

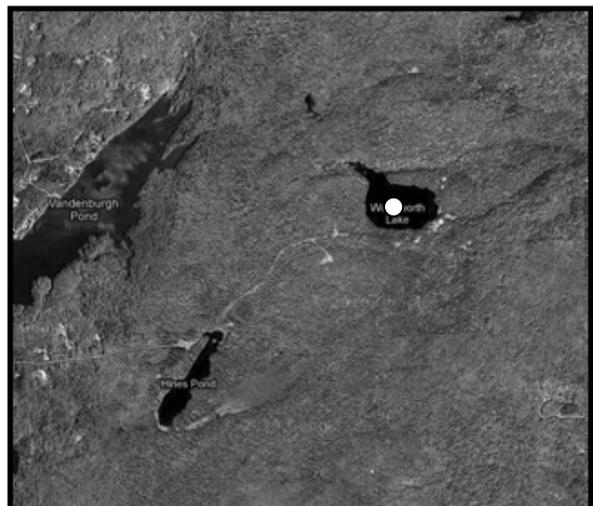
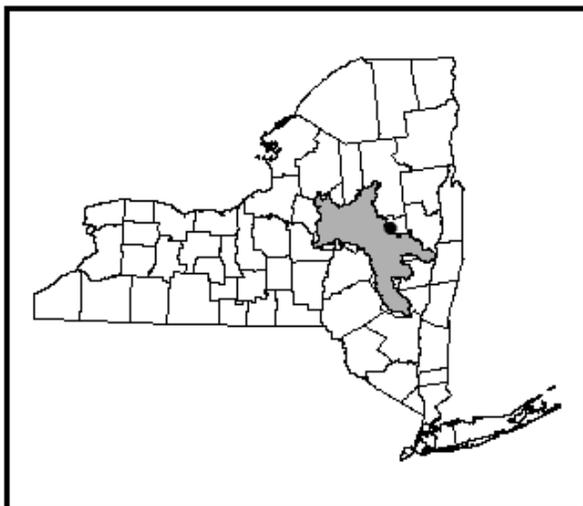
LCI Lake Water Quality Summary

General Information

Lake Name:	Woodworth Lake
Location:	Town of Bleecker, Fulton County, NY
Basin:	Mohawk River Basin
Size:	15.5 hectares (38 acres)
Lake Origins:	natural
Major Tributaries:	none
Lake Tributary to?:	Peck Lake via Vandenburg Pond
Water Quality Classification:	C (best intended use: secondary contact recreation)
Sounding Depth:	18 meters (60 feet)
Sampling Coordinates:	not recorded
Sampling Access Point:	Private land (Boy Scouts of America)
Monitoring Program:	Lake Classification and Inventory (LCI) Survey
Sampling Date:	August 26, 2010
Samplers:	Scott Kishbaugh, NYSDEC Division of Water, Albany Pieter Bridge, 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

Woodworth Lake is a 38 acre lake on land owned by Wordworth Lake Boy Scout Reservation, in the town of Bleecker in Fulton County. Both the near shore and greater watershed are almost entirely forested, with the only development being associated with the Boy Scout Reservation. Most of the watershed is in Shaker Mountain Wild Forest. The pond is used for boating (non-motorized), fishing, and swimming by campers at the Boy Scout Reservation. There is no public access to the lake.

Woodworth Lake was included in the Lake Classification and Inventory (LCI) screening (single sampling event) of the Mohawk River basin due to a lack of recent water quality data in the Division of Water's database. The only stressor found during sampling was low pH, which is commonly seen in waterbodies throughout the Adirondacks. In the absence of other indicators of water quality problems, the lake is not a candidate for more intensive monitoring during the summer of 2011.

Woodworth Lake can be characterized as *mesotrophic* or moderately productive. The water clarity reading taken in late August (TSI = 46, typical of *mesotrophic* waterbodies) was expected given the chlorophyll *a* reading (TSI = 49, typical of *mesotrophic* waterbodies), but was lower than expected given the total phosphorus reading (TSI = 36, typical of *oligotrophic* waterbodies). These data indicated that baseline nutrient levels do not support persistent algal blooms.

In late August, the lake had a slight brown color and a water clarity reading of 2.7 meters. No native or exotic plant species were recorded to be found in the lake at the time of sampling. A more thorough plant specific survey would be needed to completely assess the plant community, and to rule out the existence of any exotic species. Exotics species are unlikely to be found in the lake because of the remote location and limited access of the lake.

Woodworth Lake exhibited 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 six meters in depth. The thermocline was found at a depth of about five meters, at which point temperature and dissolved oxygen levels dropped off. Below six meters, dissolved oxygen readings were below levels needed by most aquatic life for survival. The surface pH reading was just above the state's minimum guidance value of 6.5. Between one and seven meters in depth pH levels were between 6.5 and 6.0, and below seven meters the pH values fell below 6.0. pH readings below 6 do not support most aquatic life. Adirondack lakes are commonly acidic due to naturally low alkalinity (buffering capacity to acidic inputs) and atmospheric deposition (acid rain). Conductivity readings indicate soft water (low ionic strength) which is also typical for lakes in the Adirondacks. Data collected by the Adirondack Lake Survey Corporation (ALSC 2008) in 1987 showed the lake had a neutral pH (7.0) with a conductivity reading just above what was found by the LCI in 2010.

