



RIPARIAN READS

Newsletter of the Kennebecasis Watershed Restoration Committee

Winter 2022



Winter in Waterford - Photo by Ellen MacGillivray

Manager's Message

There is no doubt that 2022 has posed some challenges for everyone as we try to move forward following Covid. We feel fortunate here at the KWRC that, while we have lost some staff time due to illness, we have been able to keep moving ahead with several projects. It is said that we are as healthy as our natural environments, and we cannot help but draw comparisons here in our region. We have started to notice a growing list of threats to the health of the watershed. Invasive species, increased erosion and the uncertainty surrounding cyanobacteria are all creating issues in our communities; it's easy to draw a correlation between these growing threats and our own social health.

We have been working hard to better understand the issues facing the watershed and take strategic steps to remedy them. In 2022 we undertook some new activities for our organization to mitigate some of these impacts. For the first time, we removed large woody debris jams to improve flow in a reach on Trout Creek. These jams were a result of a large flood event that saw Trout Creek leave its old channel and create new ones.

These new channels toppled trees into the river and left huge gravel bars in locations that posed risk to nearby infrastructure.

Our team worked with contractors to remove 8 debris jams and reposition 2 gravel bars. The goal is to create a more stable flow regime within this section of Trout Creek and protect property and infrastructure from future flooding. The team removed more than 4 truckloads of woody debris and removed a collapsed gabion (wire) cage, placing the rock that was in it along the toe of an eroding streambank to reduce further erosion. This work cannot be completed without first attaining landowner support and getting the required permits from the Department of Environment and Local Government.

Following this work our team also planted over 8000 trees and shrubs along various riparian areas throughout the watershed. These trees will mature to provide shade and temperature buffering for the river while also offering an enhanced migratory corridor for many terrestrial species; it also creates a carbon and nutrient sink.

To help us better quantify this impact we undertook our first carbon and soil health monitoring exercises this year, and we will strive to make this a normal occurrence in our future work. We also monitored pollinator biodiversity in our riparian areas to help us understand how a healthy riparian area can aid farmers with crop production.

Generating good data and implementing strategic habitat restoration approaches are critical to the work we do. It is important that people understand why we don't simply rock armor an eroding stream and why we encourage riparian/floodplain corridors; our work this past year will result in some quantifiable proof that we will soon be able to share with the various stakeholders in our watershed.

In 2023, we will continue to strategically work towards improving riparian and floodplain connectivity in areas that limit risks to public health and wealth. We will also continue to monitor and create a better understanding of the characteristics and behaviour of cyanobacteria and invasive species such as Eurasian watermilfoil. This work will allow us to create a strong plan to address these risks and guide more informed decision-making when it comes to protecting your health and wealth. Together we can not only improve the health of the watershed but the health of all.

