

LCI Lake Water Quality Summary

General Information

Lake Name: Pratt's Pond/Airport Pond

Location: Town of Mina, Chautauqua County, NY

Basin: Allegheny River Basin

Size: 1.7 hectares (4.25 acres)

Lake Origins: Manmade around 1960

Major Tributaries: none

Lake Tributary to: West Branch French Creek

Water Quality Classification: C (best intended use: secondary contact recreation)

Sounding Depth: 4 meters (13 feet)

Sampling Coordinates: 42.14715, -79.6854

Sampling Access Point: Private land at the Southern end of the pond

Monitoring Program: Lake Classification and Inventory (LCI) Survey

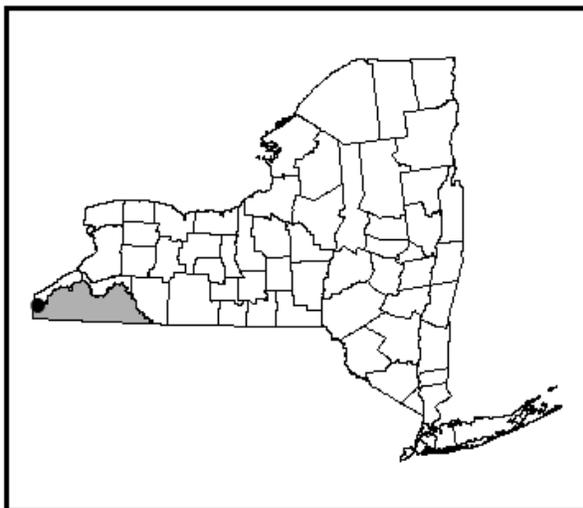
Sampling Date: July 6, 2011

Samplers: David Newman, NYSDEC Division of Water, Albany
Brian Hourigan, NYSDEC Division of Water, Buffalo

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

Airport Pond is a small manmade waterbody that has been used by private landowners and their guests for recreational purposes, including swimming, fishing, and observing nature. At the present time, the shoreline is equally divided between tree and mowed grass cover. In the past, efforts were made to reinforce the southern shoreline that had been eroding away. The NYSDEC Division of Water's lake water quality database had no previous data for the pond, and thus the pond was included in the 2011 Lake Classification and Inventory (LCI) screening program. At this time, there are no perceived water quality issues that would make this pond a candidate for additional monitoring in 2012.

Airport Pond can be characterized as *mesotrophic*, or moderately productive. The water clarity reading taken in late July (TSI = 47, typical of *mesotrophic* waterbodies) was in the expected range given the total phosphorus reading (TSI = 46, typical of *mesotrophic* waterbodies) and the chlorophyll *a* reading (TSI = 52, typical of *eutrophic* waterbodies). These data indicate that baseline nutrients do not support persistent algal blooms in the pond, but additions of phosphorus to the pond may trigger algal blooms.

In early July, the pond's surface water had a slight brown color, resulting in a water clarity reading of 2.5 meters (~8 feet). Two native aquatic plant species were found in the pond; *Ceratophyllum demersum* (coontail) and *Nymphaea sp.* (white water lily). The land owner indicated that a small number of lilies had been purposely introduced to the pond in the 1980's; these lilies now ring the shallow margins of the entire pond. Coontail is a native plant commonly found in waterbodies throughout the state. A more thorough plant specific survey may yield additional aquatic plants; however, it is unlikely there would be any exotic invasive species present due to the limited access to the lake.

Airport Pond exhibited week thermal stratification, in which depth zones (warm water on top, cold water on the bottom during the summer) are established. The thermocline in the pond was around 3 meters. Hypoxic (reduced oxygen levels) were found in the bottom one meter of the pond. This is commonly observed in lakes with moderate to high nutrient levels. The conductivity readings indicated soft water (low ionic strength) and pH readings indicated slightly alkaline conditions. Both the pH and conductivity readings were similar to those seen at a nearby pond and are probably typical for small waterbodies in this portion of the state.

Airport Pond appears typical of soft water, weakly colored, slightly alkaline waterbodies. Other water bodies with similar water quality characteristics support warmwater fish species, although the lack of cold oxygen rich water may not be supportive of coldwater fish species. However, fisheries habitat cannot be fully evaluated by the LCI. A fisheries survey would need to be conducted to further evaluate the fisheries of the pond.

Nitrogen levels were low, while iron and manganese readings were elevated in the bottom waters, which is typical of waterbodies experiencing deepwater oxygen deficits. Arsenic levels were above the laboratory detection limit in the bottom water sample; however, these readings are below the World Health Organization (WHO) standard for drinking water. Chloride levels were low in both the bottom and surface waters, indicating there has been little to no impact on the pond from road salting or runoff through urbanized areas.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Airport 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 water from the surface might be impacted due to occasionally elevated algae levels, and bottom waters of the pond would require substantial treatment to serve as a potable water supply due to the elevated manganese, iron and arsenic levels.

