LOON LAKE

2021 SAMPLING HIGHLIGHTS

Station 1 Deep

Effingham, NH

Extension

Water quality data displayed in Tables 1 and 2 are surface water measurements with the exception of the dissolved oxygen data that are collected near the lake bottom. Summary statistics are provided for bi-weekly samples collected between May 13 and October 14, 2021.

Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

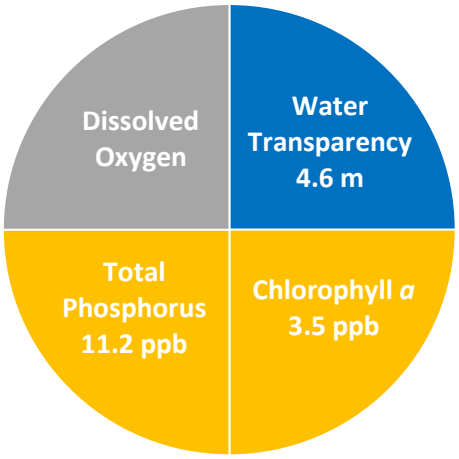


Figure 1. Loon Lake Water Quality (2021)

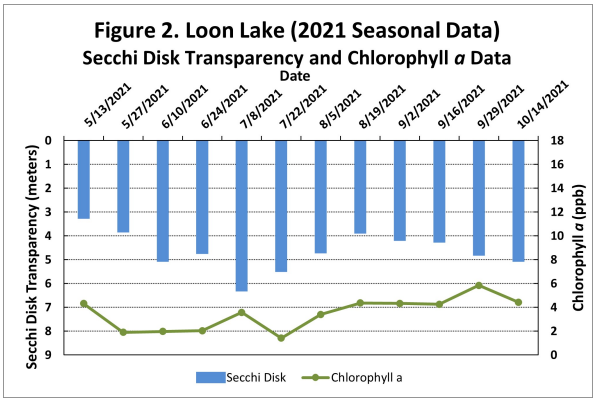
Table 1. 2021 Loon Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Loon Lake Average (range)	Loon Lake Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	**4.6** meters (3.2 – 6.3)	Oligotrophic
Chlorophyll *a* [1] (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	**3.5** ppb (1.4 – 5.8)	Mesotrophic
Total Phosphorus [1] (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	**11.2** ppb (5.2 – 24.7)	Mesotrophic
Dissolved Oxygen (ppm)	5.0 – 7.0	2.0 – 5.0	<2.0	No Data **	Not Assessed

**Late season Loon Lake dissolved oxygen concentrations, that are the basis for the assessment, were not collected in 2021. Historical data suggest the late season (August and September) dissolved oxygen concentrations become reduced below 2.0 ppm near the lake bottom.

Table 2. 2021 Loon Lake Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Loon Lake Average (range)	Loon Lake Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	**25.7** color units (range: 19.0 – 33.6)	Lightly tea colored
Alkalinity (ppm)	< 0.0 acidified	0.1 – 2.0 extremely vulnerable	2.1 – 10 moderately vulnerable	10.1 – 25.0 low vulnerability	> 25.0 not vulnerable	**6.4** ppm (range: 5.1 – 7.3)	Moderately vulnerable
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			**6.5** standard units (range: 6.1 – 7.1)	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		**75.0** *u*S/cm (range: 61.7 – 82.7)	Characteristic of lakes with some human influence



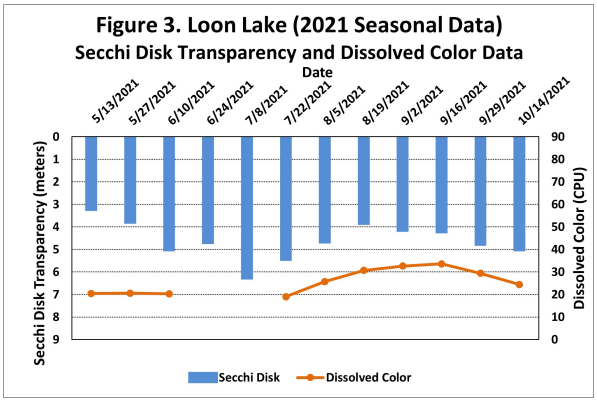


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* changes and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in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

Table 3. Loon Lake and Round Pond inter-depth (2021 Data: bi-weekly sampling between May 13 and October 14)