~ Ben Whalen
Project Manager



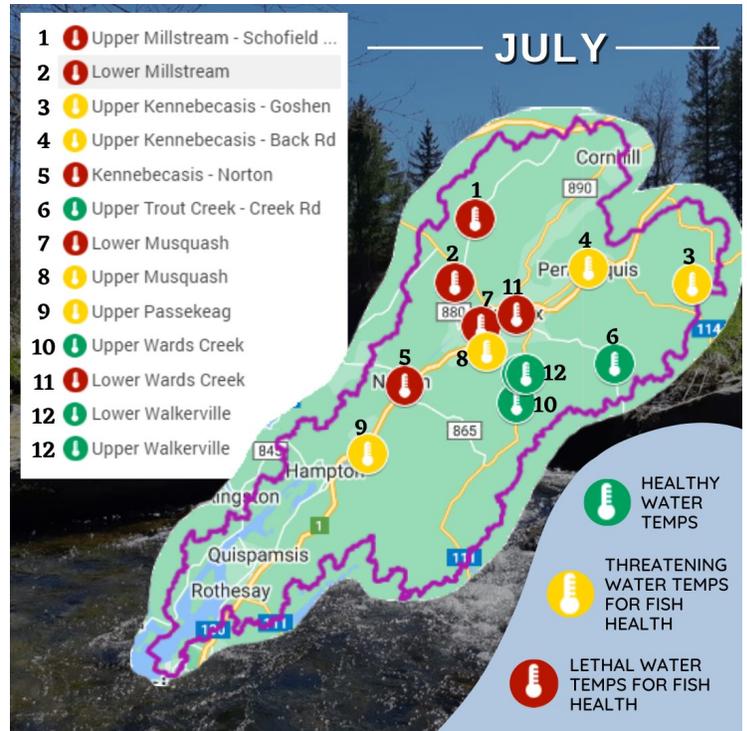
Monitoring: Field Season Overview

Winter is here, which means we have officially wrapped up our 2022 field season. This year we accomplished a *lot*, especially within our monitoring pillar, which consists of water quality and temperature monitoring in both lakes and rivers, as well as fish diversity monitoring in our lakes and rivers; flow monitoring, pollinator monitoring, and carbon monitoring. Over the upcoming winter months we will continue water quality sampling and also take on snowpack monitoring and River Watch.

Our two biggest monitoring activities, in terms of data collected, are our water quality and water temperature monitoring. These activities can be broken into two categories each: rivers and lakes. This year, we collected water quality samples at ten sites from June until October for rivers, and at 5 sites from June until September for lakes. The collected samples are sent to a lab where they are analyzed for 59 water quality parameters. In 2022, we received 3355 water quality measurements for rivers and 870 measurements for lakes. That's a grand total of 4225 water quality measurements this year.

As for temperature, we installed 25 temp loggers throughout the watershed that collected hourly water temperature data from May until October (rivers) and June until September (lakes). Of those 25 loggers, data from 4 rivers were lost. Two loggers could not be located, a battery died in another and the fourth was waterlogged, causing malfunction. Despite those hiccups, we still retrieved 51807 temperature measurements from

our river loggers and 15295 measurements from our lake loggers. That's a total of 67,102 water temperature data points! The image below is one of our temperature profile maps for rivers in the month of July.



Water temperature profile map for rivers in July. See the full post on our social media for more results: <https://www.facebook.com/kennebecasisriver/posts/pfbid0MSYQuNAPkeF5Pdpj8Fymw11gdFwnCCk-dBSWM4TNxQrpSKKrQNSsBt67q2nGfh6K4I>

There are three components of our fish diversity monitoring: physical fish capture, eDNA samples, and electrofishing. We manually catch fish using beach seines, a fyke net, and minnow traps. These activities are completed at four of our five lake sites: Hamilton, Erb, McManus, and Mud Lake. At each of these lakes, beach seining was completed twice, one fyke net set up, and two minnow traps deployed. The fish caught in these nets were identified, tallied and measured. Over the course of these activities, 20 nets were set and a total of 175 fish were caught.



A sunfish caught using a seine net at one of our lake sites.

Environmental DNA, or eDNA samples were collected in the summer (lakes) and fall (rivers). At each of our 8 sites, two water samples were collected, one of them being a replicate sample. A total of 16 eDNA water samples were sent to CRI at the UNBSJ campus to be analyzed, returning 42 results. Laura goes into more detail on these results in the following article.

The last of our fish biodiversity activities was electrofishing, which we completed in the fall with the Hammond River Angling Association. This was done at 6 sites at 3 rivers: the Kennebecasis, Trout Creek, and Smith's Creek. Through this we caught and counted 11 different fish species, and had captured a total of 1210 individual fish.

Staff also conducted flow monitoring throughout the summer months. This was a biweekly activity that took place at four different sites. A flow meter was used to determine the velocity and depth of the water at three spots along a transect. By September 14th, we had 96 velocity measurements and 96 depth measurements from 4 sites.

Two new additions to our monitoring program this year were pollinator and carbon monitoring. Both activities took place at one of our riparian restoration sites in Passekeag. On the pollinator project, we worked with Jess Vickruck, PhD, from Agriculture and Agri-Food Canada. In the spring she came out to our demo site to show us how to set up a pollinator monitoring strip and blue vane trap as well as how to handle and collect the samples. We set up our monitoring strip and traps 3 times throughout the summer. A total of 6 samples were sent to Jess for analysis. As for carbon sampling, which we did nearby to our pollinator strip, a total of 24 soil core samples were extracted and sent away for analysis. More information about our carbon monitoring project can be found in our Fall 2022 newsletter:

https://www.kennebecasisriver.org/_files/ugd/35de80_0e8c914e596548d1ad7b1092a39929b0.pdf

As we move into the cold months, we transition to our Winter monitoring activities: snowpack monitoring and River Watch, both done for the Department of Environment and Local Government. We can't wait to see what adventures lie ahead for us this Winter.

