LOVELL LAKE

2014 SAMPLING HIGHLIGHTS

Station – 2 South

Sanbornville, NH

University of New Hampshire Cooperative Extension

Station 2 South was used as a reference point to represent the overall lake quality.

Refer to the Lovell Lake Annual Report (2014) for additional information.

Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

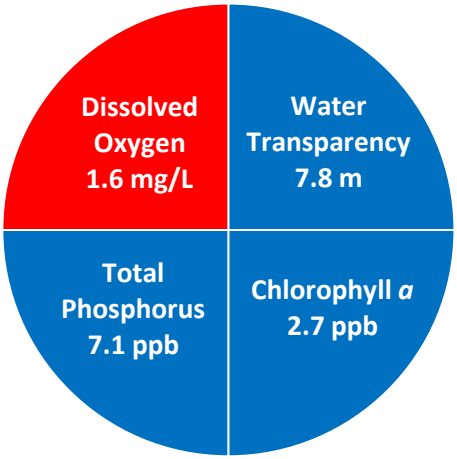


Figure 1. Lovell Lake Water Quality (2014)

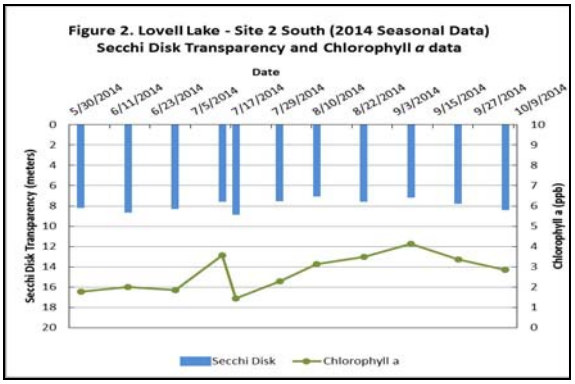
Table 1. 2014 Lovell Lake Seasonal Averages and NH DES Trophic Level Classification Criteria

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Lovell Lake Average (range)	Lovell Lake Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	**7.8** meters (6.9 – 8.7)	Oligotrophic
Chlorophyll *a* (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	**2.7** ppb (1.4 – 4.1)	Oligotrophic
Total Phosphorus (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	**7.1** ppb (5.8 – 9.2)	Oligotrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	**1.6** mg/L (0.8 – 3.1)	Eutrophic

* Dissolved oxygen concentrations were measured between 9.0 and 11.0 meters, in the layer of rapidly decreasing temperatures, on September 8, 2014.

Table 2. 2014 Lovell Lake Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Lovell Lake Average (range)	Lovell Lake Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	**9.1** color units (6.2 – 13.2)	Uncolored
Alkalinity (mg/L)	< 0.0 acidified	0.1 – 2.0 extremely vulnerable	2.1 – 10 moderately vulnerable	10.1 – 25.0 low vulnerability	> 25.0 not vulnerable	**15.0** mg/L (14.1 – 16.0)	Low vulnerability
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			**7.2** standard units (6.5 – 7.6)	Optimal range for fish growth and reproduction
Specific Conductivity (*u*S/cm)	< 50 *u*S/cm Characteristic of minimally impacted NH lakes		50-100 *u*S/cm Lakes with some human influence	> 100 *u*S/cm Characteristic of lakes experiencing human disturbances		**112.3** *u*S/cm (108.1– 123.1)	Characteristic of lakes experiencing human disturbances



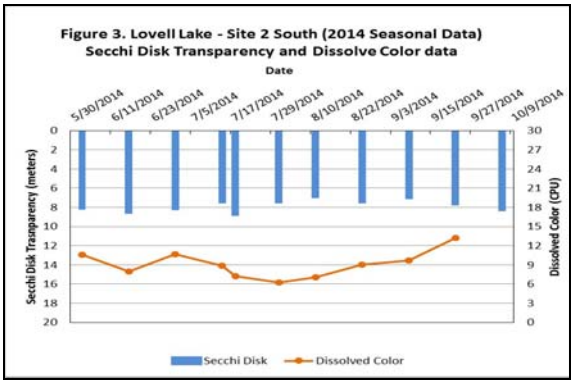


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* changes and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll *a* and/or color concentrations.

