



Chocorua Lake Conservancy

FALL 2022/WINTER 2023 NEWSLETTER



Barbara and Dwight Baldwin out in their canoe on Chocorua Lake. | *Alex Moot*

Chocorua Lake Conservancy honors Dwight and Barbara Baldwin for their lengthy service protecting water quality at Chocorua Lake

BY ARTHUR BALDWIN

Another bright, beautiful, blue-sky, summer day with warm temperatures and the prospect of getting out on Chocorua Lake sounds great! Unless you're a young teenager being asked to come along and help out again with collecting water samples, and then the idea of playing tennis, swimming, hiking, or even mowing the grass sounds like much more fun. Lake

monitoring, however, was the task at hand, and I would make my way to the water, first with my grandfather, Arthur Baldwin, Sr., and then in later years with my father Dwight. We would paddle out, line up three points on the shore that let us know we were at the deepest point in the lake, lower the anchor, and spend the next 45 minutes collecting samples and data. While my 14-year-old self didn't appreciate it then,

looking back with more than a few years behind me I realize that on each of those early mornings on the lake, a connection was being woven and strengthened between me and my father, as well as the development of a deeper appreciation and love for the Chocorua Lake Basin.

As my grandfather gradually reduced his participation, my mother Barbara became my father's water

quality monitoring partner. For more than two decades now, Dwight and Barbara have headed out in their canoe onto Chocorua Lake on more than 10 clear mornings each year to collect water samples and bring them home to test, before sending the samples and data to the University of New Hampshire as part of its New Hampshire Lakes Lay Monitoring Program. These consistent water samplings contribute to Chocorua Lake's status as the second longest uninterrupted record of water quality measurement in the State of New Hampshire.

Because of Barbara and Dwight's continued efforts, as well as those before them (including Toby Page and Arthur Baldwin, Sr., among others), the CLC has been a recipient of the Carroll County Conservation District Conservation Award of the Year, and the North American Lake Management Society Technical Excellence Award. Results from the CLC water sampling program have inspired actions that have been recognized as "best management practices" throughout New England, whether through the implementation of berms and swales, the management of logging impacts, or prevention of shoreline erosion in the CLC's public access areas along the lake.

Dwight says that water testing "is a good reason to get out on the water and feel that we're doing something worthwhile." That this activity would be appealing to Dwight is no surprise since he is a career water resources and hydrogeology (the study of groundwater) expert. Dwight is a Miami University, Oxford, Ohio, Emeritus Professor and former chair of the Geology Department, where he taught for nearly 30 years.

The CLC honored Dwight and Barbara at their 2022 Annual Meeting in August, expressing their gratitude to Barbara and Dwight Baldwin for their decades of commitment to the important job of monitoring Chocorua Lake water quality. This summer Dwight and Barbara began teaching others how to do this task and in late July delivered the water sampling equipment to the Moots, who with other volunteers will lead the



From top: Dwight teaching a group of volunteers how to take water samples from the lake; testing lake water for a variety of parameters before sending samples and data to UNH. | Alex Moot

effort going forward.

Dwight and Barbara's commitment and dedication is an important part of ensuring a clean, healthy Chocorua Lake so we can all continue to enjoy clean, swimmable water, excellent fishing, quiet shorelines, and a home for beavers, eagles, turtles, and loons. Thank you, Dwight and Barbara!

Arthur Baldwin has been part of the Chocorua Lake community for his whole life, visiting through the years with his grandparents, parents and siblings, and his immediate family. His wife, Melissa, and their three daughters all enjoy Chocorua's recreation opportunities and reconnecting with extended family. Melissa has been a member of the CLC Board of Directors since 2015.

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“Land trusts are like water, seeping into special places, vivifying the land. Conservation is a generational affair. We build on the passions of those who went before us.”

—Terry Tempest Williams

Q&A with new Stewardship Director Debra Marnich

A favorite outdoor memory from childhood? Canoeing and fishing in the Pine Barrens of New Jersey (a globally rare habitat) with my family.

Something you learned in college that you've never forgotten? Be frugal.

Something you learned in grad school that you've never forgotten? Be frugal!

Some places you feel really at home? Outside, in the woods, on the water, with my family, pup, and friends.

A favorite moment with an other-than-human animal? An encounter with a female bobcat and her two kittens. They were just as curious about me as I was about them. I watched the kittens lovingly interact with their Mom and romp about playfully. Curiosity allowed us to share five beautiful minutes together, which seemed like a wonderful eternity.