~ Abby Lamrock

Monitoring
Coordinator



McManus Lake

Environmental DNA Results of 2022

In 2021, the KWRC began environmental DNA (eDNA) monitoring on key rivers and lakes within our watershed. EDNA is nuclear or mitochondrial DNA that is released from an organism into the environment. The sources of eDNA from fish include feces, mucus, gametes, scales and carcasses. Several factors can affect DNA samples. For example, UVB radiation, acidity, temperature and organic matter can cause degradation of eDNA. When the results are returned and a species was not present in a sample, it does not mean that species is absent from that waterbody, but simply that the DNA was below detection level.

We bring the samples to the Canadian Rivers Institute (CRI) Lab at the University of New Brunswick, Saint John. The CRI Genomics Lab is directed by Scott Pavey, and uses state-of-the-art techniques to address basic and applied questions in conservation, fisheries management, evolution and ecology.

unb.ca/saintjohn/sase/dept/bio-sciences/labs/pavey/index.html



Brooklynn with the YSI monitoring meter and Laura with a river eDNA sample earlier this Fall.

In 2022, we tested four rivers and four lakes throughout the summer. Our river sites were located along Trout Creek on Maple Avenue, Smith's Creek at Oldfield Road, Millstream River at Pleasant Ridge Branch Road, and the Kennebecasis River at the Roachville boat launch. The lakes sampled were Mud Lake, Hamilton Lake, McManus Lake and Erb Lake.

The KWRC uses eDNA to detect the presence of native fish species (Atlantic salmon and brook trout) and as an early detection method for invasive species (chain pickerel and smallmouth bass). We tested for: Atlantic salmon at all river sites; smallmouth bass at all sites; chain pickerel at all lake sites and the Roachville boat launch; brook trout at all lake sites.

Atlantic salmon was found at 3 of our 4 river sites this past Fall. Trout Creek and Millstream river have a significant salmon presence and the Kennebecasis River has a salmon presence as well. The results show that Smith's Creek did not have salmon present at the time of the sample. However, through personal endeavours we know that there is salmon in Smith's Creek. Since Atlantic salmon are endangered, these findings are significant, showing that this species is still present and spawning within their native rivers.

Smallmouth bass was found at two river sites, the Kennebecasis River and Trout Creek, and in McManus Lake. This year's data shows that smallmouth bass has extended its range into Trout Creek. Since this is an invasive species, the finding is alarming and suggests action may be needed to prevent domination over native species.

Chain pickerel was found in the Kennebecasis River, Mud Lake and McManus Lake. In 2021, chain pickerel were not identified in Mud Lake due to inhibiting factors found in last year's sample. It is concerning that we have found pickerel in the Kennebecasis River, as this tells us that two invasive fish species are competing against native fish species.

Brook trout was found in Hamilton Lake and Erb Lake. This data corroborates with the 2021 eDNA data. These two sites are the only ones with brook trout and without invasive species. The data may show a correlation between invasive species' presence and brook trout's absence at other sites.

EDNA monitoring is an important tool for fish sampling as it is time efficient and an effective indicator of species presence when partnered with other fish sampling methods such as angling or net sampling. The results from this round of eDNA monitoring have indicated the importance of protecting Hamilton and Erb Lake from the introduction of invasive species. It also demonstrates the importance of continuing our streambank restoration projects. Stay tuned for our final reports!

~ Laura Lavigne
Invasive Species
and Biodiversity
Project Coordinator



Building Bats a Future in the Kennebecasis



A couple of bat boxes installed this year, placed about six feet from the ground, away from predators.

