



# 2023 VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

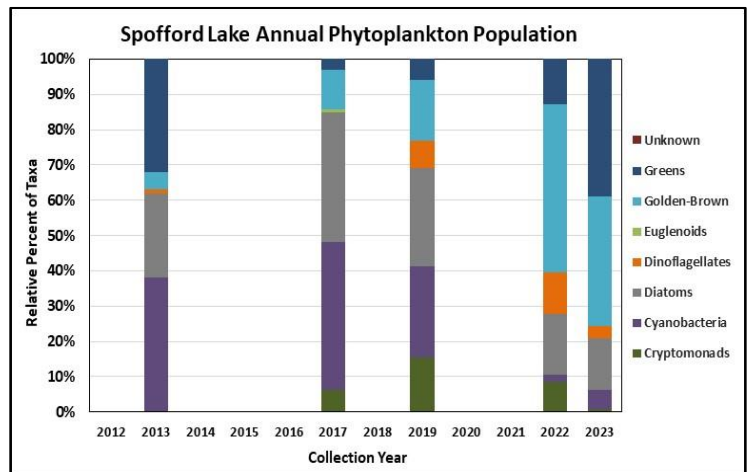
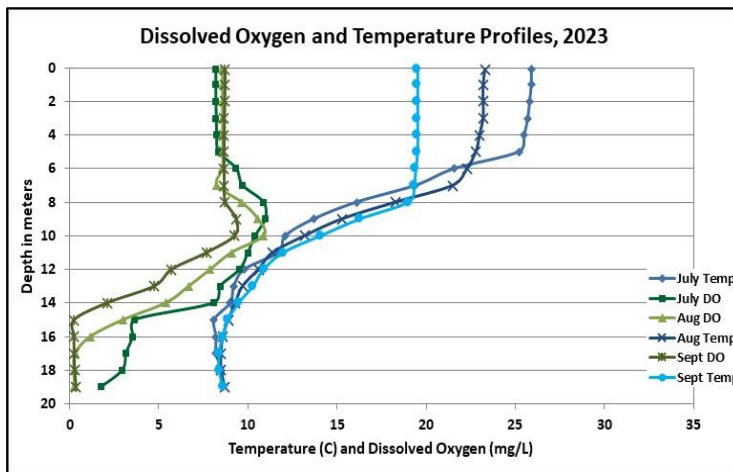
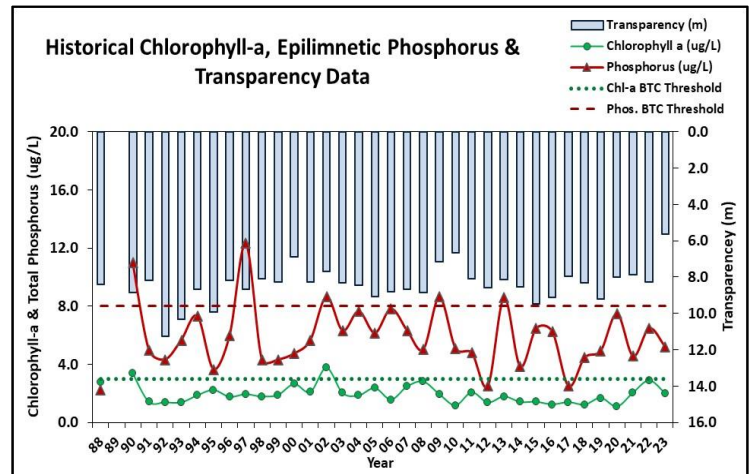
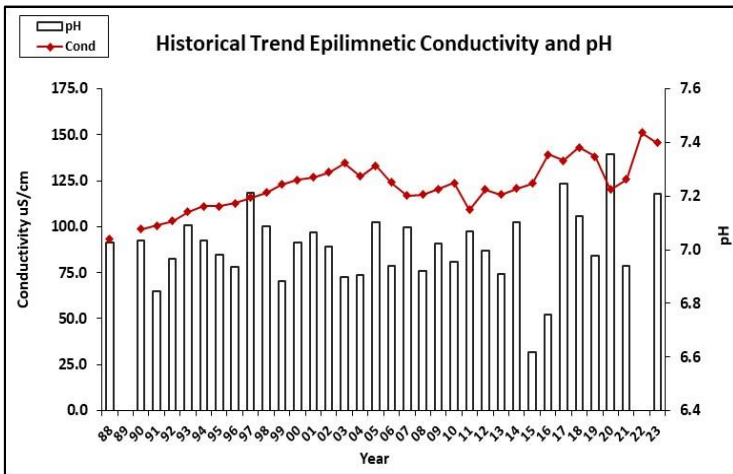
## SPOFFORD LAKE, CHESTERFIELD

