WAKONDAH POND

2023 SAMPLING HIGHLIGHTS

Station 1 Deep

Moultonborough, 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 the samples collected on August 22, 2023.

Blue = Oligotrophic

Yellow = Mesotrophic

Red = Eutrophic

Gray = No Data

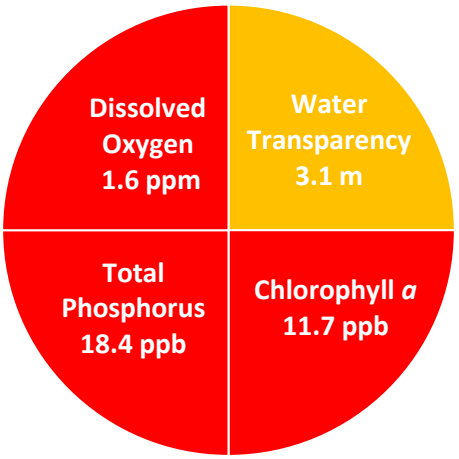


Figure 1. Wakondah Pond Water Quality

Table 1. 2023 Wakondah Pond Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Wakondah Pond Average (range)	Wakondah Pond Classification
Water Clarity (meters)	> 4.0 – 7.0	2.5 - 4.0	< 2.5	**3.1** meters (single value)	Mesotrophic
Chlorophyll *a* [1] (ppb)	< 3.3	3.3 – 5.0	> 5.0 – 11.0	**11.7** ppb (single value)	Eutrophic
Total Phosphorus [1] (ppb)	< 8.0	8.0 – 12.0	> 12.0 – 28.0	**18.4** ppb (single value)	Eutrophic
Dissolved Oxygen (ppm)	> 5.0 – 7.0	2.0 – 5.0	< 2.0	**1.6** ppm (0.0 – 6.6) *	Eutrophic

* Dissolved oxygen concentrations were measured between 4.0 and 11.5 meters, in the middle and bottom water layers, on August 22, 2023.

Table 2. 2023 Wakondah Pond Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Wakondah Pond Average (range)	Wakondah Pond Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	**27.7** color units (single value)	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	**15.9** ppm (single value)	Low vulnerability
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			**7.1** standard units (single value)	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		**72.8** *u*S/cm (single value)	Lakes with some human influence

Strategies to stabilize and improve water quality

Implement Best Management Practices (BMPs) within the Wakondah Pond watershed to minimize the adverse impacts of polluted runoff and erosion into Wakondah Pond. 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 Lake Kanasatka Watershed-Based Management Plan for information on how to reduce nutrient loading caused by overland runoff. NH Lakes also provides a series of resources aimed at educating residents and protecting our lakes and ponds through the LakeSmart program.

Figure 2. Wakondah Pond (2023 Seasonal Data)
Secchi Disk Transparency and Chlorophyll *a* Data

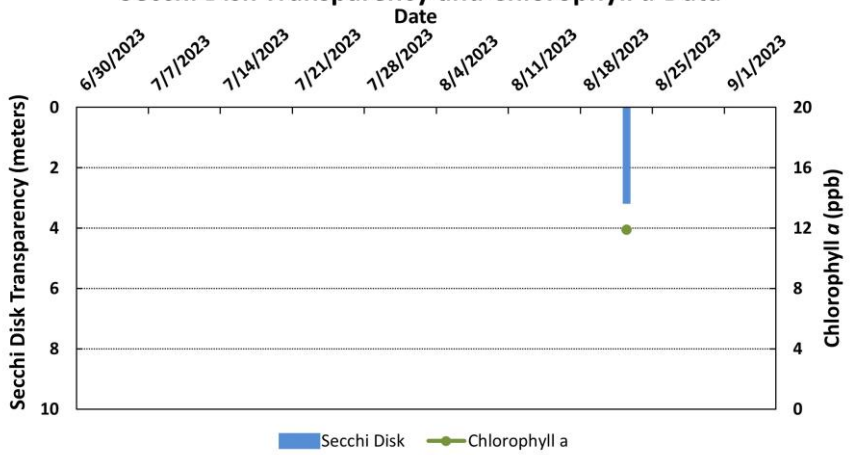


Figure 3. Wakondah Pond (2023 Seasonal Data)
Secchi Disk Transparency and Dissolved Color Data

