SUNSET LAKE

2023 SAMPLING HIGHLIGHTS

Station 1 Deep

Hampstead, 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 between April 15 and September 22, 2023.

Blue = Oligotrophic

Yellow = Mesotrophic

Red = Eutrophic

Gray = No Data

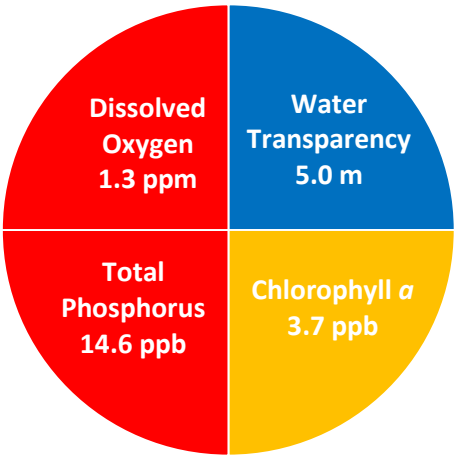


Figure 1. Sunset Lake Water Quality (2023)

Table 1. 2023 Sunset Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Sunset Lake Average (range)	Sunset Lake Classification
Water Clarity (meters)	> 4.0 – 7.0	2.5 - 4.0	< 2.5	**5.0** meters (3.9 – 7.0)	Oligotrophic
Chlorophyll *a* [1] (ppb)	< 3.3	3.3 – 5.0	> 5.0 – 11.0	**3.7** ppb (1.1 – 5.6)	Mesotrophic
Total Phosphorus [1] (ppb)	< 8.0	8.0 – 12.0	> 12.0 – 28.0	**14.6** ppb (12.1 – 19.6)	Eutrophic
Dissolved Oxygen (ppm)	> 5.0 – 7.0	2.0 – 5.0	< 2.0	**1.3** ppm (0.0 – 7.4) *	Eutrophic

* Dissolved oxygen concentrations were measured between 3.0 and 10.0 meters, in the middle and bottom water layers, on July 15, 2023.

Table 2. 2023 Sunset Lake Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Sunset Lake Average (range)	Sunset Lake Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	**22.2** color units (12.8 – 25.9)	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	**18.6** 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			**7.3** 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		**267.3** *u*S/cm (single value)	Characteristic of lakes experiencing human disturbances

Strategies to stabilize and improve water quality

Implement Best Management Practices (BMPs) within the Sunset Lake watershed to minimize the adverse impacts of polluted runoff and erosion into Sunset Lake. Refer to Landscaping at the Water's Edge: An Ecological Approach and New Hampshire Homeowner's Guide to Stormwater Management: Do-it-yourself Stormwater Solutions for Your Home for more 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. Sunset Lake (2023 Seasonal Data)
Secchi Disk Transparency and Chlorophyll *a* Data

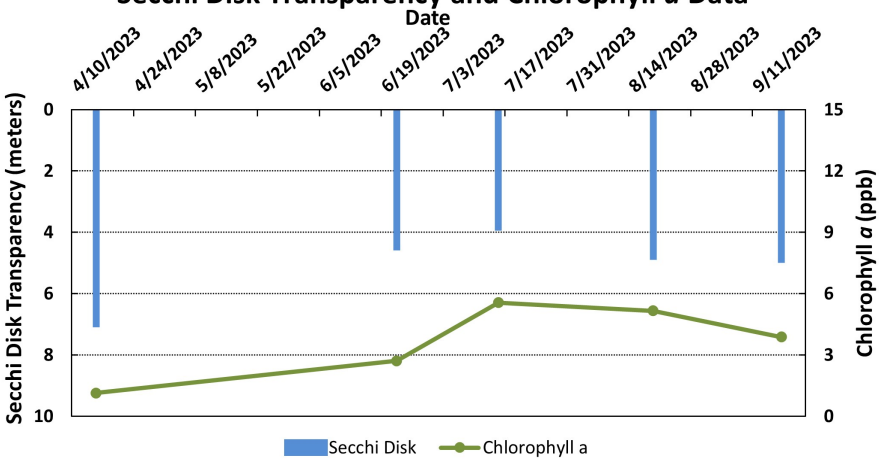


Figure 3. Sunset Lake (2023 Seasonal Data)
Secchi Disk Transparency and Dissolved Color Data