**Recommended Actions:** Great job conducting enhanced sampling in 2023! Storm event sampling identified elevated phosphorus and turbidity levels at Boat Launch Inlet, Camp Spofford Inlet & WS, Moose Hollow Inlet & WS, Rt. 63-3 Inlet NW & SW, Seamans Inlet & WS, and Wares Grove Inlet & WS. These locations should be the focus of additional investigations to determine pollutant sources. Lake water quality remained representative of oligotrophic, or high quality conditions in 2023 despite the record summer rainfall. Enhanced deep spot sampling revealed depletion of dissolved oxygen in hypolimnetic water as the summer progressed resulting in the release of phosphorus from bottom sediments, a process referred to as internal phosphorus loading. Continue to observe the lake for any signs of cyanobacteria and report to NHDES' [Harmful Algal Bloom Program](#). Continue monthly phytoplankton sampling to track shifts in algal population dynamics over the summer. Assess areas prone to stormwater runoff and implement stormwater best practices to divert or infiltrate stormwater prior to reaching tributaries and the lake. Partner with [Soak Up the Rain NH](#) to start identifying and implementing stormwater best practices in the watershed. Encourage shoreline property owners to be certified [LakeSmart](#) through NH LAKES' lake-friendly living program. Continue to evaluate monitoring program to better assess watershed conditions and implement recommendations of the management plan. Keep up the great work!

### HISTORICAL WATER QUALITY TREND ANALYSIS

| PARAMETER                | TREND     | PARAMETER               | TREND     |
|--------------------------|-----------|-------------------------|-----------|
| Conductivity             | Worsening | Chlorophyll-a           | Stable    |
| pH (epilimnion)          | Stable    | Transparency            | Worsening |
| Phosphorus (hypolimnion) | Stable    | Phosphorus (epilimnion) | Stable    |

### HISTORICAL WATER QUALITY GRAPHICS





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

- ◆ **CHLOROPHYLL-A:** Chlorophyll levels fluctuated within a low range from May through August and increased to slightly elevated levels in September. Average chlorophyll level decreased from 2022 and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- ◆ **CONDUCTIVITY/CHLORIDE:** Deep spot, Camp Spofford Inlet & WS, Clarkdale Pipe, Galka Cove, Moose Hollow Inlet & WS, Outlet, Shield Inlet, and Wares Grove Inlet & WS conductivity and/or chloride levels were slightly elevated and greater than the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Boat Launch Inlet, Rt. 63-3 Inlet NW and SW, and Seamans Inlet conductivity and chloride levels were elevated and chloride levels exceeded the state standard at several stations. Clarkdale Pipe WS, Lachance Inlet & WS, Seamans Inlet WS, Spofford Hall Pipe, Wares Grove NE Inlet WS conductivity and chloride levels were low.
- ◆ **COLOR:** Epilimnetic and Hypolimnetic color data indicates the water fluctuated within a clear range with little to no tea, or brown, coloring, and was darkest in August.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels fluctuated within a low range. Average epilimnetic phosphorus level decreased from 2022 and was less than the state median and the threshold for oligotrophic lakes. Metalimnetic and Hypolimnetic phosphorus levels were slightly elevated in August. Historical trend analysis indicates relatively stable epilimnetic and hypolimnetic phosphorus levels since monitoring began. Boat Launch Inlet, Camp Spofford Inlet & WS, Moose Hollow Inlet & WS, Rt. 63-3 Inlet NW & SW, Seamans Inlet & WS, and Wares Grove Inlet & WS experienced elevated phosphorus levels during storm event sampling. Lachance Inlet & WS phosphorus levels were greatly elevated in July and August during low/stagnant flow conditions and iron precipitate was noted. Clarkdale Pipe & WS, Outlet, Shield Inlet, Spofford Hall Pipe, and Wares Grove NE Inlet & WS phosphorus levels were within average ranges for those stations.
- ◆ **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average (worse) in July and decreased (worsened) as the summer progressed. Average NVS transparency decreased from 2022, was higher than the state median, but was the lowest (worst) measured since monitoring began. Historical trend analysis indicates significantly decreasing (worsening) NVS transparency since monitoring began. Viewscope (VS) transparency was much higher (better) than NVS transparency and a better measure of conditions.
- ◆ **TURBIDITY:** Epilimnetic and Hypolimnetic turbidity levels were average. Metalimnetic turbidity level was elevated in May. Boat Launch Inlet, Camp Spofford Inlet, Moose Hollow Inlet & WS, Rt. 63-3 Inlet NW & SW, Seamans Inlet, and Wares Grove Inlet & WS experienced elevated or higher turbidity levels during storm event sampling. All other stations experienced low to average turbidity levels or elevated turbidity levels during low flow/stagnant conditions and sediment/organic matter or iron precipitate were noted in samples.
- ◆ **PH:** Deep spot, Boat Launch Inlet, Camp Spofford Inlet & WS, Clarkdale Pipe, Moose Hollow Inlet & WS, Outlet, Rt. 63-3 Inlet NW & SW, Seamans Inlet & WS, Shield Inlet, Spofford Hall Pipe, Wares Grove Inlet & WS, and Wares Grove NE Inlet & WS pH levels were within the desirable range of 6.5-8.0 units. Historical trend analysis indicates stable, yet variable, epilimnetic pH levels since monitoring began. Clarkdale Pipe WS, Galka Cove and Lachance Inlet & WS pH levels were slightly acidic and less than desirable.

