

THE FRIENDS OF LAKE WARNER AND THE MILL RIVER

2020 FALL / WINTER NEWSLETTER

Volunteer Profiles

This summer we were lucky to have three young, energetic volunteers at the Friends of Lake Warner. Due to the restrictions on public gatherings, we were unable to hold the public events that usually form the backbone of our summer operations. These volunteers helped us with invasive plant removal, water quality testing, and river cleanup. We would not have been able to accomplish nearly as much without their help. On behalf of the board and membership of the Friends of Lake Warner and the Mill River, our deepest thanks go out to Albert Yue, Nick Bowers, and Sylvie Mahon-Moore. I asked each of them to write a short paragraph about themselves and their experiences this summer. If you see them around, be sure to let them know how much they are appreciated! - Jason Johnson, Executive Director

Hi, I'm Albert. I'm currently majoring in ecology at Simon's Rock College. I grew up a stone's throw away from the Mill River. A lot of good memories have been made there, and I love it dearly. I want to see it clean and healthy enough that other people, and other living things, are able to enjoy it fully. I'm glad to be able to do things with the Friends of Lake Warner for this purpose. I'd never been on the lake before this summer, however. It was absolutely eye-opening to be able to head out and learn about the water chestnut problem. There's something deeply satisfying (albeit exhausting!) about spooling large bunches of them up like spaghetti, and clearing the way for native plant and animal species. Despite its problems, the lake was astonishingly beautiful. It feels great to have the wind rush past your ears and rustle the waves, to hear the dragonflies buzzing around, to see herons taking off in front of you...I hope that more people, especially young people, will get involved in citizen science and conservation work, so that this great, underappreciated tributary of ours might eventually get the reverence it deserves.



From top, left to right: Sylvie pulls water chestnut in the upper lake, Albert standing next to a water chestnut harvest, Nick and Albert pulling water chestnut from a canoe, Nick and Albert scouting for garbage in the Mill River.

My name is Nick Bowers, I'm a junior in the Natural Resource Conservation program at UMASS Amherst. Working on Lake Warner and the Mill River has been a highly educational experience for me. I've learned a great deal about not only the Mill River watershed, but also general lake ecology and how certain features of the lake can exacerbate themselves into larger problems down the road. Specifically working with Jason has been great. He is a fantastic teacher as well as a fantastic steward to the lake and watershed. I'd highly encourage anyone in the area who is interested in getting involved with watershed monitoring to contact the Friends of Lake Warner and get involved with Jason's work. It's a fantastic learning experience for anyone, even if you just enjoy being on the water. Come help keep Lake Warner healthy and beautiful!



In This Issue

Volunteer Profiles.....	1-2
Climate Change	2-3
Source to Sea clean up	3
Water Chestnut.....	3-4
e. Coli.....	4
Cyanobacteria	4
Nutrients.....	4
Wildlife Profile.....	5-6
Black Crowned Heron	6
Tribute to Tributaries	6-7
In Memoriam	8
Poem by Wendell Berry	8
Donors List.....	8
Membership Form.....	8

FoLW Annual Board Meeting

January 5, 2021 from 6-9:00 p.m.
To request a Zoom invitation email
friendsoflakewarner@gmail.com

HOW TO DONATE TO FOLW

Mail donations to:
The Friends of Lake Warner
P.O. Box 11 Hadley, MA 01035

Donate at our website:
<http://friendsoflakewarner.org/donate/>

Venmo
donations
using this
QR code.



My name is Sylvie Mahon-Moore. I am a junior at Hampshire Regional High School. Before graduating, we are required to fulfill 30 hours of community service. Luckily for me I was able to take part in water chestnut pulling at Lake Warner with Jason Johnson, who happens to be my step-dad. I was happy to spend my 30 hours on the lake pulling invasive plants from the water's depths. We would push off from the bank and sail across the lake in search of our pesky prey. The work was tough. The summer sun beat down on our backs as we paddled across weeds and filled our buckets with heavy, prickly plants. Sometimes we worked with other volunteers. One time I was pulling from a canoe with Heidi Stevens, an energetic friend with a sunny outlook on mornings spent in the muck. We enjoyed talking while scouting for plants and uprooting them with ease. We got carried away with our job so much that both of us reached toward some clump of plants and flipped our canoe into the water. We frantically screamed for help, finally getting the canoe right side up. With all the adventures that came along with pulling invasive plants, community service became more than just hours I needed to get done before graduation. It was a learning experience, physically challenging, and one part of my day I could talk about months later. All that environmental work gave me a sense of accomplishment, when I realized I was essentially "saving" a lake. Being outside in the mud and plants, I felt like it was still thriving despite our climate crisis. Thank you to all the other Lake Warner volunteers who got out there and pulled water chestnut with me over the last two years. I really enjoyed this experience. This experience inspired me to possibly pursue a college degree in outdoor leadership.

