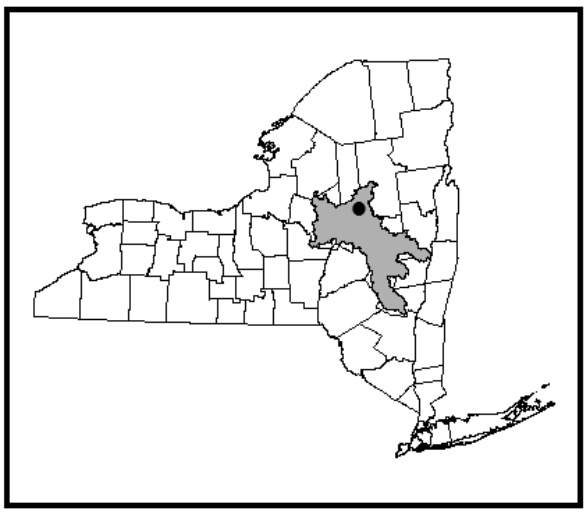
# LCI Lake Water Quality Summary

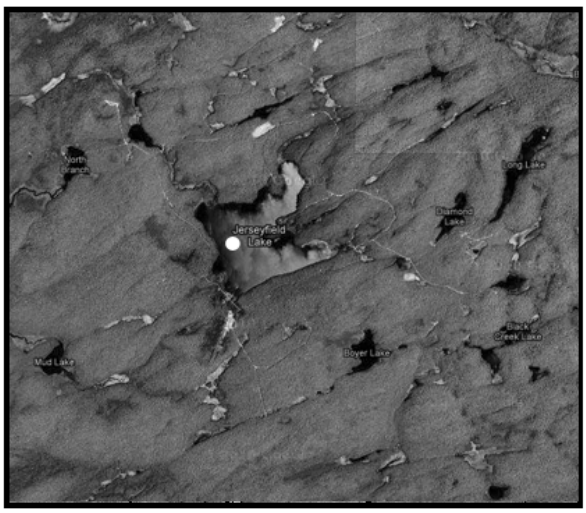
## General Information

| | |
|---|---|
| **Lake Name:** | **Jerseyfield Lake** |
| **Location:** | Salisbury, Herkimer County/<br>Morehouse, Hamilton County |
| **Basin:** | Mohawk River Basin |
| **Size:** | 152.8 hectares (378 acres) |
| **Lake Origins:** | 9ft high/62f long concrete/ earthen dam |
| **Major Tributaries:** | Several small lakes (Long, Diamond, Big Metcalf, Cold Spring Lakes and Potter Pond) |
| **Lake Tributary to?:** | Mill Creek |
| **Water Quality Classification:** | C(T) (best intended use: secondary contact recreation)<br>(T) waters should be suitable for trout survival |
| **Sounding Depth:** | 22.9 meters (75 feet) |
| **Sampling Coordinates:** | 43.30481, -74.76599 |
| **Sampling Access Point:** | Private land (Jerseyfield Preserve) |
| **Monitoring Program:** | Lake Classification and Inventory (LCI) Survey |
| **Sampling Date:** | August 25, 2010 |
| **Samplers:** | David Newman, NYSDEC Division of Water, Albany<br>Ben Sears, NYSDEC Division of Water, Albany |
| **Contact Information:** | David Newman, NYSDEC Division of Water<br>djnewman@gw.dec.state.ny.us; 518-402-8201 |

## Lake Map

(sampling location marked with a circle)





## Background and Lake Assessment

Jerseyfield Lake is an approximately 380 acre impoundment on Mill Creek that straddles the Hamilton Herkimer county-line in the southwestern portion of the Adirondack Park. The lake is part of what is known as the Jerseyfield Preserve, an inholding of private property completely within the Ferris Lake Wild Forest Area. The shoreline of the lake is completely forested except for a very small area near the outlet to Mill Creek that has maintained grass and a few structures (houses/camps). The greater watershed is completely forested except for a small handful of structures, ATV/snowmobile trails, and hiking trails. The watershed lies within either the Jerseyfield Preserve or the Ferris Lake Wild Forest Area. The lake is currently used for fishing and boating (and possibly swimming) by members and guests of the Jerseyfield Preserve. There is no public access to the lake or the Jerseyfield Preserve.