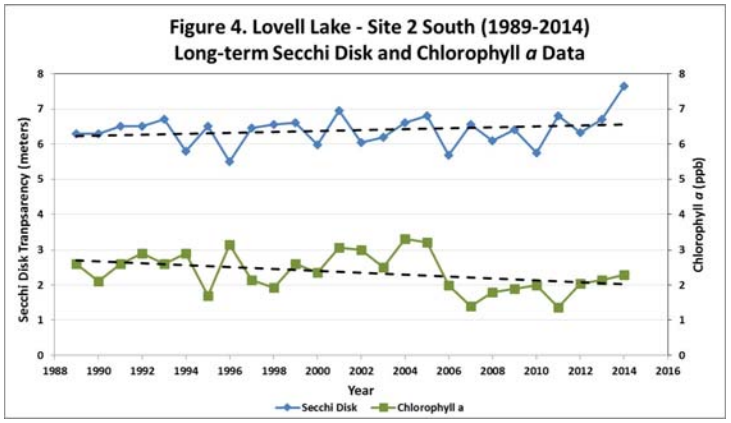
LONG-TERM TRENDS

WATER CLARITY: The Lovell Lake water clarity measurements, measured as Secchi Disk transparency, display a trend of increasing water clarity over the past twenty-six years.

CHLOROPHYLL: The Lovell Lake chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a trend of decreasing concentrations over the past twenty-six years.

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Lovell Lake total phosphorus concentrations display a trend of increasing concentrations over the twenty-five year span.

COLOR: The Lovell Lake color data, the result of naturally occurring "tea" color substances from the breakdown of soils and plant materials, are relatively stable over the past twenty-six years.



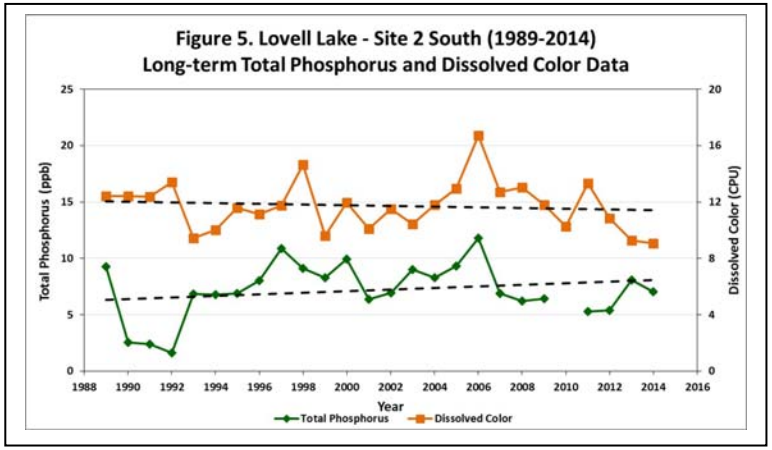


Table 3. Salmon Falls Headwaters Seasonal Average Water Quality Inter-comparison (2014)

Lake	Average Secchi Disk Transparency (meters)	Average Chlorophyll *a* (ppb)	Average Total Phosphorus (ppb)	Average Dissolved Oxygen (ppm)
Great East Lake	10.5	1.1	6.2	4.6
Wilson Lake	7.5	2.1	6.5	1.2
Lovell Lake	7.8	2.7	7.1	1.6
Horn Pond	8.1	2.1	6.7	1.3
Lake Ivanhoe	4.2	6.0	9.0	------

- Water quality data are reported for a deep reference sampling location in each water body
- Dissolved oxygen measurements were taken late season (early-mid September) and from the bottom water layer (hypolimnion).
- ------ Indicates the site is too shallow to form a bottom water layer (hypolimnion).

Figures 4 and 5. Changes in the Lovell Lake water clarity (Secchi Disk depth), chlorophyll *a*, dissolved color and total phosphorus concentrations measured between 1989 and 2014. **These data illustrate the relationship among plant growth, dissolved color and water clarity. Total phopshorus data are also displayed and are oftentimes correlated with the amount of plant growth.** Trendlines are displayed when sufficient data are available.

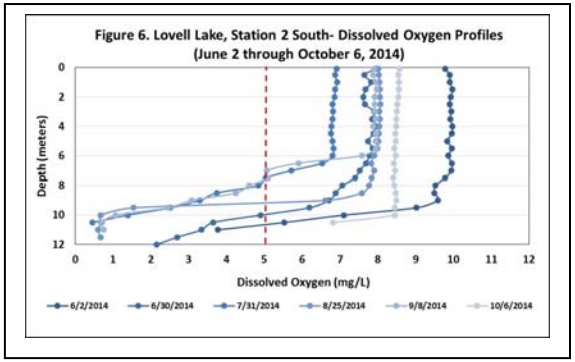


Figure 6. Monthly Lovell Lake dissolved oxygen profiles collected between June 2 and October 6, 2014. The vertical red line indicates the oxygen concentration commonly considered the threshold for successful growth and reproduction of cold water fish such as trout and salmon. *Notice the low oxygen concentations near the lake bottom between June 30 and September 8.*

