

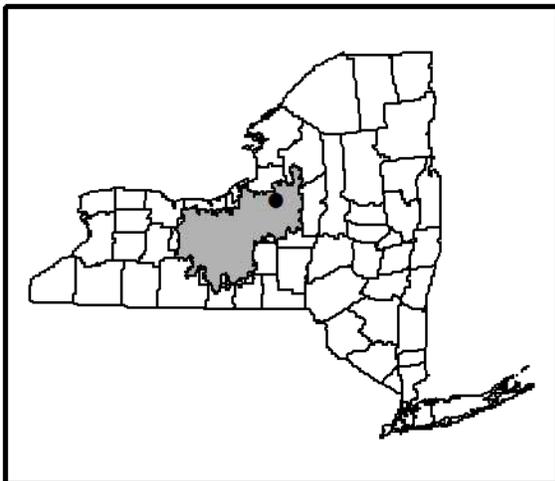
# LCI Lake Water Quality Summary

## General Information

|                                      |   |
|--------------------------------------|---|
| <b>Lake Name:</b>                    | <b>Francis Pond</b>   |
| <b>Location:</b>                     | Town of Constantia, Oswego County, NY   |
| <b>Basin:</b>                        | Seneca-Oneida-Oswego Rivers   |
| <b>Size:</b>                         | 22 hectares (54 acres)  |
| <b>Lake Origins:</b>                 | Unknown (earthen dam constructed in 1915)   |
| <b>Tributaries:</b>                  | Minor tributary   |
| <b>Watershed Area:</b>               | 1.3 square miles  |
| <b>Lake Tributary to:</b>            | Spring Brook/Dutcher Pond   |
| <b>Water Quality Classification:</b> | C(T) (best intended use: secondary contact recreation)<br>(T) waters shall be suitable for trout survival                                       |
| <b>Maximum Sounding Depth:</b>       | 2.7 meters (9 feet)   |
| <b>Sampling Coordinates:</b>         | 43.28849, -75.93698   |
| <b>Publicly Accessible:</b>          | No public access  |
| <b>Sampling Access Point:</b>        | Private land (Francis Lake LLC)   |
| <b>Monitoring Program:</b>           | Lake Classification and Inventory (LCI) Survey  |
| <b>Sampling Date:</b>                | 7/26/2011 & 6/12, 7/19, 8/15, 9/20/2012   |
| <b>Samplers:</b>                     | Chandler Rowell, Jim Swart, Brad Wenskoski & Scott Kishbaugh, NYSDEC Division of Water, Albany<br>Dan Hayes, NYSDEC Division of Water, Syracuse |
| <b>Contact Information:</b>          | David Newman, NYSDEC Division of Water<br><a href="mailto:djnewman@gw.dec.state.ny.us">djnewman@gw.dec.state.ny.us</a> ; 518-402-8201           |

## Lake Map

(sampling location marked with a circle)



## Background and Lake Assessment

Francis Pond is a 54 acre pond located about 3 miles north of Oneida Lake in Oswego County. The pond is surrounded by land owned by about a dozen individual private land owners, with no public access to the pond. Shoreline modification/improvements are limited to two to three individual properties on the south side of the pond. The rest of the nearshore area is either forested or wetland. The greater watershed is predominately forested with a small number of seasonal use homes as well as a few year round residences. At the eastern fringe of the watershed there is a permitted sand and gravel mining operation.

The NYSDEC Division of Water's water quality database had limited historical data from the pond, and thus the pond was included in the 2011 Lake Classification and Inventory (LCI) screening program. The initial 2011 survey found slightly elevated levels of phosphorus and iron in the water column. To further evaluate these conditions, additional monitoring was conducted during the summer of 2012.

Francis Pond can generally be characterized as *mesotrophic*, or moderately productive. The average water clarity of the pond (TSI = 49, typical of *mesotrophic* waterbodies) was in the expected range given the average total phosphorus level (TSI = 46, typical of *mesotrophic* waterbodies) and chlorophyll *a* level (TSI = 45, typical of *mesotrophic* waterbodies). These data indicate that baseline nutrients do not support persistent algal blooms in the pond.

