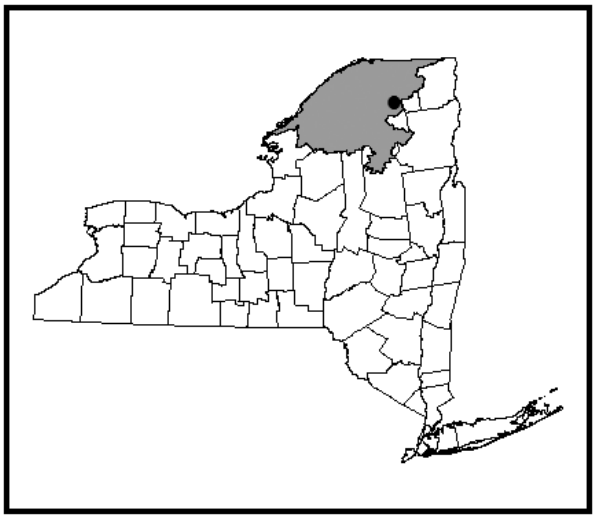
LCI Lake Water Quality Summary

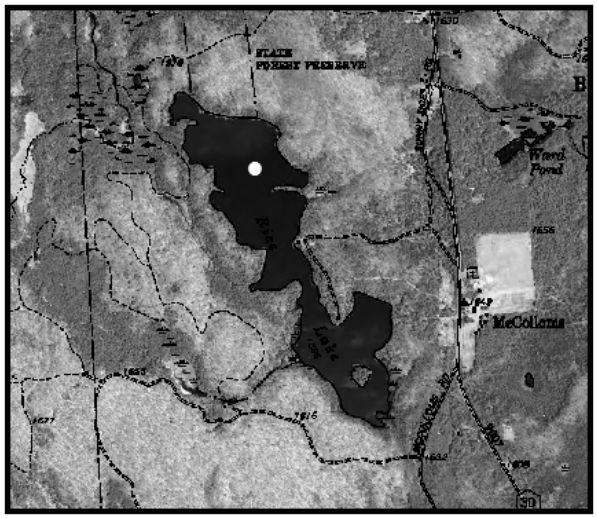
General Information

Lake Name:	**Rice Lake**
Location:	McColloms, Town of Brighton, Franklin County
Basin:	St. Lawrence River Basin
Size:	54.4 hectares (= 134 acres)
Lake Origins:	man-made
Major Tributaries:	no known inlet
Lake Tributary to?:	East Branch of the St. Regis River via Rice Brook
Water Quality Classification:	C (best intended use: secondary contact recreation)
Sounding Depth:	2.4 meters (= 8 feet)
Sampling Coordinates:	Not recorded
Sampling Access Point:	Private land (Joseph Hubard and Dick Brown)
Monitoring Program:	Lake Classification and Inventory (LCI) Survey
Sampling Date:	August 25, 2009
Samplers:	David Newman, NYSDEC Division of Water, Albany Steven Finnemore, NYSDEC Division of Water, Albany
Contact Information:	David Newman, NYSDEC Division of Water djnewman@gw.dec.state.ny.us; 518-402-8201

Lake Map

(sampling location marked with a circle)





Background and Lake Assessment

Rice Lake is a relatively shallow lake (10 foot maximum depth) lake located in the northern Adirondack Park. The land surrounding the majority of the lake is private (two land owners). The State of New York owns a very small parcel on the north shore of the lake. All of the land surrounding the lake is forested with a very small private road leading to two residences of the private land owners. This is the only access point to the lake. The lake has a small dam at the southwestern end. The lake currently supports fishing and boating.

Rice Lake was screened (single sampling event) in NYSDEC Division of Water's 2009 Lake Classification Inventory Survey (LCI), due to a lack of historical water quality data in the division's water quality database. The lake is not a candidate for intensive (monthly sampling) for the summer of 2010 due to the moderate to high water quality found during the screening year sampling session.

Rice Lake can be generally characterized as a *mesotrophic*, or moderately productive lake. The water clarity (TSI = 47, typical of *mesotrophic* lakes) was slightly lower than expected given the phosphors reading (TSI = 43, typical of *mesotrophic* lakes) and the chlorophyll *a* reading (TSI = 42, typical of *mesotrophic* lakes). These data indicate that baseline nutrient levels do not support persistent algal blooms in the lake.

