2025 Volunteer Lake Assessment Program

Individual Report: Great Pond, North Station – Kingston

Water Quality Summary: Pond quality is generally representative of mesotrophic, or average, conditions, with low to moderate levels of phosphorus and low levels of algal growth. Historical trend analysis indicates worsening epilimnetic (upper water layer) conductivity and slightly worsening epilimnetic phosphorus levels, stable levels of water transparency and hypolimnetic (bottom water layer) phosphorus, slightly improving epilimnetic pH levels and improving chlorophyll levels. Epilimnetic phosphorus levels have continued to decrease after a spike in 2021, which is encouraging, but remain slightly elevated. However, hypolimnetic phosphorus remains elevated which suggests the potential for internal phosphorus loading due to anoxic (no oxygen) conditions. On average, Great Pond, North Station has similar or slightly lower (worse) water quality compared to the median New Hampshire lake and doesn't exceed any New Hampshire water quality standards.

Recommended Actions: Pond clarity (transparency) and chlorophyll levels (algal growth) remained within normal ranges in 2025 following excessive rainfall in 2023, however, the pond experienced a Cyanobacteria bloom in May and phosphorus levels have remained within an elevated range since 2021. Elevated nutrient levels are a concern as they can fuel unwanted algal and cyanobacteria blooms. This highlights the importance of managing nutrient loads to the lake from the watershed. Continue efforts to implement the watershed management plan to reduce nutrient loading to the lake. Educate lake and watershed residents on ways to reduce stormwater runoff from their properties. Consult NHDES' New Hampshire Homeowner's Guide to Stormwater Management. Consider partnering with Soak up the Rain New Hampshire to install stormwater management controls within the watershed. Educate shorefront property owners on becoming certified LakeSmart through NH LAKES' lake-friendly living program. Continue to work with local winter maintenance companies to obtain Green SnowPro Certification to help reduce impacts of winter road salt usage on the pond. Keep up the great work and thank you for your continued participation in VLAP!

Historical Water Quality Trend Analysis

Table 1. Historical Water Quality Trends for Great Pond, North Station – Kingston

Parameter	Trend
Conductivity (Epilimnion)	Worsening
Chlorophyll-a (Composite)	Improving
pH (Epilimnion)	Slightly Improving
Transparency	Stable
Phosphorus (Epilimnion)	Slightly Worsening
Phosphorus (Hypolimnion)	Stable

Historical Water Quality Graphics - Deep Spot

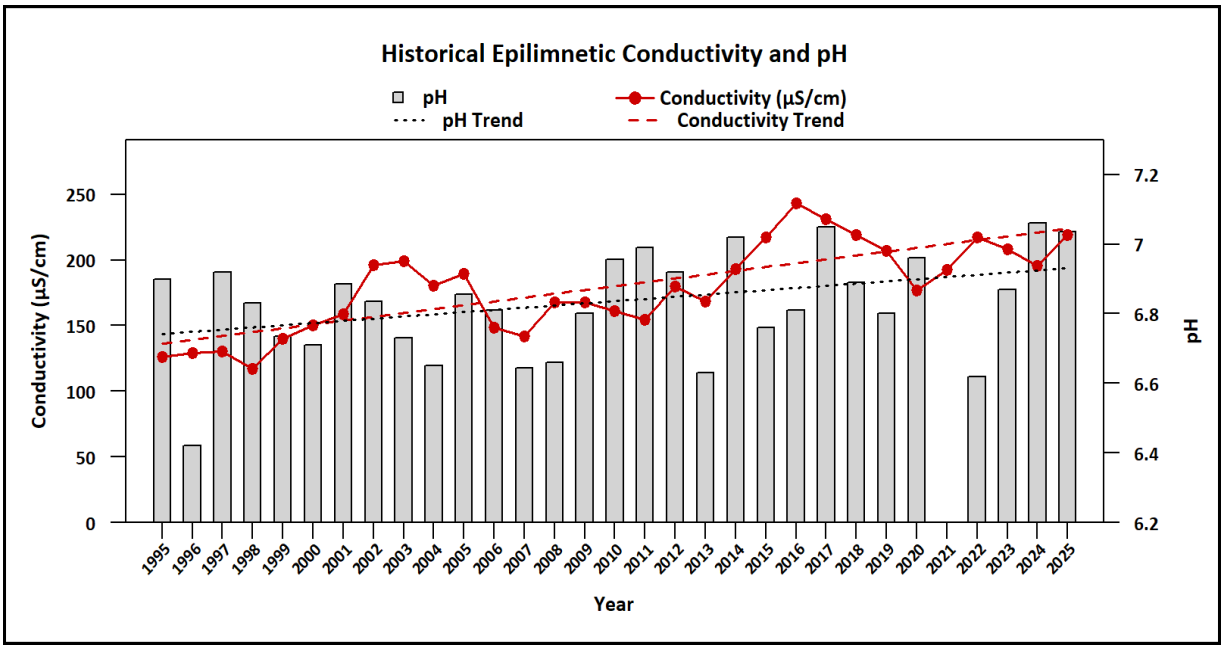

Figure 1. Median epilimnetic pH (gray bars) and conductivity (red points) by year, with corresponding trend lines shown as red and black dashed lines, respectively. Epilimnetic pH is slightly improving and conductivity is worsening since monitoring began.