Climatic Change-Floods, Droughts, the New Normal

by Jason Johnson

"Climate change and global warming are coming" we've been hearing about it for years. Guess what folks? It's here already. The Commonwealth has warmed by more than two degrees (F) in the last century. Throughout the northeastern United States, spring is arriving earlier and bringing more precipitation, heavy rainstorms are more frequent, and summers are hotter and drier. Sea level is rising, and severe storms increasingly cause floods that damage property and infrastructure. In the coming decades, the changing climate is likely to increase flooding, harm ecosystems, disrupt fishing and farming, and increase some risks to human health. Rising temperatures and shifting rainfall patterns are likely to increase the intensity of both floods and droughts. Average annual precipitation in the Northeast increased 10 percent from 1895 to 2011, and precipitation from extremely heavy storms has increased 70 percent since 1958. During the next century, average annual precipitation and the frequency of heavy downpours are likely to keep rising. Average precipitation is likely to increase during winter and spring, but not change significantly during summer and fall. Rising temperatures will melt snow earlier in spring and increase evaporation, thereby drying the soil during summer and fall. So flooding is likely to be worse during winter and spring, and droughts worse during summer and fall.

Massachusetts has been in the lead as far as preparing for and responding to climate change. The Massachusetts Climate Change Clearinghouse (<https://resilientma.org/>) is a gateway for policymakers, local planners and the public to identify and access

climate data, maps, websites, tools, and documents relevant to climate change adaptation and mitigation across Massachusetts. The goal of the website is to support scientifically sound and cost-effective decision-making and to enable users to plan and prepare for climate change impacts. The vision is a dynamic site where users can find information in multiple ways, including through interactive tools that use data from different sources.

State and local planners that are addressing climate change consistently reported that data and information is plentiful, but the task of locating and sorting through information about vulnerabilities, as well as developing, researching and assessing mitigation and adaptation strategies, was often difficult and time consuming.

Offering curated documents, data, websites, tools and maps in an online repository lessens the burden on individual municipalities and businesses. It helps people make decisions about what information is credible and promotes joint planning and information sharing. The customizable data and map products are meant to ease the job of the local planner in analyzing information, making and implementing plans, and educating the public.

The Commonwealth has also moved forward on several fronts to address the potential impacts from climate change. The State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) for the Commonwealth was adopted on September 17, 2018. The Municipal Vulnerability Preparedness grant program (MVP) provides support for cities and towns in Massachusetts to begin the process of planning for climate change resiliency and implementing priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. Communities who complete the MVP program become certified as an MVP community and are eligible for MVP Action grant funding and other opportunities.

The Green Communities Division provides funding opportunities to reduce municipal energy use and costs by way of clean energy projects in municipal buildings, facilities and schools. In addition, it provides guidance, technical assistance and local support from Regional Coordinators. Furthermore, it provides education on the benefits of clean, affordable, resilient energy and renewable energy projects.

The Town of Hadley received a planning grant through the State's Municipal Vulnerability Preparedness Program (MVP) to compile data for, and conduct, a Community Resiliency Building (CRB) workshop. The full-day CRB workshop was held on January 7th, 2020. The goal of the CRB workshop was to have community stakeholders work collaboratively to complete a climate change and natural hazard vulnerability assessment. They developed prioritized actions to address vulnerabilities and improve strengths throughout town. Upon completion of the CRB workshop report, Hadley will become an "MVP Community" and will be eligible to apply for MVP Action Grant funding from the Commonwealth to implement prioritized actions. A copy of the draft final report summarizing workshop findings can be accessed at:

https://www.hadleyma.org/sites/g/files/vyhlf651/f/uploads/hadley_mvp_final_draft_report_02.14.2020_withappendices.pdf

A recorded presentation summarizing findings has also been posted by Hadley Media at:

<https://www.youtube.com/watch?v=dzFuBjntrU&t=185s>

Members of the general public are encouraged to review materials at:

https://www.hadleyma.org/sites/g/files/vyhlif651/f/uploads/hadley_mvp_listening_session_03.19.2020.pdf

Source to Sea Clean-up by Kevin Skelly

Volunteers coordinated by FoLW Director Jason Johnson took part in The Connecticut River Conservancy's Source to Sea clean-up efforts in September. The FoLW volunteers covered parts of the Mill River roughly between Puffton Village Apartments in North Amherst, and the athletic fields behind the UMass Mullins Center.