The lake water was observed to possess a light brown or tea color. This coloring is due to natural tannins in water that come from weak organic acids found in the watershed. Three different rooted aquatic plant species were found growing in the lake. Acidic Adirondack lakes tend to have few if any rooted plants; however, the individual plants observed can be found in many other Adirondack lakes. The plant community was comprised of the floating leaf plant *Nymphaea sp.* (white water lilies) and submergent plants *Najas gracillima* (slender or thread-like naiad) and *Utricularia vulgaris* (common bladderwort). No exotic plants were observed, however, a more comprehensive survey of the entire lake would need to be done to completely rule out the presence of any exotic species.

Like most shallow lakes, Rice Lake does not exhibit thermal stratification, in which depth zones (warm water on top, cold water on the bottom during the summer) are established. Temperature and dissolved oxygen readings are comparable throughout the water column. pH readings indicate acidic waters, which is typical in the Adirondacks due naturally low alkalinity (buffering capacity) and acid precipitation. The pH level is below New York State standard of 6.5 and is low enough that it may limit or preclude the survival of many plant and fish species. The conductivity readings indicate soft water (low ionic strength), which is typical of Adirondack Park lakes.

Rice Lake appears to be typical of shallow, soft water Adirondack lakes. Other lakes with similar water quality characteristics often support warmwater fisheries, although pH levels may negatively impact some fish species. Coldwater fisheries may not be supported, given the lack of cold water during the summer. It is not known if springs or other temperature regufia exist to protect any salmonids or aquatic life susceptible to high summer temperatures. The LCI is not set up to fully evaluated fish populations. Chloride and other ions were at low levels which is typical

of lakes with a lack of development in their watersheds. None of the other water quality indicators measured through this program indicate water quality problems.

Aquatic life cannot be fully evaluated through the LCI. pH readings were low, which is again typical of lakes in the Adirondacks, but oxygen levels area fully supportive of aquatic life. No ecological impacts from low pH were observed.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Rice Lake is not classified for use as a potable water supply. Although the LCI data are not sufficient to evaluate potable water use, none of the water quality indicators evaluated by the LCI violated the NYS DOH drinking water standards.

Contact Recreation (Swimming)

Rice Lake is not classified for contact recreation—swimming and bathing. Bacteria data are needed to evaluate the safety of Rice Lake for swimming—these are not collected through the LCI. The data collected through the LCI do not indicate any issues that would prevent the lake from being used for swimming. The water clarity was well above the DOH guidance value (= 1.2 meters) for safe swimming. Aquatic plants may make swimming difficult in certain areas of the lake and shallow soft bottom areas of the lake may also not be suitable for swimming

Non-Contact Recreation (Boating and Fishing)

Rice Lake is classified for non-contact recreation. These uses are currently supported on the lake. The density of floating leafed plants in some areas of the lake may make boating difficult in these specific areas. The low pH level may impact fisheries although this cannot be fully evaluated through this program.

Aquatic Life

This use cannot be fully evaluated through the LCI, but low pH levels may negatively impact some aquatic life. Additional biological studies would be needed fully evaluate impacts to aquatic life.

Aesthetics

These data indicate that there is no impact to the aesthetics of the lake. One of the private landowners did suggest that water clarity has been decreasing over the last several years and there has been an increase in aquatic plants. If these trends continue aesthetics may start to become stressed.

Additional Comments

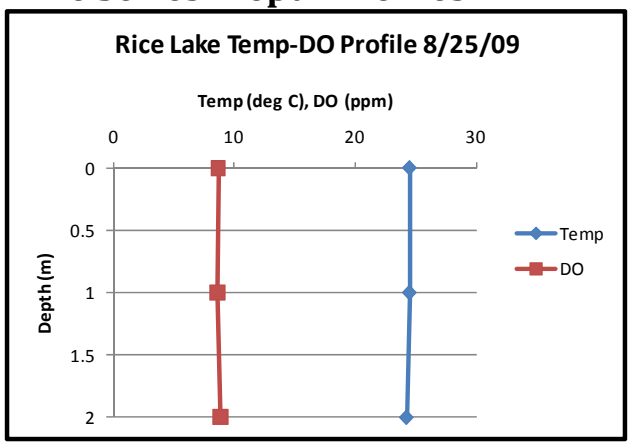
1. Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any new invaders, given the escalating problems with exotic aquatic weeds in many parts of the Adirondack Park.

