



VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

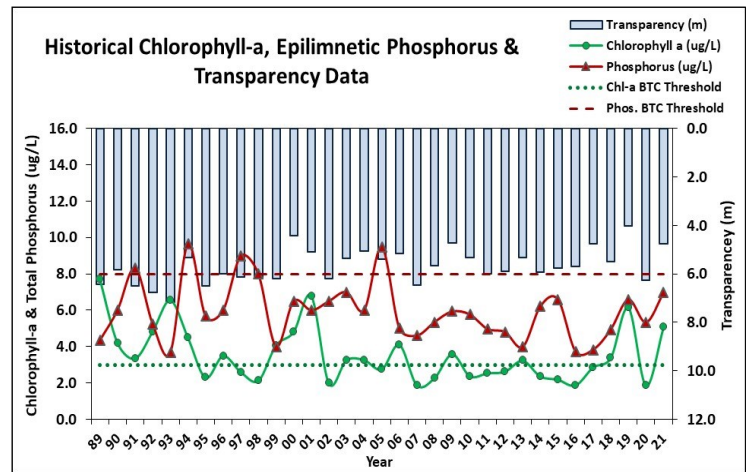
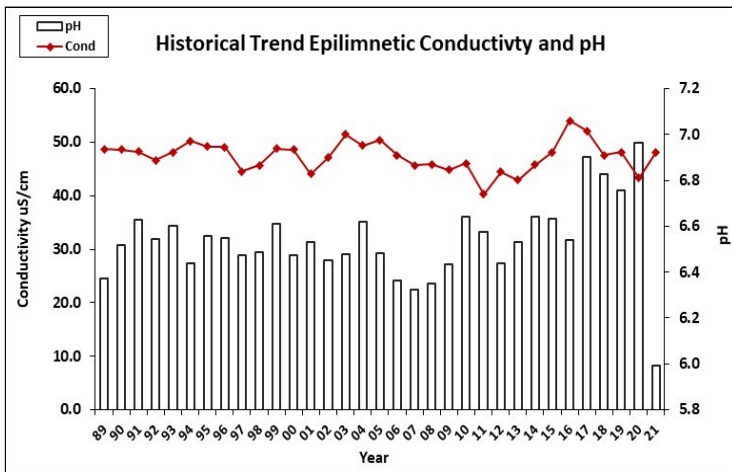
LAUREL LAKE, FITZWILLIAM

2021 DATA SUMMARY

RECOMMENDED ACTIONS: Great job sampling in 2021! In contrast to drought conditions in 2020, record rainfall amounts in summer 2021 and associated stormwater runoff and flushing of wetland systems rich in dissolved organic matter resulted in higher nutrient (phosphorus) levels, algal growth (chlorophyll) and darker water color which resulted in decreased (worsened) water clarity (transparency). This highlights the importance of managing stormwater runoff within the watershed. Great job on submitting an application to develop a watershed management plan! Continue working towards development and implementation of a plan to help protect the lake from future degradation. Lake pH levels have improved in recent years and indicate recovery of the lake from historical impacts of acid precipitation, however the record rainfall amounts in 2021 resulted in more acidic lake water. Consider sampling in May to assess nutrient loading in spring which could influence algal growth in June. Keep up the great work!

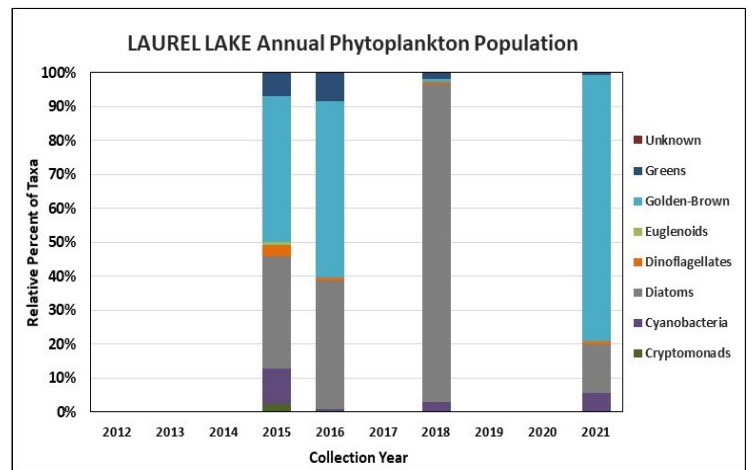
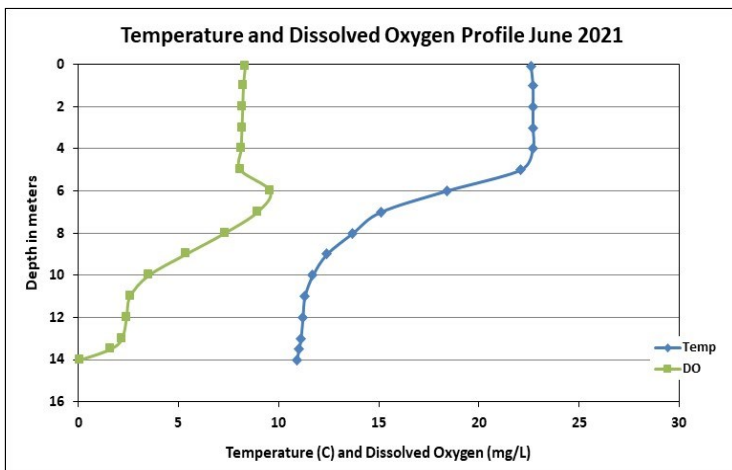
HISTORICAL WATER QUALITY TREND ANALYSIS