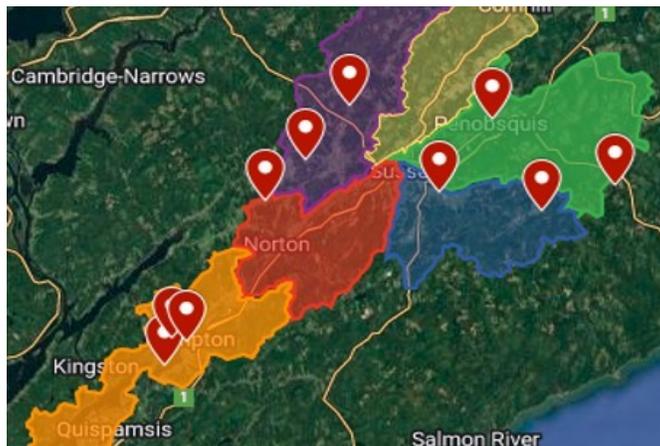


In New Brunswick, there are 7 bat species. Of these species, the little brown bat, the northern long-eared bat, and the tri-colored bat are considered endangered in Canada under the Species at Risk Act. On the East Coast of Canada, white-nose syndrome (WNS) has caused a 95% decline in the bat population. WNS was first detected in New Brunswick in 2011; it is a white powdery fungus that grows on the mouth and wings of bat species. This syndrome wakes them up during their hibernation period, which causes them to die from starvation and dehydration. The fungus thrives in caves, therefore impacting bats that hibernate in those habitats.

The population decline of bat species is also influenced by habitat loss, specifically the loss of roosting trees. This year, we installed 10 bat boxes across the watershed to provide habitat for these species. The 10 landowners who have agreed to host these boxes will be monitoring them for the next 2 years, 4 times per year. The data on the presence or absence of bats will be compiled for the knowledge and use of the KWRC as well as submitted to the Canadian Bat Box study being conducted by the Canadian Wildlife Federation and Wildlife Conservation Society. We have been working with the project's lead researcher, PhD candidate Karen Vanderwolf, to help collect data about which bat box designs are being used. It is certainly our hope that these boxes will prove to be of use to bats in the next couple of years and positively impact populations in Canada.

When the KWRC first put out a call for landowners willing to participate in the initiative, we received an overwhelmingly positive response. About 70 landowners messaged us hoping to have a bat box installed on their property. With only 10 boxes funded through this project, choosing which properties to place them was challenging. We chose landowners based on their distribution across the watershed. The majority of those interested were located in the Kennebecasis Bay

sub-watershed, so we followed additional criteria to determine the best property suited for monitoring in this area. We generally installed the boxes in areas with little light pollution and within 300 meters of a water source.



Locations of our 2022 bat box installations.

Through this project we have realized the public’s interest in improving bat populations in the area. An individual bat can eat thousands of insects every night. Therefore, people have noticed an increase in insect populations, which seems to motivate landowners even further toward restoring bat populations.

Our goal is to direct this enthusiasm toward creating more viable habitats for bats. Installing the boxes is part of that effort, while our usual riparian restoration tactics such as tree planting will hopefully contribute as well. This project would not have been possible without funding from the New Brunswick Wildlife Trust Fund.

~ Brooklynne King
Waste Diversion
Project Coordinator



Winter Wonderland: BioBlitz-ing in the Snowy Season

Winter can be a tough time for many people; the short days and cold weather keep us wanting to curl up indoors and stay cozy. There’s nothing wrong with that, but if you begin to feel blue, remind yourself that the scarcity of sunshine and hustle of the holidays take their toll on anyone. However, bundling up and getting out can do wonders for your mental health. We’re lucky that here at the KWRC, the work doesn’t stop in the Winter. We are still completing weekly monitoring efforts such as water sampling, and will soon begin snowpack monitoring and River Watch, allowing us to breathe some fresh air and enjoy the ever-changing scenery of our watershed. My love of photography and my position in Education Outreach mean that I’m taking photos by default, for my own enjoyment and for our social media, but it also allows me to complete mini ‘bio blitzes’ every week at our recurring sites by uploading photos of my observations to iNaturalist. This is an activity we have a lot of fun with, but it also adds to the database of biodiversity and species distribution that the KWRC is building. Which brings me to make this suggestion: this Winter, try a BioBlitz for yourself! You’ll be amazed at the things you’ll notice that you normally miss, and if you upload your observations to iNaturalist, you’ll contribute as a citizen science to an ever-growing biodiversity database.

A ‘BioBlitz’ is a method of documenting biodiversity by identifying as many species as possible at a certain location within a set timeframe. Doing this on your own, you can take a more relaxed approach. For instance, rather than setting a timeframe beforehand, you can simply head out for a walk and be done when you decide you’re done. We use the app iNaturalist, which is free to download, easy to use, and allows you to ID your observations at any time.