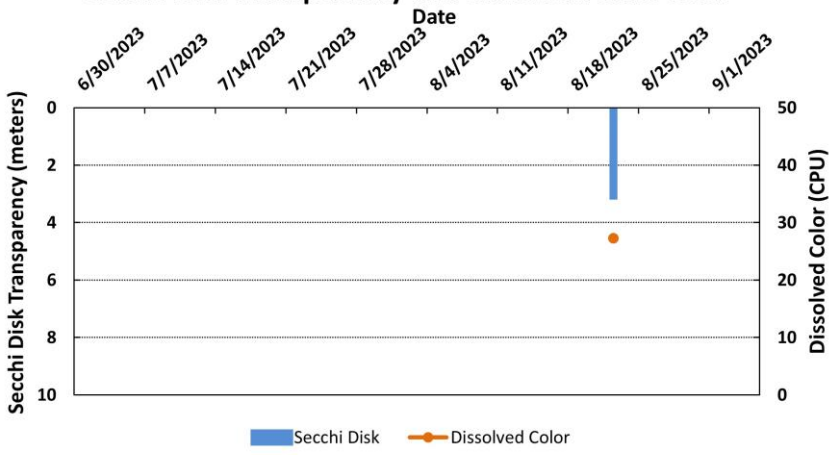


Figure 4. Wakondah Pond - Site 1 Deep (1982-2023)
Long-term Secchi Disk Transparency and Chlorophyll *a* Data

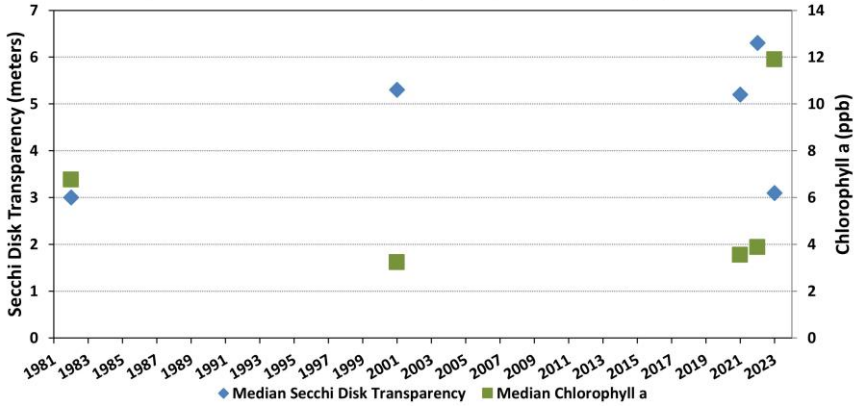
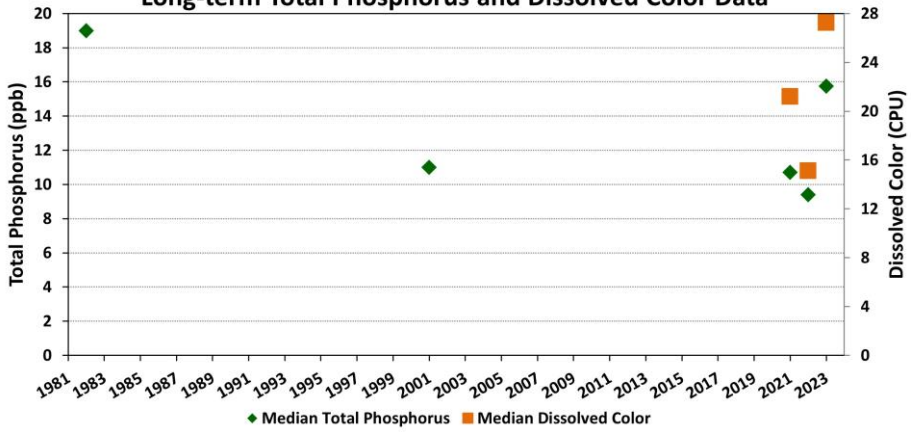


Figure 5. Wakondah Pond - Site 1 Deep (1982-2023)
Long-term Total Phosphorus and Dissolved Color Data



Figures 2 and 3. Seasonal comparison of Wakondah Pond, Site 1 Deep, water transparency (Secchi Disk depth), chlorophyll *a* and dissolved color for 2023. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll *a* and/or color concentrations.

