LCI Lake Water Quality Summary

General Information

Lake Name: Gilman Lake

Location: Town of Lake Pleasant, Hamilton County, NY
Basin: Upper Hudson River Basin
Size: 18 hectares (44 acres)
Lake Origins: natural
Major Tributaries: none
Lake Tributary to: Dunning Creek
Water Quality Classification: C(T) (best intended use: secondary contact recreation)
(T) water should be suitable for trout survival

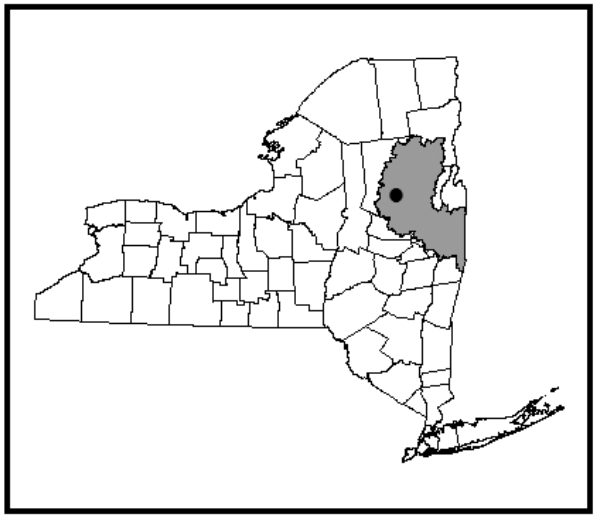
Sounding Depth: 18 meters (60 feet)
Sampling Coordinates: 43.4648, -74.31547
Sampling Access Point: State Land off of Gilmantown Road

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

Gilman Lake is small (44 acre), natural, Adirondack Park lake located southeast of the Town of Lake Pleasant in Hamilton County. The northern portion of the lake lies within the Jessup River Wild Forest and the Silver Lake Wilderness Area. Approximately 50% of the shoreline is in private ownership. There is an informal public access point off Gilmantown Road, where people can launch small boats. Members of the Gilman Lake Association have been in discussion with the DEC to restrict the use of electric motors on the lake to 5 horsepower or less. The near shore and greater watershed are almost entirely forested. Lakefront use is limited to a small number of primitive tent sites near the launching area and Gilmantown Road, and two camps with large lawn areas on the east shore.

The lake is currently used for boating and fishing by both the private landowners as well as the general public. The lake was included in the Division of Water's Lake Classification and Inventory (LCI) 2010 screening (single sampling event) survey due to a lack of recent water quality data for the lake. There were no major water quality issues observed during this sampling event, so the lake will not be included in the intensive (monthly monitoring) of lakes in the Upper Hudson River Basin during the summer of 2012.

Gilman Lake can generally be characterized as *mesotrophic*, or moderately productive. The water clarity reading (TSI = 44, typical of *mesotrophic* lakes) was in the expected range given the chlorophyll *a* reading (TSI = 48, typical of *mesotrophic* lakes) but lower than what would be expected given the total phosphorus reading (TSI = 35, typical of *oligotrophic* lakes). These data indicate that baseline nutrient levels do not support algal blooms in the lake.

In late August the lake was observed to be "not quite crystal clear" having a slight brownish coloration. During the sampling event two submergent plants species were observed: *Potamogeton oakesianus* (whitestem pondweed) and *Eriocaulon septangulare* (pipewort). Four emergent plant species were also observed: *Pontederia cordata* (pickerelweed), *Sagittaria sp.* (arrowhead), *Sparganium sp.* (bur reed), and *Juncus sp.* (rush). A fisheries survey conducted in mid-July of 2004 found a similar assemblage of plants but also noted pond lilies. The survey in late-August of 2010 may have been too late in season to observe these floating-leafed plants. All of the plant species that were observed are fairly common in, and native to, the Adirondack Park.