I met Jason in the back of the UMass parking lot on a comfortable, sunny Saturday morning, and was paired up with a wonderful young man named Albert who studies Ecology at Simon's Rock. We plunged into the woods and down to the river, where we began walking, right up the middle of the stream. I was wearing water moccasins and shorts, Albert, wisely, was in hip waders.

The going was easy at first. Mostly shallow, with a firm bottom, and very little litter. As we proceeded, there were spots where we – particularly me, handicapped with inadequate gear – had to leave the stream to get around deep spots. It was pretty rough up there along the shore. Dense, with lots of wild raspberry and other pricklers. And a little litter here and there to add to the bag.

Further along, the water got deeper and the bottom softer. Along the sides, the brush grew thicker as well. Finally, we arrived at a "sweeper," a fallen tree with its branches in the river, sweeping the flotsam up in front of itself. We had plenty to start filling up the bags now. A little further along, a half-buried tire. Then, another sweeper. This was the mother lode, here at the end. We didn't exactly know where that was though.

We were right along North Hadley Road between the 116-exit ramp and North Maple Street, but we couldn't see an easy way out. Ultimately, we had to thrash our way out of there to meet Jason with his truck. That stretch is frequently strewn with litter, which provided us with an opportunity to top off our bags.

Lots of cans, bottles and various packaging for the most part. A football. A Timex watch. It wasn't ticking. And a tire. There were more tires actually, that the other teams discovered and we're now working on getting them out of there. I would recommend this activity to anyone who feels the calling to see a cleaner, healthier environment. Just get a pair of waders.

As you're down there, not just cleaning up, but bearing witness to the refuse of our excess, and sharing your thoughts and observations with your clean-up partner, you see the things that go unseen in our everyday lives. The section we were working on cuts right across my commute to work for the last twenty years, and it was hard to tell where we were.

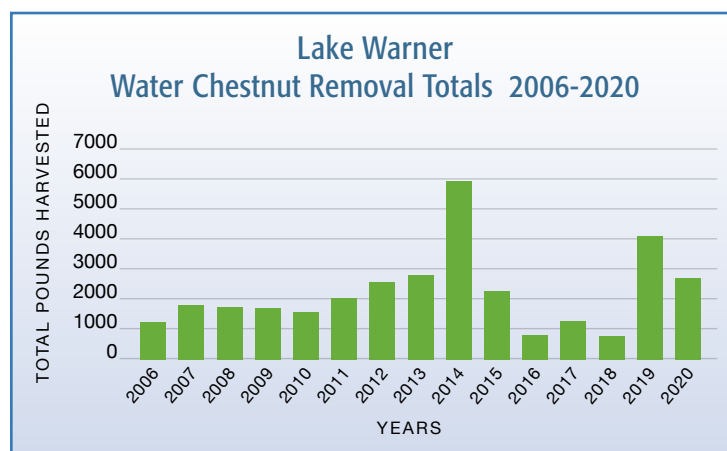
Amidst the pricklers and vines, one can see the remains of a fence that maybe separated the university land from the river. Another thirty feet or so is another, newer, but once again buried fence, lost in the pricklers. My take on this is that we have assiduously turned our backs over the decades, to these bodies of water. We thereby turned

them into dumps. The Connecticut River Conservancy has had such remarkable results by calling upon us to turn our faces towards the river, and to address its needs. How rewarded our community has been by these efforts in quality of life and improved health!

In our work at Friends of Lake Warner, we support this work, and extend it up the tributaries.

Water Chestnut Removal Efforts by Jason Johnson

This is the 6th year the Friends of Lake Warner have been fully responsible for the management of the water chestnut infestation at Lake Warner. Since being first identified in the Lake in 2002, the Conte Refuge Invasive Plant Program led by Cynthia Boettner led a heroic effort at Lake Warner and many other sites throughout the Connecticut River watershed using volunteers and the Youth Conservation Corps. What started at Lake Warner 1-3 times a season has morphed into a scouting and removal effort that has taken up to 200 hours a summer. Since FoLW took over the program in 2014, several advances have been made that increased efficiency and reduced the amount of time needed to effectively clear the lake of plants. Most of these advances have been made possible through the use of a Jon Boat equipped with a mud motor that enabled us to scout the entire lake more quickly than in canoes or kayaks. Utilizing the Jon boat has also enabled us to haul more plants, enabling other volunteers to continue to pull plants while the boat operator barges plants to shore. We have also gotten more efficient by using an "early and often" technique, trying to identify and pull plants before they get larger and heavier.



