LCI Lake Water Quality Summary

General Information

Lake Name: Wolf Pond

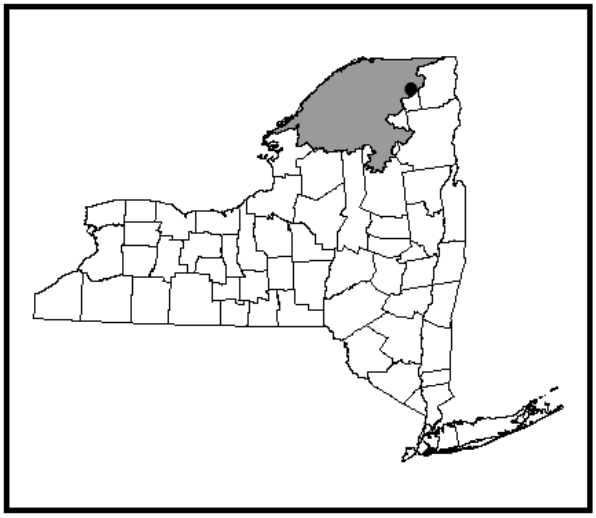
Location: Town of Bellmont, Franklin County, NY
Basin: St. Lawrence River Basin
Size: 20.7 hectares (51 acres)
Lake Origins: natural
Major Tributaries: none
Lake Tributary to?: none
Water Quality Classification: B (best intended use: primary contact recreation)

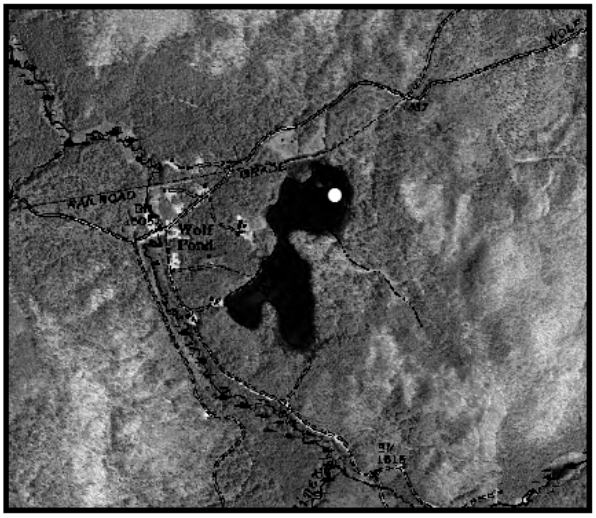
Sounding Depth: 15.2 meters (50 feet)
Sampling Coordinates: Latitude: 44.65031, Longitude: -74.05734
Sampling Access Point: private land (Floyd Hatch)

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

Wolf Pond is a 50 acre private Adirondack Park lake in Franklin County, northeast of the town of Paul Smiths. All the land surrounding the lake is privately owned by a few landowners. There are only a few predominately seasonal use buildings on the lake. The lake's watershed is almost entirely forested although there has been some logging within the past 10 years around the lake. One of the landowners stated that the water level has been rising over the past several years. In the mid 1980's the lake had a baking soda treatment to help raise the pH level of the lake that was suffering from the impacts of acid rain.

Wolf Pond was included in the 2009 New York State DEC Division of Water's 2009 screening (single sampling event) Lake Classification and Inventory (LCI) survey of the St. Lawrence River Basin. Inclusion in this survey was due to a "Impaired Segment" listing in the February 2009 Saint Lawrence River Basin Waterbody Inventory and Priority Waterbodies List (WIPWL). The WIPWL states that, Aquatic life support in Wolf Pond are known to be impaired by low pH, a result of atmospheric deposition (acid rain). Historical monitoring by the Division of Fish Wildlife and Marine Resources showed that pH levels were below 5.0.

Wolf Pond can be generally characterized as *mesotrophic*, or moderately productive. The water clarity reading (TSI = 45, typical of *mesotrophic* lakes) was expected given the phosphorus reading (TSI = 47 typical of *mesotrophic* lakes) and the chlorophyll *a* reading (TSI = 43 typical of *mesotrophic* lakes). These data indicate baseline nutrient levels do not support persistent algal blooms in the lake.

The lake water was observed to have a slight brown coloration, which may be due to natural tannins in the water that come from weak organic acids found in the watershed. The water clarity was close to 3 meters, which was in the range of other lakes sampled in the St. Lawrence River Basin. There were two native species of water lilies observed in a small shallow area of the lake, with the majority of the lake being devoid of plant life. The acidic conditions in the lake may prevent most plant species from surviving in the lake.

