Water Quality Testing Report, 2019

Submitted by Jerry Butters, July, 2020

The Bearcamp Pond Association participates in the Volunteer Lake Assessment Program (VLAP) of New Hampshire's Department of Environmental Services (DES). The purpose of VLAP is to monitor water quality trends in NH lakes, ponds, and streams across the state and over time to help identify sources of pollution that are degrading our waterways and identify remediation steps to halt or reverse the degradation.

The main long term threat to our lakes and ponds is the process of eutrophication, caused by excess nutrients, especially phosphorus, that lead to excessive growth of algae and rooted plants. Algae growth reduces water clarity and ultimately can make it murky. It also reduces dissolved oxygen in the water needed by fish. Excess phosphorus also contributes to the growth of cyanobacteria, formally known as blue-green algae due to its appearance. While normally harmless, cyanobacteria can "bloom" into an unsightly, smelly mess that can be toxic to humans and wildlife. The main sources of current phosphorus pollution are from fertilizer and animal (including human) waste which reaches waterways due to inadequate septic and sewage treatment systems, erosion, and storm run-off.

Another potential threat to our lakes is acid rain due to emissions of sulfur dioxide and nitrogen compounds by the burning of coal and other fossil fuels in power plants and motor vehicle engines. Fortunately, the acid rain problem has become less severe in the U.S. in recent years due to less burning of coal, but the problem still persists. If our lakes become too acidic it is harmful to many forms of aquatic wildlife.

A third long-term threat is the prospect of excessive salinity due to the use of road salt, which eventually leaches into our streams and lakes. Salinity can kill native plant and animal species, disturbing ecosystems and leading to more rapid eutrophication and opening ecological niches for undesirable invasive species. Although salinity is not an immediate threat to most of our waterways, there is the potential of a gradual increase over the years which would be difficult to reverse, especially if increased use of road salt

and increased development near lakes results in greater run-off into our lakes.

In order to assess the above risks, DEP, with our assistance, makes the following measurements:

Phosphorus: Using the NH Public Health Laboratories, DEP measures the level of phosphorus, the nutrient which is the biggest threat to water quality, from water samples that we gather from 6 places:

(1) (pre-inlet) in the Bearcamp River which feeds the pond where is passes under the bridge on Middle Road
(2) (inlet) further downstream where the Bearcamp River becomes the inlet to the pond, at the bend of the inlet near Mary Hillsgrove's house
(3, 4, and 5) from the upper, middle, and lower levels of the pond at the deepest spot in the pond, and
(6) (outlet) in the outlet of the pond, the continuation of the Bearcamp River below the dam on the Bryants property on Bearcamp Pond Road.

2019 results:

The pre-inlet, inlet, and outlet phosphorus levels were low to moderate, and broadly similar to last year's results. The top layer of the pond had low phosphorus in June, moderate in August, but slightly elevated in July, which the VLAP report attributed to higher rainfall in July causing greater inflow of phosphorus from nearby wetlands. The middle and lower levels of the pond had low to moderate phosphorus levels, slightly better than last year.

Chlorophyll-A: VLAP measures the amount of chlorophyll-A, an indication of algae levels in the pond, in an "integrated sample" we collect, which consists of a column of water from the middle level of the pond to the surface. In 2019, Chlorophyll-A was low in June and July, but elevated in August, perhaps due to the phosphorus entering the pond in July.

Apparent color: VLAP measures the apparent color of the lake's upper level, which can be influenced by decaying organic matter or metals in the soil, and is often associated with eutrophic waters. In 2019 the color was

normal and comparable to 2018 except for in July, when it was highly tea colored.

Transparency: We measure transparency by lowering a disk with contrasting colors into the water at the deep spot of the lake until it no longer can be seen. Transparency is reduced by algae, color, and particulate matter in the water. In 2019 transparency was good in June, but much worse in July following the high rainfall and darker water color, and continued to be poor in August due to the increased algae growth in that month. On average, transparency was the lowest measured in the history of the program. The good news is that transparency is highly variable and our preliminary testing in 2020 shows it bouncing back to normal.

Turbidity: Turbidity is the degree to which water loses its transparency due to suspended particulars such as clay, silt, and algae. Turbidity levels were low in all 6 of the water samples we collected (pre-inlet, inlet, outlet, and the upper, middle, and lower samples at the deep spot).

pH: The level of acidity in the pond is measured by its pH. The pre-inlet pH this year was in the desirable range with little change from last year. The upper level of the lake was at the lower end of the desirable range, slightly worse than last year, and the outlet pH was also borderline, similar to last year. The main concern is that the middle and lower levels of the pond were slightly acidic and potentially harmful for aquatic life.

Chloride/Conductivity: These are measures of salinity. The pond continues to have very low chloride levels and no problems due to salinity.

Summary: Nearly all measurements are near the average of the past 30 years, so the pond's condition remains stable. Last year's phosphorus levels were the best in many years, so the increase this year associated with increase rainfall is not alarming. The low transparency appears to be a blip that is returning to normal this year.