CARMI Communicator #4
October 2020

Dear Friends of Lake Carmi,

Welcome to the fourth edition of the Carmi Communicator, the Vermont DEC's efforts to keep Lake Carmi stakeholders informed about ongoing efforts to improve water quality in the lake and its watershed.

I hope everyone had a productive and fun summer despite the challenges presented by the ongoing COVID-19 pandemic, and that you were able to get up to Lake Carmi and enjoy this gem of a Vermont lake. DEC and our partners, including UVM, the Agency of Agriculture, Food & Markets, the Franklin Watershed Committee, the Northwest Regional Planning Commission, Everblue Lakes, Stone Environmental, and others had a busy summer up on the lake with lots of monitoring, outreach, analysis, and planning work taking place. This fall edition of the Carmi Communicator aims to give an update on what took place this summer, and well get into more detail soon on what we learned, once we have time to compile and analyze all the monitoring data that came in. Lots to talk about, so here we go…

- **New Franklin Watershed Committee Coordinator Tucker Wehner:** Tucker joined the Franklin Watershed Committee as the Coordinator in July. He recently graduated from St. Lawrence University with a Biology/Environmental Studies major, and has worked previously in Plymouth, Vermont. He will not be leading the Franklin Watershed Committee's efforts to implement projects to help restore Lake Carmi and the promote sustainable land use management in the surrounding area.

- **Summer 2020 Aeration System Operation:** DEC and Everblue Lakes turned on the Lake Carmi aeration system on June 5, 2020, once the lake had surpassed the Dissolved Oxygen threshold for operation of the system agreed to with the Department of Fish and Wildlife. While the northern compressor operated normally through the summer, the southern compressor at the state park encountered some electrical problems that kept it offline for much of June and July. By the end of July, these problems were resolved, the system was upgraded with more powerful breakers and a larger controller drive, and all 80 diffusers were back online and running at 55 hertz. The system operated normally thereafter and was shut down for the season on October 15. Many thanks to Rob Evans and Pete Benevento as well as staff from Everblue Lakes, Vermont Electric Cooperative, and Peck Electrical Services for their responsiveness and commitment to resolving this issue.

- **Summer 2020 Lake Water Quality Monitoring:** Water Quality monitoring in Lake Carmi over the summer months was comprised of complementary efforts from Dr. Andrew Schroth (UVM) and his team, Lay Monitoring Program Volunteer Pete Benevento, and DEC Staff. Monitoring began in earnest on June 12th when the UVM and VT DEC team deployed a high-frequency monitoring buoy near the DEC's long-term monitoring site. The buoy uses advanced sensor technology to monitor changes in Lake Carmi's physical, chemical, and ecological properties over the course of the year, and the data will be used understand how Lake Carmi has changed due to the aeration, with particular focus on how the behavior of phosphorus (an essential nutrient that feeds algae populations in the lake) and algae populations themselves responded the aeration program. Two websites were established to display data from the buoy in quasi real-time; one hosted by UVM and a second hosted by DEC, and these websites have become very useful sources of information about lake water quality conditions. DEC and UVM are beginning to analyze all of the summer data and will share at the next Carmi Coordination Team meeting and in future updates to this group, and DEC is exploring options to continue the UVM high-frequency monitoring work during the summer of 2021.

- **Summer 2020 Carmi Tributary Monitoring:** With a pause in the DEC LaRosa Volunteer Monitoring Program for the summer of 2020, it took a team of volunteers and DEC staff to complete Carmi Tributary Monitoring at five sites around the lake. Led by Pete Benevento and supported by Karen Bates and Pete Stangel of DEC, the following five tributaries were sampled intermittently throughout the summer for total phosphorus and dissolved phosphorus: Sandy Bay Brook @ Black Woods Rd, Marsh Brook @ Lake Carmi State Park, Dicky's Brook @ Lake Rd, Dewing Brook @ Dewing Rd, and Kane's Brook. Dry conditions made sampling difficult for much of July and August, and we will aim to the results of this effort in the next Carmi Communicator.

- **Carmi Clean Water Progress Report:** On July 17, DEC published the "Lake Carmi Clean Water Progress Report" that summarizes projects within Lake Carmi and its watershed from 2016 to 2019, as well as progress towards meeting the Lake Carmi Phosphorus Total Maximum Daily Load target. The report shows that state and federal investments in and around Lake Carmi reduced an estimated 251 kilograms (kg) of phosphorus loading, which is estimated to be approximately 41% of the phosphorus reduction required to meet the Lake Carmi Phosphorus Total Maximum Daily Load.

- **Groundwater Study Update:** During the week of October 12th to 19th Cascade Drilling are installing ten shallow monitoring wells, between 15 and 20 ft deep, at seven locations around the shore of Lake Carmi. Vermont Department of Environmental Conservation will collect and analyze groundwater samples every three months. This will help us to understand the groundwater chemistry and the source and movement of phosphorous moving with the groundwater towards the lake. The soil cores are being logged on site before being sent to Middlebury College where the geology will be analyzed in detail. As I write on Tuesday evening, five wells have been installed successfully, and we have identified various soil types characteristic of lake sediment, wetland deposits, and glacial till deposited under the ice sheet over 14,000 year ago.