Winter BioBlitz Checklist

- ___ Warm clothes, scarf, boots, hat, gloves or mittens
- ___ Water bottle and snack
- ___ Your phone with the app iNaturalist downloaded (though you can wait till you’re home with a wi-fi connection to upload your observations if you prefer)
- — — — — *Optional* — — — — —
- ___ A notebook to keep track of your observations
- ___ Field guides for plants and wildlife
- ___ Binoculars or a camera
- ___ Additional ID apps such as Merlin for birds

Choose a favourite walking trail or park and immerse yourself in the kind of peaceful silence that only the wintertime can offer. If you plan to wander off the beaten path, be sure to let someone know where you'll be, just in case. Now you're ready to do some blitzing!

Everything looks different in Winter. Most organisms are dormant, hiding or hibernating, meaning your observations may be scarce—and therefore all the more exciting. A branch poking out of the snow is hardly something to notice, but if you take a closer look, it may reveal clues about the plant itself. Some field guides point out branch-tip features that can help you identify it. We also have a series of videos on our YouTube channel with tips & tricks for Winter tree ID:

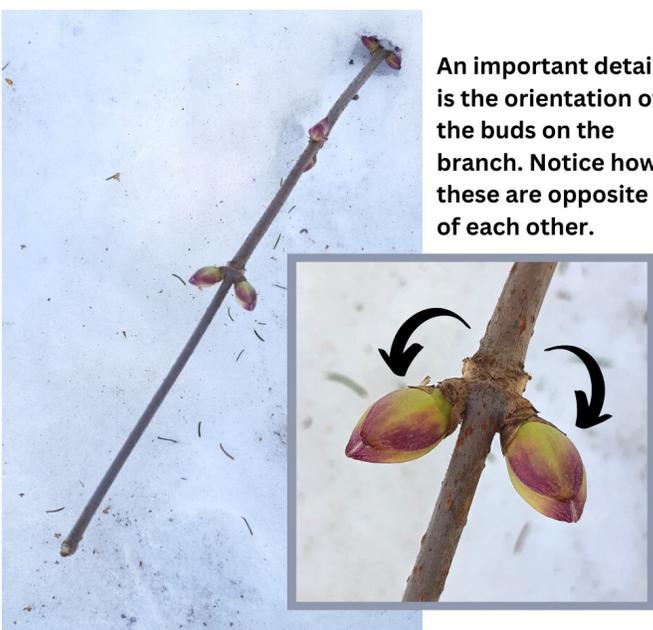
Part 1: https://youtu.be/FRAbiw_xP4s

Part 2: <https://youtu.be/yvgw6zpK5KQ>

Part 3: <https://youtu.be/f8fZUV5u6v8>



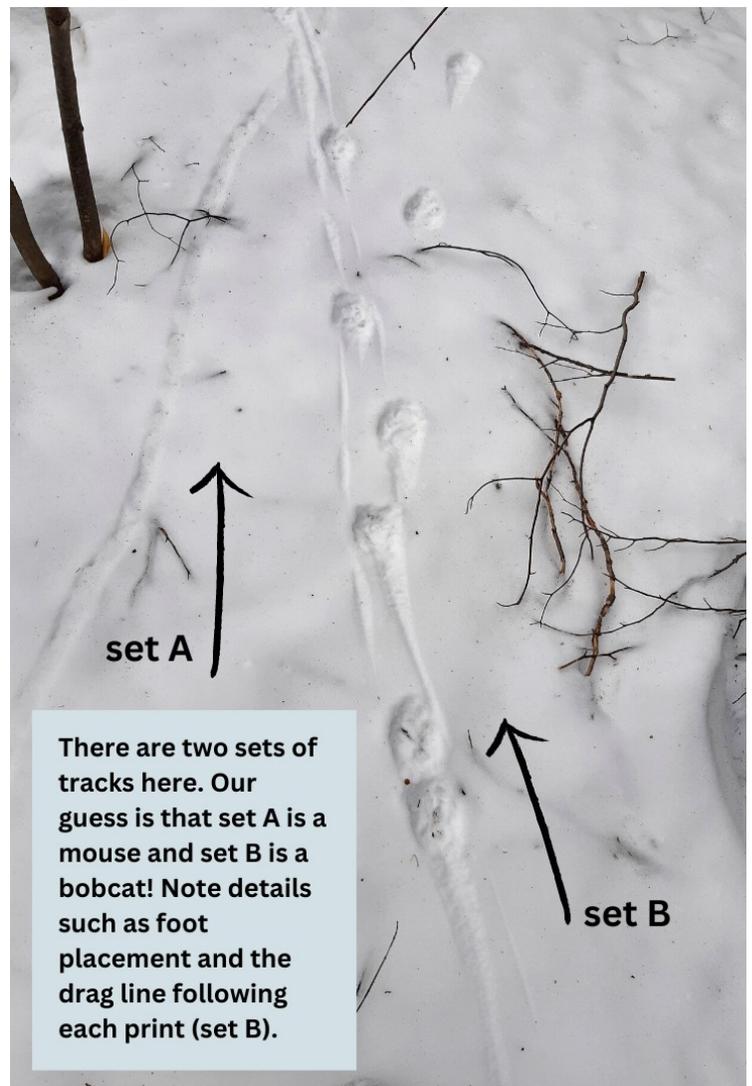
Apps like iNaturalist generate ID suggestions based on an artificial intelligence (aside from the additional help of other users) which becomes a better tool every time an observation is identified. You may find that uploading a photo of a branch produces sketchy suggestions, but that's all the more reason to be persistent. Even if you discover an identification through other means, such as a field guide, upload your observation regardless. iNaturalist will log the upload for future reference, improving the reliability of this tool for all users.



An important detail is the orientation of the buds on the branch. Notice how these are opposite of each other.

March 2022: identified by iNaturalist users as Red-Berried Elder, which the app did not suggest.

Wildlife can be much easier and more fun to look out for in the Winter landscape, not only because their fur or feathers stand out against the white backdrop and leafless trees, but because they leave behind evidence or make their presence known through sound. In fact, Winter can be the ideal time for tracking wildlife as both their scat and tracks stand out in the snow. There are field guides that help you to identify animals based on these types of evidence, but iNaturalist also accepts evidence as a valid wildlife observation. Whether it's scat or a set of tracks, including something in your photo for scale is extremely useful for identification. Some people use a ruler laid next to the tracks, while your own boot next to it should do the trick as well.