Contact Recreation (Swimming)

Airport Pond is not classified for primary contact recreation- swimming and bathing being the best intended use. The New York State Water Quality Classification of *Class C* states: water quality shall be suitable for primary contact recreation, although other factors may limit the use for this purpose. The private landowner did indicate that at least at one time people did swim in the lake. Bacteria data are needed to evaluate the safety of Airport Pond for swimming—these are not collected through the LCI. The data collected through the LCI indicate *no known impact* to swimming with a water clarity reading above the State Department of Health’s guidance value of 1.2 meters to protect swimmers, although elevated algae levels may ultimately *threaten* this use.

Non-Contact Recreation (Boating and Fishing)

Class “C” waters shall be suitable for boating and fishing. The data collected through the LCI indicates *no known impact* to boating or fishing on the pond.

Aquatic Life

Organisms susceptible to high summer temperature may be *stressed* due to a lack of cold oxygen rich water in the pond during the summer. Additional biological studies would need to be conducted to further evaluate impacts to aquatic life.

Aesthetics

These data indicate *no known impact* to the aesthetics of the pond.

Additional Comments

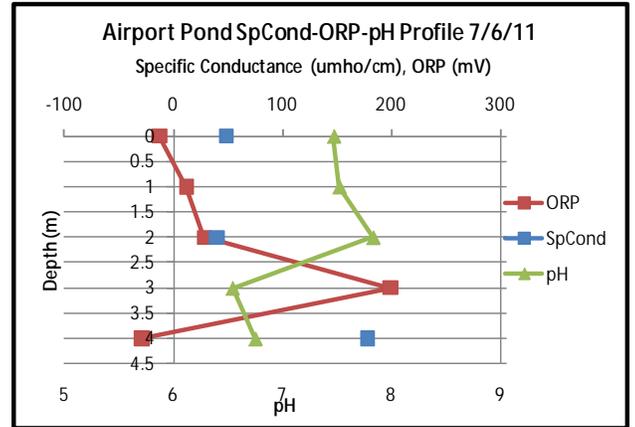
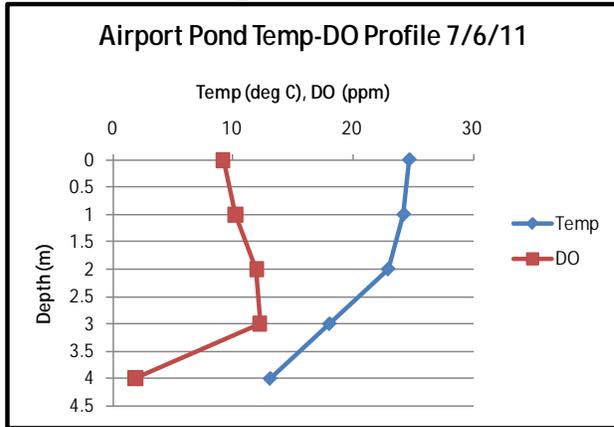
- Airport Pond has probably seen little change through the years as the land use around the pond has remained unchanged. Future development of the neighboring airstrip and or surrounding land would likely have some impact to the pond’s water quality.
- Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any new invaders, given the escalating problems with exotic aquatic weeds.