Jerseyfield Lake was screened (single sample) through the NYSDEC Division of Water's Lake Classification and Inventory (LCI) program in the summer of 2010, due to a lack of water quality data in the Division of Water's database. In addition, *The 2002 Mohawk River Basin Waterbody Inventory and Priority Waterbodies List* (DEC 2003), identifies the aquatic life in "Lakes tributary to Jerseyfield Lake" as *impaired* due to atmospheric deposition (acid rain) and low pH values (in some cases less than 5.0). Due to the acidic condition found in the Jerseyfield Lake, an additional visit to the lake in the summer of 2011 may be warranted to confirm the pH values.

Based on data from the single sampling event in late August 2010, Jerseyfield Lake can be characterized as a *mesoligotrophic*, or moderately unproductive. The water clarity reading (TSI = 46, typical of *mesotrophic* lakes) was in the expected range given the chlorophyll *a* reading (TSI = 43, typical of *mesotrophic* lakes). However, the phosphorus reading (TSI = 30, typical of *oligotrophic* lakes) was lower than expected given the water clarity and chlorophyll *a* readings. These data indicate that baseline nutrient levels do not support persistent algal blooms in the lake. Due to heavy rain in the days leading up to the sampling date, the water clarity may have been lower than what is typical for the lake.

No aquatic plants were observed during a visual assessment and rake tosses. A more thorough plants specific survey would be needed to adequately assess the plant community of the lake and rule out the existence of any invasive species. The acidic nature of the lake may preclude the survival of many plant species.

Jerseyfield 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 the lake was at seven to eight meters in late August. The hypolimnion (bottom waters) remained oxygenated through 20 meters; however, at 15 meters the dissolved oxygen level dropped below the state standard to protect trout survival and dropped below the state standard to protect aquatic life at 19 meters. The pH readings were just above 5.0 at the surface and then fell below 5.0 at depths greater than one meter. pH values of less than 5.0 will *stress* most aquatic life. Conductivity readings indicate soft water, as is typical for Adirondack lakes due to the granitic nature of the watershed. These vertical profile data were consistent with the data collected in 2008, by a consultant hired by the Jerseyfield Preserve.

Jerseyfield Lake appears to be typical of acidic, soft water, weakly colored lakes in the Adirondacks. Other waterbodies with similar water quality characteristics often do not support a wide variety of fish and plant life due to the low pH, although fisheries habitat cannot be fully evaluated through this monitoring program. A fisheries survey would need to be conducted to look at the impacts of low pH and other parameters on the survival of fish in the lake. pH levels have improved in the lake since data collected in 1979 where a surface pH reading of 4.13 (ALSC unpublished data). The caretaker of the Jerseyfield Preserve did report that in the last few years they have observed small trout in the lake, further suggesting there has been some pH recovery in response to the federal Clean Air Act amendments in the last 20 years.

Chloride levels were below the laboratory detection limit, indicating little to no impacts from road salting and runoff through developed areas. Low chloride readings are commonly reported in waterbodies with highly forested watersheds. The alkalinity levels were also below the laboratories detection limit, indicating the lake has little to no buffering capacity to acidic inputs to the lake; this is also common to many Adirondack Lakes due to low level of carbonates in the underlying soil. None of the other parameters measured indicate any water quality problems.

## Evaluation of Lake Condition Impacts to Lake Uses

### *Potable Water (Drinking Water)*

Jerseyfield Lake is not classified for use as a potable water supply. Although the LCI data are not sufficient to evaluate potable water use, these data indicate that water from the lake might require increasing the pH to prevent plumbing corrosion.

### *Contact Recreation (Swimming)*

Jerseyfield Lake is not classified for swimming. It is not known if anyone uses the lake for this purpose. Bacteria data are needed to evaluate the safety of Jerseyfield Lake for swimming; these are not collected through the LCI. Data collected though the LCI indicate that swimming should be supported in the lake. The water clarity was above the State Department of Health's guidance value of 1.2 meters to protect the safety of swimmers.