Woodworth Lake appears to be typical of deep, acidic Adirondack lakes. Other lakes with similar water quality characteristics often support warmwater fisheries, although fisheries habitat cannot be fully evaluated through this monitoring program. The lake probably does not support cold water fish species because of a lack of cold oxygen rich water in the summer. During the 1987 ALSC (2008) survey of Woodworth Lake five different warmwater fish species were

captured (brown bullhead, pumpkinseed, smallmouth bass, largemouth bass, and yellow perch) and no cold water fish species were captured during the survey. An updated fisheries survey would be needed to determine if there is currently a similar fish community to that found in 1987.

All of the surface water parameters analyzed through the LCI except for pH were below the state's water quality standards and guidance values. These surface water levels were consistent with those found during the 1987 ALSC (2008) survey, showing the only significant water quality change in the last 20 years has been the lake becoming more acidic. The deepwater sample had levels of iron and manganese above the state's water quality standards. Elevated levels of iron and manganese are often found in lakes with oxygen deficits in the bottom water.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Woodworth Lake is not classified to be used for potable water. LCI data are not sufficient to evaluate potable use; pH was the only parameter analyzed that would impact surface water withdrawals. Bottom water withdrawals would also be impacted by iron and manganese levels.

Contact Recreation (Swimming)

Woodworth Lake is not classified for primary contact recreation, including swimming and bathing. Bacteria data are needed to evaluate the safety of Woodworth Lake for swimming, but these data are not collected through the LCI. The Boy Scout camp does use the lake for swimming, indicating that swimming is supported by the existing water quality conditions, at least from an aesthetics perspective. The water clarity reading was well above the 1.2 meter minimum guidance value to protect swimmers.

Non-Contact Recreation (Boating and Fishing)

Woodworth Lake is classified for non-contact recreation, including boating and fishing. The Boy Scout Camp does use the lake for both non-motorized boating and fish, indicating that these uses are currently supported. The LCI data did not indicate any stressors to these uses.

Aquatic Life

Aquatic life may be *stressed* by low dissolved oxygen in the bottom waters and low pH in both the bottom and surface waters. Additional biological studies would be needed to fully evaluate impacts to aquatic life.

Aesthetics

These data indicate that aesthetics should be fully supported, due to a lack of excessive algal and plant growth.

Additional Comments

- 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. Not allowing outside boats to be brought to the pond would help limit any inadvertent introductions.

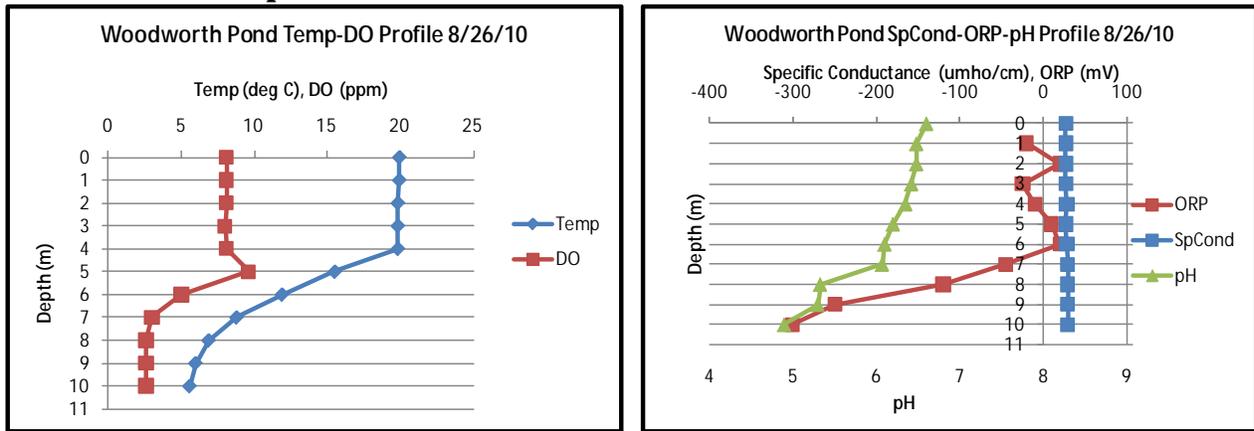
- Efforts are underway on a national level to address problems caused by acid rain by reducing pollutant emissions, as required by the Clean Air Act. New York State (and other northeastern states) has taken legal action against USEPA to accelerate implementation of controls. Monitoring of these waters will continue, in order to assess changes in water quality resulting from implementation of the Clean Air Act. However, these changes are expected to occur only slowly over time.

