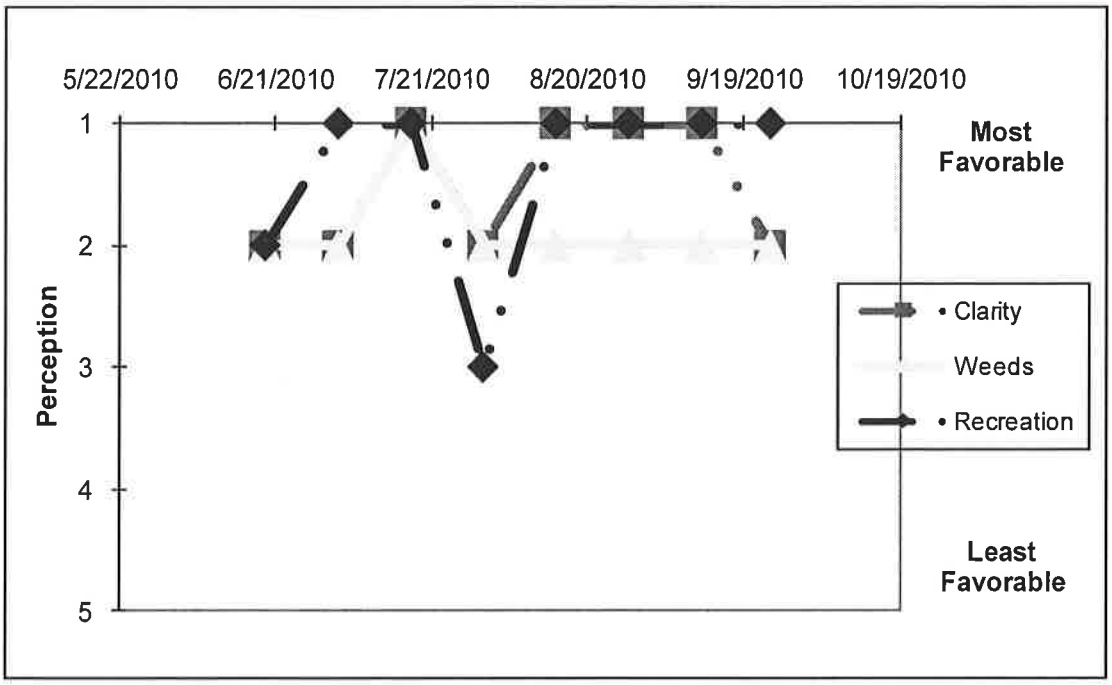
Time Series: Trophic Indicators, 2010



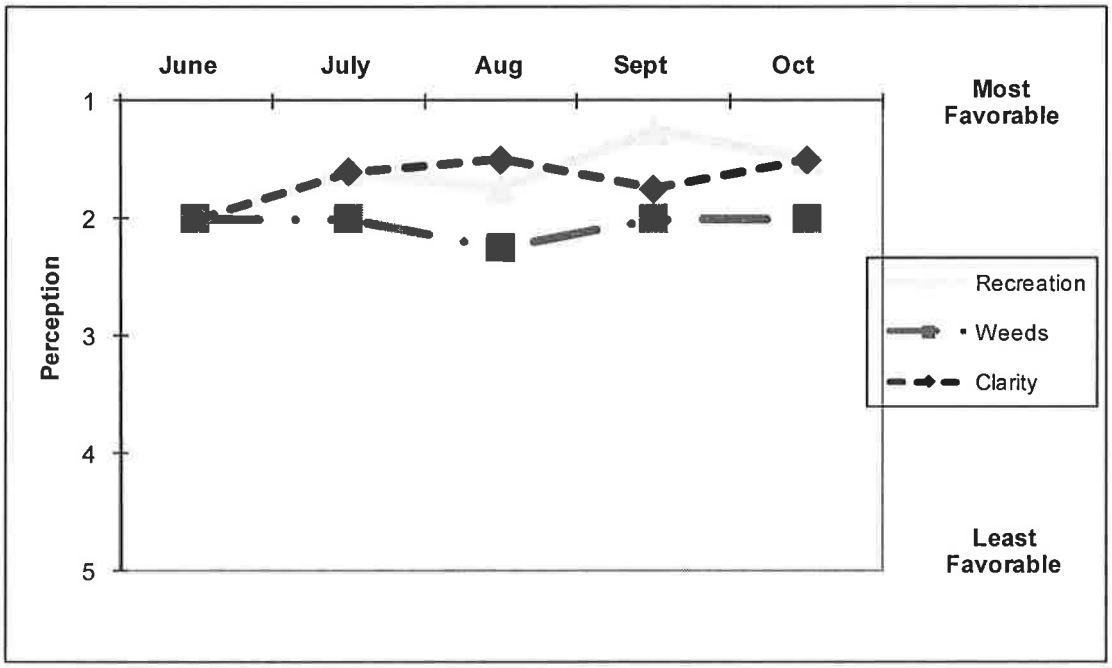
Time Series: Trophic Indicators, Typical Year (2009-2010)