A favorite moment with an other-than-human plant or tree? Encounter with the largest American Chestnut tree I have ever seen, with huge chestnuts on it that looked like

spiny sea urchins (in Maine).

Best piece of advice? Keep it simple.

What's your motto? Be kind.

Secret art project? No secret projects, but I do have a passion for photography.

If you could invite anyone, real or imaginary, dead or alive, over for a meal, who would it be, and what would you serve? [English primatologist] Jane Goodall, for sure. I'd serve something from the garden or foraged.

If you could sing a song with anyone, real or imaginary, dead or alive, who would it be, and what song? John Lennon, *Imagine* (but I'm not sure I could hit the high notes like him).

Coffee or tea? Yes please, both are great.

Sweet or salty? Yes please, depending on the mood.

Dance party or roller rink? Yes please! Disco dance party at the roller rink! Both are celebrated childhood memories that I'll never forget.

What's next? Continue the amazing journey.

EDITOR'S NOTE

It takes a village, because everything is connected

The original theme for the Fall 2022/Winter 2023 newsletter was "It Takes a Village." This issue highlights work being done, often behind the scenes, by *many* people and organizations, to care for land and water and their inhabitants in this bioregion. None of us could do this work alone.

As the articles came in, a larger theme emerged: "Everything is Connected." We humans are connected to each other and to the land by our care for this place, and through the time we spend together volunteering, working side by side outdoors, learning about the natural world, and sharing ideas for best practices. Connected corridors of conservation land create space for animals to roam and breed. The humble magic of logs in a stream helps create cool shady pools for trout. And, and it's a *big* and, all of us—humans, birds and insects and animals, fungi, plants and trees, streams and rivers and lakes—are connected by water: the water that moves through the aquifer beneath us, that flows back and forth between the aquifer and the water in lakes and streams, that makes up more than half of our human bodies, and is part of the bodies of all the other-than-humans. None of us could do this work without clean water to drink!

We are glad to be connected to you through our newsletters, volunteer mornings, and year-round educational events. Please join us this winter for programs indoors and out—learn about beavers, listen for owls on a moonlit night, explore how climate change is affecting New Hampshire and what we can do close to home to mitigate and adapt to these changes. To be the first to learn about programs, please sign up for our monthly e-newsletter. You can sign up from the bottom of any page of our website, chocorualake.org, or at bit.ly/CLC_e-news. We wish you a peaceful autumn and winter, wherever you are.

Generations of care...

Dear CLC Members and Friends,

After years of reading the newsletter and seeing articles and President's letters written by generations of family and friends, it is finally my turn. The CLC's predecessor organization and I were both born in the same eventful year (1968), and although I can claim no credit for the birth of the organization, I do have to say that the birth of the CLC in the midst of that tumultuous year provided a hopeful example of what a group of people can do together when they share a vision and a purpose.

Over the years, the CLC has grown and evolved from infancy to adolescence and now into a mature organization. While our central purpose—preserving the Basin in its natural beauty—remains the same as when the first covenants were established, how we go about that and the challenges we face are different. Patterns of land ownership and usage have changed dramatically over the last 54 years, requiring new approaches to accomplishing our mission of protecting the scenic and natural resources of the Basin through conservation, land protection, public access, and the development of a dedicated community of support.

The CLC was born of the merger of its two original entities to better, more efficiently meet the needs of the organization. It became clear that in order to maintain and preserve what makes the Basin so special, the CLC would need professional staff to help steward the organization. As our first Stewardship Director, Lynne Flaccus began the process of assisting the CLC in becoming a professional land trust. Our Timeless Chocorua Capital Campaign, made so successful through the generosity of hundreds of small and large donors, affirmed the importance of positioning the CLC to be able to implement its mission in perpetuity.



Above: A young CLC member exploring the Chocorua River at Charlotte C. Browne Woods. At right: Generations of care for the Chocorua Lake Basin: Penny Wheeler-Abbott's father John Wheeler pulling bittersweet at the Brown Lot this summer. | Alex Moot

Then the pandemic hit. Again, the CLC evolved and adapted, providing opportunities for community building and access in a very different way, spearheaded by the wonderful creativity of our Director of Programming and Outreach, Juno Lamb.

Today, the CLC continues to evolve with the hiring of our first Executive Director, Alex Moot, and with the addition of Deb Marnich, our second Stewardship Director. As an organization with a long history, we have both the curse and the luxury of our years. The curse, as any middle-aged person will tell you, is that there is a certain longing to be able to do things as we always have. The luxury, on the other hand, is having the wisdom to recognize that that is not always possible, practical, or the right thing to do. The changing world around us brings new challenges and opportunities, and a new generation of people who will be touched by the work that the CLC does and will continue to do for generations to come.