After six years we have learned a lot. This plant is tenacious and persistent, the seeds can persist in the substrate for up to twelve years, each rosette can produce up to 20 viable nuts, and it only takes 5 percent of the population going to seed to completely replicate the standing crop from the previous year. So, are we winning, losing or breaking even? It is hard to tell. Below is a graph of total pounds removed over the last 18 years. (Keep in mind that weights were estimated until 2015 when we started weighing all the plants removed or weighing subsamples of each effort and estimating by number of rosettes.) The average amount of weight pulled is close to the amount pulled this year. Even though it's half as much as when management efforts started, and nearly a third less than the highest amount pulled in 2014, we still are not able to consistently reduce numbers to the point where we may look forward to complete eradication.

Also, while the number of hours required to scout and pull the plants has gone down from its peak, it still is taking a similar number of hours to remove 800 lbs. as it is 2,800 lbs. This seemed improbable to me when I noticed it, compared with the effort at Fitzgerald Lake who spent just about the same amount of time to collect 178 lbs. as we did 2,700 lbs. This is due to the range and diversity of where we find plants, and the fact that germination times are spread out through the entire season from late May-August. So even if you harvest plants younger that weigh less, you still have to be looking for new ones late in the season. If you find a well-hidden patch that you missed early in the season, you can be assured that your weight totals are going to go up as well as your total plant count. This happened to us late this summer, where one large patch, well hidden in the reeds in the upper lake produced an astounding 2,113 plants. This was nearly a seventh of the plants and twenty percent of the total weight collected throughout the lake during the rest of the summer. Needless to say, this is an ongoing battle and the effort is not nearly over. What we do know with certainty is that if the FoLW had not removed the 18,000 pounds of water chestnut representing over 60,000 plants and up to 1,200,000 seeds from the lake over the last 6 years, the lake ecosystem would be completely overwhelmed and dominated by this plant species.

The Connecticut River Conservancy has made an excellent effort to consolidate useful information, coordinate volunteers, advertise public pulls and document efforts to control water chestnut. Our total of 2,710 lbs. this year, representing 14,000 individual plants, is roughly 9 percent of all the plants harvested in the Connecticut River Watershed this year.

E. coli bacteria monitoring results

The Friends of Lake Warner collected E. coli bacteria samples from the Main Stem of the Mill River above the lake inlet and at the Lake Warner boat ramp, bi-weekly between mid-June and mid-October. E. coli bacteria can cause illness and the state has established standards in recreational waters to protect user health and safety. This year's effort was in collaboration with the Hadley Board of Health,

the samples were analyzed at the Amherst Wastewater Treatment Plant laboratory. E. coli levels in the lake were low this year, most likely due to low levels of precipitation and runoff. Lake levels only exceeded the recreational health threshold of 225CFU/100mL once between mid-June and mid- October. However, E. coli bacteria levels remain very high in the Mill River above the inlet of the lake. The river levels exceeded the recreational health and safety level for the entire duration of sampling period.

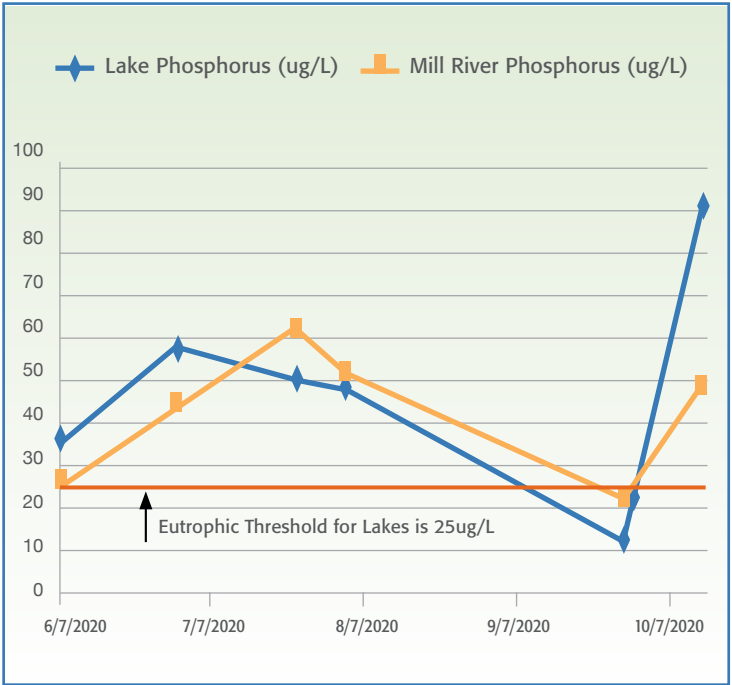
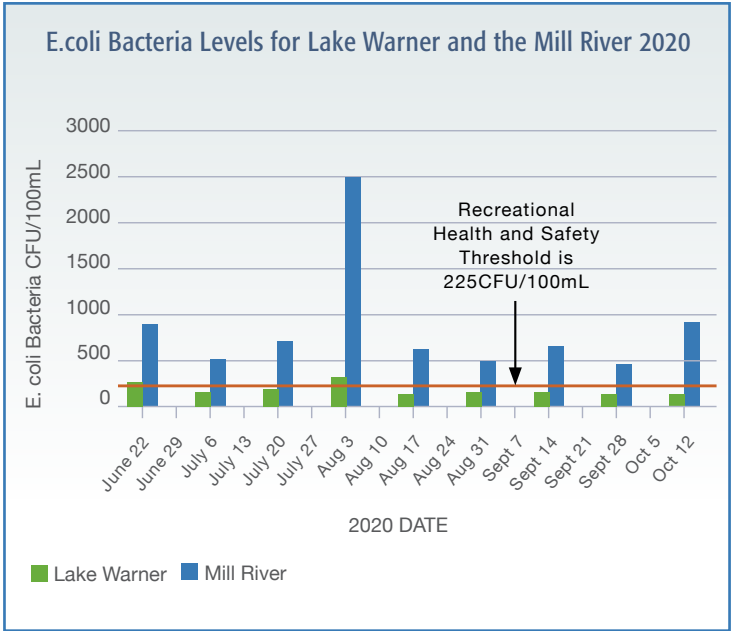
Cyanobacteria advisory and testing results