Time Series: Lake Perception Indicators, 2010



Time Series: Lake Perception Indicators, Typical Year (2009-2010)



Appendix A- CSLAP Water Quality Sampling Results for Roaring Brook Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
225	Roaring Brook Lake	07/11/2009	4.8	1.25	1.5	0.018	0.05	0.01	0.28	34.43	40	7.27	204	14.6	4.37
225	Roaring Brook Lake	07/25/2009	5.0	2.90	1.5	0.011	0.05	0.05	0.42	87.18	36	7.58	217		1.88
225	Roaring Brook Lake	08/08/2009	5.2	2.90	1.5	0.014	0.05	0.02	0.29	46.26	31	7.87	224		2.30
225	Roaring Brook Lake	08/24/2009	5.1	2.65	1.5	0.012	0.02	0.02	0.30	55.85	30	8.82	188		1.30
225	Roaring Brook Lake	09/05/2009	5.1	2.10	1.5	0.012	0.01	0.01	0.19	36.22	32	7.16	241	14.3	2.20
225	Roaring Brook Lake	09/20/2009	5.1	1.25	1.5	0.013	0.01	0.10	0.34	59.59	63	7.18	203		4.70
225	Roaring Brook Lake	10/04/2009	5.3	1.60	1.5	0.021	0.01	0.05	0.34	36.10	35	7.51	243		4.66
225	Roaring Brook Lake	10/25/2009	4.8	3.05	1.5	0.013	0.03	0.06	0.35	61.11		7.76	173		4.80
225	Roaring Brook Lake	6/19/2010	5.2	2.50	1.5	0.028	0.01	0.02			14	7.13	290	12.9	0.70
225	Roaring Brook Lake	7/3/2010	4.9	3.45	1.5	0.011	0.03	0.00	0.19	37.71	10	8.07	307		1.30
225	Roaring Brook Lake	7/17/2010	4.8	3.00	1.5	0.011	0.01	0.02	0.41	82.55	12	8.35	328		1.00
225	Roaring Brook Lake	7/31/2010	4.9	2.30	1.5	0.011	0.02	0.03	0.34	66.00	32	7.61	310		2.10
225	Roaring Brook Lake	8/14/2010	4.8	1.55	1.5	0.017	0.05	0.04	0.27	34.26	17	7.95	326	8.1	6.70
225	Roaring Brook Lake	8/28/2010	4.9	2.20	1.5	0.017	0.03	0.05	0.75	95.55	22	7.33	313		3.30
225	Roaring Brook Lake	9/11/2010	4.8	3.25	1.5	0.015	0.01	0.04	0.39	56.59	1	7.38	316		2.50
225	Roaring Brook Lake	9/24/2010	4.9	2.30	1.5	0.012	0.02	0.02	0.28	49.37	12	7.41	323		1.20

LNum	PName	Date	Zbot	Zsd	Zsamp	TAir	TH20	QA	QB	QC	QD
225	Roaring Brook Lake	07/11/2009	4.8	1.25	1.5	24	24	2	3	2	1
225	Roaring Brook Lake	07/25/2009	5.0	2.90	1.5	25	24	1	2	1	0
225	Roaring Brook Lake	08/08/2009	5.2	2.90	1.5	23	24	3	3	3	12
225	Roaring Brook Lake	08/24/2009	5.1	2.65	1.5	24	26	1	2	2	0
225	Roaring Brook Lake	09/05/2009	5.1	2.10	1.5	25	23	1	2	2	0
225	Roaring Brook Lake	09/20/2009	5.1	1.25	1.5	16	19	3	2	1	0
225	Roaring Brook Lake	10/04/2009	5.3	1.60	1.5	20	17	1	1	1	0
225	Roaring Brook Lake	10/25/2009	4.8	3.05	1.5	13	12	2	3	2	0
225	Roaring Brook Lake	6/19/2010	5.2	2.50	1.5	26	23	2	2	2	0
225	Roaring Brook Lake	7/3/2010	4.9	3.45	1.5	26	25	2	2	1	0
225	Roaring Brook Lake	7/17/2010	4.8	3.00	1.5	31	28	1	1	1	0
225	Roaring Brook Lake	7/31/2010	4.9	2.30	1.5	23	25	2	2	3	2
225	Roaring Brook Lake	8/14/2010	4.8	1.55	1.5	25	26	1	2	1	0
225	Roaring Brook Lake	8/28/2010	4.9	2.20	1.5	24	23	1	2	1	0
225	Roaring Brook Lake	9/11/2010	4.8	3.25	1.5	23	22	1	2	1	0
225	Roaring Brook Lake	9/24/2010	4.9	2.30	1.5	26	21	2	2	1	0