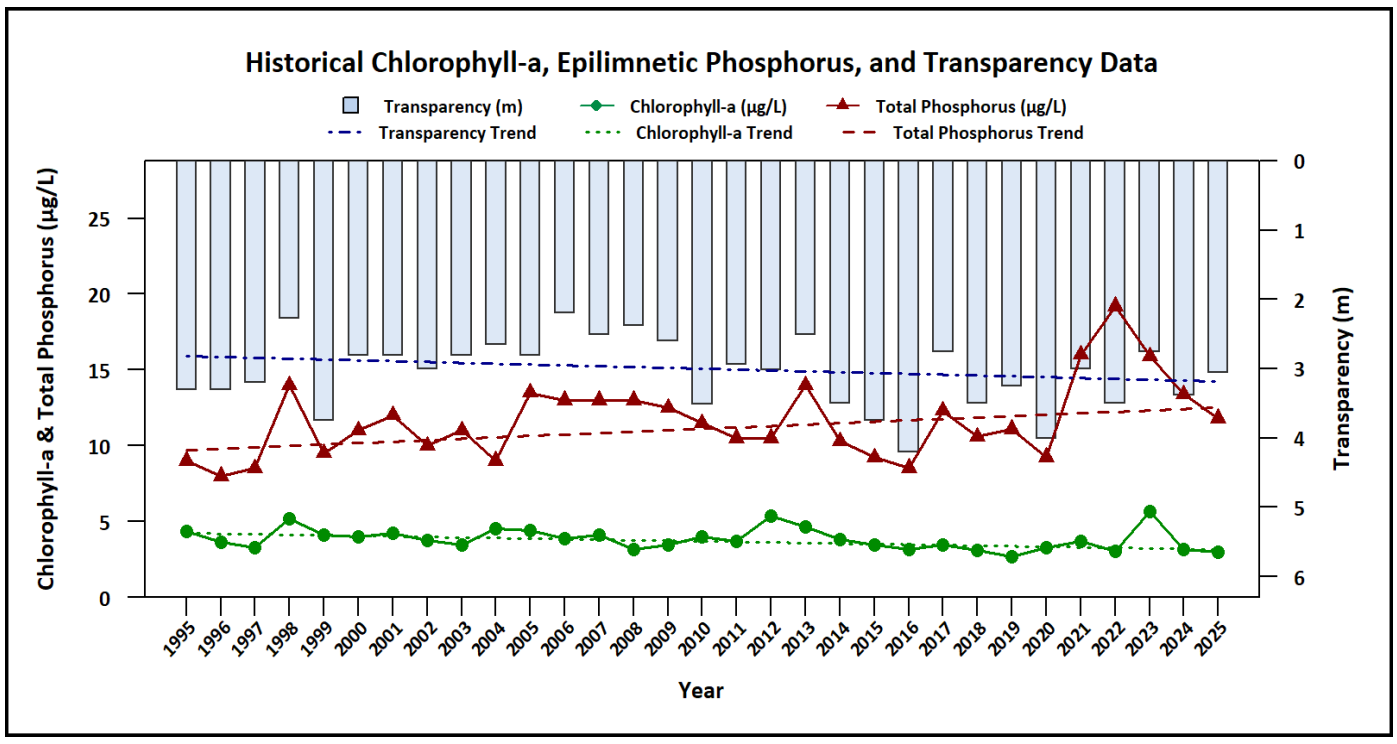

Figure 2. Median Secchi disk transparency (blue bars), epilimnetic phosphorus (red triangles), and chlorophyll-a (green points) by year, with corresponding trend lines shown as blue, red, and green dashed lines, respectively. Water transparency is stable, phosphorus is slightly worsening, and chlorophyll-a is improving since monitoring began.

