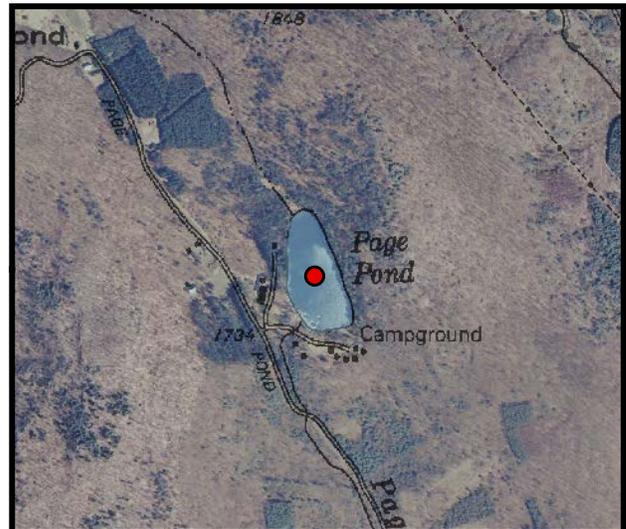
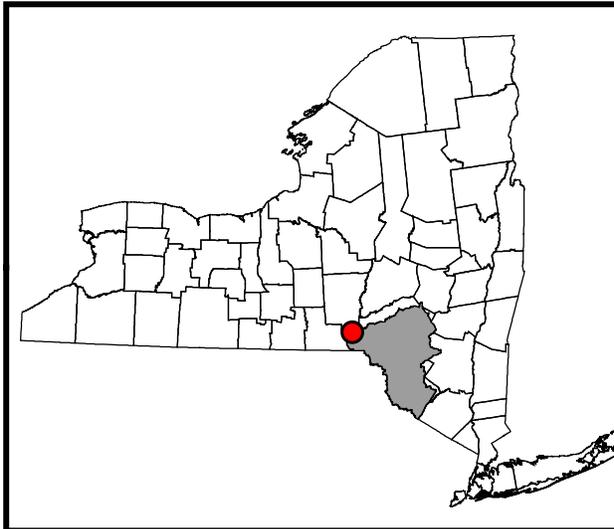


LCI 2014 Lake Water Quality Summary: Page Pond

General Lake Information

Location	Town of Sanford
County	Broome
Basin	Delaware River Basin
Size	4 hectares (10 acres)
Lake Origins	Natural, augmented with a berm, to provide power to a mill
Watershed Area	425 hectares (1,047 acres)
Retention Time	
Maximum Depth	9.0 meters (30 feet)
Access	Restricted, Girl Scouts of NYPENN Pathways
Major Tributaries	Page Pond Brook
Lake Tributary To...	Page Pond Brook to Oquaga Creek
WQ Classification	B (contact recreation = swimming)
Sampling Latitude	42.5363
Sampling Longitude	-73.9597
Sampling Date	8/6/2014
2014 Sampling Staff	David Newman & Brad Wenskoski
DEC Contact	David Newman, DEC Division of Water david.newman@dec.ny.gov

Lake Map



Background

Page Pond is a slightly greater than 1000 acres, class B lake located in the town of Sanford in Broome County New York. The lake is located at the Amahami Outdoor Program Center, which is owned and operated by the Girl Scouts of NYPENN Pathways. The Amahami Outdoor Program Center is used by girl scouts and other groups as an opportunity for exploring the outdoors and participating in other camp activities. Page Pond is specifically used for swimming and boating by those visiting the program center.

Lake Uses

Page Pond 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 fishing; aesthetics and aquatic life. Access to Page Pond and the rest of the Amahami property is restricted to groups with reservations for the facility, there is no access for the general public.

General statewide fishing regulations are applicable in Page Pond.

Historical Water Quality Data

Prior to the summer of 2014, there had not been any DEC directed water quality studies of the pond. For assessment purposes the pond was included in the Lake Classification and Inventory's screening program (single sampling event) in the Delaware River Basin. Page Pond was one of 13 waterbodies sampled in the basin.

Summary of 2014 LCI Sampling Results

Evaluation of Eutrophication Indicators

Based on a single sampling event Page Pond can generally be characterized as *mesoeutrophic*, or moderately productive to highly productive. The water clarity reading of 2.95 meters (typical of *mesotrophic* lakes) was expected given the total phosphorus reading of 18ug/l. The chlorophyll a reading of 12.2 ug/l (typical of eutrophic lakes) was higher than expected given the water clarity and phosphorus readings. With data from only a single point in time it is hard to draw any conclusions regarding the discrepancy in the eutrophication indicators. One possibility is, that due to wind mixing, phosphorus is being reductively released from bottom sediment and may be migrating into the surface water and fueling primary production. In the absence of high winds the pond likely holds its thermal stratification preventing the mixing of the more highly enriched cold bottom waters with the warmer less enriched surface waters.

The surface phosphorus and water clarity readings were in the range of values deemed as fully supporting public bathing and other recreational uses of the pond. The chlorophyll a value suggest that recreational uses in the pond may be impacted.