Like all organisms, we will continue to grow, evolve, and adapt. It's wonderful to see that there are



those in our community who are now developing connections to the Basin and the CLC that will be shared with their children and grandchildren, just as that connection and commitment has been passed to me from my grandfather, grandmother, aunt, father, and mother, all of whom have dedicated many years of service to the CLC helping to preserve a place that is so special to so many people. I look forward to continuing the important work of the CLC in partnership with our community.

Penny Wheeler-Abbott
President, CLC Board of Directors

...for a special place

Dear CLC Members and Friends,

The Chocorua Lake Conservancy is a land trust. But our work is about a lot more than conserving land. We are responsible for stewarding a *place* for area residents, visitors, and future generations to enjoy forever.

A *place* is about more than land. Place is the feeling that connects people and their physical environment. Place is where the experiences we have and the people we know intersect. Place ties these things together: the places we spend time determine who we are.

The Chocorua Lake Basin is one of the special places in many of our lives. Some years ago, a visitor mailed us a small donation with a note:

"Chocorua Lake is one of the few places from my childhood that has remained essentially unchanged. Even the gnarly root structures of the trees along the shore are always familiar. I see myself hanging out in those roots, looking out at Mount Chocorua, going for another dip."

"What makes the lake stand out, even then but especially now, is the feeling that it's not preserved—it just is. No front gate, no snack stand, no lifeguard, no ropes to tell you where you can't swim. Just a lake in the mountains, like it belongs there. I can imagine you work hard to preserve the character of the lake. I want it to stay this way!"

Some of us have childhood memories of time in the Chocorua Lake Basin. Some of us have experiences from a few years ago, or from a recent stop to swim, kayak, picnic, or take a photo from the Narrows Bridge. I recall the pride that I felt as a young child canoeing with my father at dusk during the annual Parade of Lights and seeing reflected lights from other boats shimmering on the lake. I remember the incredible feeling of childhood independence when I was 10 or 11 years old and would paddle at night



The gnarly root structures of the trees along the lake also made an impression on the painters of the 2018 Chocorua Lake Crankie. | *Chocorua Lake Crankie painters*

to the “rock” in the Little Lake to fish for hornpout.

We are constantly balancing different parts of the CLC’s mission, working to preserve the natural beauty of the Basin while also providing convenient lake access for everyone. During one week in July 2021, over two thousand vehicles parked in the Grove at the southern end of Chocorua Lake. If the number of visitors that week was representative, and we assume two people per vehicle, then over 50,000 people visit the Grove every summer. If a similar number visit our two other public access areas on the north end of the lake, then our lake access areas welcome 100,000 people throughout the warmer seasons.

In spite of this intensive use, we have been able to preserve the natural beauty of these public access areas through the help of the many CLC volunteers who spread fresh wood chips and serve as Grove and Island property stewards; the dedication of Troy Emerson, our longtime Lake Patrol Officer, who visits our lake access areas twice a day from May to October and keeps them free of trash; and everyone who attends our Adopt-a-Highway events to pick up trash along Route 16.

We continue our ongoing work—maintaining public lake access areas, managing conservation properties for improved wildlife habitat, offering opportunities for people of all ages to learn about the natural world, monitoring the water quality in the lake and the more than a hundred properties in the Chocorua Lake Basin

protected by conservation covenants and easements.

In addition, we are engaged with other important projects. We are working with an engineering firm on a plan to repair the dam at the outflow of the Little Lake, with a local forester to develop forest management plans for our two new conservation properties on Washington Hill, and with local and state officials to improve safety and reduce traffic noise on the section of Route 16 that runs along Chocorua Lake.

I cherished days of walking in the woods of the Chocorua Lake Basin this past spring with Lynne Flaccus, who departed the CLC in June after six years as our Stewardship Director. Lynne helped me notice fascinating details about this landscape that I’d missed during my first five decades in this place. I’ve enjoyed working alongside and getting to know CLC volunteers at stewardship mornings, and interacting with CLC members at cookouts and other events. Attending a couple of volunteer listening sessions this summer helped me understand how others connect with this special place. These opportunities with Lynne, volunteers, and members have deepened my connection to and appreciation for this place.