| Parameter | Trend | Parameter | Trend |
|-----------------|--------|-------------------------|-----------|
| Conductivity | Stable | Chlorophyll-a | Improving |
| pH (epilimnion) | Stable | Transparency | Worsening |
| | | Phosphorus (epilimnion) | Stable |



DISSOLVED OXYGEN AND PHYTOPLANKTON

(Note: Information may not be collected annually)





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OBSERVATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- ◆ **CHLOROPHYLL-A:** Chlorophyll level was elevated in June, decreased to a low level in July, and then increased to a slightly elevated level in August. Average chlorophyll level increased sharply from 2020 and was greater than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- ◆ **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), and Keene Ave. Trib. conductivity levels remained within a low range and were approximately equal to the state median. Epilimnetic and Keene Ave. Trib. chloride levels were also low and slightly greater than the state median. Historical trend analysis indicates stable epilimnetic conductivity levels since monitoring began.
- ◆ **COLOR:** Apparent color measured in the epilimnion indicates the water was clear, with little to no tea or brown coloring in June, remained stable in July, and then darkened to moderately tea colored conditions in August following significant rainfall amounts prior to sampling.
- ◆ **E. COLI:** Keene Ave. Trib. E. coli levels were higher following storm events in July and August but levels remained less than the state standard for surface waters. Swim Club E. coli levels were very low on each sampling event.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels fluctuated within a low range. Average epilimnetic phosphorus level increased from 2020 but remained less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic phosphorus level was slightly elevated in July. Hypolimnetic phosphorus level was slightly elevated in June and August. Keene Ave. Trib. phosphorus level was elevated in August following significant rainfall amounts, however field data note low flows and lab data note highly colored water.
- ◆ **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in June, decreased (worsened) in July likely due to wave conditions, and then increased (improved) slightly in August. Average NVS transparency decreased (worsened) from 2020 but remained higher (better) than the state median. Historical trend analysis indicates significantly decreasing (worsening) NVS transparency since monitoring began. VS transparency was higher than NVS transparency and likely a better measure of actual conditions.
- ◆ **TURBIDITY:** Epilimnetic, Metalimnetic, Hypolimnetic, and Keene Ave. Trib. turbidity levels fluctuated within a low range.
- ◆ **PH:** Epilimnetic and Hypolimnetic pH levels were slightly acidic and less than desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Metalimnetic pH level fluctuated around the low end of the desirable range in June and July and decreased in August likely due to significant rainfall amounts prior to sampling. Keene Ave. Trib. pH level was acidic and potentially critical to aquatic life.

| Station Name | Table 1. 2021 Average Water Quality Data for LAUREL LAKE - FITZWILLIAM | | | | | | | | | | |
|---------------------------------|--|-------------------|--------------------|----------------|------------------|------------------------|-------------------|------------|------|----------------|------|
| | Alk. (mg/L) | Chlor-a (ug/L) | Chloride (mg/L) | Color (pcu) | Cond. (us/cm) | E. coli (mpn/100mL) | Total P (ug/L) | Trans. (m) | | Turb. (ntu) | pH |
| | | | | | | | | NVS | VS | | |
| Epilimnion | 4.0 | 5.06 | 10 | 37 | 48.1 | | 7 | 4.75 | 5.72 | 0.40 | 5.99 |
| Metalimnion | | | | | 48.6 | | 9 | | | 0.41 | 6.32 |
| Hypolimnion | | | | | 51.0 | | 13 | | | 0.58 | 5.84 |
| Keene Ave. Trib. Before Lake | | | 10 | | 50.4 | 84 | 45 | | | 0.39 | 5.05 |
| North Beach | | | | | | 6 | | | | | |
| Swim Club | | | | | | 2 | | | | | |

NH Median Values

Median values generated from historic lake monitoring data.

Alkalinity: 4.5 mg/L **Chlorophyll-a:** 4.39 ug/L

Conductivity: 42.3 uS/cm **Chloride:** 5 mg/L

Total Phosphorus: 11 ug/L **Transparency:** 3.3 m

pH: 6.6

NH Water Quality Standards

Numeric criteria for specific parameters. Water quality violation if thresholds exceeded.

Chloride: > 230 mg/L (chronic) **Turbidity:** > 10 NTU above natural

E. coli: > 88 cts/100 mL (beach)

E. coli: > 406 cts/100 mL (surface waters)

pH: between 6.5-8.0 (unless naturally occurring)