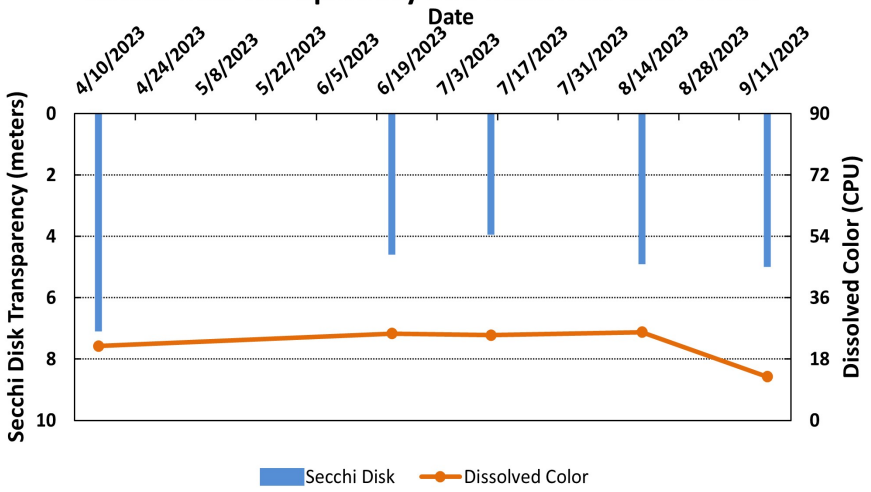


Figure 4. Sunset Lake - Site 1 Deep (1984-2023)
Long-term Secchi Disk Transparency and Chlorophyll *a* Data

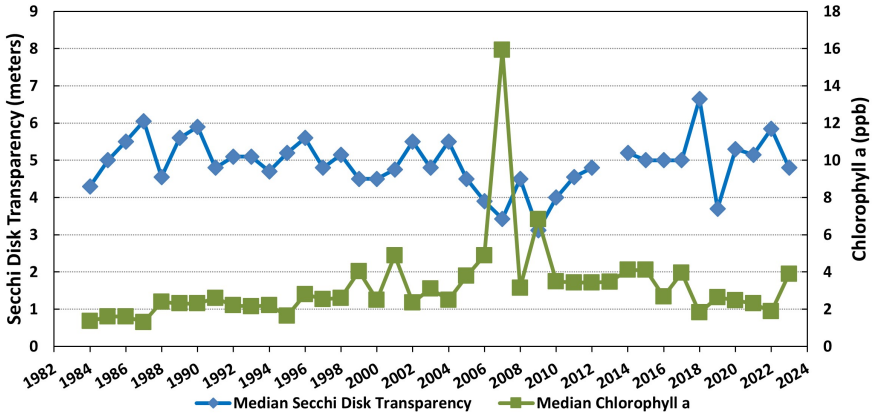
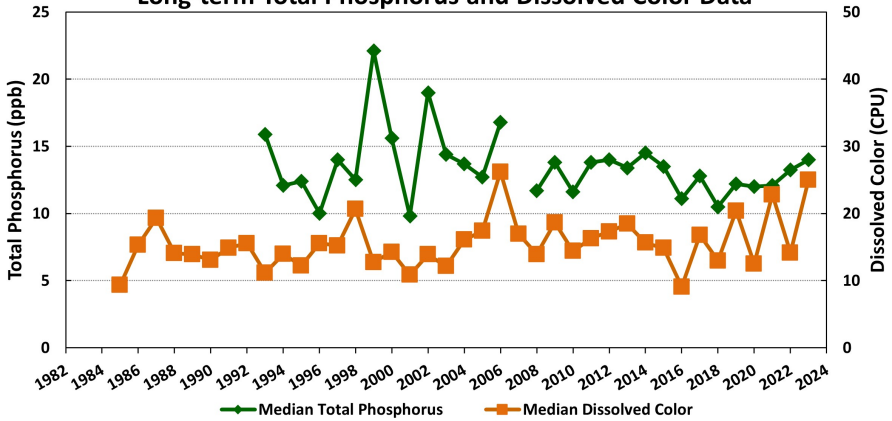


Figure 5. Sunset Lake - Site 1 Deep (1984-2023)
Long-term Total Phosphorus and Dissolved Color Data



Figures 2 and 3. Seasonal comparison of Sunset Lake, 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 Sunset Lake water transparency, chlorophyll *a*, dissolved color and total phosphorus concentrations measured through the New Hampshire Lakes Lay Monitoring Program between 1984 and 2023**.** The long-term data provide insight into the water quality fluctuations, among years, that have been documented in Sunset Lake.