I am thrilled to have Deb Marnich on the CLC team as our new Stewardship Director. Deb has lived and worked in this area for twenty years and understands the importance of this special place in our lives. She brings to us a wealth of knowledge and expertise about the flora, fauna, and ecosystems of this area, relationships with local landowners, and connections to a wide network of experts.

We at the CLC are very appreciative of all the volunteers and donors who make possible so many facets of our work. Since May, over a hundred individuals have generously volunteered their time in myriad ways. Working with so many dedicated individuals over my first six months as Executive Director has been a great pleasure.

Alex

Alex Moot
Executive Director

Building refuge, instead of buildings, with wildlife corridors

BY MEGHAN HURLEY

This morning, I swerved my car to avoid a dead fox on the side of the road. I was driving to the Chocorua Lake Conservancy's Charlotte C. Browne Woods, where a trail weaves through a short section of a protected stretch of land.

The trail starts in a field. Bird houses line its edges and patches of goldenrod and aster tinge the green landscape. Mount Chocorua is just visible over the trees. Where the trail becomes wooded, leaves that are starting to turn red and orange drop into the path. A glacial erratic towers over passersby farther along the trail. It's made softer, and green, with a layer of moss and hardy seedlings.

But what I noticed first were layers of sound. The combined hum of a sea of crickets, bees buzzing over one another, then birdsong. An occasional rustle from a squirrel passing through dry grass. And, the rhythm of traffic in the distance—a steady rumble, then quiet, then a steady rumble, then quiet again. I was reminded of the fox I saw on the way here.

Charlotte C. Browne Woods is part of a corridor of protected land, a collection of CLC-owned properties that connect the CLC's Tewksbury Reserve, on the border of Madison, to Chocorua Lake. On the map, this wooded haven looks like a path of its own for bushwhacking wildlife to follow. The trail I walked is nestled into this wildlife corridor, where land protected from the encroachment of roads, buildings, and other human disturbances is connected together instead of fragmented into smaller, disparate patches.

Protected land is good, but longer stretches of it, with mechanisms for wildlife to move between habitat areas, is better. In a region where we share the road with a variety of New Hampshire's four-legged inhabitants, corridors offer protection. They protect wildlife from the dangers of vehicles, and vehicles from the dangers of passing wildlife. We know the risk, for all parties



Above: Protecting habitat through wildlife corridors for larger mammals also benefits birds and insects like this monarch butterfly perched on goldenrod in the field at Charlotte C. Browne Woods. | *Meghan Hurley*. **At right:** Land protected for wildlife also benefits humans! This one is picking dewberries in the field at Charlotte C. Browne Woods after the Insects for Kids! workshop this summer. | *Juno Lamb*

involved, of hitting a moose with a car. When moose can move through an intact habitat, they no longer need to make a dangerous trip across the highway—and everyone gets where they need to go.

Moose are also large creatures that need space. One small patch of protected land isn't enough to provide them with their preferred five—and up to 50—miles worth of resources. The area's carnivorous predators, like bobcats, need up to 25 miles to roam and find adequate food. To ensure that species at the top of the food chain in particular can persist in the face of increasing development, we need to give them room.

In addition to providing a route to food sources and prey, wildlife corridors allow animals to get to each other. So instead of one herd of deer isolated in one forest, and another in the forest across the highway, these populations can interact. This contributes to the long-term health of a species; it decreases inbreeding,



improves genetic diversity, and increases resilience to diseases. And when disaster strikes, enough individuals are likely to escape to replenish the population.

By better connecting land through wildlife corridors, we can protect current and future generations of moose, bobcats, and others from the steady rhythm of traffic that threatens to infiltrate their wooded havens. We can lower our chances of coming across the sad sight of wildlife on the side of the road, hit by a car. And we can share space with the other inhabitants of our corner of the world. I find comfort in the knowledge that the sounds, colors and liveliness of the other-than-humans have a place to find refuge, a place where bird calls might just drown out traffic in the distance.

Meghan Hurley is a resident of Moultonborough and a conservation advocate interested in protecting land, water, and the various forms of life that depend on it.

Trout Habitat Restoration

BY RICH COLLINS

History

Back In 2018, the Chocorua Lake Conservancy, with funding from the USDA Natural Resources Conservation Service (NRCS) and help from Tin Mountain Conservation Center, began a trout habitat improvement effort to benefit native brook trout in Allen Brook, a small, cold water tributary of the Chocorua River that traverses CLC-owned land in the Scott Reserve. The brook, which is north of the lake, flows into the Chocorua River below an old mill. In 2019 the CLC further expanded the improvement areas on the brook, partnering with The Nature Conservancy, a private landowner, and the Carroll County Conservation District.