Gilman Lake 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 deep. The thermocline in late August was at a depth of 6 to 7 meters. The dissolved oxygen (DO) profile indicates hypoxic (low oxygen) conditions occur in the bottom few meters of the lake. The hypoxic conditions in the bottom few meters are consistent with the 2004 fisheries data. The Jessup River Wild Forest Unit Management Plan (JRWF-UMP) (DEC 2006) also indicated that data collected in 1956, 1958, and 1970 also showed low oxygen conditions below 25 feet (7.5 meters).

The late-August pH readings were 6.35 at the surface and decreased with depth. These readings indicate acidic conditions and fall below the state's water quality standard of 6.5. pH levels below 6.5 can have negative impacts on aquatic life. Acidic conditions are commonly found throughout the Adirondacks due to acid deposition and natural low alkalinity (buffering capacity

to acidic inputs) levels. Slightly higher pH levels were recorded in the 2004 fisheries survey with the historical data in the JRWF-UMP indicating that pH ranged from 6 to 7.1 depending on depth and time of year. Conductivity readings indicate soft water (low ionic strength), which is also typical of Adirondack lakes.

Gilman Lake is a weakly acidic, moderately deep Adirondack lake. Other lakes with similar water quality characteristics often support warm water and cold water fisheries, although fisheries habitat cannot be fully evaluated through this monitoring program. Historical fishing records indicate round whitefish (*Prosopium cylindraceum)*, a state listed endangered species, was present in the lake in the 1920's and 30's. The round whitefish were not found in a 1956 survey but were found in 1968. Other fish that historically (present in surveys before 1970) occurred in the lake include: lake trout, smallmouth bass, brown bullhead, yellow perch, pumpkinseed, rockbass, creek chub, blacknose dace, northern pike, common shiner, golden shiner, banded killifish, smelt, and white sucker. The Gilman Lake summary in the JRWF-UMP indicates that brook trout and round whitefish were probably out competed by the nonnative fish species (DEC 2006). In 2004 fisheries staff observed white sucker, yellow perch, rainbow trout, smallmouth bass and pumpkinseed in the lake. In addition, the state has stocked rainbow trout in the lake for many years including 760 and 780 in the spring of 2009 and 2010 respectively. Current fishing regulations for the lake are lake trout of 21 inches or longer with a daily limit of three fish, and other trout are limited to five fish per day.

Iron levels in the bottom water sample were above drinking water standards. Elevated iron levels are common in lakes experiencing oxygen deficits in the bottom waters. Chloride, sodium and sulfate levels were all low which is common for lakes in non-developed watersheds. None of the other parameters evaluated through the LCI indicated water quality problems.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Gilman Lake is not classified for use as a potable water supply. Individuals camping near the lake may use treated surface water for drinking, cooking, and cleaning. LCI data are not sufficient to evaluate potable water use. Of the parameters examined by the LCI, the only parameter of concern was iron levels in the bottom waters. The elevated iron levels would impact deep water withdrawals from the lake.

Contact Recreation (Swimming)

Gilman Lake is not classified for primary contact recreation, which includes swimming and bathing. It is not know if people swim in the lake. Bacteria data are needed to evaluate the safety of Gilman Lake for swimming, but these data are not collected through the LCI. The data collected through the LCI indicated that water clarity was sufficient to be above the state health department's minimum guidance value of 1.2 meters to protect the safety of swimmers, and nutrient and algae levels are low enough to support swimming.

Non-Contact Recreation (Boating and Fishing)

Gilman Lake is classified for non-contact recreation, including boating and fishing. Lake residents and visitors use the lake for both of these purposes, indicating that these uses are

currently supported. None of the parameters examined though the LCI indicated any stressors that would impact boating or fishing. DEC stocks rainbow trout in the lake every spring. A 2004 fisheries survey indicated the lake supports a two story fishery with both warm and cold water fish species being captured during the fisheries survey.