Figures 4 and 5. Annual median Wakondah Pond water transparency, chlorophyll *a*, dissolved color and total phosphorus concentrations measured through the New Hampshire Lakes Lay Monitoring Program (2021 and 2023) and the New Hampshire Department of Environmental Services (1982 and 2001). The long-term data provide insight into the water quality fluctuations, among years, that have been documented in Wakondah Pond.

Figure 6. Wakondah Pond - Site 1 Deep

Temperature Profiles (August 22, 2023)

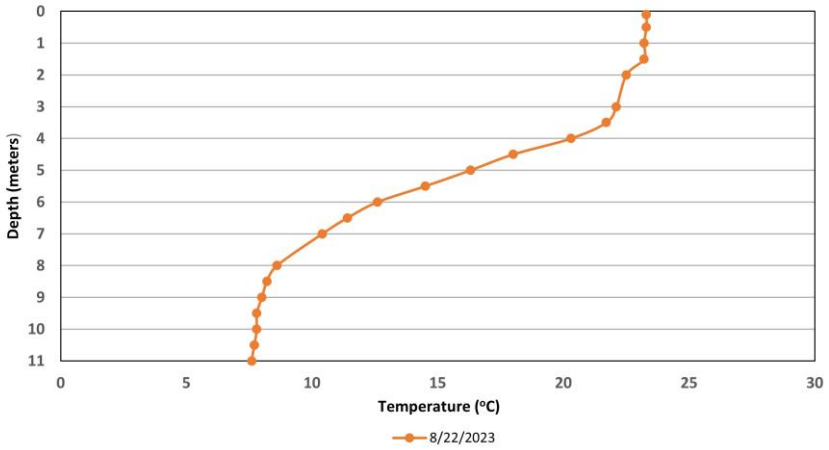


Figure 7. Wakondah Pond - Site 1 Deep

Dissolved Oxygen Profiles (August 22, 2023)

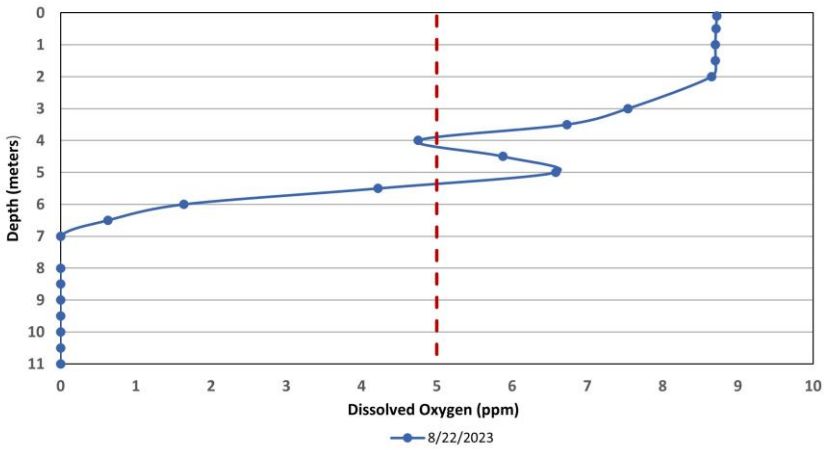


Figure 8. Wakondah Pond - Site 1 Deep

Specific Conductivity Profiles (August 22, 2023)