Wood Loading as a Means of Habitat Improvement

The idea here is to improve the overall trout habitat on Allen Brook by supplementing natural woody materials in the water (trees, leaves, moss and other nutrient-rich organics), thus creating a diverse structure to the stream. Earlier timber harvest techniques removed mature trees near stream banks and restricted slash left in the water, thereby reducing the supply of stream-slowing forest materials. But without such barriers, streams begin to “scour” and are prone to flooding. We sought to re-start the natural process by “dropping” wood; that is, felling trees strategically so that they lie across the brook, locked into place.

The photo above shows the result of such wood-loading projects. The (man-made) fallen debris from 2019 has helped to create a catch-all for sticks, leaves, and other woody and organic objects, which in turn create shade, habitat, and protection from predators for native brook trout. Once a “snag” is placed, other debris catches in its path, and the stream water often is disturbed, creating jigs, jags, and jogs



An example of “dropped” logs across the brook. Can you guess which were Mother Nature’s doings? | Rich Collins

around the debris that create new pools for hiding, and other areas of habitat both in the stream bed and above the stream itself. Never do we want to load so much wood that the stream becomes impassable (fish move upstream, downstream, and into other bodies of water seeking colder temperatures and food). The woody deposits help slow water and create deeper and cooler pools, provide shade, and help catch sand and gravel to create spawning sites—all critical for wild trout survival.

This summer, officials from NH Fish & Game, Tin Mountain staff, and volunteers visited Allen Brook and collected data on current native brook trout populations to assess the effectiveness of work done in 2018 and 2019 to improve trout habitat. Teams surveyed the sample areas, collecting data on size, weight, and a count of all fish found in the designated areas of the brook. To ensure consistency in the data collection, stream sampling areas are measured out in defined increments, marked with stakes, and carefully documented so that volunteers are able to sample the exact same stretches of the stream each year.

Results

The data from this summertime

team excursion has been collected, tallied, and validated, and an initial analysis of the data was conducted to determine what appears to be excellent news:

“In the three to four years since wood was restored in Allen Brook, the brook trout population increased significantly, around two to three times what it was before wood was restored. This is consistent with research in New Hampshire and Vermont on the benefits of restoring woody habitat to brook trout streams.”

—John Magee, Fish Habitat Program Coordinator at NH Fish and Game

We call that a resounding success! More data needs to be collected over time to validate such conclusions, but all the stars seem to have aligned to suggest a successful habitat improvement effort with demonstrative results. We love that!

More information about this project, and the practices of both electroshocking and wood loading for habitat improvement, will be made available on our website in the coming months. Stay tuned!

Rich Collins is a CLC Property Steward, Chocorua resident, trout lover, and fly fishing fanatic.

The Ossipee Aquifer: Our Wealth, Our Health

BY KAREN MCCALL

My family always took our summer vacations at the beach where I delighted for hours, bodysurfing large waves that pummeled me in the sand. As a teen, I took my first sailing lessons on the Potomac River, a river so polluted I needed vaccines against typhoid, typhus, and tetanus to enroll in the school. These waters felt exhilarating but they were also threatening. Years later, with my baby girl in my arms, I visited Tamworth at the generous invitation of a friend. My exposure to this area's freshwater lakes, ponds, rivers, and brooks impressed me so profoundly that our family returned every summer for over thirty years and now I live here.

Over time, I have learned that we all have our favorite swimming holes here in Carroll County. The first time I encountered mine, I stood transfixed as the afternoon sun's fire splintered its white light across ruffled waters. The rest of the pond's surface was placid, dark and shiny. I wondered what secret web of lives fed upon one another beneath that dusky skin, and, a bit apprehensively, I dove into that darkness. Surfacing chest deep in the pond, I was relieved to see that the water was actually clear and filled with subaquatic plants sheltering myriad life forms. I had loved the wild ride of the mid-Atlantic Ocean and the Potomac River for their challenge. However, I had never felt the joy of immersing myself in the gentle, clean, silky waters of a New England pond. These freshwater havens invited, rather than challenged: this was a place I felt safe.