Table 1. 2023 Average Water Quality Data for SPOFFORD LAKE - CHESTERFIELD

| Station Name            | Alk.<br>(mg/L) | Chlor-a<br>(ug/L) | Chloride<br>(mg/L) | Color<br>(pcu) | Cond.<br>(us/cm) | Total P<br>(ug/L) | Trans. (m) |      | Turb.<br>(ntu) | pH   |
|-------------------------|----------------|-------------------|--------------------|----------------|------------------|-------------------|------------|------|----------------|------|
|                         |                |                   |                    |                |                  |                   | NVS        | VS   |                |      |
| Epilimnion              | 10.2           | 2.00              | 31                 | 17             | 145.8            | 5                 | 5.62       | 7.41 | 0.67           | 7.21 |
| Metalimnion             | -              | -                 | 32                 | -              | 149.3            | 9                 | -          | -    | 1.28           | 7.04 |
| Hypolimnion             | -              | -                 | 30                 | 22             | 152.3            | 14                | -          | -    | 1.10           | 6.69 |
| Boat Launch Inlet       | -              | -                 | 322                | -              | 1171.8           | 31                | -          | -    | 30.33          | 6.57 |
| Camp Spofford Inlet     | -              | -                 | 42                 | -              | 193.9            | 29                | -          | -    | 1.66           | 6.95 |
| Camp Spofford Inlet WS  | -              | -                 | 30                 | -              | 152.0            | 23                | -          | -    | 0.63           | 7.17 |
| Clarkdale Pipe          | -              | -                 | 34                 | -              | 178.9            | 26                | -          | -    | 7.63           | 6.73 |
| Clarkdale Pipe WS       | -              | -                 | 12                 | -              | 82.0             | 13                | -          | -    | 1.49           | 6.12 |
| Galka Cove              | -              | -                 | 18                 | -              | 102.5            | 24                | -          | -    | 4.43           | 6.29 |
| Lachance Inlet          | -              | -                 | 5                  | -              | 66.1             | 81                | -          | -    | 4.10           | 6.32 |
| Lachance Inlet WS       | -              | -                 | 5                  | -              | 66.9             | 131               | -          | -    | 3.85           | 6.28 |
| Moose Hollow Inlet      | -              | -                 | 20                 | -              | 136.8            | 34                | -          | -    | 7.20           | 7.02 |
| Moose Hollow WS         | -              | -                 | 18                 | -              | 137.0            | 41                | -          | -    | 4.64           | 6.71 |
| Outlet                  | -              | -                 | 32                 | -              | 158.6            | 13                | -          | -    | 0.98           | 6.92 |
| Rt. 63-3 Inlet          | -              | -                 | 238                | -              | 888.6            | 24                | -          | -    | 3.11           | 7.06 |
| Rt. 63-3 NW Drainage    | -              | -                 | 97                 | -              | 417.8            | 85                | -          | -    | 18.84          | 6.77 |
| Rt. 63-3 SW Drainage    | -              | -                 | 246                | -              | 952.4            | 32                | -          | -    | 5.45           | 7.17 |
| Seamans Inlet           | -              | -                 | 103                | -              | 408.1            | 25                | -          | -    | 3.47           | 6.95 |
| Seamans Inlet WS        | -              | -                 | 3                  | -              | 33.4             | 29                | -          | -    | 2.00           | 6.68 |
| Shield Inlet            | -              | -                 | 33                 | -              | 170.8            | 8                 | -          | -    | 2.13           | 6.95 |
| Spofford Hall Pipe      | -              | -                 | 4                  | -              | 102.2            | 13                | -          | -    | 2.34           | 6.90 |
| Wares Grove Inlet       | -              | -                 | 37                 | -              | 182.8            | 14                | -          | -    | 1.43           | 6.79 |
| Wares Grove Inlet WS    | -              | -                 | 29                 | -              | 156.5            | 14                | -          | -    | 1.70           | 6.90 |
| Wares Grove NE Inlet    | -              | -                 | 7                  | -              | 77.7             | 21                | -          | -    | 0.90           | 6.73 |
| Wares Grove NE Inlet WS | -              | -                 | 2                  | -              | 58.3             | 9                 | -          | -    | 0.65           | 6.83 |

**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)