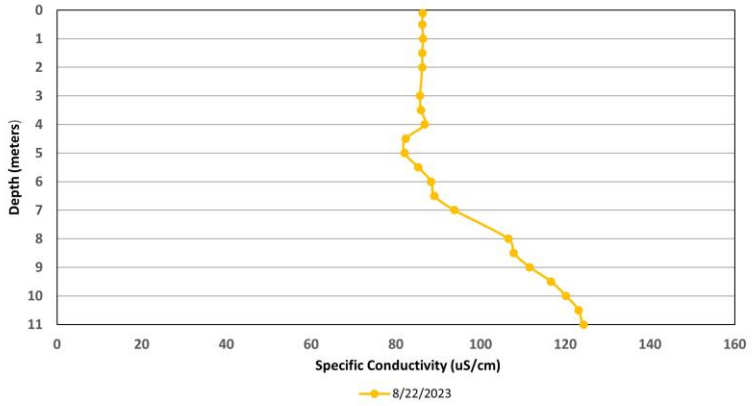
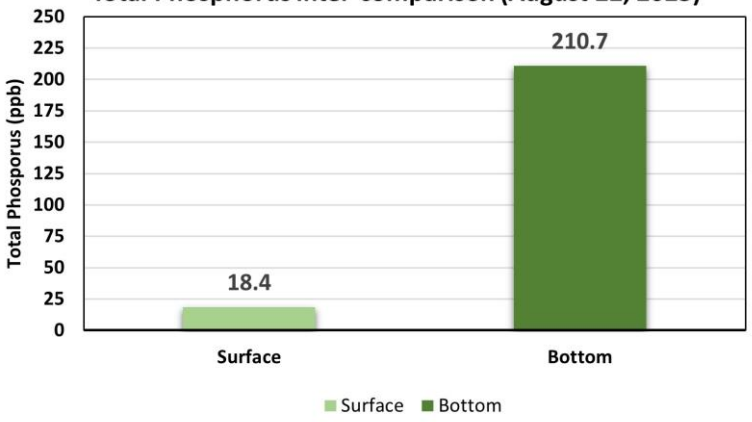


Figure 9. Wakondah Pond - Site 1 Deep

Total Phosphorus inter-comparison (August 22, 2023)



Figures 6, 7 and 8. Temperature, dissolved oxygen and specific conductivity profiles displaying the water quality differences, through the water column, in 0.5-meter increments. Notice the decreasing dissolved oxygen concentrations and the increasing specific conductivity levels, near the lake bottom. The dashed vertical red line in Figure 7 displays the dissolved oxygen threshold for the successful growth and reproduction of cold-water fish such as trout and salmon.

Figure 9. Total phosphorus comparison between the surface (epilimnion) and bottom water (hypolimnion) zones. Notice the difference between the surface and deep, bottom water, total phosphorus concentrations.

Data Interpretation: Overview of factors to consider when reviewing the Wakondah Pond data