Much of the reason my husband and I moved here in our retirement was to access this area's rare gift of clean fresh water for recreation and drinking. Since only 2.5 percent of the world's water is fresh, and an even smaller percentage of that water is actually potable, there is great reason to celebrate our local treasure, the Ossipee Aquifer. This "stratified drift" aquifer is particularly vulnerable because it is made of porous



The preciousness of clean water. | Juno Lamb

sand and gravel that allow hazardous materials to percolate quickly to the groundwater below. Since groundwater moves, these pollutants can then spread to larger areas, contaminating wells and surface waters such as lakes, rivers, and streams. Up to 80 percent of households in our watershed have private wells that draw directly from the Aquifer.

Others recognize our treasure: Carroll County is one of the fastest growing counties in New Hampshire, and beverage industries have moved here because they recognize the economic value of our freshwater supplies. At the same time, hazardous chemicals such as gasoline and PFAs, microplastics, and bacteria have been found in many New Hampshire wells, including locally. Once a well is contaminated, disastrous health and economic consequences can result. Safeguarding the Ossipee Aquifer is critically important because, in almost all cases, it is impossible to fully restore a polluted aquifer, and it is always more cost effective to prevent a problem than to have to remedy one. Tragically, it takes only one incident to harm our vulnerable aquifer and spoil it for the thousands of people who share this groundwater.

Cell biologist and poet Loren Easley wrote, "If there is magic on this planet, it is contained in water." I feel this magic in the way my frequent pond immersions transform me from anxious adult to innocent child. The water in our

lakes, ponds, and rivers courses to and from the Aquifer; the groundwater from this Aquifer fills the well on my land and your land, and it flows through the tap in my kitchen and yours to fill our drinking glasses. When we drink from those glasses, a life-giving fluid swirls into, and around, every cell of my body, and yours. When rain seeps through the earth's layers to refuel the groundwater below, it animates every human, animal and plant within its reach, connecting us all in an unexpectedly intimate way. The great marine biologist and oceanographer Sylvia Earle says, "No water, no life. No blue, no green." Since there is no substitute for this natural gift, we must protect our local surface and groundwaters as though our lives depend on them, because they literally do. I want to treat these waters with the utmost reverence because they deserve to be healthy and fully alive. So do I. So do you.

Karen McCall, a retired environmental educator of 35 years, currently serves on the Tamworth Groundwater Protection Ordinance Committee, Green Mountain Conservation Group's Aquifer Protection Committee, Bearcamp Pond Association, and Tamworth Community Nurse Association.

Tamworth citizens will have an opportunity to vote on the Tamworth Groundwater Protection Ordinance in March of 2023.

RIVERS program brings towns together over 20 years

BY MADISON MARTIN

For more than 50 years, The Chocorua Lake Conservancy has worked to protect the Chocorua Lake Basin watershed, and the aquifer that sits beneath it. We are not alone in this care. People and groups all over the region share a commitment to protecting the waters of our aquifer, rivers, and lakes from hazardous chemicals, bacteria, and more. One of these is the RIVERS program and its many volunteers.

Every other week from May to October, over 30 volunteers from across the Saco River watershed spend their mornings standing in cold rivers and streams collecting data and water samples in the interest of protecting local waterways and learning.

The Regional Interstate Volunteers for the Ecosystems and Rivers of Saco (RIVERS) Water Quality Monitoring Program was established by Green Mountain Conservation Group (GMCG) and the Saco River Corridor Commission (SRCC) in 2001. The primary goal of the program is to provide a baseline of data for rivers and streams in the Saco River watershed. When climate change or another major ecological event changes the water quality, GMCG and SRCC will have data to show how the water has been impacted, which will allow them to better advocate for its protection.

The RIVERS program monitors over 60 sites across 26 towns in both New Hampshire and Maine. The sites are tested by SRCC and GMCG staff, AmeriCorps members, and over 30 volunteers from towns across the area.

On their testing days, volunteers head out with bags containing a multi-parameter meter, two probes, a thermometer, a turbidity meter, and bottles for collecting samples. Some RIVERS sites are right off the road and



Tim White tests his site on the Pine River. The meter sits on the rocks near the river while the probes acclimate to the water. | *Madison Martin*

easy to get to, while others require a bit of bushwhacking or a short hike to reach.

Tim White started volunteering for RIVERS in 2004; he tests the Pine River near his house in Effingham. “It’s a tangible activity that contributes steadily to searchable, comparable data,” White said. “I’m fortunate to live so close to a test site that I can walk to it. The Pine River can be muddy and slick in wet weather, but it’s never extremely difficult.”