The pond's surface water was most often observed to be brown to light green. Water clarity was typically greater than 2.25 meters (~7 feet), well above the NYS Health Department's criteria for regulated swimming beaches. The brown coloration is probably caused by weak organic acids entering the pond from the wetlands areas within the watershed. At least 13 different native aquatic plant species are found in the pond, including one state listed rare species. The plant communities mainly consist of submergent plant species and were not observed to be a hindrance to recreational uses of the pond. 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.

Like most shallow lakes and ponds, Francis Pond does not thermally stratify (warm water on top, cold water on the bottom during the summer). Temperature and dissolved oxygen readings were comparable throughout the water column throughout the summer. pH readings indicate alkaline water, with the July and September 2012 readings being above the state's water quality standard of 8.5. Conductivity readings indicate moderately soft water (low ionic strength) and showed very little seasonal variation. Both the pH and conductivity readings were similar to those seen in other waterbodies in this area of the state.

Francis Pond appears typical of soft water, highly colored, alkaline waterbodies. Other water bodies with similar water quality characteristics often support warmwater fish species. Summer water temperatures may become too warm to support 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.

Phosphorus levels were in the moderate to high range with the July 2011 and June 2012 samples being above the state's 0.020 mg/l guidance value. Nitrogen levels were low to intermediate. As in most water bodies in New York State, the nitrogen to phosphorus ratio indicates that phosphorus is the limiting nutrient for the production of algae. The iron level in the July 2011 sample was above the state's water quality standard, however none of the 2012 samples were above the water quality standard. It is likely that the 2011 iron value was not representative of normal conditions in the pond and may have been related to a rain event. None of the other parameters that were analyzed through the LCI indicated any water quality-related issues.

## **Evaluation of Lake Condition Impacts to Lake Uses**

### ***Potable Water (Drinking Water)***

Francis 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 that iron levels may sporadically cause water from the pond to have taste or odor problems.

### ***Contact Recreation (Swimming)***

Francis Pond is not classified for primary contact recreation (swimming and bathing). It was not reported if people swim in the pond. Bacteria data are needed to evaluate the safety of Francis Pond for swimming—these are not collected through the LCI. The data collected through the LCI showed the water clarity was above the State Department of Health's guidance value of 1.2 meters to protect swimmers. None of the other parameters analyzed through the LCI indicate stressors to swimming in the pond, and no algal blooms were observed.

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

Francis Pond is classified for non-contact recreation. It is likely that the pond is at least occasionally used for non-power boating as well as fishing. There were no water quality indicators that would suggest impacts to these uses.

### ***Aquatic Life***

As the pond is not deep enough to thermally stratify, it may not support organisms susceptible to high summer temperatures. Although the pond is classified for trout survival, it is unlikely that the pond ever supported trout or other cold water organisms during the summer months, except in areas associated with coldwater springs. Additional biological studies would need to be conducted to further evaluate other impacts to aquatic life.

### ***Aesthetics***

These data indicate that aesthetics should be fully supported; however the moderate to high phosphorus levels in the pond may occasionally produce algal blooms that would detract from the aesthetics of the pond.

## 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.
- Francis Pond is currently located in a rural watershed with little to no development. This has prevented declines in water quality seen on other lakes and ponds throughout the state. Future development in the pond's watershed may negatively impact water quality.