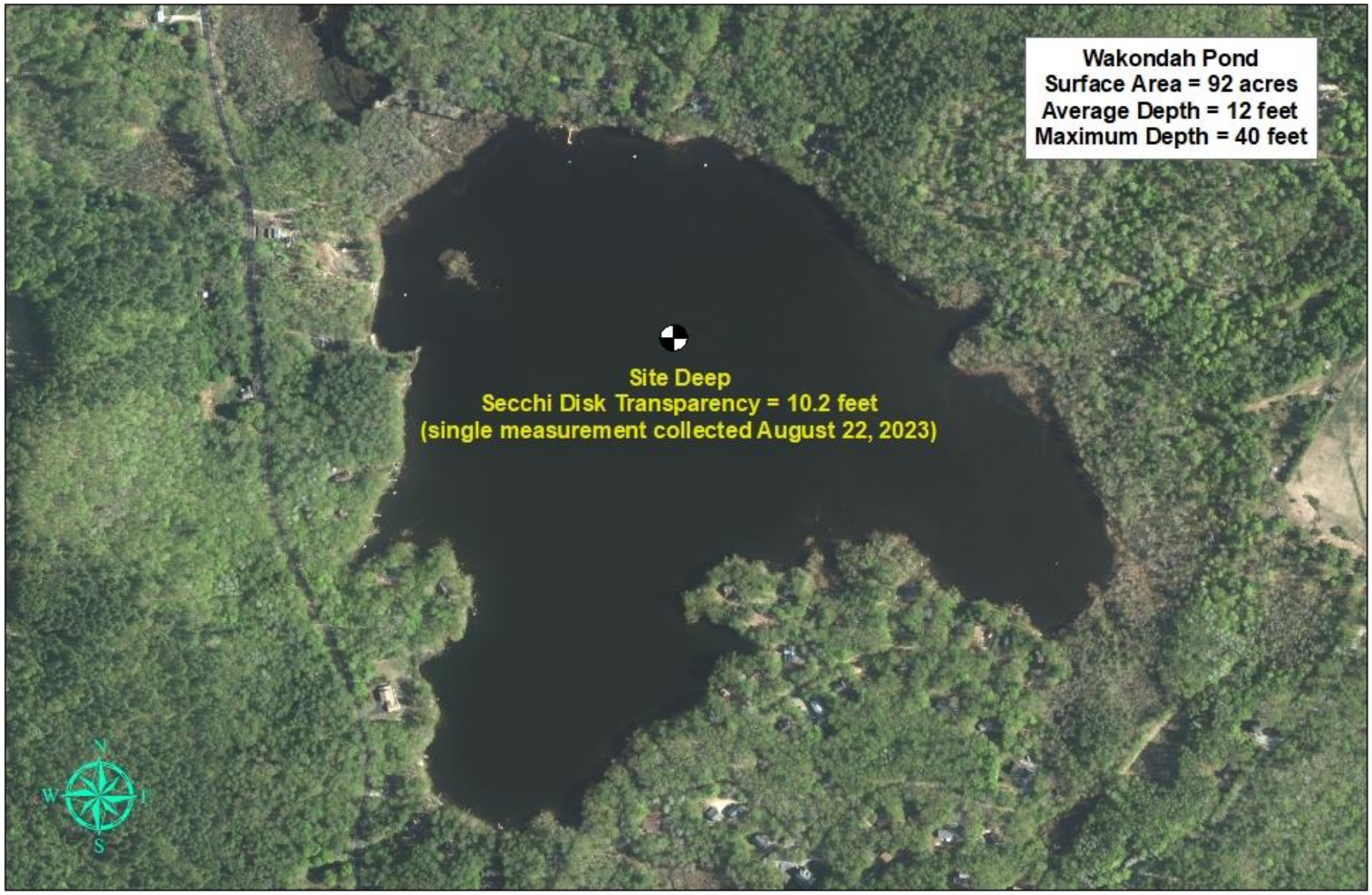
This highlight report provides a general overview of the current and historical conditions of Wakondah Pond. The report is intended to provide a simple assessment of the water quality trends. Should you have additional questions about interpreting your water quality results, we would be happy to discuss the data with you and/or any concerns you may have. In general, some factors that influence the current and long-term water quality results/trends for our New Hampshire lakes and ponds include:

- **Land-use Patterns** within the watershed (drainage basin) – Research indicates land use patterns have an impact on how much phosphorus (nutrient) is washing into our lakes. In general, more urbanized watersheds have a greater degree of phosphorus runoff than highly forested/vegetated drainage areas.
- **Weather Patterns** – Rainfall and temperature can influence water quality. Wet periods, and overland runoff, tend to be a time when elevated nutrients and other pollutants are transported into our lakes. Temperature can also influence water quality conditions since many aquatic plants and algae tend to respond to changing seasonal conditions. Unusually warm periods are sometimes tied to short-term algal and cyanobacteria blooms.
- **Best Management Practices (BMPs)** – The presence/absence of best management practices can have an interplay on water quality. BMPs are measures that are used to manage nutrients and other pollutants that could otherwise make their way into our lakes. Properties that employ BMPs, designed specifically to remove pollutants of concern (e.g. sediments and phosphorus), are less likely to contribute nutrients and other pollutants into our lakes.
- **Temperature (Thermal) Stratification** – Many lakes become thermally stratified during the summer months and may form three distinct thermal layers: upper water layer (epilimnion), middle lake layer (metalimnion) and bottom cold-water layer (hypolimnion). These thermal zones form a barrier to lake mixing, during the summer months, and can coincide with differences in dissolved oxygen and specific conductivity through the water column.
- **Internal Nutrient Loading** (nutrients that are introduced from the sediments along the lake bottom) – Some of our lakes experience significant internal nutrient loading. Such lakes generally tend to be well stratified and exhibit increasing deep water phosphorus concentrations, relative to surface levels. Lakes that exhibit internal nutrient loading may also exhibit increasing deep water specific conductivity concentrations (a measure of dissolved materials) through the summer months.

Figure 10. Wakondah Pond

Moultonborough, NH

2023 Deep water sampling location and seasonal average water transaprency.



Aerial Orthophoto Source: NH GRANIT
GPS Coordinates collected by the UNH Center for Freshwater Biology

NH Extension