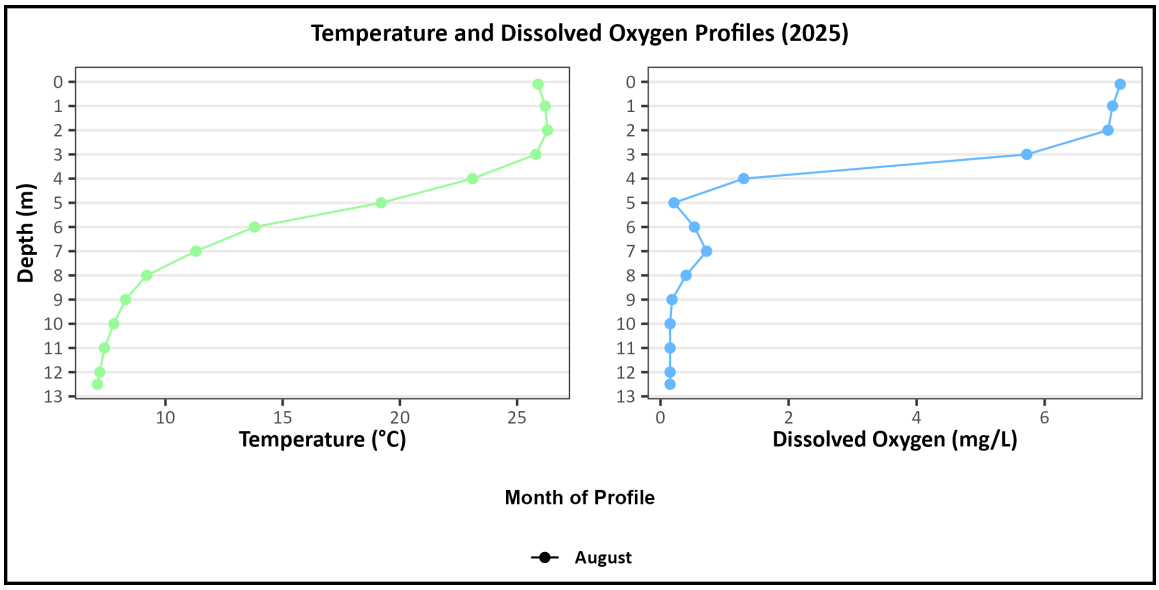

Figure 3. 2025 vertical profiles of temperature (°C; green points, left plot) and dissolved oxygen (mg/L; blue points, right plot) plotted against depth (m).

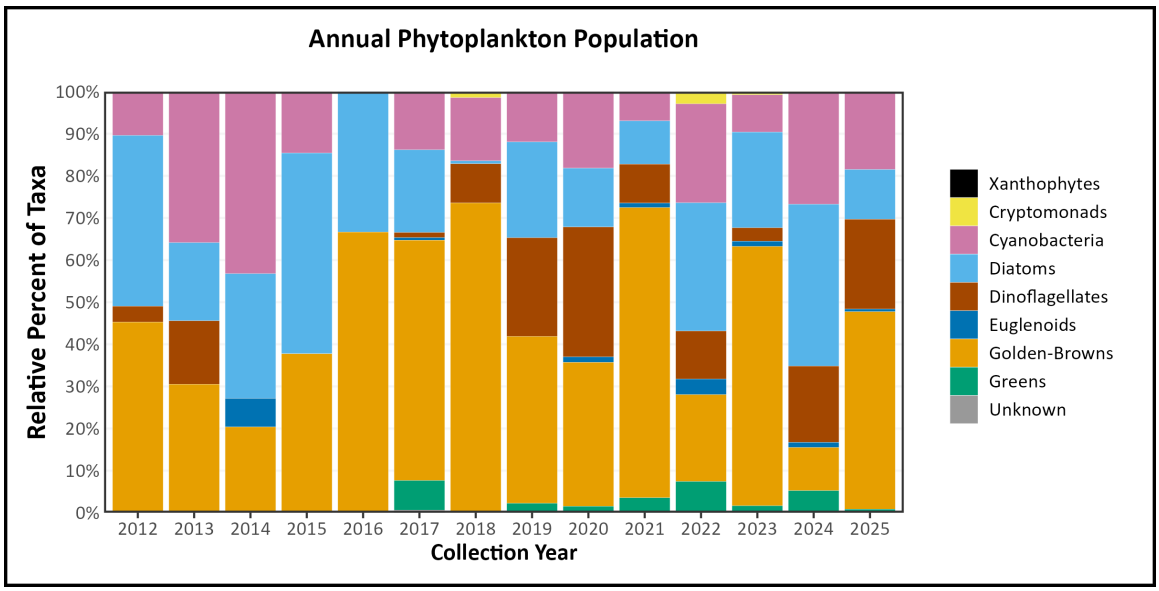

Figure 4. Phytoplankton community composition over time, expressed as relative abundance of major taxonomic groups.