Lake / Zone	Average (range) Total Phosphorus (ppb)	Average (range) Specific Conductivity (uS/cm)	Average (range) Total Alkalinity @ pH 5.2 (ppm)	Average (range) pH (standard units)
Loon Lake – surface composite (epilimnion)	11.2 ppb (range: 5.2 – 24.7)	75.0 *uS/cm* (range: 61.7 – 82.7)	6.4 ppm (range: 5.1 – 7.3)	6.5 std units (range: 6.1 – 7.1)
Loon Lake – surface zone (epilimnion)	8.0 ppb (range: 5.4 – 16.3)	76.3 *uS/cm* (range: 57.7 – 87.4)	6.7 ppm (range: 5.7 – 7.7)	6.7 std units (range: 6.3 – 7.3)
Loon Lake - mid-lake zone (metalimnion)	8.3 ppb (range: 5.7 – 10.8)	66.6 *uS/cm* (range: 57.5 – 83.4)	5.4 ppm (range: 4.7 – 6.7)	6.3 std units (range: 5.6 – 7.2)
Loon Lake – deep water zone (hypolimnion)	14.7 ppb (range: 6.8 – 46.2)	68.9 *uS/cm* (range: 57.4 – 83.7)	7.5 ppm (range: 4.9 – 16.5)	5.9 std units (range: 5.2 – 6.4)
Round Pond – surface composite (epilimnion)	13.5 ppb (range: 7.4 – 37.8)	43.5 *uS/cm* (range: 37.2 – 53.4)	3.1 ppm (range: 2.6 – 4.2)	6.3 std units (range: 5.9 – 6.9)
Round Pond – surface zone (epilimnion)	11.7 ppb (range: 6.8 – 37.2)	41.9 *uS/cm* (range: 37.0 – 49.9)	3.3 ppm (range: 2.6 – 4.1)	6.3 std units (range: 5.8 – 6.7)
Round Pond – mid-lake zone (metalimnion)	10.3 ppb (range: 7.8 – 15.3)	42.0 *uS/cm* (range: 36.5 – 47.3)	3.1 ppm (range: 2.4 – 4.2)	6.2 std units (range: 5.9 – 6.9)

- Water quality summary statistics are reported for Loon Lake and Round Pond. Summary data are included for each of the three thermal zones (when applicable), as well as the epilimnetic surface composite samples. *Note: Round Pond becomes thermally stratified intermittently and does not develop a deep water (hypolimnion) zone.*

Figure 4. Loon Lake - Deep Site (1993-2021)
Long-term Secchi Disk Transparency and Chlorophyll *a* Data

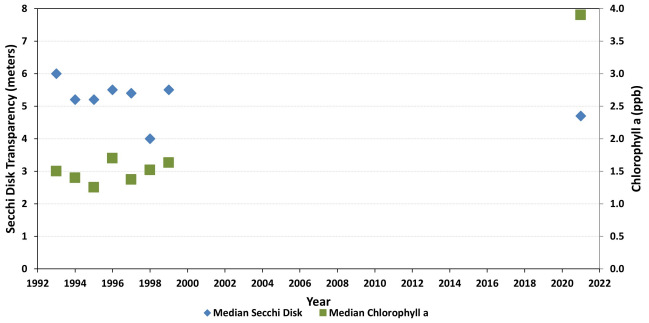
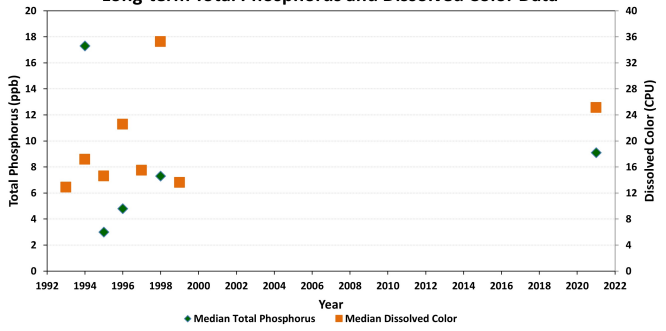


Figure 5. Loon Lake - Deep Site (1993-2021)
Long-term Total Phosphorus and Dissolved Color Data



Figures 4 and 5. Annual Median Loon Lake water transparency (Secchi Disk depth), chlorophyll *a*, dissolved color and total phosphorus concentrations measured between 1993 and 2021, through the New Hampshire Lakes Lay Monitoring Program.