Aquatic Life

They hypoxic conditions found in the bottom waters may stress some aquatic life susceptible to high summer water temperature; although these data indicate that there may be enough cool oxygen rich water to support cold water fish species. The July 2004 fisheries survey and historical records indicate that the lake did/does support cold water fish species. The acidic condition of the lake may also have a negative impact on some aquatic life. The past introductions of non-native fish species including: largemouth and smallmouth bass, golden shiner, yellow perch, rock bass and northern pike have altered Gilman Lake's native fish populations and likely altered the entire aquatic ecosystem.

Aesthetics

These data did not indicate any stressors to the aesthetics of the lake.

Additional Comments

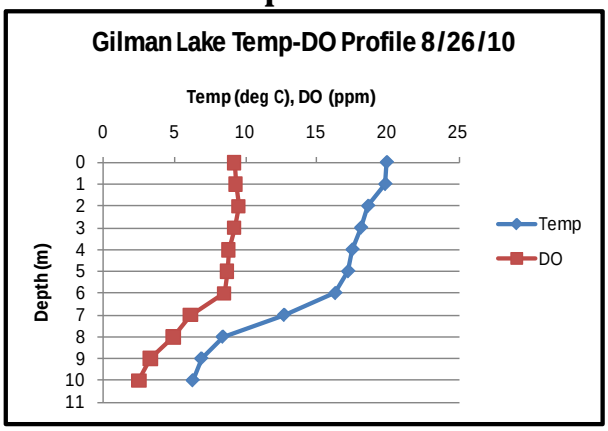
- Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any new invaders, given the escalating problems with exotic aquatic weeds.
- DEC has information on their public website regarding Adirondack fish and the impacts that non-native fish species can have on the native fish populations. This information can be accessed at the following URL: http://www.dec.ny.gov/outdoor/31920.html
- 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) have 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.
- It is not known if and which recommendations in the JRWF-UMP (NYS DEC 2006) have been acted on. These recommendations include: improving access and parking at the lake, installing a suitable barrier to deter the launching of trailered boats, and resurveying the lake to confirm the presence of nonnative fish species and reassess the rainbow trout stocking policy.

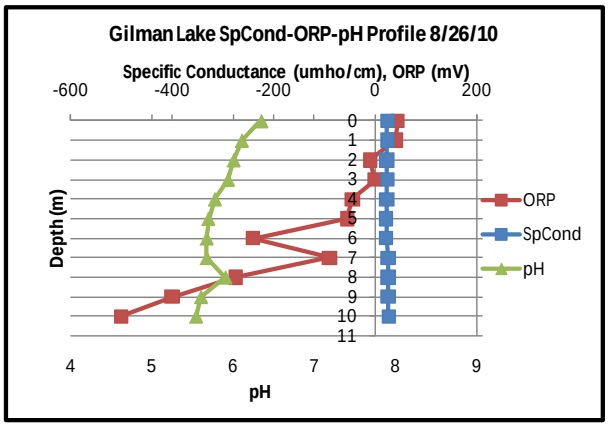
Aquatic Plant IDs

Exotic Plants: none observed

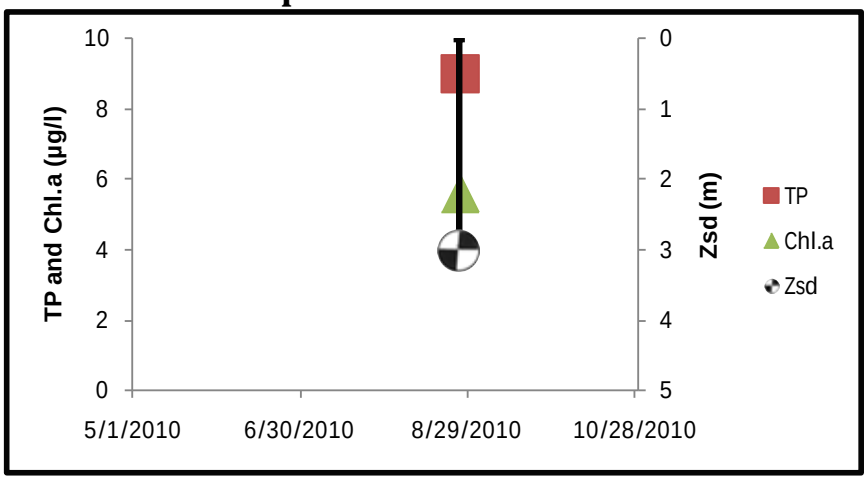
Native Plants: *Potamogeton oakesianus* (whitestem pondweed)
Pontederia cordata (pickerelweed)
Sagittaria sp. (arrowhead)
Sparganium sp. (bur reed
Juncus sp. (rush)
Eriocaulon septangulare (pipewort)