Recommendations

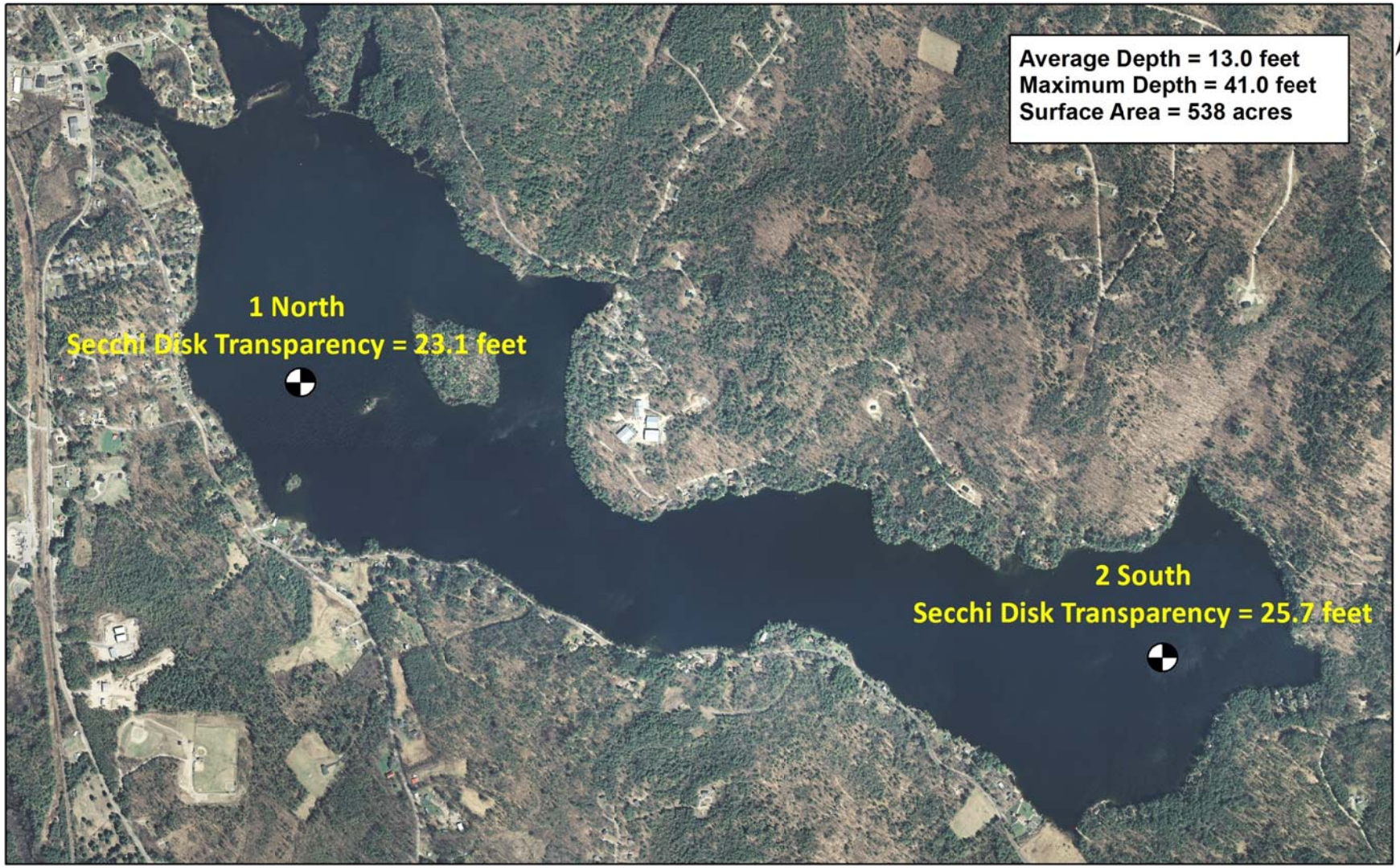
Implement Best Management Practices within the Lovell Lake watershed to minimize the adverse impacts of polluted runoff and erosion into the lake. Refer to "Landscaping at the Water's Edge: An Ecological Approach" and "New Hampshire Homeowner's Guide to Stormwater Management: Do-It-Yourself Stormwater Solutions for Your Home" for more information on how to reduce nutrient loading caused by overland run-off. The Acton Wakefield Watershed Alliance also offers technical assistance to help design and implement erosion control projects that protect and improve the water quality.

- http://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
- http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf
- http://awwatersheds.org/healthy-lakes/conservation-practices-for-homeowners/

Figure 7. Lovell Lake

Wakefield, NH

2014 Deep water sampling site locations that display the seasonal average water clarity



Aerial Orthophoto Source: NH GRANIT
Site locations GPSed by the UNH Center of Freshwater Biology

University of New Hampshire Cooperative Extension

NEW HAMPSHIRE LAKES LAY MONITORING