Following the cyanobacteria advisory placed on Lake Warner in August by the Hadley Department of Health, the lake was posted to notify users of the potential presence of harmful algal blooms in the lake. The Hadley Department of Health provided the Friends of Lake Warner with testing kits, to be used once visible signs of algal blooms had passed.

The test is for the presence of cyanobacteria, it does not determine the species or concentration of cyanobacteria cells. The test kits are made by a company called Salofa, which is based in Finland. The test is conducted by submerging a testing vial in a bucket of lake water for 15 seconds. There is then a chemical reaction in the vial which heats the sample up; the sample “cooks” for 10-15 minutes, is drawn by pipette from the vial, and three drops are placed onto a slide. After waiting for 8 minutes, the results are indicated by two lines (positive), one line (negative), or no lines (test failure). For our sample, one line was clearly displayed. Two tests were made in October, one in the mid-lake area and one in the upper cove. The results were negative for presence of cyanobacteria.

Nutrient Levels

Nutrients in the river and lake are slightly lower this year. This is likely due to the low level of rainfall received this year and subsequent reduced runoff. Below is a graph of phosphorus levels in the Mill River and Lake Warner.



Wildlife Profile

Information provided by the Canadian Wildlife Federation

The muskrat (*Ondatra zibethicus*) is a fairly large rodent commonly found in the wetlands and waterways of North America. It has a rotund, paunchy appearance. The entire body, with the exception of the tail and feet, is covered with a rich, waterproof layer of fur. The short underfur is dense and silky, while the longer guard hairs are coarser and glossy. The color ranges from dark brown on the head and back to a light greyish-brown on the belly. A full-grown animal weighs on the average about 1 kg but this varies considerably in various parts of North America. The length of the body from the tip of the nose to the end of the tail is usually about 50 cm. The tail is slender, flattened vertically and up to about 25 cm long. It is covered with a scaly skin that protects it from physical damage.

Only a minimal amount of hair grows on the feet. The hand-like front feet are used in building lodges, holding food, and digging burrows and channels. Although the larger hind feet are used in swimming, they are not webbed like those of the beaver and otter. Instead, the four long toes of each foot have a fringe of specialized hairs along each side, giving the foot a paddle-like effect. The rather small ears are usually completely hidden by the long fur. The four chisel-like front teeth (two upper and two lower incisors), each up to 2 cm long, are used in cutting stems and roots of plants.

The muskrat's name is derived from the fact that the animal has two special musk glands—also called anal glands—situated beneath the skin in the region of the anus. These glands enlarge during the



breeding season and produce a yellowish, musky-smelling substance that is deposited at stations along travel routes used by muskrats. Common sites of deposition are “toilets,” bases of lodges, and conspicuous points of land. The biology of musk glands has not been studied extensively, but the odor produced is believed to be a means of communication among muskrats, particularly during the breeding season.

Muskrats typically live in freshwater marshes, marshy areas of lakes, and slow-moving streams. The water must be deep enough so that it will not freeze to the bottom during the winter, but shallow enough to permit growth of aquatic vegetation—ideally between 1 and 2 m. Areas with good growths of bulrushes, cattails, pondweeds, or sedges are preferred.

Compact mounds of partially dried and decayed plant material can frequently be seen scattered among the cattails and bulrushes. These

dead-looking heaps are homes of the muskrat. Bulrushes and cattails are most important, particularly in lakes. As well as being eaten, they are used as building material in the construction of lodges and feeding stations, and as shelter from winds and wave action. In northern regions, horsetails can be important in muskrat habitat.