Figure 6. Sunset Lake - Site 1 Deep

Temperature Profiles (April 15 through September 17, 2023)

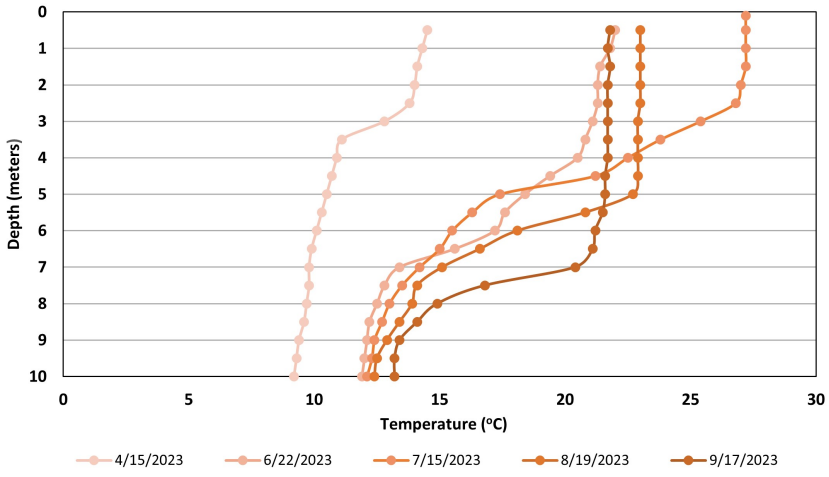


Figure 7. Sunset Lake - Site 1 Deep

Dissolved Oxygen Profiles (April 15 through September 17, 2023)

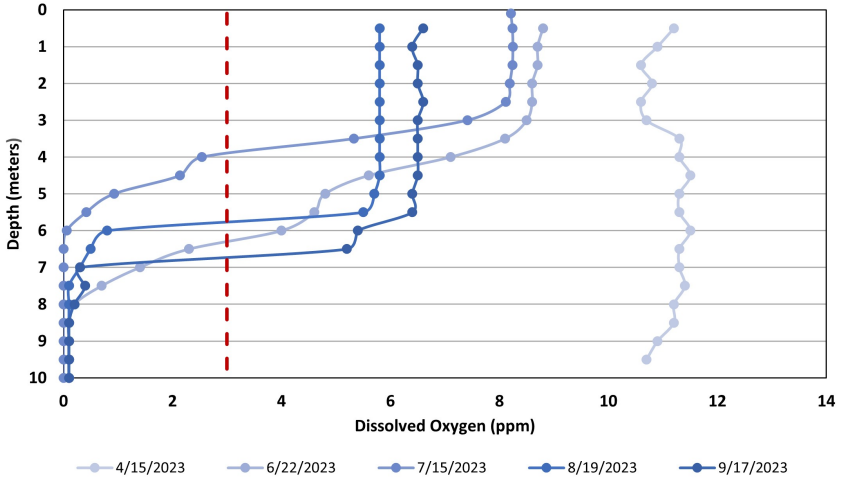


Figure 8. Sunset Lake - Site 1 Deep

Specific Conductivity Profiles (April 15 through September 17, 2023)

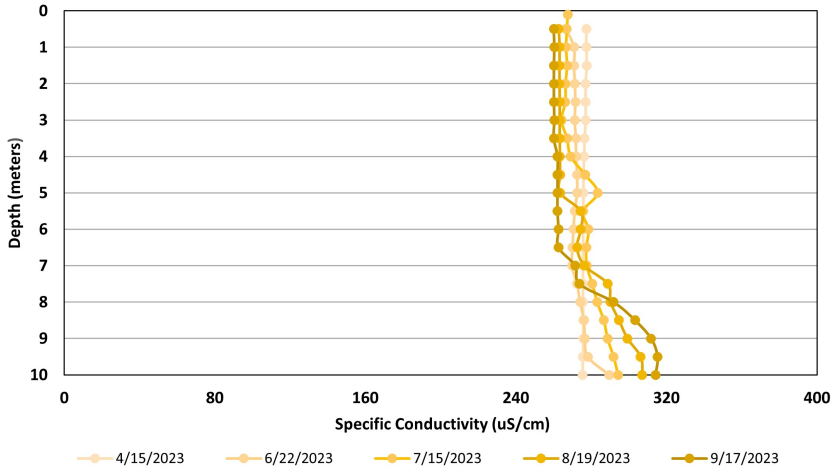
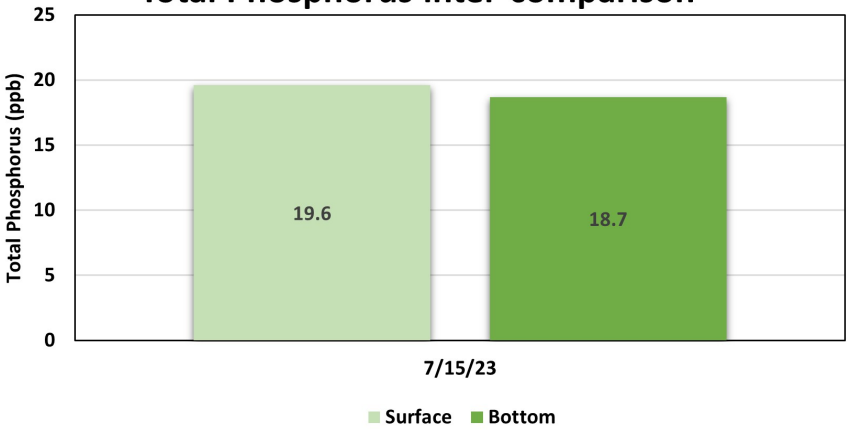


Figure 9. Sunset Lake - Site 1 Deep
Total Phosphorus inter-comparison



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 warm-water fish such as bass and perch.

