

It's hard to believe that a few short weeks ago, we were still worrying about frost, the challenge of when and what to start growing, the usual spring clean-up of homes and yards, the dreary days interspersed with some absolutely gorgeous days as a tease of things to come. And then this week, like magic, we have heat and humidity, bright sunshine, green, magnificent lush and verdant, leafing out. The daffodils, tulips, and forsythia of early spring are giving way to the blooming lilacs, which are taking their glorious but short turn in the spotlight. The entire village smells and looks stunning. It's at this resurgence of life throughout our peaceful village that we once again turn our attention to our beloved lake and its affluents.

This year our report of the usual observations, we have an opportunity to pose a couple of questions about what is living in our brooks. The two species we wanted to start with are frogs and salamanders. We will then narrow that down to one species of each that are most abundant in our particular watershed.

We are learning how to take the samples of water from each brook and look for environmental DNA (eDNA), we will take two samples one upstream and one closer to the mouth of each brook. We will be able to determine from this environmental DNA (eDNA), with the help of Professor Michael Kinnison and his graduate students from his Evolutionary Applications Lab at the University of Maine, Orono what the species are. The samples sent to the lab will give us results in 6 months.

Our goal is to keep a running tab on the bigger species in the brooks to monitor decline or growth. Next spring, we want to invite people to give suggestions on what species to track with new samples.

Climate change has brought more extreme rain, snow to Maine. The brooks have taken a pounding from this severe weather. For example, Kedar Brook has flooded its banks and completely changed course.

According to the new National Climate Assessment, the number of extreme rain or snow events in the Northeast is up 62%, the largest increase in the nation. Two-inch rain days were up 49% when comparing averages between 1958 and 2022, while 5-inch days were up 102%.

How does Maine stack up? The assessment's conclusions about the Northeast are based on data from 13 states, from Maryland and West Virginia to Maine. It doesn't specify how many heavy rain days any one state within the region has racked up.

An independent review of five long-term weather stations in Maine conducted by the state climatologist, Sean Birkel, shows some of the regional extreme precipitation trends hold true in Maine: The number of 2-, 3-, and 4-inch rain days are increasing.

National Climate Assessment <https://nca2023.globalchange.gov/>

As of April 16, 2024 the US Drought Monitor map shows Maine to be out of drought.

<https://droughtmonitor.unl.edu/CurrentMap.aspx>

For both of these sites reports more in depth please refer to the websites.

### **Kedar Brook**

Since last May Kedar Brook has overflowed its banks below the Struck's house with each major storm. There is now a new channel at the first bend that has been cut straight across to the third bend. There is an increase of a sandy bottom after the third bend and the pools have become quite deep. Due to the intense burst of each storm the brook didn't have time to undercut the banks, rather the water just flooded the land. There isn't any debris constricting the flow of the brook upstream by Charlotte and John's home.

At the mouth of the brook the beaver lodge has gotten bigger with the rise in water level though there isn't much beaver activity noted. The channel leading out into the lake is very deep even for this time of year.

### **Sucker Brook**

Sucker Brook is running very dark with tannin, while this is not unusual for spring, per se, in most pools this year it is difficult to see to the bottom. There is quite a lot of debris from the storms, but water is still flowing, and the extra channels are drying up. Surprisingly, the overflow has not changed any undercuts in the banking. This brook always needs a clean up throughout the year due to trash ending up on the banks or in the brook itself.

### **Johnson Brook**

Starting at the culvert and going up stream past the horse farm the channel has widened considerably since the storms over the winter. Many trees are down but since the water has subsided the trees are not blocking the downflow. Overflow is marked at 20 feet on each side of the brook, very little undercut. I noticed rust colored patches of water this year. This coloring is due to iron-oxidizing bacteria which is not harmful to water quality.

Starting from the culvert going towards the lake there is now a small island that has been carved out from the water. The alders have taken a beating this year, the banks are not undercut. The water is running clear and is deep in some of the channels and I saw fish! There is very little debris on this side of the brook, I'm happy to report the fort remains standing near Charlie's home.

### **Stony Cove Brook**

This year the water is very deep at the mouth of this brook and dark from the tannin as well, which is a normal occurrence on this side of the lake. There are small tributaries this year that are still running. Unless we have another wet summer, they will dry up. Moving up the brook the moss is quite thick and healthy, in the water is a flowing green substance which turns out to be green algae: green algae often look like strands of green hair flowing in the current. Spirogyra is a common green alga. Under a microscope its chloroplasts are clearly seen as spirals.<sup>1</sup> This algae growth has not been observed before. The rest of the brook continues to follow the expected course of disappearing under rocks and trees. One must be careful where stepping moving upstream, as falling into a hole is a real danger.