Time Series: Depth Profiles





Time Series: Trophic Indicators



WQ Sampling Results

Surface Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
SECCHI	meters	3	Mesotrophic	Readings does not violate DOH guidance value
TSI-Secchi		44.2	Mesotrophic	No pertinent water quality standards
TP	mg/l	0.009	Oligotrophic	Reading does not violate DEC guidance values
TSI-TP		35.8	Oligotrophic	No pertinent water quality standards
TSP	mg/l	0.0049	Little available phosphorus	No pertinent water quality standards
NOx	mg/l	0.0745	Low nitrate	Reading does not violate guidance
NH4	mg/l	ND	Low ammonia	Reading does not violate guidance
TKN	mg/l	0.37	Low organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	108.66	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	5.6	Mesotrophic	No pertinent water quality standards
TSI-CHLA		47.5	Mesotrophic	No pertinent water quality standards
Alkalinity	mg/l	3.2	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	30	Weakly Colored	No pertinent water quality standards
TOC	mg/l	5.4		No pertinent water quality standards
Ca	mg/l	1.89	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	0.0944		Reading does not violate water quality standards
Mn	mg/l	0.0173		Reading does not violate water quality standards
Mg	mg/l	0.563		Reading does not violate water quality standards
K	mg/l	0.259		No pertinent water quality standards
Na	mg/l	1.19		Reading does not violate water quality standards
Cl	mg/l	2.4	Little impact from road salt	Reading does not violate water quality standards
SO4	mg/l	2.9		Reading does not violate water quality standards

Bottom Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
TP-bottom	mg/l	0.0188	Elevated deepwater phosphorus	No pertinent water quality standards
TSP-bottom	mg/l	0.0171	High % soluble phosphorus	No pertinent water quality standards
NOx-bottom	mg/l	0.0121	No evidence of DO depletion	Reading does not violate water quality standards
NH4-bottom	mg/l	0.518	No evidence of DO depletion	Reading does not violate water quality standards
TKN-bottom	mg/l	0.87		No pertinent water quality standards
Alk-bottom	mg/l	10	Poorly Buffered	No pertinent water quality standards
TCOLOR-bottom	ptu	50	Highly Colored	No pertinent water quality standards
TOC-bottom	mg/l	4.9		No pertinent water quality standards
Ca-bottom	mg/l	2.86	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe-bottom	mg/l	4.01	Taste or odor likely	Reading violates water quality standards

Bottom Samples (Cont.)

	UNITS	Reading	Scientific Classification	Regulatory Comments
Mn-bottom	mg/l	0.289		Reading does not violate water quality standards
Mg-bottom	mg/l	0.685		Reading does not violate water quality standards
K-bottom	mg/l	0.263		No pertinent water quality standards
Na-bottom	mg/l	1.29		Reading does not violate water quality standards
Cl-bottom	mg/l	2.5		Reading does not violate water quality standards
SO4-bottom	mg/l	2.1		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	2	Plants Visible Below Surface	No pertinent water quality standards
Recreational Assessment	1-5, 1 best	1	Could Not Be Nicer	No pertinent water quality standards

References

New York State Department of Environmental Conservation, Division of Lands & Forest. 2006. Jessup River Wild Forest Unit Management Plan Environmental Impact Statement. Available online at http://www.dec.ny.gov/docs/lands_forests_pdf/jrwfinal.pdf.

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

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