Table 2. 2025 Average Water Quality Data for Great Pond, North Station – Kingston

Station	Alk. (mg/L)	Chlor-a (µg/L)	Chloride (mg/L)	Color (pcu)	Cond. (µS/cm)	Total P (µg/L)	Trans. NVS (m)	Trans. VS (m)	Turb. (ntu)	pH
Epilimnion	12.45	3.43	44.33	74.75	218.48	12.30	3.09	3.5	0.88	7.03
Metalimnion	No Value	No Value	No Value	No Value	198.43	16.00	No Value	No Value	1.48	6.47
Hypolimnion	No Value	No Value	No Value	No Value	200.22	24.75	No Value	No Value	4.64	6.57
Thayer Rd Inlet	No Value	No Value	35.6	No Value	188.45	60.25	No Value	No Value	6.40	6.52

Observations *(Refer to Table 2 and Historical Deep Spot Data Graphics)*:

- **Chlorophyll-a (Chlor-a)**: Chlorophyll levels fluctuated within a low range and were highest in August. The median chlorophyll level remained stable with 2024 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates improving (decreasing) chlorophyll levels since monitoring began.
- **Conductivity (Cond.)/Chloride:** Epilimnetic, Metalimnetic (middle water layer), Hypolimnetic and Thayer Road Inlet conductivity and/or chloride levels remained elevated and greater than the state medians. However, chloride levels were less than the state chronic chloride standards. Historical trend analysis indicates significantly worsening (increasing) epilimnetic conductivity levels since monitoring began.
- **Color**: Apparent color measured in the epilimnion was highly tea colored in June and became lighter as the summer progressed. The average color was greater than that measured in 2024.
- **Total Phosphorus (Total P):** Epilimnetic phosphorus level was highest in June and decreased to average levels as the summer progressed. The median epilimnetic phosphorus level decreased from 2024 but remained greater than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates slightly worsening (increasing) epilimnetic phosphorus levels since monitoring began. Metalimnetic phosphorus levels fluctuated within an average range and were highest in September. Hypolimnetic phosphorus levels were elevated from June through August but remained stable during that period. Historical trend analysis indicates relatively stable hypolimnetic phosphorus levels since monitoring began. Thayer Road Inlet phosphorus levels were greatly elevated in June and July and lab data noted highly turbid water.
- **Transparency (Trans.)**: Transparency measured with (VS) and without (NVS) the viewscope was lowest in June but continued to increase (good) to average levels as the summer progressed. The median NVS transparency decreased slightly from 2024 and was approximately equal to the state median. Historical trend analysis indicates relatively stable NVS transparency since monitoring began.
- **Turbidity (Turb.):** Epilimnetic turbidity levels were low. Metalimnetic turbidity levels fluctuated within a slightly elevated range. Hypolimnetic turbidity levels were elevated throughout the summer and were highest in August. Thayer Road Inlet turbidity levels were greatly elevated in July when flows were low.
- **pH:** Epilimnetic, Hypolimnetic and Thayer Road Inlet pH levels were within the desirable range of 6.5-8.0 units. Historical trend analysis indicates slightly improving (increasing) epilimnetic pH levels since monitoring began. Metalimnetic pH levels were slightly less than desirable.
- **Temperature/Dissolved Oxygen (DO) Profile:** The pond was stratified in August at the time of sampling. Epilimnetic water temperatures were approximately 25 °C, with DO concentrations around 8 mg/L. The metalimnion (thermocline) began at approximately 2.0 m, where both temperature and DO decreased rapidly. By 5.0 m, DO concentrations dropped to 0 mg/L and remained anoxic through the bottom of the pond (hypolimnion), temperatures stabilized at around 8 °C. These anoxic conditions may be contributing to elevated hypolimnetic phosphorus levels due to internal loading.
- **Phytoplankton Community:** Since 2012, the phytoplankton community has been dominated by Golden-Brown algae, Diatoms, Dinoflagellates and Cyanobacteria. Cyanobacteria were present in 2025 but not abundant. Continue collecting phytoplankton samples to track changes in cyanobacteria abundance.

How does your lake compare to New Hampshire lakes and water quality standards?

Table 3. New Hampshire Median Lake Water Quality Values. Median values generated from historic lake monitoring data.

Parameter	Median Value
Alkalinity	4.5 mg/L
Chlorophyll-a	4.39 µg/L
Chloride	5 mg/L
Conductivity	42.3 µS/cm
Total Phosphorus	11 µg/L
Transparency	3.3 m
pH	6.6

Table 4. New Hampshire Water Quality Standards. Numeric criteria for specific parameters. Water quality violation occurs if thresholds are exceeded.

Parameter	Threshold
Chloride	> 230 mg/L (chronic)
E. coli (beach)	> 88 cts/100 mL
E. coli (surface water)	> 406 cts/100 mL
pH	between 6.5-8.0 (unless naturally occurring)
Turbidity	> 10 NTU above natural