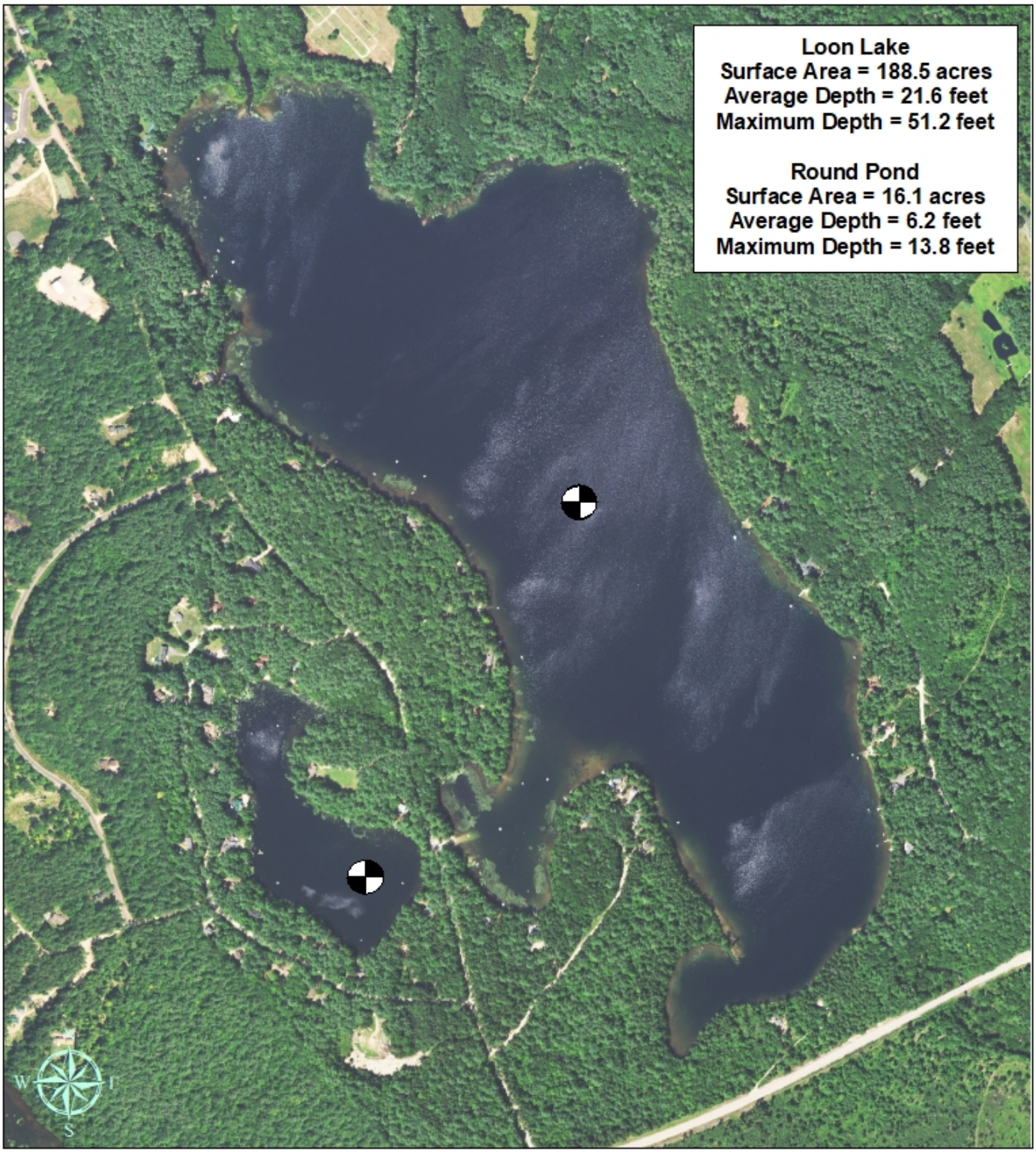
Recommendations

Implement Best Management Practices (BMPs) within the Loon Lake watershed to minimize the adverse impacts of polluted runoff and erosion into Loon Lake. Refer to "Landscaping at the Water's Edge: An Ecological Approach", "New Hampshire Homeowner's Guide to Stormwater Management: Do-It-Yourself Stormwater Solutions for Your Home", and the Green Mountain Conservation Group BMP page for more information on how to reduce nutrient loading caused by overland run-off.

- https://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
- https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/homeowner-guide-stormwater.pdf
- https://www.gmcg.org/project-bmp/

Figure 6. Loon Lake and Round Pond

Effingham, NH
2021 deep sampling locations



Aerial Orthophoto Source: NH Granit, 2018 National Agriculture Imagery Program
GPS Coordinates collected by the UNH Center for Freshwater Biology

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