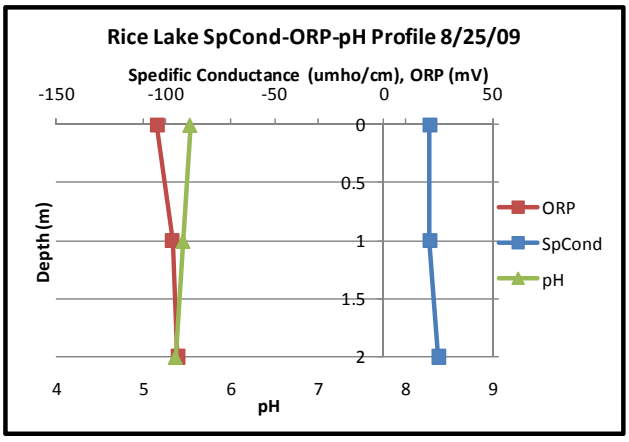
2. A policy of cleaning boats and gear used on other water bodies before using them on Rice Lake will limit the potential for the spread of invasive species to Rice Lake.
3. Current declines in water clarity observed by the private land owners may just be part of the natural cycle of Rice Lake. The lake may naturally move along a gradient from oligotrophic (unproductive, crystal clear and devoid of plant life) to eutrophic (highly productive, reduced water clarity due to algal production and high density of plant life). Periodically draining the lake, as was done back in the 1980's, may reset this natural cycle. Drawdown of the lake is a regulated activity for lakes in the Adirondack Park and may require a permit from the APA.
4. Additional biological monitoring may be warranted to determine if any ecological impacts stem from the dilute, slightly acidic waters measured through the LCI. This detailed biological monitoring is beyond the scope of this monitoring program.

Aquatic Plant IDs

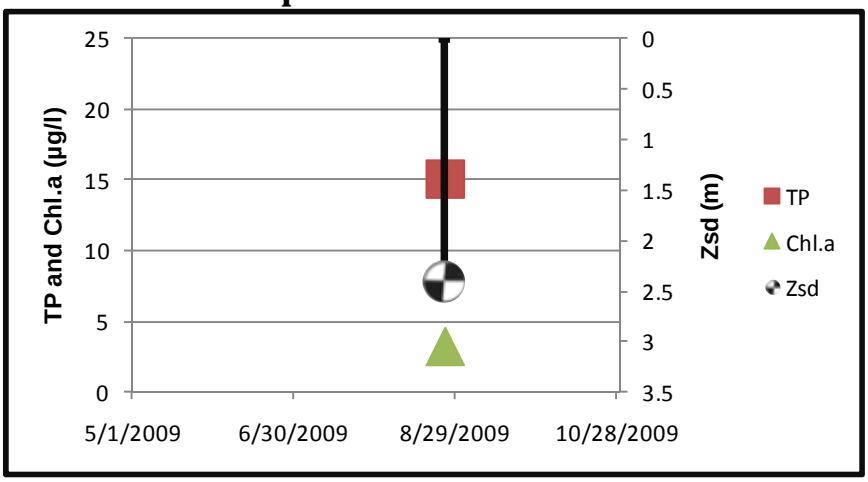
Exotic Plants:	None
Native Plants:	*Najas gracillima* (thread-like naiad)
	Utricularia vulgaris (common bladderwort)
	Nymphaea sp. (white water lily)

Time Series: Depth Profiles





Time Series: Trophic Indicators



WQ Sampling Results

Surface Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
SECCHI	meters	2.4	Mesotrophic	Readings does not violate DOH guidance value
TSI-Secchi		47.4	Mesotrophic	No pertinent water quality standards
TP	mg/l	0.015	Mesotrophic	Readings does not violate DEC guidance values
TSI-TP		43.2	Mesotrophic	No pertinent water quality standards
TSP	mg/l	0.01	High % soluble Phosphorus	No pertinent water quality standards
NOx	mg/l	0.003	Low nitrate	Reading does not violate guidance
NH4	mg/l	0.019	Low ammonia	Reading does not violate guidance
TKN	mg/l	0.57	Intermediate organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	84.04	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	3.2	Mesotrophic	No pertinent water quality standards
TSI-CHLA		42.0	Mesotrophic	No pertinent water quality standards
Alkalinity	mg/l	7.9	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	ND	Uncolored	No pertinent water quality standards
TOC	mg/l	6		No pertinent water quality standards
Ca	mg/l	2.8	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	0.224		Reading does not violate water quality standards
Mn	mg/l	0.0165		Reading does not violate water quality standards
Mg	mg/l	1		Reading does not violate water quality standards
K	mg/l	0.462		No pertinent water quality standards
Na	mg/l	0.937		Reading does not violate water quality standards
Cl	mg/l	2	Little impact from road salt	Reading does not violate water quality standards
SO4	mg/l	3		Reading does not violate water quality standards