Legend Information

Indicator	*Description*	*Detection Limit*	*Standard (S) / Criteria (C)*
General Information			
Lnum	lake number (unique to CSLAP)		
Lname	name of lake (as it appears in the Gazetteer of NYS Lakes)		
Date	sampling date		
Field Parameters			
Zbot	lake depth at sampling point, meters (m)		
Zsd	Secchi disk transparency or clarity	0.1m	1.2m (C)
Zsamp	water sample depth (m)	0.1m	none
Tair	air temperature (C)	-10C	none
TH20	water temperature (C)	-10C	none
Laboratory Parameters			
Tot.P	total phosphorus (mg/l)	0.003 mg/l	0.020 mg/l (C)
NOx	nitrate + nitrite (mg/l)	0.01 mg/l	10 mg/l NO3 (S), 2 mg/l NO2 (S)
NH4	total ammonia (mg/l)	0.01 mg/l	2 mg/l NH4 (S)
TN	total nitrogen (mg/l)	0.01 mg/l	none
TN/TP	nitrogen to phosphorus (molar) ratio, = (TKN + NOx)*2.2/TP		none
TCOLOR	true (filtered) color (ptu, platinum color units)	1 ptu	none
pH	powers of hydrogen (S.U., standard pH units)	0.1 S.U.	6.5, 8.5 S.U. (S)
Cond25	specific conductance, corrected to 25C (umho/cm)	1 umho/cm	none
Ca	calcium (mg/l)	1 mg/l	none
Chl.a	chlorophyll a (ug/l)	0.01 ug/l	none
Fe	iron (mg/l)	0.1 mg/1	1.0 mg/l (S)
Mn	manganese (mg/l)	0.01 mg/l	0.3 mg/l (S)
As	arsenic (ug/l)	1 ug/l	10 ug/l (S)
Lake Assessment			
QA	water quality assessment, 5 point scale; 1 = crystal clear, 2 = not quite crystal clear, 3 = definite algae greenness, 4 = high algae levels, 5 = severely high algae levels		
QB	aquatic plant assessment, 5 point scale; 1 = no plants visible, 2 = plants below surface, 3 = plants at surface, 4 = plants dense at surface, 5 = surface plant coverage		
QC	recreational assessment, 5 point scale; 1 = could not be nicer, 2 = excellent, 3 = slightly impaired, 4 = substantially impaired, 5 = lake not usable		
QD	reasons for recreational assessment, 8 choices; 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		

Appendix B: Priority Waterbody Listing for Roaring Brook Lake

Roaring Brook Lake (1301-0037) Need Verific

Waterbody Location Information

Revised: 07/11/2008

Water Index No:	H- 55-18-P183a			**Drain Basin:**	Lower Hudson River
Hydro Unit Code:	02030101/020	**Str Class:**	B		Lower Hudson River
Waterbody Type:	Lake			**Reg/County:**	3/Putnam Co. (40)
Waterbody Size:	114.9 Acres			**Quad Map:**	OSCAWANA LAKE (P-25-2)
Seg Description:	entire lake				

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Recreation	Stressed	Possible

Type of Pollutant(s)

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

Source(s) of Pollutant(s)

Known: ---
Suspected: ON-SITE/SEPTIC SYST, Urban/Storm Runoff
Possible: ---

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 1 (Waterbody Nominated, Problem Not Verified)
Lead Agency/Office: DOW/BWAM **Resolution Potential:** Medium
TMDL/303d Status: n/a

Further Details

Overview
Recreational uses in Roaring Brook Lake may experience minor impacts/threats due to excessive aquatic vegetation and/or algal growth. This assessment is based on previously reported concerns and conditions in the lake need to be verified.

Previous Assessment
Concerns that recreational uses and aesthetics in Walton Lake may be restricted by excessive aquatic vegetation were previously reported. A 1985 lake study by a consultant indicated suspected sources of nutrients feeding the lake include inadequate and/or failing on-site septic systems serving residences along the lake and lawn chemical/fertilizer usage. Urban runoff and the impact of proposed residential developments was also raised. (Putnam County WQCC, 1996)