If bulrushes or cattails are not available, muskrats dig burrows in firm banks of mossy soil or clay. Because muskrats require easy access to deep water, water depths must increase fairly rapidly from the shore where burrows are situated. This provides muskrats with an opportunity to escape from predators, and with a food supply under the ice during the winter.

Some people refer to muskrats as “house rats” and “bank rats” because the animals build lodges in certain areas and bank burrows in others. Often, these names are used in a way that suggests that these two “types” of muskrats possess inherited biological differences. This is not the case. The type of habitation used is simply a response to local conditions.

With the shortening of days and the coming of colder weather in September, preparations for winter begin. The fall is spent building and reinforcing lodges for winter occupancy, and, in some regions, storing food for winter use. Lodge building behavior is an extremely important aspect of the ecology of muskrats. The lodge permits them to live in areas surrounded by water, far away from dry land. It protects them from enemies and gives them shelter from the weather.

A muskrat builds a lodge by first heaping plant material and mud to form a mound. A burrow is then dug into the mound from below the water level, and a chamber is fashioned at the core of the mound. Later, the walls of the lodge are reinforced from the outside with more plants and mud. A simple lodge of this type is about 0.5 to 1 m high and 0.5 to 1 m in diameter. It contains only one chamber and has one or two plunge holes, or exit burrows. More complex lodges, containing several separate chambers and plunge holes, may be up to 1.5 m high and 1.8 m in diameter.

Shortly after freeze-up, muskrats chew holes through the ice in bays and channels up to 90 m away from the lodge to create “push-ups.” After an opening has been created, plant material and mud are used to make a roof over it, resulting in a miniature lodge. Typically there is just enough room for one muskrat in the push-up. It is used as a resting place during underwater forays, and as a feeding station.

The winter is a period of relative inactivity. The muskrat is safe from the cold and from most predators. It spends most of its time sleeping and feeding until breeding activities begin after spring break-up.

The muskrat is well adapted to a semi-aquatic life style. Although fully functional on land, it has evolved characteristics that make it at home in the water. At three weeks of age it is a capable swimmer and diver. As an adult, it swims effortlessly and can do so for long periods of time. This ability is greatly facilitated by the buoyant qualities of the thick waterproof fur. When swimming on the surface, the muskrat tucks its front feet slightly forward against the upper chest while using the back feet in alternate strokes to propel the body. The tail is used at most as a rudder. When the muskrat is swimming under water, however, the sculling action of the tail probably provides as much propulsive force as do the hind feet.

In the late evening during ice-free periods of the year, muskrats can be seen swimming, sitting at feeding stations such as logs or points of land, and busily improving lodges.

Although the muskrat builds lodges near the water and is an accomplished swimmer, it is not a close relative of the beaver, as is sometimes thought. Nor is it a true rat. Instead, it is basically a large field mouse that has adapted to life in and around water.

The muskrat, together with the beaver and several other mammals, is capable of remaining submerged up to 15 minutes if in a relaxed state. Non-aquatic mammals cannot do this because they need a constant supply of oxygen and must continually expel carbon dioxide. The muskrat is able to partially overcome this problem by reducing its heart rate and relaxing its muscles when submerged; this reduces the rate at which oxygen is used. Also, it stores a supply of oxygen in its muscles for use during a dive and is less sensitive to high carbon dioxide levels in the blood than are non-diving mammals. This ability for extended dives is important in escaping enemies, digging channels and burrows, cutting submerged stems and roots, and travelling long distances under the ice.

The muskrat's front teeth are especially modified for underwater chewing. Non-aquatic mammals such as dogs or humans would have great difficulty in trying to chew on a large object under water, because water would enter the mouth, throat, and nasal passages. This problem has been overcome in the muskrat through the evolution of incisors, or cutting teeth, that protrude ahead of the cheeks and of lips that can close behind the teeth. This adaptation permits the muskrat (and the beaver) to chew on stems and roots under water "with its mouth closed."

Black Crowned Night Heron

Information provided by the Cornell Lab of Ornithology

This Spring Lake Warner was visited by at least one Black Crowned Night Heron, this did not cause quite as much of a stir as last year's visit by a Yellow Crowned Night Heron but was nonetheless exciting for local birders and lake users.

Black-crowned Night-Herons are stocky birds compared to many of their long-limbed heron relatives. They're most active at night or at dusk, when you may see their ghostly forms flapping out from daytime roosts to forage in wetlands. In the light of day adults are striking in gray-and-black plumage and long white head plumes.



These social birds breed in colonies of stick nests usually built over water. They live in fresh, salt, and brackish wetlands and are the most widespread heron in the world.