Figure 1. Installing a monitoring well to collect groundwater samples.

- **State Route 236 Culvert Replacement Project Update:** The Town of Franklin advertised a Request for Proposal in August for an engineering firm to provide design and construction supervision services for the replacement of two culverts on State Route 236 adjacent to the intersection with Dewing Road. An evaluation panel comprised of Town of Franklin Select Board members, DEC Staff, and VTRANS staff met to review proposals on October 16, and anticipate awarding a contract by the end of the month. Construction of the two new culverts is scheduled to take place in early summer 2021.

- **Lake Carmi Tributary Flow Monitoring Feasibility Assessment:** The Vermont Agency of Agriculture, Food & Markets has begun an assessment of tributaries to Lake Carmi and hired Stone Environmental, Inc. to determine the feasibility of monitoring their streamflow. Stone scientists Meghan Arpino and Dave Braun have been evaluating the stream channels and culverts to identify suitable sites for installation of flow gauges. Pete Benevento and Tucker Werner of the FWC have been helpful in this effort, assisting Stone with landowner outreach and lending a hand in field work. Eight of the ten recognized tributaries to Lake Carmi have been assessed to date. Stone has also begun evaluating methods and instruments for gauging these streams. Progress will be reported during the first Technical Advisory Committee meeting for this project, scheduled for October 28, 2020.

- **Carmi Private Roads Inventory Update:** NRPC has initiated outreach for the project with a mailing to all property owners in the Lake Carmi watershed to inform them of the project and anticipated timeline. There will be 3 phases to this project:
  - Road erosion inventory**:** NRPC staff will be walking private roads and driveways in the Lake Carmi Watershed and collecting data to assess the condition. This may include taking photos of the area. *Fall 2020*
  - Workshops**:** An online workshop will be available for residents, landowners, and homeowners to learn about BMPs to reduce erosion on your private road and/or driveway. *Spring 2021*
  - Construction**:** A mini-grant program will be available to fund the installation of BMPs in high priority areas. *Summer 2021-2022*

- **State of Vermont/UVM agricultural activities in the Carmi Watershed:** UVM Extension continues to work one-on-one with the farmers in the Lake Carmi watershed, as much as possible due to COVID restrictions. Farmers have used the grassland manure injector on over 500 acres so far this year and anticipate reaching 750 before the ground freezes. 80-85% of the corn fields will be seeded to cover crops and UVM is evaluating how to increase earlier cover crop establishment through another grant. Extension personnel are also looking at 3 potential wetland restoration sites on farms in the watershed. This type of restoration will also reduce potential nutrient runoff from open land.
-

- **Marsh Brook Investigations:** Staci Pomeroy, DEC stream scientist, Karen Bates, DEC Basin planner and Tucker Wehner, FWC assessed the Marsh Brook from mouth to headwaters near Little Pond Road over three days in late September and early October. The work completed included noting stream's ability to access floodplain during storm events, degree of restricted flow through culverts, as well as the characteristics of tributaries or drainages that contributed flows to the stream and their watershed. Staci and Karen were very appreciative of Tucker Wehner's assistance in measuring and note taking. They also appreciate landowners' willingness to provide permission to walk the stream. Highlights of the walk included discussion with landowners on history of brook, including learning that large stone wall was part of a shingle factory (picture?) They were also happy to have had the opportunity to walk a beautiful stream, with its associated wetlands and forested banks, over three days in good company. Staci will complete the Marsh Brook stream geomorphic assessment report by the end of the year and will present her results to the community at a future Carmi Coordination Team meeting. The report will assess the stream's progress towards meeting a state of equilibrium with watershed processes and characteristics, which will help with gaging the degree to which the stream is a source of excessive sediment as well as a site for sediment deposition as part of its processes towards adjustment in its path towards Marsh Brook.

- **Next Carmi Coordination Team Meeting:** The next Carmi Coordination Team meeting will take place on *Thursday, November 12, 2020 @ 4:45 PM* either virtually or, if circumstances allow, in the FELCO Room at the Franklin Homestead. We hope to "see" many of you there, and feel free to send me any agenda items you would like to discuss.

- **Angela Shambaugh's Retirement**: After 16 years of service to Vermont DEC, Angela Shambaugh is retiring on Friday, October 23rd. Angela has been a key cyanobacteria expert for the state and has helped us understand and respond to blooms in Lake Carmi. Please join me in wishing her well.

As always, we would love to hear from you, either during the upcoming Coordination Team Meeting or via email. I look forward to continuing our efforts to improve water quality in Lake Carmi and reduce nutrient runoff from the watershed.

Regards,
Oliver Pierson / Lakes and Ponds Program Manager / 802-490-6198 / Oliver.Pierson@vermont.gov