Figure 9. Total phosphorus comparison between the surface (epilimnion) and bottom water (hypolimnion) zones.

Data Interpretation: Overview of factors to consider when reviewing the Sunset Lake data

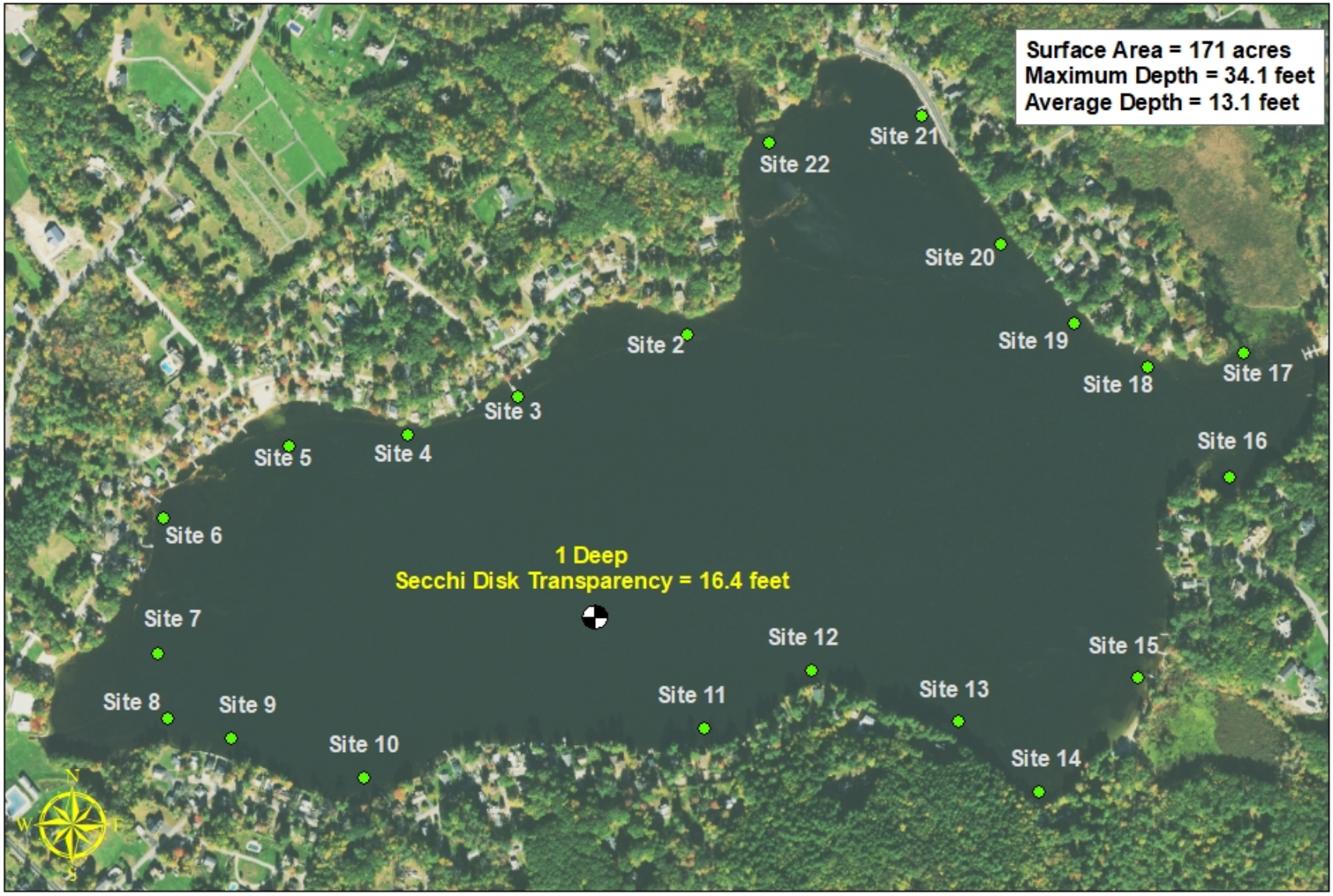
This highlight report provides a general overview of the current and historical conditions of Sunset Lake. The report is intended to provide a simple assessment of the water quality trends. Should you have additional questions about interpreting your water quality results, we would be happy to discuss 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. Sunset Lake

Hampstead, NH

2023 Deep water sampling station and seasonal average water clarity



Aerial Orthophoto Source: NH GRANIT
Site location GPS coordinates collected by the UNH Center for Freshwater Biology