July 11, 2025

Water testing has been sampled for the following parameters under the NH Volunteer Lake Assessment Program (VLAP). Some samples are taken at one or more depths and locations around the lake. Testing was performed on Wed May 28, 2025 10am – 12:30pm (EDT) as is done annually. This year's testing was hampered by weather as the first attempt on May 22nd became too windy to secure proper positions for accurate depth sampling and we rescheduled it to the 28th.

As announced prior to testing, Sara Steiner had left the program and was replaced by Harvey

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We had VLAP interns on board who took turns sampling and working with Harvey.

Key Notes

The most notable issue was the weather leading up to May 28thth which was overcast and rainy for an extended period of many weeks. This impacted the formation or definition of the three core water temperature layers (epilimnetic, metalimnetic, hypolimnetic). The water was still cold from top to bottom. This measurement is taken at the deepest spot of the lake. The results are reflected in four test groups: Conductivity, Secchi disk (water clarity), Chloride, and of course, water temperature.

The deep spot now measures at 31 feet. This is up from 27 feet of the past. This was verified by two depth instruments,

I've noted the related impact in the analysis (in bold type below) where it's related. Test samples were taken from five locations on the lake and one external stream that feeds across the street from the boat launch (as usual).

Bill Coffill

2025 results and analysis

- **Phosphorus**

Definition: Phosphorus is the most important water quality parameter measured in our lakes. It is the nutrient that limits algae's ability to grow and reproduce.

Phosphorus sources around a lake typically include septic systems, animal waste, lawn fertilizer, erosion from roads and construction sites, and natural wetlands.

Total Phosphorus (TP) Ranges for New Hampshire Lakes and Ponds:

TP (ug/L) Category

1-10 Low (good)

11-20 Average

21-40 High

>40 Excessive

Our five samples were taken at five locations on the lake.

The results were excellent (better than low-good) coming in under 1.0 with a range from .0093 to .016

- **PH**

Definition: pH is measured on a logarithmic scale of 0 to 14. Lake pH is important to the survival and reproduction of fish and other aquatic life. A pH below 5.5 severely limits the growth and reproduction of fish. The Quality Standard is between 6.5 and 8.0

pH (units) Category

<5 Acidified

5.0-5.4 Critical

5.5-6.4 Endangered

6.5-8.0 Satisfactory

Our seven samples were taken at six locations on the lake.

The results were Satisfactory between with results ranging between 6.28. and 6.61. There were nine measurements for this. Two in the deep spot and seven from the other locations. Of the six test spots, there was only one that measured in the endangered range. That was at the Moore Brook location with 6.28 and 6.38. Just a fraction under the satisfactory range but in the endangered range still.

Acid Neutralizing Capacity (anc)

Definition: Buffering capacity or Acid Neutralizing Capacity (ANC) describes the ability of a solution to resist changes in pH by neutralizing the acidic input to the lake. Historically, the waters of NH have had low ANC because of the prevalence of granite bedrock. The relatively low ANC values mean that NH surface waters are vulnerable to the effects of acid precipitation.

ANC (mg/l as CaCO3) Category

<0 Acidified

0-2 Extremely Vulnerable

2.1-10 Moderately Vulnerable

10.1-25 Low Vulnerability

>25 Not Vulnerable

This is measured only in the deep spot that was representative of where the mid-temperature layer would be. The result was 2.8.

Last year it was 3.1 and are both rated at Moderately Vulnerable. As noted by VLAP description, these low values are historically consistent in this Granite State (related to granite bedrock).

- **Turbidity (NTUs)(TURB on the report)**

Definition: Turbidity in the water is caused by suspended matter (such as clay, silt, and algae) that cause light to be scattered and absorbed, not transmitted in straight lines through water. High turbidity readings are often found in water adjacent to construction sites. Also, improper sampling techniques (such as hitting the bottom sediments or sampling streams with little flow) may also cause high turbidity readings. The Class B standard for a water quality violation is 10 NTUs over the lake background level.

Statistical Summary of Turbidity Values for NH Lakes and Ponds:

Turbidity (NTUs) Category

<0.1 Minimum

22.0 Maximum

1.0 Median

Our seven samples were taken at six locations on the lake.

The results of nine samples from six locations were ; seven under 1.0 and one at 2.64, one at 6.69.

