September 21, 2020

Board of Directors,

A summary of the Water Quality Committee activities is presented below.

PROGRESS

Cyanobacteria Bloom

Kim Tower was on vacation the week of August 24 and David Gould came out twice that week in her stead to see if we could start the 2-week countdown to re-open Great Herring Pond. On Friday, August 28, he officially OK'd the start of the countdown. Great Herring Pond was officially re-opened September 11. Many thanks to Beth and Geri for posting updates on the bloom on our website, Facebook and Constant Contact. Thanks also to Jerry for ordering and installing the "Cyanobacteria Warning" signs. Special thanks to Geri for her microscopy, Secchi Disk and fluorometer work that certainly showed David that the pond health had been trending in the right direction.

We have gained new members, raised HPWA's $10,000 share of the cost of the Water Quality Plan, provided important educational material to watershed residents and developed interest and awareness in what HPWA does. It is important for us to continue to capitalize on these developments.

E. coli Sampling

I am pleased to report that from the August 20 sampling, we have either 5 colonies/100 ml or <5 colonies/100 ml E. coli. Generally, greater than 80 or 100 (depending on who you ask) are cause for concern. This is a good result. Why did we take samples if no one should be swimming? E. coli is a good indicator of septic problems; if a spike is noted in one of the 11 locations, further investigation should be done. We will be increasing the number of sampling points in future summers to give better area coverage of Great Herring Pond in order to (possibly) detect septic/cesspool malfunction.

While we (Don, Geri, Jerry, Chris, Tom O'Brien, Jack and Denise) were out, we took a Secchi reading. It had increased from 1.5 m in July to 2.3 m in August – a good sign for pond recovery from the cyanobacteria bloom. We also took a dissolved oxygen sampling at the deep hole. There was some DO decrease at depth, but this is normal for the summer season. There was measurable oxygen even at 13 m, a healthy indicator.

Our intrepid crew also took samples for SMAST at the deep hole.

Little Herring Pond Bog Results

On August 5, Jim Smith and Lee Pulis and I took samples at the wet former cranberry bog (it had rained hard the night before) north of Little Herring Pond and at the LHP spring to be tested for both nitrate and total phosphorus. We were hoping to establish how much phosphorus may be making its way into our watershed from this cranberry bog. You may recall that I had established a correlation between the spikes in total phosphorus found in previous LHP spring samples and a recent rainfall. Moreover, in the absence of recent rainfall, total phosphorus in the LHP spring remained low.

I prodded Ron Saari to send me these results for our meeting; it had been over six week since the samples were taken. I finally got the results this afternoon (9/18). Both nitrate values were low (bog – 0.06 mg/L and LHP spring – < 0.01 mg/). Total phosphorus, however, was a different story! The bog

value was 0.581 mg/L and, as predicted, the LHP spring total phosphorus spiked at 0.029 mg/L. I conclude from this that the bog is the source of much phosphorus and is most likely responsible for the occasional spikes in total phosphorus seen at the LHP spring.

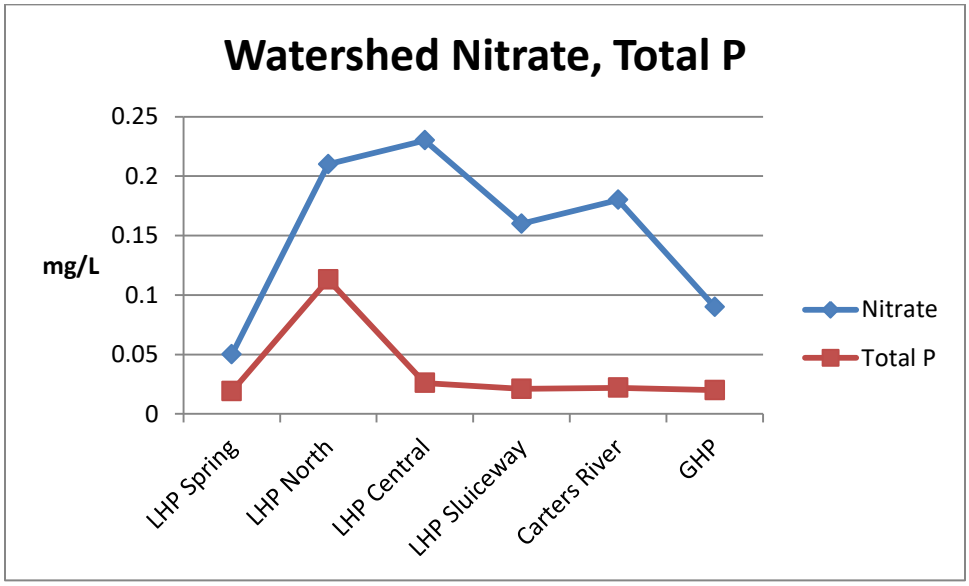
Since the Town of Plymouth owns the bog land, perhaps they can apply for a grant to cleanse it of phosphorus, thereby reducing phosphorus downstream of that source. An exciting possibility.

Elbow Pond

I took two samples at Elbow Pond on August 27. No results as yet. We intend to monitor pollution increase with time by comparing values to last year's baseline results. Elbow Pond is a Coastal Plains Pond with neither ingress nor egress and so is very susceptible to pollution.

Watershed Nitrate, Total Phosphorus Progression

As you know, we had been monitoring Nitrate and Total Phosphorus from LHP Spring to LHP Sluiceway to Carters River to Great Herring Pond. We had noticed that the LHP spring had relatively low values of both (with the exception of occasional Total Phosphorus spikes after rainfalls). LHP Sluiceway, however, consistently showed increases of 5 – 6 times the nitrate seen at LHP spring. Nothing to be concerned about because the levels are still very low, but interesting nonetheless. The result is interesting because we are obviously seeing the effect of human impact somewhere on LHP. At our last Water Quality Committee meeting, Jerry Levine suggested we take more LHP samples in order to more specifically pinpoint the source of the "human impact." Great idea! Below is the August 20 chart of the results of the expanded testing. These results were also received this afternoon (09/18) from Ron Saari after prompting.



These are exciting results, especially for Total Phosphorus. Note the Total Phosphorus spike at LHP North, the sampling closest to the spring. By LHP Central, the Total Phosphorus had decreased to "expected" levels that were then basically constant down through GHP. What could be causing the increase in pollution at LHP North? The bog?

The results for Nitrate may be mirroring the Total Phosphorus behavior but here, the highest value is for LHP Central.

These are both important results for guiding the Water Quality Plan study. We should look very carefully at LHP in the study as a source of Total Phosphorus pollution throughout the entire watershed.

PLANS

Raman Spectroscopy

I have been talking with Bob Lane (I met him on vacation in NC last spring)about using Raman Spectroscopy for water quality analyses. He thinks there is a possibility that this spectroscopy can determine the source of phosphorus in our waters (septic, sediment, runoff). He also thinks that it can be used to determine pollution from defective septic/cesspool sources. He has proposed a project at Virginia Polytech that would only cost us $300 for the Raman cuvettes plus postage for sending samples. This is an intriguing possible source of answers to two key water quality questions. The study would utilize students (no charge for their labor!) at Virginia Polytech. We are still hammering out details.

October Sampling

Bob O'Brien has volunteered his boat for our October sampling for SMAST. We would also check Secchi Disk and DO at the deep hole. We'll be looking for intrepid volunteers for this foray, once scheduled.

LHP Bog

I plan to share our data with David Gould to see if a Bog Remediation grant may be possible.