Evaluation of Limnological Indicators

Alkalinity levels were low, indicating the pond is poorly buffered against acidic inputs. Color readings indicate low levels of dissolved organic matter, typical of other lakes in the area. Nitrate, ammonia and organic nitrogen levels were low. The nitrogen to phosphorus ratio indicate that algae growth is controlled by phosphorus rather than nitrogen which is typical of New York State lakes. None of the other indicators sampled through this program point to any water quality impairments.

Evaluation of Depth Profiles

Page Pond exhibited thermal stratification, in which depth zones (warm water on top, cold water on the bottom during the summer) are established. In early August there was a distinct thermocline between 3 and 4 meters where the temperature levels rapidly dropped off. In the metalimnion, transition layer between warm upper waters and colder bottom waters, a dissolved oxygen maximum was observed. Below 5 meters in depth the dissolved oxygen level quickly dropped to zero, or exhibiting anoxic conditions (lack of oxygen). The dissolved oxygen profile shows that cold-water fish may be able to survive within a 3-4 meter layer of cool to cold oxygen rich water layer. Below 5-6 meters dissolved oxygen levels would not be supportive of fish.

The pH readings show that the lakes surface waters are slightly basic with lower water layers being slightly acidic. Specific conductance levels indicate soft water (low ionic strength.) The pH and specific conductance values fell within the range of values observed in other Delaware Basin lakes.

Evaluation of Biological Condition

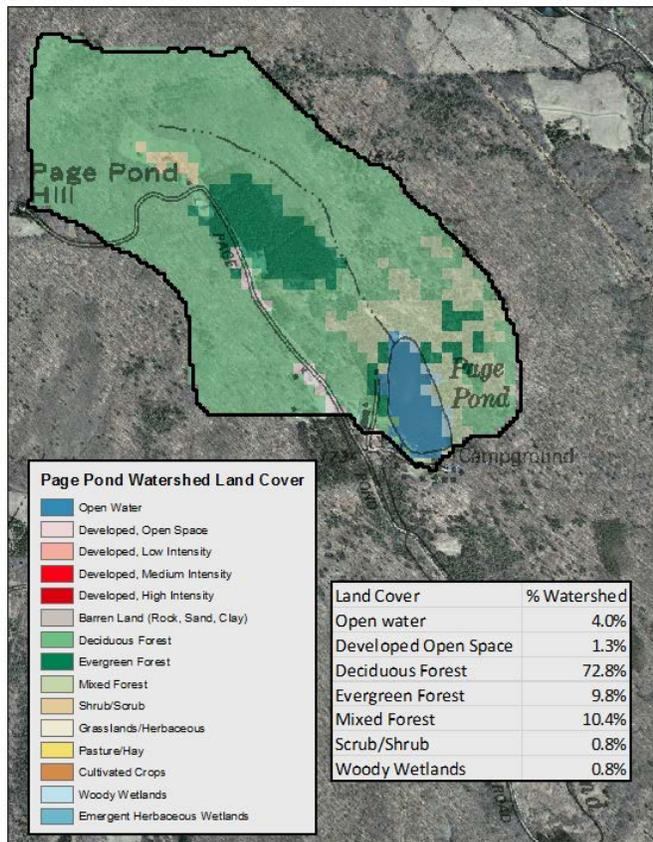
Macrophytes were informally surveyed during the sampling trip. The only species of aquatic plant that was observed was the native yellow water lily (*Nuphar sp.*). No other native or invasive aquatic plant species were observed at the pond.

Evaluation of Lake Perception

An evaluation of user perception was made during the sampling trip to the pond. Users' perception of water clarity was noted as not quite crystal clear with a slight tannic appearance, with no mention of algal greenness. The extent of the lilies did not impact recreational activities on the pond. The overall all recreational assessment was recorded as "could not be nicer."

Lake Watershed Analysis

Page Pond's watershed is almost entirely forested with little to no developed land. The only developed land within the pond's watershed is associated with the Girl Scout Camp. The camp does include a horse pasture and stable. Some of the buildings at the Girl Scout Camp are served by a wastewater treatment system which discharges downstream of the pond. Other areas of the camp are served by composting toilets or other non-waterborne wastewater management systems.



Lake Condition Summary

Evaluation of Lake Condition Impacts to Lake Uses

Page Pond is presently among the lakes listed on the Delaware River drainage basin Waterbody Inventory as “*unassessed*”. After an additional year of monitoring a full water quality assessment will be made for the pond.

Potable Water (Drinking Water)

The LCI dataset at Page Pond, including water chemistry data, physical measurements, and user perception data, is inadequate to evaluate the use of the pond for potable water, and the pond is not classified nor currently used for this purpose. Elevated algae levels may indicate a threat to any “unofficial” potable water use.

Public Bathing

The LCI dataset at Page Pond, including water chemistry data, physical measurements, and user perception data, suggests that public bathing may experience impacts due to elevated algae levels, but water clarity is sufficient to support public bathing. Additional information about bacterial levels is needed to fully evaluate the safety of the water for public bathing. It is unknown if bacterial samples are collected at the camp’s waterfront.