### *Non-Contact Recreation (Boating and Fishing)*

Jerseyfield Lake is classified for non-contact recreation including boating and fishing. The observation of a small number of boats and jet skis around the lake shore indicates that the lake presently supports boating and perhaps fishing. Due to the acidic nature of the lake it is unlikely that the lake supports a large number of fish. Besides the low pH, these data did not indicate any stressors to boating or fishing.

### *Aquatic Life*

The low pH levels in the lake are not conducive to aquatic life. A biological survey of the lake would be needed to fully evaluate the impacts of low pH and any other stressors to aquatic life. It is noted that loons (an indicator of good water quality) were seen on the lake during sampling, and the caretaker of the Jerseyfield Preserve indicated that in the past few years they have seen small trout in the lake.

### *Aesthetics*

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

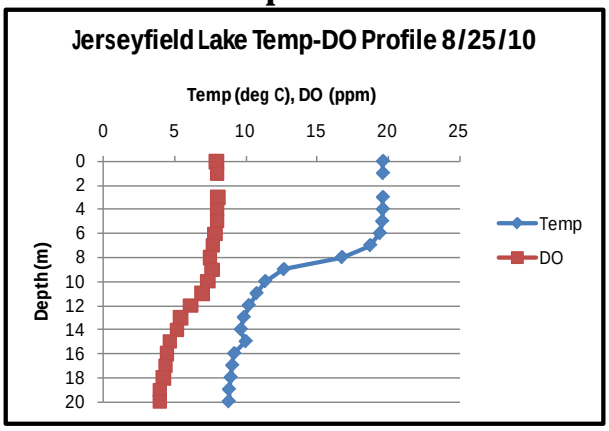
## Additional Comments

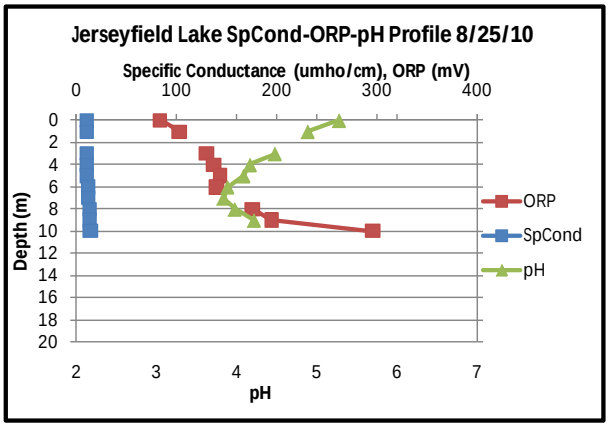
- Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any new invaders, given the escalating problems with exotic aquatic weeds.
- "Efforts are underway on a national level to address problems caused by acid rain by reducing pollutant emissions, as required by the Clean Air Act. New York State (and other northeastern states) ha[s] taken legal action against USEPA to accelerate implementation of controls. Monitoring of these waters (waterbodies impacted by acid deposition) 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 (DEC 2003)".

## Aquatic Plant IDs

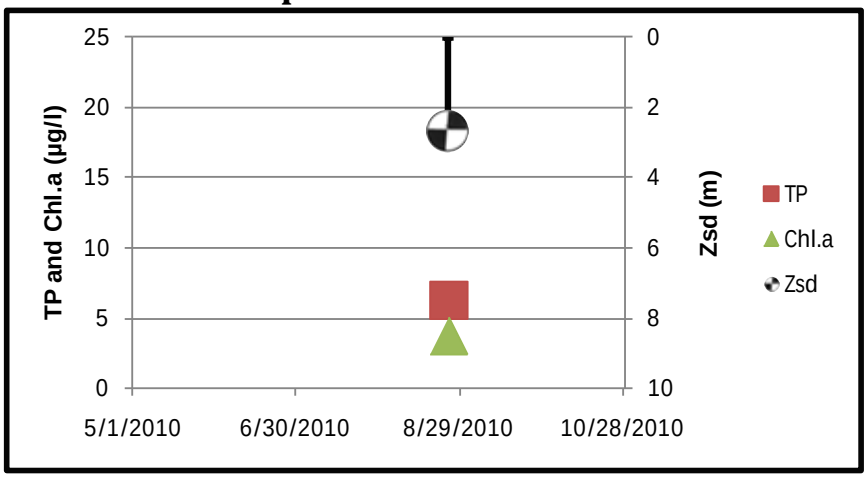
No aquatic plants exotic or native were observed during the sampling effort.