## Aquatic Plant IDs

Exotic Plants: none observed

State Listed Rare Native Plants:

*Potamogeton confervoides* (Tuckerman's pondweed)

Native Plants:

*Ceratophyllum demersum* (coontail)

*Elodea canadensis* (common waterweed)

*Potamogeton amplifolius* (largeleaf pondweed)

*Sparganium sp.* (bur reed)

*Nuphar sp.* (yellow waterlily)

*Nymphaea sp.* (white waterlily)

*Najas flexilis* (slender water nymph)

*Najas guadalupensis* (common water nymph)

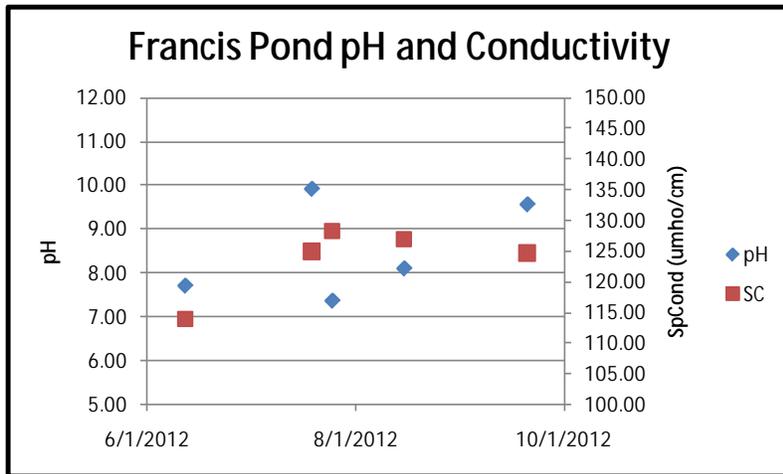
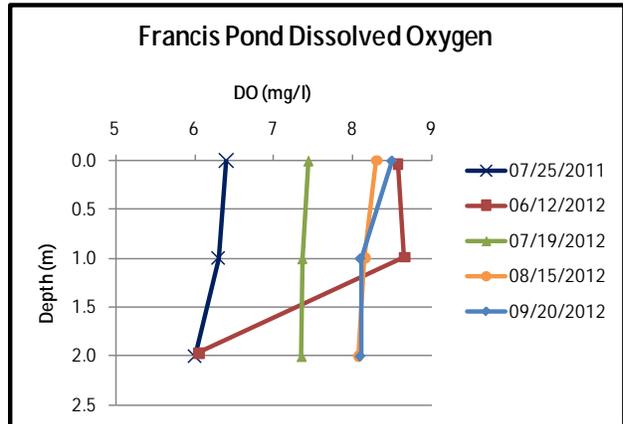
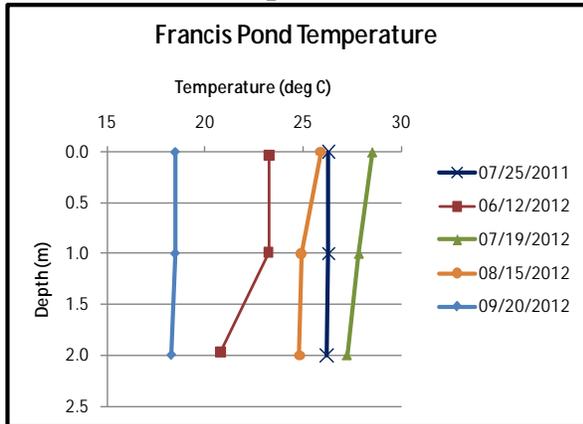
*Nitella sp.* (stonewort)

*Utricularia vulgaris* (common bladderwort)

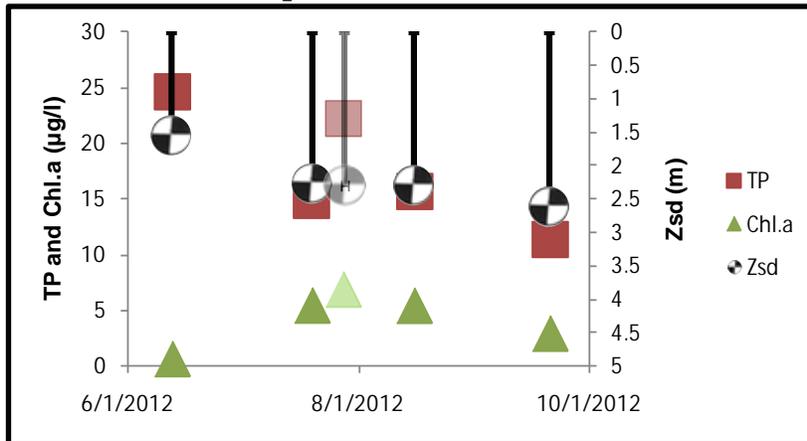
*Vallisneria americanum* (eel grass)