Lake Perception

	UNITS	Reading	Scientific Classification	Regulatory Comments
WQ Assessment	1-5, 1 best	3	Definite Algal Greenness	No pertinent water quality standards
Weed Assessment	1-5, 1 best	3	Plants Grow to Lake Surface	No pertinent water quality standards
Recreational Assessment	1-5, 1 best	3	Slightly Impaired	No pertinent water quality standards

Legend Information

General Legend Information

Surface Samples = integrated sample collected in the first 2 meters of surface water
SECCHI = Secchi disk water transparency or clarity - measured in meters (m)
TSI-SECCHI = Trophic State Index calculated from Secchi, = 60 – 14.41*ln(Secchi)

Laboratory Parameters

ND = Non-Detect, the level of the analyte in question is at or below the laboratory's detection limit
TP = total phosphorus- milligrams per liter (mg/l)
Detection limit = 0.003 mg/l; NYS Guidance Value = 0.020 mg/l
TSI-TP = Trophic State Index calculated from TP, = 14.42*ln(TP*1000) + 4.15
TSP = total soluble phosphorus, mg/l
Detection limit = 0.003 mg/l; no NYS standard or guidance value
NOx = nitrate + nitrite nitrogen, mg/l
Detection limit = 0.01 mg/l; NYS WQ standard = 10 mg/l
NH4 = total ammonia, mg/l
Detection limit = 0.01 mg/l; NYS WQ standard = 2 mg/l
TKN = total Kjeldahl nitrogen (= organic nitrogen + ammonia), mg/l
Detection limit = 0.01 mg/l; no NYS standard or guidance value
TN/TP = Nitrogen to Phosphorus ratio (molar ratio), = (TKN + NOx)*2.2/TP
> 30 suggests phosphorus limitation, < 10 suggests nitrogen limitation
CHLA = chlorophyll *a*, micrograms per liter (µg/l) or parts per billion (ppb)
Detection limit = 2 µg/l; no NYS standard or guidance value
TSI-CHLA = Trophic State Index calculated from CHLA, = 9.81*ln(CHLA) + 30.6
ALKALINITY = total alkalinity in mg/l as calcium carbonate
Detection limit = 10 mg/l; no NYS standard or guidance value
TCOLOR = true (filtered or centrifuged) color, platinum color units (ptu)
Detection limit = 5 ptu; no NYS standard or guidance value
TOC = total organic carbon, mg/l
Detection limit = 1 mg/l; no NYS standard or guidance value
Ca = calcium, mg/l
Detection limit = 1 mg/l; no NYS standard or guidance value
Fe = iron, mg/l
Detection limit = 0.1 mg/l; NYS standard = 0.3 mg/l
Mn = manganese, mg/l
Detection limit = 0.01 mg/l; NYS standard = 0.3 mg/l
Mg = magnesium, mg/l
Detection limit = 2 mg/l; NYS standard = 35 mg/l
K = potassium, mg/l

Detection limit = 2 mg/l; no NYS standard or guidance value

Na = sodium, mg/l
Detection limit = 2 mg/l; NYS standard = 20 mg/l

Cl = chloride, mg/l
Detection limit = 2 mg/l; NYS standard = 250 mg/l

SO4 = sulfate, mg/l
Detection limit = 2 mg/l; NYS standard = 250 mg/l

Field Parameters

Depth = water depth, meters

Temp = water temperature, degrees Celsius

D.O. = dissolved oxygen, in milligrams per liter (mg/l) or parts per million (ppm)
NYS standard = 4 mg/l; 5 mg/l for salmonids

pH = powers of hydrogen, standard pH units (S.U.)
Detection limit = 1 S.U.; NYS standard = 6.5 and 8.5

SpCond = specific conductance, corrected to 25ºC, micromho per centimeter (µmho/cm)
Detection limit = 1 µmho/cm; no NYS standard or guidance value

ORP = Oxygen Reduction Potential, millivolts (MV)
Detection limit = -250 mV; no NYS standard or guidance value

Lake Assessment

WQ Assessment **= 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

Weed Assessment **= weed coverage/density assessment**, 5 point scale, 1 = no plants visible, 2 = plants below surface, 3 = plants at surface, 4 = plants dense at surface, 5 = plants cover surface

Recreational Assessment **= swimming/aesthetic assessment**, 5 point scale; 1 = could not be nicer, 2 = excellent, 3= slightly impaired, 4 = substantially impaired, 5 = lake not usable