Black-crowned Night-Herons are small herons with rather squat, thick proportions. They have thick necks, large, flat heads, and heavy, pointed bills. The legs are short and, in flight, barely reach the end of the tail. The wings are broad and rounded.

Adults are light-gray birds with a neatly defined black back and black crown. Immatures are brown with large white spots on the wings and blurry streaks on the underparts. Adults have all-black bills; immatures have yellow-and-black bills.

Interesting Facts

Scientists find it easy, if a bit smelly and messy, to study the diet of young Black-crowned Night-Herons—the nestlings often disgorge their stomach contents when approached.

Black-crowned Night Heron nest in groups that often include other species, including herons, egrets, and ibises.

A breeding Black-crowned Night-Heron will brood any chick that is placed in its nest. The herons apparently don't distinguish between their own offspring and nestlings from other parents.

Young Black-crowned Night-Herons leave the nest at the age of 1 month but cannot fly until they are 6 weeks old. They move through the vegetation on foot, joining up in foraging flocks at night.

The oldest Black-crowned Night-Heron on record was a female who was at least 21 years, 5 months old.

A Tribute to Tributaries and the Mill River

by Michele Morris-Friedman

While Lake Warner is the obvious and most visible focus of our group, our official name is Friends of Lake Warner and the Mill River. That attention to the source of Lake Warner is intentional. We cannot have a healthy lake if the Mill River and its tributaries do not have healthy water. Testing the water in the tributaries has been an integral part of FoLW's lake monitoring activities for years, as has working with UMASS, the Town of Amherst, and the Hampshire Hampden Conservation District and other groups to pinpoint sources of excess nutrients and harmful pathogens.

With most leaves off the trees and winter cover crops blanketing the fields, late fall and winter offer a great opportunity to trace the streams, brooks and rivers that feed the lake. The presence of water is evident in the landscape, marked by lines of trees along the banks of streams and lush vegetation flanking wet ditches.

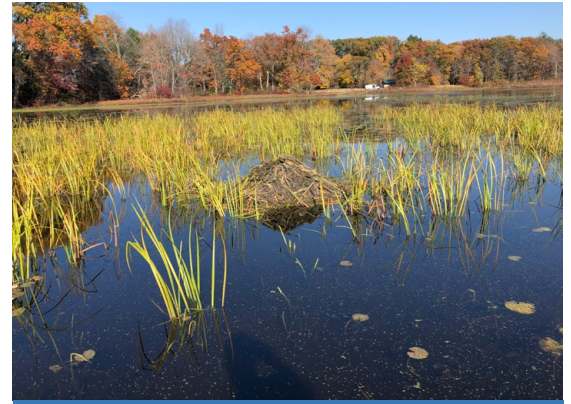
There are vantage points to view the sources of Lake Warner that are especially accessible. One is at the Mill River in North Hadley. The river flows through the Kelley farm paralleling North Hadley Road and passes under a culvert bridge at Roosevelt Street. If one heads west and then north on Mill Site Road there is a good view of the river from the site of the abutment of the former bridge (at Mill Site Road.) (That bridge was removed in the 1980s after a state study found it to be structurally deficient.) The area surrounding the abutment, and the one surrounding the abutment across the river on the other end of Mill Site Road, are favorite fishing spots in the spring.



Dolittle Brook, Leverett



Mill River, Hadley



Muskrat Den, Lake Warner

Studying the surrounding wetlands at Mill Site Road reveals a natural record of recent weather. If the rains have been abundant and prolonged, water will extend beyond the usual banks and will sometimes display strong currents in the normally placid swamp areas. (If one lives in the neighborhood, as I do, this is a time to check one's basement for dampness.) In times of drought one might see steep river banks and irrigation pipes drawing from this section of the Mill River to keep the nearby crops going.

The Podick and Katherine Cole Conservation Areas, accessible off of Route 116 and owned by the Kestrel Land Trust, offer nice views of two streams that drain into Swamp Brook, which itself drains into the Mill River just southeast of the intersection of Meadow Street and Russellville Road in Amherst. The trails there are good for walking and cross-country skiing.

Another easily accessed branch of the Mill River is on the trail in the Mill River Conservation Area between Puffer's Pond and the Mill River Recreation Area. From the trail one can see portions of the river before it crosses under bridges on Routes 63 and 116 and heads south crossing Meadow Street near Route 116. To the east and north of the pond there is an accessible trail that affords views of Cushman Brook. Haskins Meadow Conservation Area on East Leverett Road in Amherst also offers views of Cushman Brook; it does not have trails but is open to the public and walkable.