## Time Series: Depth Profiles




## Time Series: Trophic Indicators



# WQ Sampling Results

## *Surface Samples*

| | UNITS | Reading | Scientific Classification | Regulatory Comments |
|---|---|---|---|---|
| SECCHI | meters | 2.65 | Mesotrophic | Readings does not violate DOH guidance value |
| TSI-Secchi | | 46.0 | Mesotrophic | No pertinent water quality standards |
| TP | mg/l | 0.0063 | Oligotrophic | Reading does not violate DEC guidance values |
| TSI-TP | | 30.7 | Oligotrophic | No pertinent water quality standards |
| TSP | mg/l | 0.0036 | Little available phosphorus | No pertinent water quality standards |
| NOx | mg/l | 0.0571 | Low nitrate | Reading does not violate guidance |
| NH4 | mg/l | 0.019 | Low ammonia | Reading does not violate guidance |
| TKN | mg/l | 0.31 | Low organic nitrogen | No pertinent water quality standards |
| TN/TP | mg/l | 128.19 | 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 | 20 | Weakly Colored | No pertinent water quality standards |
| TOC | mg/l | 3.9 | | No pertinent water quality standards |
| Ca | mg/l | 1.13 | Does Not Support Zebra Mussels | No pertinent water quality standards |
| Fe | mg/l | 0.155 | | Reading does not violate water quality standards |
| Mn | mg/l | 0.0223 | | Reading does not violate water quality standards |
| Mg | mg/l | 0.286 | | Reading does not violate water quality standards |
| K | mg/l | 0.128 | | No pertinent water quality standards |
| Na | mg/l | 0.53 | | 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 | 3.2 | | Reading does not violate water quality standards |

## *Bottom Samples*

| | UNITS | Reading | Scientific Classification | Regulatory Comments |
|---|---|---|---|---|
| TP-bottom | mg/l | 0.0074 | | No pertinent water quality standards |
| TSP-bottom | mg/l | 0.0037 | High % soluble phosphorus | No pertinent water quality standards |
| NOx-bottom | mg/l | 0.128 | No evidence of DO depletion | Reading does not violate water quality standards |
| NH4-bottom | mg/l | 0.044 | No evidence of DO depletion | Reading does not violate water quality standards |
| TKN-bottom | mg/l | 0.26 | | No pertinent water quality standards |
| Alk-bottom | mg/l | ND | Poorly Buffered | No pertinent water quality standards |
| TCOLOR-bottom | ptu | 20 | Weakly Colored | No pertinent water quality standards |
| TOC-bottom | mg/l | 3.4 | | No pertinent water quality standards |
| Ca-bottom | mg/l | 1.06 | Does Not Support Zebra Mussels | No pertinent water quality standards |
| Fe-bottom | mg/l | 0.178 | | Reading does not violate water quality standards |

### *Bottom Samples (continued)*

| | UNITS | Reading | Scientific Classification | Regulatory Comments |
|---|---|---|---|---|
| Mn-bottom | mg/l | 0.0272 | | Reading does not violate water quality standards |
| Mg-bottom | mg/l | 0.29 | | Reading does not violate water quality standards |
| K-bottom | mg/l | 0.144 | | No pertinent water quality standards |
| Na-bottom | mg/l | 0.505 | | Reading does not violate water quality standards |
| Cl-bottom | mg/l | ND | | Reading does not violate water quality standard |
| SO4-bottom | mg/l | 39.6 | | 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 |

## Literature Cited

NYSDEC. 2003. The 2002 Mohawk River Basin Waterbody Inventory and Priority Waterbodies List. Albany, NY. NYSDEC. 370 p.

## 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 = 1.0 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