

Summary of Six Ponds Water Quality Results (Fall 2023)

In September of 2023 a team of Six Ponds volunteers collected water samples from each of our six ponds. Samples were drawn from various depths at the deepest location in each pond. These samples were analyzed by the Town of Plymouth

In 2014, the Town of Plymouth initiated the Plymouth Ponds and Lakes Stewardship Program (PALS). All Six Ponds water quality data is now collected under this protocol. Some of the measurements that Six Ponds had been using since 2002 were changed. While some of the parameters measured were the same, others were dropped and a couple of new ones were added.

As a result, for a number of years now, it has necessary to understand our water quality results by examining just a few of the main differences in results among our six ponds. The three things which have characterized differences among the ponds across many years are the results for Phosphorus and Nitrogen, and the results for salts and some chemical components of salts.

In addition to describing some of the main results for 2023, this summary comments on similarities and differences between these results and those obtained from 2017 to 2022 as well as some from 2002 to 2016.

Earlier summaries were written in 2016 and 2011, and these may be found on the water quality website that can be accessed from www.sixponds.org. A direct link to the water quality website is www.sixpondswaterquality.org, and these earlier summaries are located in the sections dealing with 2008 to 2013 and with 2014 to Present. In addition, the Phosphorus and Nitrogen data extracted from the Town PALS spreadsheet files for 2017 to 2023 are included in the 2014 to Present section of the website.

Phosphorus

In the fall of 2023, eutrophic levels of Phosphorus were found in just three samples (both samples from Little Long and from a deep sample in Long Pond). Aside from this, the Phosphorus levels in samples from Long and our four other ponds were quite good.

The 2023 Phosphorus results for Little Long continue to highlight a consistent problem where most of the samples taken since 2002 have been at eutrophic levels. The PALS data from 2017 to 2023 also show that Phosphorus levels in the deeper samples from Long were about the same as the most eutrophic samples from Little Long throughout this period. It has also been common for Halfway to have Phosphorus levels right up there with Little Long. In 2023 the Phosphorus levels in our other ponds were below the eutrophic level, and nearly all Phosphorus measurements since 2017 have been quite good.

It should be noted that this year the Phosphorus results for Halfway were better than they have been over most of the past seven years as well as in most years back to 2002. The Phosphorus readings in Halfway Pond have mostly declined over the past seven years, and hopefully this trend will continue now that the bogs around the pond have been out service for a few years.

More generally, the Phosphorus in water samples drawn from all six of our ponds since 2002 reveal the following pattern:

Little Long – 30 of 36 samples taken from this pond since 2002 were high

Halfway – 28 of 36 samples were high

Long – 20 of 44 samples were high

Round – 9 of 27 samples were high

Gallows – 12 of 35 samples were high

Bloody – 9 of 33 samples were high

Nitrogen Measures

Over more than two decades now, samples from Little Long have consistently contained more Nitrogen than samples from our other ponds, and this year was no exception. The Nitrogen level in the Little Long samples was again higher than that found in samples from our other ponds with one important difference. Specifically, the deeper measurements of Nitrogen in Long were comparable to and in some years higher than the Little Long measurements. This has been evident in the PALS data since 2017, and this was most likely the situation for many year prior to that since much of the water that flows into Long comes from Little Long.

On the positive side this year, the Nitrogen results for Halfway were better than they have been over most of the past seven years. In addition, the Nitrogen levels in our other ponds were quite good this year and for most of the past seven years as well.

Also, it should be pointed out that water samples from the ponds surrounded by the most houses and the steepest slopes down to the water have yielded the highest evidence of Nitrogen in the water. Septic systems, fertilizers and pesticides are the obvious causes, and people must attempt to minimize their negative impacts on their environment

Salt Components

For quite a number of years, the chemical analyses of our water samples included salt components such as

Chloride, Sodium and Potassium. The results showed that all three of these were highest in Bloody, next highest in Little Long, third highest in Long, and much lower in the rest of our ponds. For a while, the PALS analyses included specific conductance which can indicate the presence of salt, and these results were consistent with what was just described.

In 2016 Chloride was the only salt indicator included in the PALS analyses, but the results were completely consistent with past findings. Bloody was the highest, Little Long was next, Long was third, and the rest of our ponds were much lower. For several years now, the PALS analyses have not included any measurement of salt components.

In 2020 separately collected and analyzed water samples showed that chloride, potassium, calcium and sodium components of salts measured nearly twice what they had averaged two decades earlier. Also, as found earlier, the readings were highest for Bloody, next highest for Little Long and Long was third.

In any case, a number of years of similar results have consistently suggested that salt and salt components in winter road runoff from Route 3, Long Pond Road, Clark Road and Oar and Line Road are negatively affecting water quality in some of our ponds.

Stormwater Runoff Samples

Several years ago stormwater runoff samples were gathered at three locations by two dedicated Six Ponds volunteers. They went out shortly after a pouring rain began in order to collect water samples at outfall pipes coming from drains on Oar and Line Road and Clark Road. Two of the pipes empty directly into Little Long, and one empties into the stream flowing from Little Long to Long.

The E-Coli results in these samples were astounding because any number over 50 can be cause for great concern, beach closings and investigations. The results were 15000, 2200 and 480.

But the E-Coli results weren't the only alarming ones in the stormwater being flushed into Little Long and the stream. The Phosphorus results were far higher than the eutrophic level (.772, .696, and .564). The Nitrate levels were 2 to 4 times higher than the level which greatly accelerates algae and plant growth (1.12, 1.07, .76). Also, Total Nitrogen and Kjeldhal Nitrogen results were from 4 to 10 times higher than the highest levels found in any of our ponds.