Other conservation areas are also prime spots for viewing the Mill River tributaries. The Teawaddle Farm Conservation Area in Leverett has beautiful trails through a variety of habitats. Doolittle Brook runs through it and is joined by Roaring Brook near Teawaddle Road before heading south and emptying into Cushman Brook. Eastman Brook is easily spotted at the Eastman Brook Conservation Area and also the Cherry Hill golf course in Amherst.

Of course, not all viewpoints of the Mill River tributaries are in conservation areas or scenic spots.

Horsefarm Brook begins in back of the Cinemark and winds by the USFWS headquarters before crossing Route 9. You can see it again at the Alexandra Dawson Conservation Area before it approaches the Hadley Farm. It eventually crosses N. Hadley Road and enters the Mill River across from Full of Grace Farm.

Horsefarm Brook is not visible where it crosses Route 9 because it runs under the road there. It is an interesting task to track where the tributaries go underground and where they reemerge. For example,

several small and mostly channelized streams run from North Amherst through high-density student housing and stormwater systems before entering the Main Stem Mill River between Pine street and UMASS. (This is the area that FoLW worked on for the Source-to-Sea cleanup this past September.) Tan Brook originates near the Amherst Cemetery and flows next to the high school before passing through a culvert under a large portion of downtown Amherst. It reemerges in between urban homes before going subsurface again where it splits into two branches. One branch feeds the campus pond, reemerging by the Lot 12 parking lot by the Heating Plant where it joins the Mill River; the other branch exits a pipe at Massachusetts avenue and Commonwealth avenue, flowing by the athletic fields and entering a wetland system by the wastewater treatment plant before entering the Mill River.

Taking the time to notice the waterways that feed the lake and keep our fields and forests green can transform how we think about our place in the ecosystem. Even when hidden from view, these tributaries are essential to our region's wellbeing. And the knowledge that "a river runs through it" can make a walk through the UMass campus or downtown Amherst feel rooted in both the built environment and the ancient geology that undergirds it.

Please feel free to write to us with your favorite tributary and river spots!

Links to Mill River Conservation Area Maps

<https://www.kestrreltrust.org/wp-content/uploads/2018/11/KLT-Trails-10-Podick-Katherine-Cole-v1.pdf>

<https://www.kestrreltrust.org/places/teawaddle-hill-farm/millriverconservationarea>

<https://www.google.com/maps/place/Katherine+Cole+Conservation+Area,+Amherst,+MA+01002/@42.4094986,-72.5413485,15z/data=!4m5!3m4!1s0x89e6d2937d3b8e4b:0xe9d43a6c1e67fb95!8m2!3d42.4186995!4d-72.5434051>

<https://www.google.com/maps/search/north+amherst+ma+map+gis/@42.4327141,-72.4978727,16z>

<https://www.mass-trails.org/towns/Amherst/haskinsmeadowconservationarea.html>

<https://www.amherstma.gov/DocumentCenter/View/3566/Mill-River-Area-Map-5-Amherst-Open-Space-and-Trai?bidId=>

In Memoriam

The North Hadley community lost two long-time residents recently, Margaret Freeman and Martha Boisvert. They were early and strong supporters of the Friends of Lake Warner and will be sorely missed. Margaret Freeman served on the Hadley Historical Commission during the negotiations around the future of the dam. She was always strongly in favor of preservation and helped review the historic preservation restrictions for the dam and of the lake as a historic landscape. Her husband Jim was a founding board member of the Friends of Lake Warner.



Martha Boisvert and
Margaret Freeman, 1979

Martha Boisvert and her husband John, took over ownership of Warner Dam in 1970, maintaining ownership until sale to the Valley Land Fund in 1996. She was always interested in the preservation of the dam and lake, respecting its place in the village history and did not want to see this special area developed. We would like to recognize and remember these two strong women in our community, who helped us get started and continued to support us for many years.

The Peace of Wild Things

When despair for the world grows in me
and I wake in the night at the least sound
in fear of what my life and my children's lives may be,
I go and lie down where the wood drake
rests in his beauty on the water, and the great heron feeds.
I come into the peace of wild things
who do not tax their lives with forethought
of grief. I come into the presence of still water.
And I feel above me the day-blind stars
waiting with their light. For a time
I rest in the grace of the world, and am free.

by Wendell Berry

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accomplish what we do without you.



Please Join The Friends of Lake Warner and The Mill River. We Need You!

We are a non-profit, citizen community organization. • Members receive a bi-annual newsletter. • Members are invited to participate in our activities, workdays and social events. • Your tax-deductible dues support our efforts to preserve, clean and maintain our lake. • Your dues also support the printing cost of our brochures and newsletters.

I want to join

☐ Individual membership - \$25 ☐ Family membership - \$35 ☐ Sustaining membership - \$100

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