Aquatic Plant IDs

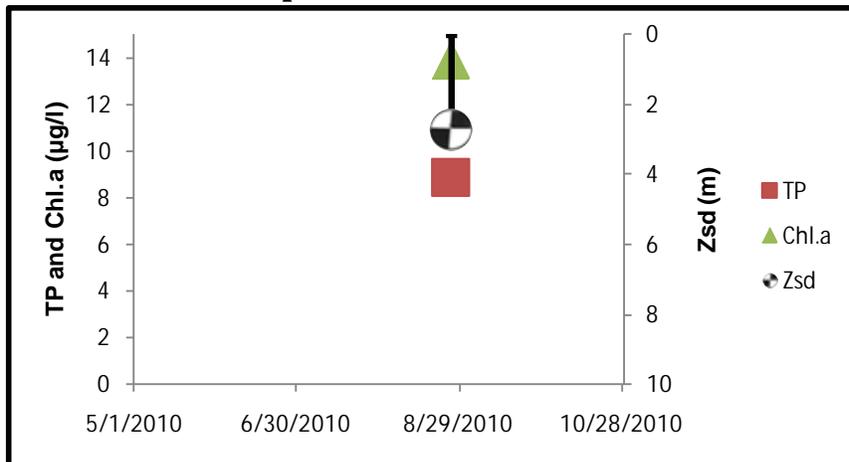
Exotic Plants: None observed

Native Plants: None recorded

Time Series: Depth Profiles



Time Series: Trophic Indicators



WQ Sampling Results

Surface Samples

	UNITS	LCI/2010 [#]	ALSC/1987 [#]	Scientific Classification*	Regulatory Comments*
SECCHI	meters	2.7		Mesotrophic	Readings does not violate DOH guidance value
TSI-Secchi		45.7		Mesotrophic	No pertinent water quality standards
TP	mg/l	0.0089	0.006	Oligotrophic	Reading does not violate DEC guidance values
TSI-TP		35.7		Oligotrophic	No pertinent water quality standards
TSP	mg/l	0.0066		High % soluble Phosphorus	No pertinent water quality standards
NO _x	mg/l	0.0129		Low nitrate	Reading does not violate guidance
NH ₄	mg/l	ND		Low ammonia	Reading does not violate guidance
TKN	mg/l	0.45		Low organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	114.42		Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	6.94		Mesotrophic	No pertinent water quality standards
TSI-CHLA		49.6		Mesotrophic	No pertinent water quality standards
Alkalinity	mg/l	6.5		Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	30	25	Weakly Colored	No pertinent water quality standards
TOC	mg/l	6.6			No pertinent water quality standards
Ca	mg/l	2.84	3.37	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	0.056	0.009		Reading does not violate water quality standards
Mn	mg/l	0.0077			Reading does not violate water quality standards
Mg	mg/l	0.825	0.84		Reading does not violate water quality standards
K	mg/l	0.468	0.36		No pertinent water quality standards
Na	mg/l	0.47	0.49		Reading does not violate water quality standards
Cl	mg/l	ND	0.6	Little impact from road salt	Reading does not violate water quality standards
SO ₄	mg/l	3.5	6.25		Reading does not violate water quality standards

[#] LCI/2010 LCI data from August 26, 2010 | ALSC/1987 Adirondack Lake Survey Corporation data from August 13, 1987 (ALSC 2008)

*Scientific Classification and Regulatory Comments based on LCI 2010 data

Bottom Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
TP-bottom	mg/l	0.0311	Elevated deepwater phosphorus	No pertinent water quality standards
TSP-bottom	mg/l	0.0301	High % soluble phosphorus	No pertinent water quality standards
NOx-bottom	mg/l	0.0094	No evidence of DO depletion	Reading does not violate water quality standards
NH4-bottom	mg/l	0.52	No evidence of DO depletion	Reading does not violate water quality standards
TKN-bottom	mg/l	0.99		No pertinent water quality standards
Alk-bottom	mg/l	13.4	Poorly Buffered	No pertinent water quality standards
TCOLOR-bottom	ptu	75	Highly Colored	No pertinent water quality standards
TOC-bottom	mg/l	7.1		No pertinent water quality standards
Ca-bottom	mg/l	3.71	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe-bottom	mg/l	1.34	Taste or odor likely	Reading violates water quality standards
Mn-bottom	mg/l	0.391	Taste or odor likely	Reading violates water quality standards
Mg-bottom	mg/l	0.889		Reading does not violate water quality standards
K-bottom	mg/l	0.532		No pertinent water quality standards
Na-bottom	mg/l	0.47		Reading does not violate water quality standards
Cl-bottom	mg/l	ND		Reading does not violate water quality standard
SO4-bottom	mg/l	2.2		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	1	Plants Usually Not Visible	No pertinent water quality standards
Recreational Assessment	1-5, 1 best	1	Could Not Be Nicer	No pertinent water quality standards

References

Adirondack Lake Survey Corporation (ALSC). 2008. Data from the Comprehensive 1984-1987 Adirondack lake Survey. Available online at: <http://www.adirondacklakessurvey.org>

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 ($\mu\text{g/l}$) or parts per billion (ppb) Detection limit = 2 $\mu\text{g/l}$; 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
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 25°C, micromho per centimeter ($\mu\text{mho/cm}$) Detection limit = 1 $\mu\text{mho/cm}$; 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