Wolf Pond exhibits thermal stratification, in which depth zones (warm water on top, cold water on the bottom during the summer) are established, as in most NYS lakes greater than 6 meters in depth. The thermocline in the lake was around 4 meters in late August. Hypoxic (reduced oxygen content) conditions were found below 4 meters with anoxic (without oxygen) conditions in the bottom 3 meters of the pond. Surface pH readings were below 5 indicating that the acidic conditions recorded in the early 1980's have returned. Due to equipment failure a conductivity reading was not able to be taken. Softwater is typically found in water bodies throughout the Adirondacks and is a function of the underlying soil and rock types for the area. The oxygen reduction potential (ORP) readings dropped below zero in the in the deepest few meters of the pond, indicating that oxygen deficits may be persistent.

The lake appears to be typical of other acidified Adirondack waterbodies. The acidic conditions are unlikely to support a strong lake fisheries, although fisheries survival cannot be fully evaluated through this monitoring program. The hypoxic and anoxic conditions found below the thermocline are also not supportive of aquatic life.

The soluble (available) phosphorus levels makes up a high percentage of the total phosphorus, suggesting primary algal production may not be limited by phosphorus. In the case of Wolf Pond, acidic conditions probably limits algae. Total phosphorus levels were high in the bottom waters, which may be due to the oxygen deficiencies that allow phosphorus bound in the sediments to be released into the water column. There were elevated iron levels in the bottom waters which is typically seen in water bodies experiencing oxygen deficiencies. However, nitrate and ammonia levels were low, which would not be indicative of persistent oxygen deficiencies. Chloride and other ion levels were low, which is typical for waterbodies in highly forested watersheds lacking development.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Wolf Pond is not classified for use as a potable water supply. Although the LCI data are not sufficient to evaluate potable water use, these data suggest that the lake water require substantial treatment to serve as a potable water supply. pH levels in the surface and bottom waters would not meet drinking water standards and the elevated iron levels are also above drinking water standards.

Contact Recreation (Swimming)

Wolf Pond is classified for contact recreation- swimming and bathing. Landowners indicated that they do occasionally swim and scuba dive in the pond. Bacteria data are needed to evaluate the safety to Wolf Pond 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 form being used for swimming. The water clarity was well above the State Department of Health's guidance value of 1.2 meters.

Non-Contact Recreation (Boating and Fishing)

These data did not indicate anything that would prevent the lake from being used for boating. Due to low pH levels fish may not be surviving in the pond, as discussed below.

Aquatic Life

Low pH levels and the reduced oxygen levels in the lake may not be supportive of aquatic life. Additional biological studies would need to be conducted to fully evaluate impacts to aquatic life.

Aesthetics

These data indicate that there are no impacts to the aesthetics of the lake.

Additional Comments

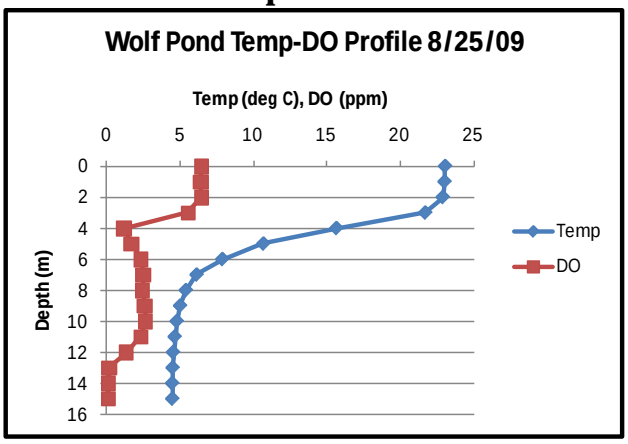
1. Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any new invaders, given the escalating problems with exotic aquatic weeds. Insuring any boats brought to the pond are cleaned well before placing them in the lake will help prevent inadvertent introductions to the pond.

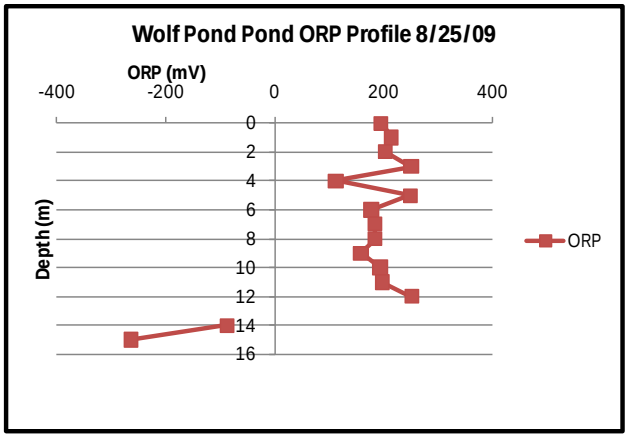
2. Concerns about varying water levels due to excessive (episodic) seepage cannot be evaluated through this program, and would need to be investigated through other means.