## **Lenassi Brook**

This year, the water flow is quite high! The boulders at the mouth haven't shifted much, despite the heavy rains. The streambed of most of the brook is sandy and there are numerous frogs this year. Because of the landscape there is some debris in the brook but not enough to impede flow. The pools are deeper than normal at this time of year, again due to the winter storms.

This brook rarely undercuts, the overflow is about 20 feet on both banks.

If the Association would like to learn more about eDNA, Mike Kinnison is willing to come and give a short presentation in July depending on his schedule or perhaps in the fall.

Respectfully submitted,

Kim Struck  
T'ing Doore

### **1. What are algae?**

Algae are simple, aquatic, plant-like organisms that do not have true roots, stems and leaves. Many are single-celled so can only be seen using a microscope, while others grow in filaments or mats that are quite conspicuous. Algae have chlorophyll and can make their own food through the process of photosynthesis.

Although algal growths can often be seen in the water, a microscope is required to appreciate their beauty and complexity.

### **Why are algae important?**

Algae produce oxygen as a waste product of photosynthesis. Cyanobacteria are amongst the most ancient forms of life and they have been contributing oxygen to the world's atmosphere for the last three billion years.

Cyanobacteria are able to fix nitrogen from the atmosphere. All organisms require large amounts of nitrogen for their metabolism and cyanobacteria play an important role in making atmospheric nitrogen available in nutrient cycles.

Algae help to 'purify' water by absorbing nutrients and heavy metals from streams and rivers.

Algae are the basis of most aquatic food webs. They are food for many small aquatic invertebrates, and in turn, these small creatures are food for larger animals such as fish. Algae also provide important habitats for invertebrates and fish.

Without organisms that can capture energy from the sun by photosynthesis, none of the higher organisms would exist.

Algae can be valuable indicators of environmental quality. Many are sensitive to changes in pH, in nutrient levels or in temperature. Monitoring species abundance and composition can be useful to identify changes in water quality caused by changes in surrounding land use.

Where are algae found?

Freshwater algae are found growing underwater on rocks and mud in streams and rivers. They are usually more abundant in slower streams than in fast flowing rivers. Didymo, the exotic pest alga commonly known as 'rock snot', is one of the few species that grow well in swift rivers. However, even didymo cannot withstand turbulent flood waters.

#### **What types of freshwater algae are there?**

The main groups of algae found in streams are the green algae (Chlorophyta), red algae (Rhodophyta), blue-green algae (Cyanobacteria) and diatoms (Bacillariophyta).

**Green algae:** Green algae often look like strands of green hair flowing in the current. Spirogyra is a common green alga. Under a microscope its chloroplasts are clearly seen as spirals.

**Red algae:** Red algae, such as Audouinella, uses a different part of the light spectrum it is able to grow in places where the other algae can't, so tends to be found in shaded places such as under rocks or banks.

**Blue-green algae:** The chlorophyll in the alga Cyanobacteria is not in chloroplasts but diffused throughout the cell. Pigments, other than chlorophyll, contribute to their colouration so cyanobacteria are not usually bright green. Nostoc is another cyanobacteria that is often conspicuous in streams. It looks like bubbles of firm jelly attached to the rocks. The 'bubbles' are masses of small chains of cells. .

**Diatoms:** Mats of brown growth, fluffy masses or slimy layers on rocks are some of the ways diatoms appear to the naked eye. Gomphoneis forms thick, glistening, light-brownish mats on river substances and is often mistaken for didymo. However, didymo has much larger cells and grows in tougher, more fibrous mats.

#### **Can algae be bad?**

Excessive nutrients in runoff from land used for intensive agriculture will alter the natural composition of algae in streams and rivers. If the natural balance is disturbed algal blooms may occur, causing undesirable discolouration, scum and odors and even toxic effects.

Didymo (*Didymosphenia geminata*) is an example of an introduced organism that has grown into unsightly mats over stream and river bottoms. In many places it has out-competed the native algae and destroyed invertebrate and fish habitat. Be fastidious in taking measures to stop the spread of didymo. Follow the simple rules – Check, Clean, Dry – when moving from one waterway to another.

Department of Conservation NZ