Aquatic Plant IDs

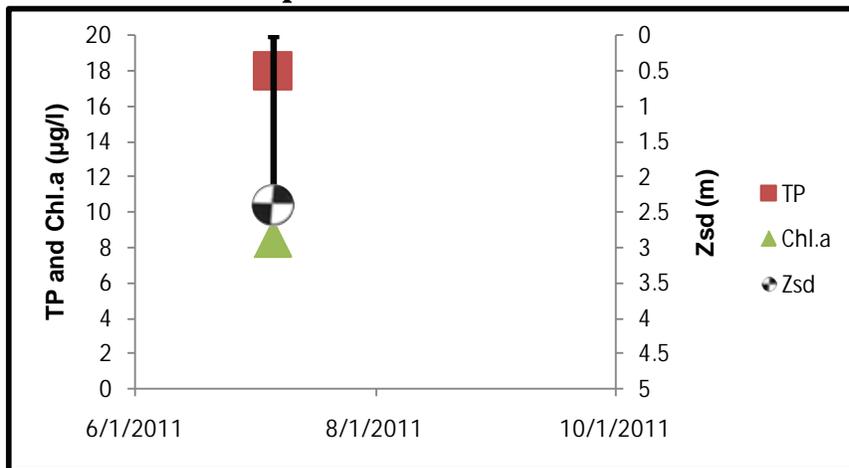
Exotic Plants: None observed

Native Plants: *Ceratophyllum demersum* (coontail)
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	0.018	Mesotrophic	Reading does not violate DEC guidance values
TSI-TP		45.8	Mesotrophic	No pertinent water quality standards
TSP	mg/l	0.0069	High % soluble Phosphorus	No pertinent water quality standards
NOx	mg/l	ND	Low nitrate	Reading does not violate guidance
NH4	mg/l	ND	Low ammonia	Reading does not violate guidance
TKN	mg/l	0.34	Low organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	39.11	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	8.50	Eutrophic	No pertinent water quality standards
TSI-CHLA		51.6	Eutrophic	No pertinent water quality standards
Alkalinity	mg/l	28.7	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	19	Weakly Colored	No pertinent water quality standards
TOC	mg/l	3.8		No pertinent water quality standards
Ca	mg/l	9.94	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	0.487	Taste or odor likely	Reading does not violate water quality standards
Mn	mg/l	0.0433		Reading does not violate water quality standards
Mg	mg/l	1.78		Reading does not violate water quality standards
K	mg/l	ND		No pertinent water quality standards
Na	mg/l	0.212		Reading does not violate water quality standards
Cl	mg/l	ND	Little impact from road salt	Reading does not violate water quality standards
SO4	mg/l	2.7		Reading does not violate water quality standards

Bottom Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
TP-bottom	mg/l	0.1	Elevated deepwater phosphorus	No pertinent water quality standards
TSP-bottom	mg/l	0.012	Little available phosphorus	No pertinent water quality standards
NOx-bottom	mg/l	ND	No evidence of DO depletion	Reading does not violate water quality standards
NH4-bottom	mg/l	ND	No evidence of DO depletion	Reading does not violate water quality standards
TKN-bottom	mg/l	1.19		No pertinent water quality standards
Alk-bottom	mg/l	53.3	Moderately Buffered	No pertinent water quality standards
TCOLOR-bottom	ptu	39	Highly Colored	No pertinent water quality standards
TOC-bottom	mg/l	6.3		No pertinent water quality standards
Ca-bottom	mg/l	14.9	Minimally Supports Zebra Mussels	No pertinent water quality standards
Fe-bottom	mg/l	4.62	Taste or odor likely	Reading violates water quality standards

Bottom Samples (Continued)

	UNITS	Reading	Scientific Classification	Regulatory Comments
Mn-bottom	mg/l	3.92	Taste or odor likely	Reading violates water quality standards
Mg-bottom	mg/l	2.59		Reading does not violate water quality standards
K-bottom	mg/l	1.34		No pertinent water quality standards
Na-bottom	mg/l	0.749		Reading does not violate water quality standards
Cl-bottom	mg/l	ND		Reading does not violate water quality standard
SO4-bottom	mg/l	ND		Reading does not violate water quality standards
As-bottom	mg/l	0.246	Threat to deep potable water intakes	Reading does not violate water quality standards

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	3	Plants Grow to Lake 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, = $60 - 14.41 * \ln(\text{Secchi})$

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, = $14.42 * \ln(\text{TP} * 1000) + 4.15$
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), = $(\text{TKN} + \text{NOx}) * 2.2 / \text{TP}$ > 30 suggests phosphorus limitation, < 10 suggests nitrogen limitation
CHLA	= chlorophyll <i>a</i> , micrograms per liter (µg/l) or parts per billion (ppb)

TSI-CHLA	Detection limit = 2 µg/l; no NYS standard or guidance value
ALKALINITY	= Trophic State Index calculated from CHLA, = $9.81 * \ln(\text{CHLA}) + 30.6$ = total alkalinity in mg/l as calcium carbonate
TCOLOR	Detection limit = 10 mg/l; no NYS standard or guidance value = true (filtered or centrifuged) color, platinum color units (ptu)
TOC	Detection limit = 5 ptu; no NYS standard or guidance value = total organic carbon, mg/l
Ca	Detection limit = 1 mg/l; no NYS standard or guidance value = calcium, mg/l
Fe	Detection limit = 1 mg/l; no NYS standard or guidance value = iron, mg/l
Mn	Detection limit = 0.1 mg/l; NYS standard = 0.3 mg/l = manganese, mg/l
Mg	Detection limit = 0.01 mg/l; NYS standard = 0.3 mg/l = magnesium, mg/l
K	Detection limit = 2 mg/l; NYS standard = 35 mg/l = potassium, mg/l
Na	Detection limit = 2 mg/l; no NYS standard or guidance value = sodium, mg/l
Cl	Detection limit = 2 mg/l; NYS standard = 20 mg/l = chloride, mg/l
SO4	Detection limit = 2 mg/l; NYS standard = 250 mg/l = sulfate, mg/l
As	Detection limit = 2 mg/l; NYS standard = 250 mg/l = 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 25°C, 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