*Zosterella dubia* (water stargrass)

## Time Series: Depth Profiles



## Time Series: Trophic Indicators



\* transparent symbols represent the July 25, 2011 data

## WQ Sampling Results

### Surface Samples

|            | UNITS  | N | MIN    | AVG     | MAX    | Scientific Classification        | Regulatory Comments                                    |
|------------|--------|---|--------|---------|--------|----------------------------------|--|
| SECCHI     | meters | 5 | 1.55   | 2.202   | > 2.6  | Mesotrophic                      | No readings violate DOH guidance value                 |
| TSI-Secchi |        |   | 53.7   | 48.6    | 46.2   | Mesotrophic                      | No pertinent water quality standards                   |
| TP         | mg/l   | 5 | 0.0114 | 0.0178  | 0.0246 | Mesotrophic                      | <b>40% of readings violate water quality standards</b> |
| TSI-TP     |        |   | 39.2   | 45.6    | 50.3   | Mesotrophic                      | No pertinent water quality standards                   |
| TSP        | mg/l   | 3 | 0.005  | 0.0076  | 0.0099 | High % soluble Phosphorus        | No pertinent water quality standards                   |
| NOx        | mg/l   | 5 | 0.0029 | 0.01044 | 0.0224 | Low nitrate                      | No readings violate water quality standards            |
| NH4        | mg/l   | 5 | 0.01   | 0.0186  | 0.032  | Low ammonia                      | No readings violate water quality standards            |
| TKN        | mg/l   | 5 | 0.33   | 0.446   | 0.65   | Low organic nitrogen             | No pertinent water quality standards                   |
| TN/TP      |        |   | 39.56  | 59.31   | 65.90  | Phosphorus Limited               | No pertinent water quality standards                   |
| CHLA       | ug/l   | 5 | 0.71   | 4.33    | 6.9    | Mesotrophic                      | No pertinent water quality standards                   |
| TSI-CHLA   |        |   | 27.2   | 45.0    | 49.5   | Mesotrophic                      | No pertinent water quality standards                   |
| Alkalinity | mg/l   | 5 | 41.6   | 45.76   | 48.9   | Poorly Buffered                  | No pertinent water quality standards                   |
| TCOLOR     | ptu    | 5 | 25     | 33.8    | 43     | Highly Colored                   | No pertinent water quality standards                   |
| TOC        | mg/l   | 5 | 4.9    | 5.76    | 6.9    |                                  | No pertinent water quality standards                   |
| Ca         | mg/l   | 5 | 12.7   | 14.04   | 15     | Minimally Supports Zebra Mussels | No pertinent water quality standards                   |
| Fe         | mg/l   | 5 | 0.0487 | 0.1837  | 0.554  | May have some taste/odor         | <b>20% of readings violate water quality standards</b> |
| Mn         | mg/l   | 5 | 0.0137 | 0.0682  | 0.16   |                                  | No readings violate water quality standards            |
| Mg         | mg/l   | 5 | 4.25   | 4.61    | 5.04   |                                  | No readings violate water quality standards            |
| K          | mg/l   | 5 | 0.193  | 0.45    | 0.82   |                                  | No pertinent water quality standards                   |
| Na         | mg/l   | 5 | 3.9    | 4.32    | 5.04   |                                  | No readings violate water quality standards            |
| Cl         | mg/l   | 5 | 7      | 7.38    | 8.1    | Minor road salt runoff           | No readings violate water quality standards            |
| SO4        | mg/l   | 5 | 2.3    | 3.56    | 4.9    |                                  | No readings violate water quality standards            |
| Si         | mg/l   | 5 | 2.09   | 2.66    | 3.58   |                                  | No pertinent water quality standards                   |