Except for two of the nine locations tested, the lake is under the median 1.0 value. However, two locations this year tested above 1.0; Hood Beach at 6.69 and Thurber Brook at 2.64.

There was only one location last year that was over the 1.0 value and that was Morse Spring Brook at 4.5. This year Morse Brook was less than 1.0. We seem to be well within the lake's background level of fluctuation, which remains well under the maximum of 22.0.

- **Conductivity (cond)**

Definition: Conductivity is the numerical expression of the ability of water to carry an electrical current. It is determined by the number of ionic particles present.

The soft waters of New Hampshire have traditionally had low conductivity values. High conductivity may indicate pollution from such sources as road salting, septic systems, wastewater treatment plants, or agriculture runoff.

Note: Specific categories of good and bad levels can not be constructed for conductivity, because variations in watershed geology can result in natural fluctuations in conductivity. However, values in NH lakes exceeding 100 uMhos/cm generally indicate human disturbance.

The results of nine samples from six locations were all less than 100 with one exception. Thurber Brook Upstream was at 102.6

- **Chloride**

The chloride ion (Cl-) is found naturally in some surface ground waters and in high concentrations in seawater. Research has shown that elevated chloride levels can be toxic to freshwater aquatic life. In order to protect freshwater aquatic life in New Hampshire, the state has adopted acute and chronic chloride criteria of 860 and 230 mg/L respectively. The chloride content in New Hampshire lakes is naturally low, generally less than 2 mg/L in surface waters located in remote areas away from habitation. Higher values are generally associated with salted highways and, to a lesser extent, with septic inputs.

The results of five samples at four locations were between 7.67 and 22.1. While these are higher than the average for remote areas away from any habitation (which we are not), we are well under (a fraction of) the minimum level of 230 where toxic levels would be a concern and still trending much lower than the last two years.

- **Chlorophyll-A (Chl-a)**

Definition: VLAP measures chlorophyll-a, a pigment found in plants, as an indicator of algal abundance. Because algae is a plant and contains chlorophyll-a, the concentration of chlorophyll-a found in the water provides an estimation of the concentration of algae.

Chlorophyll-a (ug/L) Category

0-5 Good

5.1 – 15 More than desirable

>15 Nuisance Amounts

The result of one sample taken at the deep spot was 1. 97 and 2.36 which is lower than last year at 3.58 but still well within the good level.

- **Water Clarity (secchi)**

Definition: The Secchi-disk is a 20cm disk with alternating black and white quadrants used to measure water clarity (how far a person can see into the water).

Transparency, a measure of water clarity, is affected by the number of algae, color, and particulate matter within a lake.

Water Clarity (m) Category

< 2 Poor

2-4.5 Good

> 4.5 Exceptional

The results of samples taken at the deep spot with two measurements, one on the sunny side of the vessel, and one on the shady side were 3.85 and 4.5 meters. This takes us out of the exceptional range that we experienced (between 5 and 6 +). The impact consideration for this year's test is the weather conditions that stalled the water temperature levels from developing which prevented the separation of elements into the three distinct temperature layers.

Water Color (color)

APPARENT COLOR

Definition: A visual measure of the color of water. This color is generally caused by decaying organic matter or by naturally occurring metals in the soils, such as iron and manganese. A highly colored lake generally has extensive wetlands along the shore or within the watershed, and often a mucky bottom, conditions often associated with eutrophic waters.

Color (PCU) Category

0-25 clear

25-40 light tea color

40-80 tea color

>80 highly colored

This year was 39, higher than last year at 20 however the test depth for this also relates to water temperature changes that we did not yet achieve in the temperature layers, as noted.

- **Phytoplankton**

As in the past, Phytoplankton results will be included in the annual VLAP Report. It is not included with our test period.

Definition: Phytoplankton are microscopic algae floating in the water column. The type of phytoplankton present in a lake can be used as an indicator of general lake quality. An abundance of cyanobacteria (such as Anabaena, Aphanizomenon, Oscillatoria, or Microcystis) may indicate excessive phosphorus concentrations or that the lake ecology is out of balance. Diatoms (such as Asterionella, Melosira, and Tabellaria) and golden-brown algae (such as Dinobryon or Chrysosphaerella) are typical of NH's less productive lakes.