



The Monitoring Crew Left to the right boat captain, Mark Wageling, Joe Medeiros, and Pete Wawrzonek

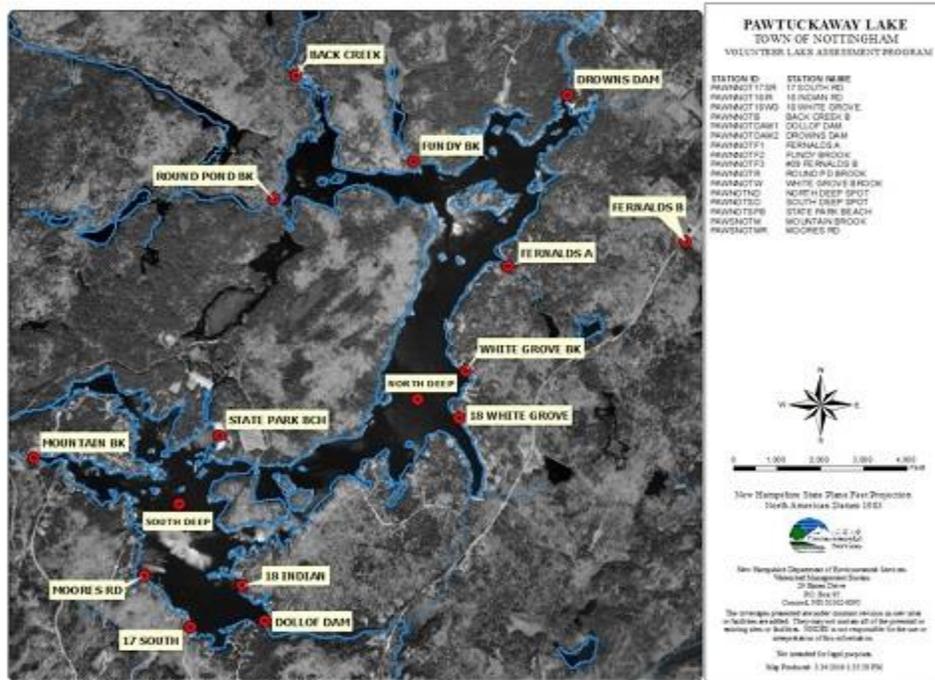
Monitoring Pawtuckaway Lake's Water Quality

Steve Soreff, MD

This article has two parts. First, this reporter describes his participation in the summer monthly Pawtuckaway Lake Improvement Association (PLIA) [Water Testing Program](#). And second, he will show how that program is part of a state-wide lake monitor system called the Volunteer Lake Assessment Program (VLAP).

On a bright sun shining Tuesday morning, June 14, 2022, at 9 AM, I joined the Water Testing crew on Mark Wageling's pontoon boat. The vessel was docked on the South Channel of Pawtuckaway Lake. On the second Tuesday in May, June, July, August, September, and October, the crew monitors water at the deepest part of both North and South Pawtuckaway Lake. In terms of full disclosure, this reporter is also the President of the PLIA. The PLIA has been doing Water Testing since. 1993.

We motored out to the deepest section of South Lake which was found using the boat's depth finder. Once there we anchored. Then the crew took water samples at the depths. Following an equipment rinsing protocol, they sampled the water for Total Phosphorus, Conductivity, pH, Alkalinity, Turbidity, Apparent color, Chloride, E. Coli, and Phytoplankton. Also, using a device they measured the water's clarity. During the week other members of the Water Testing Team sample a number of the tributary streams entering the lake for Total Phosphorus, Conductivity, pH, Alkalinity, Turbidity, Apparent color, and Chloride. This procedure was also followed at the deepest part of the North lake. Also, the crew took samples from another in the section of North lake where there are concerns about Phosphorus runoff from area dairy farms. Later, usually Wageling brings the samples to the NH DES in Concord for processing.



NH Department of Environmental Services Map

Here is the article's second section on how today's testing is just one part of a state-wide program. On this particular day, Nisa Marks, Watershed Coordinator, NHDES, and Kira Brancheau, an intern, joined the crew. They support the [Volunteer Lake Assessment Program \(VLAP\)](#). Over 500 volunteers participate in VLAP by providing samples, such as we did today, from nearly 180 NH lakes. Every two years staff from NHDES monitor the work of each of the volunteer water testing teams. In the process, they offer current information to the crews on collection techniques and data trends. Here is the link to the VLAP [Field Manual](#). In fact, learning from Marks was a neat course in limnology, the study of the biological, chemical, and physical features of lakes and other bodies of fresh water.



, Nisa Marks, Watershed Coordinator, NHDES

She pointed out the importance of looking at lake temperature and oxygen saturation at various depth levels. Where the level of oxygen saturation is low at the lower lake depth Phosphorus is released from sediments. She went on to say a major source of phosphorus in the lake comes from stormwater runoff. She added excess Phosphorus can result in the production of algae, cyanobacteria, and harmful cyanobacteria blooms. Homeowners who want to learn what they can do to reduce runoff and protect lake health can participate in NH LAKES's free, voluntary, nonregulatory [LakeSmart](#) Program.



South Lake of Pawtuckaway Lake at sunset

Here are the 2021 VLAP Reports for the [North site](#) and [South site](#) of Pawtuckaway Lake. Marks added “You will notice that phosphorus levels are increasing at the North site, which is concerning for lake health. We saw low levels of dissolved oxygen at the bottom of the lake there today; phosphorus can be released from lake sediments when the lake bottom becomes anoxic.”

Marks also talked about the lake depth levels-epilimnion, metalimnion, and hypolimnion. These are based on the water temperature. Furthermore, here is how they apply to Pawtuckaway Lake according to Sara Steiner, VLAP Coordinator, Watershed Management Bureau, Water Division, NH Department of Environmental Services. “Deep spot samples are collected in the middle of each thermal layer of the lake. The thermal layers are based on water temperature. The Pawtuckaway Lake’s South deep site has two layers, while the North deep site has three layers. The South deep site samples are collected in the Epilimnion (upper) and Hypolimnion (lower) layers. When three distinct thermal layers exist, such as at the North deep site, the layers are Epilimnion (upper), Metalimnion (middle), and Hypolimnion (lower). Samples are collected at 2m and 6m at the South site, and 2m, 6m, and 12m or roughly the middle of each thermal layer at the North site”.

There are many levels of [Water Testing](#).