Volunteers need to head out early because water samples must be collected before 9AM to avoid aquatic plants’ oxygen production time as much as possible. This allows volunteers to capture the dissolved oxygen level of the water at its lowest, and helps the data collection to remain as consistent

as possible. In addition to testing dissolved oxygen, volunteers also record parameters on conductivity, turbidity, and temperature. They also collect pH samples bi-weekly that are processed in GMCG’s water resource center, and total phosphorus samples monthly that are sent to the University of New Hampshire (UNH).

Dave Downs, a Madison resident, who started volunteering for RIVERS in the early 2000s, said that getting out in the morning was one of his favorite parts of the program. “Seeing the day waking up and potentially seeing some wildlife is always nice,” Downs said. “Meeting other volunteers. But also knowing that you are doing a small part in the big scheme of our water protection.”

The data collected by the RIVERS

program is used to create reports that analyze long-term trends on surface water quality and offer recommendations for protecting clean water to local towns. The most recent of these reports was the 15+ Year Water Quality Report for the RIVERS project, which analyzed data from 2002-2019.

One trend shown in this report was an increase in conductivity at 85% of RIVERS sites since 2002. Conductivity is the measurement of water's ability to conduct electricity and is usually affected by the type of bedrock in the area. However, road salt entering waterways also increases conductivity, and since freshwater systems have no natural method of managing salt, it stays in rivers and streams long after it is introduced. GMCG has identified road salt as a significant threat to local streams and rivers and launched the "Salt Responsibly" campaign in 2021 to encourage residents to reduce the amount of salt they use on their roads and driveways.

"Since getting involved with the RIVERS program I have developed a much better understanding of the threats to our water from things like road salt, gasoline spills, chemicals applied to the environment, and the downstream effects of these bad actions," Downs said. "We need the data that this program provides to help make decisions on where the problems are and how to combat them."

Like any citizen science program, RIVERS is about more than the data it acquires. RIVERS provides an opportunity for community members to connect with the environment around them, learn about science, and protect natural resources, and promotes the idea that water connects communities because the actions of one community will affect another.

White agrees. "Water crosses all boundaries," he says, "and ties all life together."

Madison Martin grew up in New Hampshire and will be serving as an AmeriCorps at Green Mountain Conservation Group until mid-October. She graduated from Ithaca College last May and wants to continue working in conservation.

NATURE NOTES

Wood Duck (*Aix sponsa*): A cavity-nesting, forest-loving, tree-perching duck



BY DEBRA MARNICH

Stewardship Director

Amongst and surrounding the wetlands of the Chocorua Lake Basin are some of the highest quality protected and preserved wetlands, water courses, and forests to be found in New Hampshire. A species of duck that relies on a varied habitat mixture of forest and riparian edge is the wood duck, *Aix sponsa*. This spring I had the opportunity to observe a female wood duck nesting in a large Bigtooth Aspen, *Populus grandidentata*. The tree was roughly 70 feet tall and averaged a 25-inch diameter at breast height (DBH). In the past I have observed pileated woodpeckers, white-breasted nuthatches, and gray squirrels nesting in the cavity, which is located about 40 feet off the ground. The tree is a mile from any water source, so the choice of cavity and tree location was somewhat of a surprise. However, wood ducks and their nestlings are known to walk far distances across land to access water and forage for food.



From top: The wood duck hen looking out from her nest forty feet in the air; the ducklings have left the nest. | Debra Marnich

Wood ducks usually live three to four years, but can live up to 15 years. They may have one to two broods a year and the clutch size can vary from six to 16 eggs. The eggs are glossy to creamy white in color and the incubation period is 28 to 37 days. Chicks hatch with a full coat of down. One day after hatching, the chicks jump from the nest to the ground and start their trek to water. Wood ducks are perching ducks; claws on their feet enable them to perch,

and the claws also enable the nestlings to climb out of the nest cavity. The male is the most celebrated species of wood duck; when in breeding plumage, he is strikingly colorful and looks uniquely painted. Wood ducks' diets are 80 percent plant materials—both aquatic plants such as duckweed or water lily, and terrestrial food including acorns and grains. They also eat insects such as beetles, flies, and caterpillars.

The female wood duck is colored a dull brown to ensure extra protection from predators for herself and her ducklings. However, I certainly found a natural and simplistic beauty and elegance in the hen wood duck and her survival techniques. Her muted appearance was clearly secondary to the wit and keen sense of observation she displayed. Every night the hen left the nest in search of food, at the same exact time, to the minute: she would peer out of the cavity hole for quite some time before she perched on the edge of it and exploded out of the nest when all was safe. This was a repeated behavior every time she left the nest in search of food to ensure anonymity and protection of the nest. Roughly 12 to 15 down-covered ducklings hatched from the clutch. I missed the jump of the nestlings; however, I was very excited to catch them scurrying across the forest floor, loudly peeping for Mom.