### 2011 & 2012 Lake Perception

|                         | UNITS       | N | MIN | AVG | MAX | Scientific Classification    | Regulatory Comments                  |
|-------------------------|-------------|---|-----|-----|-----|------------------------------|--------------------------------------|
| WQ Assessment           | 1-5, 1 best | 5 | 2   | 2.4 | 3   | Not Quite Crystal Clear      | No pertinent water quality standards |
| Weed Assessment         | 1-5, 1 best | 5 | 2   | 2.2 | 3   | Plants Visible Below Surface | No pertinent water quality standards |
| Recreational Assessment | 1-5, 1 best | 5 | 2   | 2.2 | 3   | 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)<br>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<br>Detection limit = 0.003 mg/l; no NYS standard or guidance value   |
| NOx        | = nitrate + nitrite nitrogen, mg/l<br>Detection limit = 0.01 mg/l; NYS WQ standard = 10 mg/l  |
| NH4        | = total ammonia, mg/l<br>Detection limit = 0.01 mg/l; NYS WQ standard = 2 mg/l  |
| TKN        | = total Kjeldahl nitrogen (= organic nitrogen + ammonia), mg/l<br>Detection limit = 0.01 mg/l; no NYS standard or guidance value  |
| TN/TP      | = Nitrogen to Phosphorus ratio (molar ratio), = $(\text{TKN} + \text{NOx}) * 2.2 / \text{TP}$<br>> 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)<br>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<br>Detection limit = 10 mg/l; no NYS standard or guidance value   |
| TCOLOR     | = true (filtered or centrifuged) color, platinum color units (ptu)<br>Detection limit = 5 ptu; no NYS standard or guidance value  |
| TOC        | = total organic carbon, mg/l<br>Detection limit = 1 mg/l; no NYS standard or guidance value   |
| Ca         | = calcium, mg/l<br>Detection limit = 1 mg/l; no NYS standard or guidance value  |
| Fe         | = iron, mg/l<br>Detection limit = 0.1 mg/l; NYS standard = 0.3 mg/l   |
| Mn         | = manganese, mg/l<br>Detection limit = 0.01 mg/l; NYS standard = 0.3 mg/l   |
| Mg         | = magnesium, mg/l<br>Detection limit = 2 mg/l; NYS standard = 35 mg/l   |
| K          | = potassium, mg/l<br>Detection limit = 2 mg/l; no NYS standard or guidance value  |
| Na         | = sodium, mg/l<br>Detection limit = 2 mg/l; NYS standard = 20 mg/l  |
| Cl         | = chloride, mg/l<br>Detection limit = 2 mg/l; NYS standard = 250 mg/l   |
| SO4        | = sulfate, mg/l<br>Detection limit = 2 mg/l; NYS standard = 250 mg/l  |
| Si         | = Dissolved silica, mg/l<br>Detection limit = 0.01 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)<br>NYS standard = 4 mg/l; 5 mg/l for salmonids  |
| pH     | = powers of hydrogen, standard pH units (S.U.)<br>Detection limit = 1 S.U.; NYS standard = 6.5 and 8.5  |
| SpCond | = specific conductance, corrected to 25°C, micromho per centimeter ( $\mu\text{mho/cm}$ )<br>Detection limit = 1 $\mu\text{mho/cm}$ ; no NYS standard or guidance value |
| ORP    | = Oxygen Reduction Potential, millivolts (MV)<br>Detection limit = -250 mV; no NYS standard or guidance value   |

### ***Lake Assessment***

|                         |  |
|-------------------------|--|
| WQ Assessment           | = <b>water quality assessment</b> , 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         | = <b>weed coverage/density assessment</b> , 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 | = <b>swimming/aesthetic assessment</b> , 5 point scale; 1 = could not be nicer, 2 = excellent, 3= slightly impaired, 4 = substantially impaired, 5 = lake not usable                     |