

Newsletter Winter 2021



Ice Symphony



*Chilly Schanda Park in Newmarket
photo by Rachel Stevens*

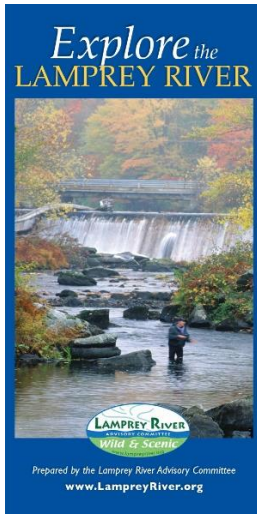
Most of the 49-mile Lamprey River is freshwater, but the 2-mile section from Macallen Dam in Newmarket out to Great Bay is saltwater. Twice a day, this water rises and falls with the tides. This rhythm occurs even with a covering of ice. As ice expands with the incoming tide and constricts with the outgoing tide, it cracks and contorts. This action does not happen silently. The sound waves travel through air and water as usual, but they are distorted when they travel through ice. The result is a symphony of eerie and spacy sounds consisting of creaks, groans,

pings, pops, rumbles, and screeches. The best times to hear these estuary concerts are when the tide is actively turning, about halfway between high and low tides. Free tide charts based on location are readily available on-line.

The same phenomenon that occurs in estuaries and on tidal rivers can also be found on frozen lakes. Lakes do not experience tides, but changes in temperature cause ice to contract and expand, resulting in similar sounds. The best times to catch an ice symphony on freshwater typically are often near sunrise and sunset when the sun actively affects the temperature of air. For those who have not heard an ice symphony, internet searches using "sounds under ice" will produce a few lake hits. Lake ice sounds are interesting, but tidal flows help to diversify the mix, with currents' sometimes dragging ice under ice. So, dress warmly and go visit your local tidal river in person. If you are lucky, the ice will be nice and sound will abound.

Recreation, Revised!

Our popular *Explore the Lamprey River Map and Guide* has been updated and is now available for free at most local libraries, town recreation departments, and on-line. Updates include new paddling access points, more hiking trails, and new parks. You can also request a free copy to be mailed to your house. Please send your request to info@LampreyRiver.org and provide your mailing address. Winter is a great time to enjoy many beautiful trails!



Nutrient Budget Analysis



Anna Lowien gathering a water sample for testing.

The LRAC was pleased to award a community grant last year to the NH Water Quality Laboratory at UNH. Graduate student Anna Lowien, under the guidance of William McDowell and Michelle Shattuck, reviewed and assessed nitrogen and phosphorus in the Lamprey River. Her goals were to assess how these nutrient loads vary over time and along the length of the river in the context of different land uses. Higher loads of nutrients are often associated with water pollution and ecological impairment.

Her analysis produced several key findings:

- Sampling stations with agricultural or suburban land use had significantly higher average annual nitrogen loads than the other sampling stations.
- Thirteen of the sampling stations showed significant increasing trends in annual phosphate over time.
- Most river segments had positive incremental loads, indicating that downstream nitrogen outputs were greater than nitrogen inputs upstream. Positive incremental loads found between most stations indicate a net accumulation of nitrogen in the river. This means that natural nitrogen removal processes (such as uptake by instream vegetation and denitrification in wetlands) cannot keep pace with nitrogen inputs.

Improving Detection of Variable Milfoil in Pawtuckaway Lake



variable milfoil stem and cross section

Pawtuckaway Lake empties into the Lamprey River in Nottingham. Problems in the lake can easily become problems in the river. Variable milfoil is one of those potential problems; it grows and spreads quickly. Left unchecked, it can overtake a body of water, ruining its water quality and recreational appeal. In 2014, variable milfoil plants were found in the lake.

The Pawtuckaway Lake Improvement Association (PLIA) sprang into action and employed a seek-and-remove campaign to augment its already robust invasive plant prevention program. Locating variable milfoil is normally a time and energy consuming effort, with divers physically searching for individual plants. With over 50 percent of Pawtuckaway Lake shallow enough to support the growth of milfoil, the task of detecting each individual plant was daunting. To make early detection more efficient, the PLIA requested and received a Community Grant from the LRAC to purchase side-scan sonar for a pilot project.

During the summer of 2020, PLIA volunteers learned how to use the equipment and interpret the data. Their results were impressive! After scanning areas known to have supported variable milfoil in the past, other areas of the lake not known to have milfoil were searched. The sonar logs from these runs were analyzed and all suspicious areas were investigated. Fortunately, no new areas of infestation were found. In the five years that the PLIA has been searching for milfoil, they learned that underwater searches take about one person hour per acre; side scan sonar can cover about 10 acres per person hour. This order of magnitude increase in productivity makes it feasible to satisfy the original goal of searching a high percentage of potential areas of infestation on a regular basis with reasonable amounts of time and effort. While they did have a number of “false positives”, divers were able investigate each case without undue extra effort, especially in early summer when the surrounding native vegetation was still small.

To see the reports, please visit www.LampreyRiver.org under research on the multi-media tab.

Wetlands Inventory and Recommendations for Priority Protection in Raymond

Municipal conservation commissions have authority under New Hampshire RSA 36-A:2: to keep an index of all marshlands, swamps and all other wetlands in a like manner, and may recommend to the city council or selectmen or to the department of natural and

cultural resources a program for the protection, development or better utilization of all such areas. The first step in this process is to map and assess each wetland: area and depth, vegetation, soils, value to wildlife in and near the site, connection to rivers and aquifers, and value to human needs such as proximity to sources of groundwater for human consumption. This assessment is made by a certified wetland scientist.

The second step, recommending how best to protect the most valuable wetlands, is much less straightforward. Conservation commissions have several tools available to them; in Raymond, the best tool is considered to be land use regulations that define what activities or types of development can occur where. This spring, residents will be asked to vote whether to accept the recommended regulatory changes that will help to protect the highest ranked wetlands going forward or to keep the *status quo* and risk losses to water quality and ecological values as Raymond continues to be developed.

The wetlands map and proposed changes to town ordinances can be found at [Conservation Commission | raymond-nh](http://ConservationCommission.raymond-nh) under the tabs for “Top Ten Ranked Priority Wetlands” and “Wetlands and Water Quality Presentation”, respectively.



The LRAC was one of several partners that helped to fund this important work in 2020.

More Science!

The LRAC is pleased to announce two grants have been awarded that will help to expand the data base of water quality assessments and improve our understanding of potential issues.

- ✚ *Bacterial tracking on saltwater and freshwater areas of the Lamprey River:*
The Lamprey River does not have public beaches, so the state does not conduct bacterial assessments for human recreational safety. This research will provide much needed information about the type, concentration, and source of possible bacterial contamination at popular recreational areas on the Lamprey River.
- ✚ *Water Quality Testing Upgrades and Analysis at Wiswall Falls:*
This project will fund replacement of important continuous-testing water quality sensors that are at the end of their serviceable lives. It will also enable the continuation of data analysis so that this long-term study can be sustained in a year of financial challenges.