Aquatic Plant IDs

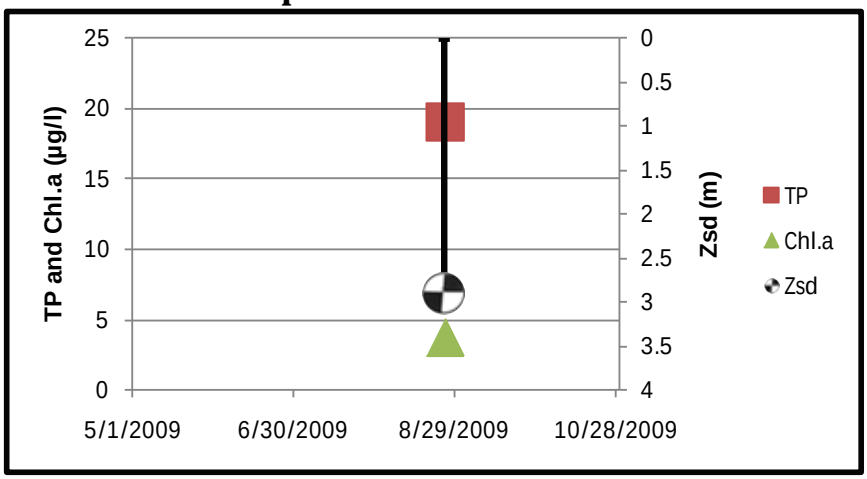
Exotic Plants: none observed
Native Plants: *Nuphar sp.* (yellow water lily)
Nymphaea sp. (white water lily)

Time Series: Depth Profiles





Time Series: Trophic Indicators



WQ Sampling Results

Surface Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
SECCHI	meters	2.9	Mesotrophic	Readings does not violate DOH guidance value
TSI-Secchi		44.7	Mesotrophic	No pertinent water quality standards
TP	mg/l	0.019	Mesotrophic	Readings does not violate DEC guidance values
TSI-TP		46.6	Mesotrophic	No pertinent water quality standards
TSP	mg/l	0.0147	High % soluble Phosphorus	No pertinent water quality standards
NOx	mg/l	0.0054	Low nitrate	Reading does not violate guidance
NH4	mg/l	0.025	Low ammonia	Reading does not violate guidance
TKN	mg/l	0.48	Low organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	56.20	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	3.7	Mesotrophic	No pertinent water quality standards
TSI-CHLA		43.4	Mesotrophic	No pertinent water quality standards
Alkalinity	mg/l	ND	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	ND	Uncolored	No pertinent water quality standards
TOC	mg/l	5.1		No pertinent water quality standards
Ca	mg/l	0.298	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	0.197		Reading does not violate water quality standards
Mn	mg/l	0.0113		Reading does not violate water quality standards
Mg	mg/l	0.103		Reading does not violate water quality standards
K	mg/l	0.254		No pertinent water quality standards
Na	mg/l	0.837		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	2.2		Reading does not violate water quality standards

Bottom Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
TP-bottom	mg/l	0.0519	Elevated deepwater phosphorus	No pertinent water quality standards
TSP-bottom	mg/l	0.0384	High % soluble phosphorus	No pertinent water quality standards
NOx-bottom	mg/l	0.0103	No evidence of DO depletion	Reading does not violate water quality standards
NH4-bottom	mg/l	0.32	Evidence of DO depletion	Reading does not violate water quality standards
TKN-bottom	mg/l	0.72		No pertinent water quality standards
Alk-bottom	mg/l	-2	Poorly Buffered	No pertinent water quality standards
TCOLOR-bottom	ptu	20	Weakly Colored	No pertinent water quality standards
TOC-bottom	mg/l	5.5		No pertinent water quality standards
Ca-bottom	mg/l	0.383	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe-bottom	mg/l	0.613	Taste or odor likely	Reading violates water quality standards

Bottom Sample (Continued)

	UNITS	Reading	Scientific Classification	Regulatory Comments
Mn-bottom	mg/l	0.0232		Reading does not violate water quality standards
Mg-bottom	mg/l	0.0991		Reading does not violate water quality standards
K-bottom	mg/l	0.278		
Na-bottom	mg/l	0.912		Reading does not violate water quality standards
Cl-bottom	mg/l	2		Reading does not violate water quality standards
SO4-bottom	mg/l	2.3		Reading does not violate water quality standards
As-bottom	mg/l	Not detected	No evidence of potable water threats	Reading does not violate guidance value

Lake Perception

	UNITS	Reading	Scientific Classification	Regulatory Comments
WQ Assessment	1-5, 1 best	2	Not Quite Crystal Clear	No pertinent water quality standards
Weed Assessment	1-5, 1 best	2	Plants Visible Below Surface	No pertinent water quality standards
Recreational Assessment	1-5, 1 best	2	Excellent for Most Uses	No pertinent water quality standards

Legend Information

General Legend Information

Surface Samples = integrated sample collected in the first 2 meters of surface water
Bottom Samples = grab sample collected from a depth of approximately 1 meter from the lake bottom
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
As	=arsenic, mg/l Detection limit = 3.2 mg/l; NYS standard = 10 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