There has been a strong wood duck conservation movement over the last 40 years and according to the North American Breeding Bird Survey the population has increased. The increase is largely attributed to artificial wood duck nesting boxes created and placed by humans. As a cavity-nesting bird, the wood duck relies on large dead trees for nest cavities; these have become less available because of development and the loss of habitat that comes with it. The CLC has contributed to the wood duck conservation movement by installing multiple wood duck nesting structures on CLC properties in partnership with the USDA, NRCS. I am excited to monitor and discover the progress of this wonderful forest duck in the woods, wetlands, and riparian areas of the Chocorua Lake Basin with all of you.

STEWARDSHIP CORNER

A Season of Change

BY DEBRA MARNICH

Stewardship Director

Fall is a season where change is in the air—and visible all around us. Whether we humans want to embrace change or not, Mother Nature always keeps us aware that there is more to life than us. When the time arrives, it's as though she flips a switch, and flora, fauna, and weather all start the response process to gear up for the next season. Daylight gets shorter by minutes a day and the hours of darkness expand. The air is crisp, cooler, and dry. Sunny August days resound with endless chirping crickets desperate to call a mate in a last-minute effort to reproduce and complete the life cycle. Insects are in the process of morphing from eggs to larvae to pupae, and soon into adult Monarch butterflies that will migrate south for the winter.

Mass seasonal bird migration will take place all day and all night over the next few months. Responding to light availability, and navigating by the sun and stars, birds will start their long journeys southward thousands of miles to a more hospitable winter range where food and shelter are plentiful. Genetic traits, habitat, and food requirements all dictate why one species will leave sooner or later than another. Male hummingbirds are among the first to start the fall migration as early as June or July. Shorebirds are the next to migrate starting in early August while summer celebration is still in full swing. Songbirds head south next with waves of colorful warblers grouping and starting the movement in late August into September. Kettles of migrating hawks will gather and circle high above, taking advantage of rising thermals through September and October.

Meanwhile, down below, vegetation also responds to changes in light and temperature. Red maples in wetlands lead the charge and turn a brilliant red. Mast-producing trees will drop acorns and beech nuts, and soft mast trees



Fall foliage on display at the Chocorua Lake Dam. | Alex Moot

and shrubs will be heavy with fruits and berries for wildlife. Ferns will turn a golden hue, and when the fireweed flower that blooms from the bottom up is ablaze at the top of its stalk, it is said that six more weeks remain until frost.

Bull moose are almost in the rut, young common loons are gathering for migration at staging areas, and beavers will be filling food caches for the winter season. Before long, the first hard frost will appear, causing a dieback of most vegetation. Leaves on trees will change from green to an array of brilliant colors, fall to the ground, and be swept up in blustery gusts of wind that will lead to the first snowflake falling. Then, the next seasonal change will commence and be celebrated.

It is my pleasure this year to celebrate a season of change with the CLC as the new Stewardship Director as of September of 2022. Many of you may know me in my previous position as a Conservation Planner with the USDA, NRCS where I have helped you plan and implement conservation practices on your property. For those of you who have not met me, I am looking forward to working with you in conservation and preservation, and to furthering the mission of the CLC. It is an exciting season of change—for the natural world, the CLC as an organization, and for me as I begin my journey as Stewardship Director.

The Chocorua Lake Conservancy publishes and distributes an educational newsletter twice a year, in the Spring/Summer and Fall/Winter. Current and past issues are posted online at chocorualake.org/newsletters.

Have an idea for a newsletter article? Let us know!

Editor: Juno Lamb

Layout: Vanessa Valdes

Contributors: Arthur Baldwin, Rich Collins, Meghan Hurley, Juno Lamb, Debra Marnich, Madison Martin, Karen McCall, Alex Moot, Penny Wheeler-Abbott, Chocorua Lake crankie artists

Chocorua Lake Conservancy
PO Box 105
Chocorua, NH 03817
603-323-6252



The Chocorua Lake Conservancy is a nonprofit land trust dedicated to its mission of protecting the natural beauty of the Chocorua Lake Basin and providing public access for present and future visitors.



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The Narrows Bridge as depicted in the 2018 Chocorua Lake Crankie. | *Chocorua Lake Crankie painters*

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