There are two sets of tracks here. Our guess is that set A is a mouse and set B is a bobcat! Note details such as foot placement and the drag line following each print (set B).

Notice how the prints in set A are barely discernable from one another, creating the illusion of a solid line, while the prints in set B are distinct from one another, though sometimes they come close to overlapping. An animal's gait can help determine the identification.

Birdwatching is another great activity for the wintertime. They're easier to see than in other seasons, and often even easier to hear! iNaturalist has a feature where you can upload recordings of bird sounds, but the Merlin app, designed specifically for bird ID, has multiple methods for uploading an observation and is user-friendly. Merlin allows you to ID bird sightings without a photo, asking a few simple questions about the bird. It also has an option to record real-time bird sounds and then suggests a match. As long as you're bundled up, Winter birding can be endless entertainment. There are even events you can take part in, such as the Christmas Bird Count, happening now until January 5th, and the Great Backyard Bird Count which will take place in February. Anyone can contribute to citizen science through these events, which help researchers understand bird migration patterns and species distribution. Challenge your friends to make the bird count even more exciting! And, although we encourage you to spend time outdoors, birding can be done from the comfort of your own home: just look out the window!



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However, if you do choose to immerse yourself in the Winter wonderland outside, we've just received a new order of blue and forest green KWRC hoodies to help keep you warm in your adventures! We also have toques and tees available among other options, so head over to our merch shop at kennebecasisriver.org/shop to browse.

Making time for fresh air in the cold weather can be a chore, but you know you can't beat that feeling of being outside! Giving yourself an activity such as a Bio-Blitz can be great incentive; you'll learn a lot about your surroundings and help to improve ID apps, making them an even more reliable tool for citizen scientists and researchers alike! If you see something in our watershed worth sharing, feel free to tag us or use #worthwadinginto so we can see it, too!

~ Ellen MacGillivray

Education Outreach Coordinator



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