Recreation

The LCI dataset on Page Pond, including water chemistry data, physical measurements, and user perception data, suggest that recreation may experience impacts due to elevated algae levels.

Aquatic Life

Low dissolved oxygen in the deeper portions of the lake (below 5 meters) may stress aquatic life in the pond, although no direct impacts have been measured or reported. It is unknown if the low dissolved oxygen levels in the bottom water of the pond are a natural phenomenon or related to an anthropogenic water quality problem.

Aesthetics

The LCI dataset on Page Pond, including water chemistry data, physical measurements, and user perception data, suggest no impacts to the aesthetics of the pond.

Fish Consumption

There are no fish consumption advisories posted for Page Pond.

Additional Comments

- Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any invasive species, given the escalating problems with exotic aquatic weeds. Any boats that have been used off site should be properly clean, drained and dried before being used on Page Pond.
- Routine inspection and maintenance should be performed on all wastewater management systems that are used at the camp. Taking these measure will limit potential problems associated with bacteria and nutrients entering the pond.

Page Pond Data Summary

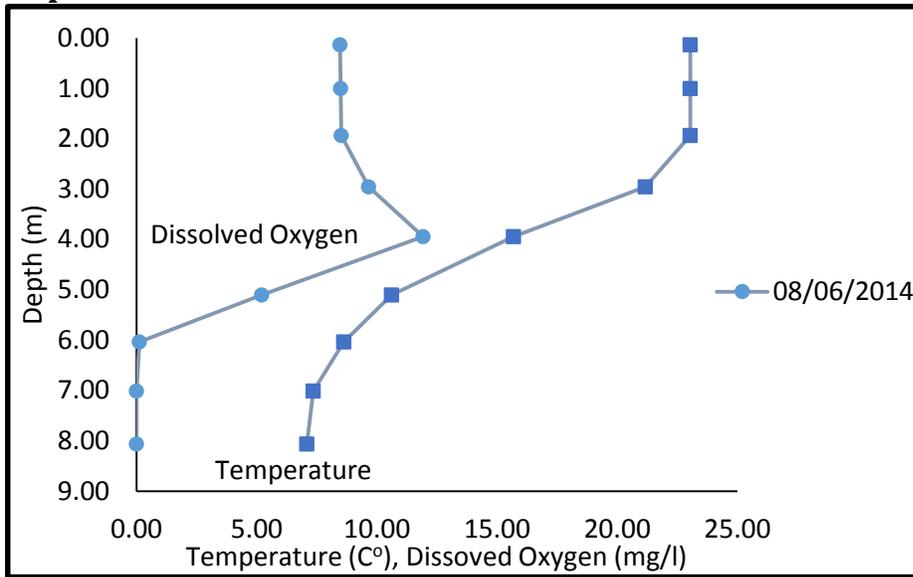
Aquatic Plant IDs

Exotic Plants: None observed

Native Plants: *Nuphar sp.* (yellow water lily)

Time Series: Trophic Indicators

Depth Profile Chart



Surface Sample

	UNITS	Value	Scientific Classification	Regulatory Comments
SECCHI	meters	2.95	Mesotrophic	Readings does not violate DOH guidance value
TSI-Secchi		44.4	Mesotrophic	No pertinent water quality standards
TP	mg/l	0.0178	Mesotrophic	Reading does not violate DEC guidance values
TSI-TP		45.6	Mesotrophic	No pertinent water quality standards
TSP	mg/l	0.0066	High % soluble Phosphorus	No pertinent water quality standards
NOx	mg/l	0.0694	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	50.6	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	12.2	Eutrophic	No pertinent water quality standards
TSI-CHLA		55.14	Eutrophic	No pertinent water quality standards
Alkalinity	mg/l	5.6	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	16	Weakly Colored	No pertinent water quality standards
TOC	mg/l	5		No pertinent water quality standards

Bottom Sample (collected at a depth of 7 meters)

	UNITS	Value	Scientific Classification	Regulatory Comments
TP-bottom	mg/l	0.0339		No pertinent water quality standards
TSP-bottom	mg/l	0.0073	Little available phosphorus	No pertinent water quality standards
NOx bottom	mg/l	0.0054	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	0.42		No pertinent water quality standards
TCOLOR-bottom	ptu	25.0	Weakly Colored	No pertinent water quality standards
TOC bottom	mg/l	3.7		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
NO _x	= nitrate + nitrite nitrogen, mg/l Detection limit = 0.01 mg/l; NYS WQ standard = 10 mg/l
NH ₄	= 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), = $(\text{TKN} + \text{NO}_x) * 2.2 / \text{TP}$ > 30 suggests phosphorus limitation, < 10 suggests nitrogen limitation
CHLA	= chlorophyll <i>a</i> , micrograms per liter (µg/l) or parts per billion (ppb) Detection limit = 2 µg/l; no NYS standard or guidance value
TSI-CHLA	= Trophic State Index calculated from CHLA, = $9.81 * \ln(\text{CHLA}) + 30.6$
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

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