

COMMISSIONER'S COLUMN

ARPA funds for high-hazard, municipally owned dams

The State of New Hampshire continues to direct American Rescue Plan Act funds toward major infrastructure projects that will yield real-life and much-needed benefits to our citizens. NHDES has offered over \$100 million in funding for more than 200 drinking water, wastewater and flood-risk infrastructure improvement projects, as well as projects focused on energy efficiency; all of which are in various stages of the approval process.

Most recently, the state approved \$35 million of ARPA money to go toward necessary repairs to State-owned dams and to fund the creation of a Dam Rehabilitation/Removal Grant Program for municipally owned high hazard dams. The failure of these dams would inundate homes, businesses and roads downstream and cause significant loss of life.

A large chunk of that money – \$30 million – will go toward 11 State-owned dams that the NHDES Dam Bureau has identified as having known deficiencies. Some of these dams, like Goose Pond Dam in Canaan and Mendums Pond Dam in Barrington, have rehabilitation designs nearly complete, so ARPA money will be spent on construction contracts to complete construction of the design. Others, such as Little Bog and Lower Trio Dams in Odell and Sunset Lake Dam in Alton, will be reconstructed by NHDES' in-house Dam Maintenance Crew with ARPA funding. The funding will be spent on the

Ashuelot River outreach sessions

On May 17 and 18, 2022, the NHDES Instream Flow (ISF) Program conducted outreach sessions during two datalogger deployments on the Ashuelot River. As one of the 19 designated rivers in New Hampshire, it is undergoing a Protected Instream Flow Study. Protected instream flows are criteria that define the stream flow pattern to maintain the flows needed for public use and aquatic wildlife, and to meet water quality standards. Stressors that range from droughts to dams, land development, and drinking and irrigation use change the dynamics of the rivers, and knowing the baseline helps to protect the vital flows. The ISFP deploys temperature, conductivity and water level dataloggers from late spring through fall along the 65-mile reach to evaluate baseline habitat parameters.

After the seasonal flows necessary to support the natural ecosystems and human uses are determined, the ISFP works with water users and dam owners to maintain the protected flows. Currently, the Lamprey and Souhegan rivers are actively managed under the program, the Cold River's protected flows have been established, and studies on the Ashuelot and Warner rivers are underway.



On May 17, during ISFP's deployment of a temperature datalogger in the Ashuelot River in Surry, approximately 15 individuals joined us. Among them were a master's student from Antioch University, members of the Army Corps of Engineers, teachers from Keene High School's science department, members of the Ashuelot River's local advisory committee (LAC), and others. We saw how the river changed its course over the last year, almost completely switching its flow to a different channel, and identified some wetland plant species alongside a member of the Ashuelot

Commissioner's Column *continued from page 1*

remaining dams to complete a design and prepare plans and specifications to reconstruct the dams and remediate known problems.

The remaining \$5 million will fund the new Dam Rehabilitation/Removal Grant Program for municipally owned high hazard dams, which will pay up to \$1 million per grantee toward the rehabilitation or removal of municipally owned high hazard dams that are rated in "Poor" or "Unsatisfactory" condition because they are unable to safely pass the design flood without overtopping, which could lead to failure during these floods. The goal of the new grant program is to make the dams compliant with current state dam safety standards or remove them and eliminate the risk to life and property that they pose.

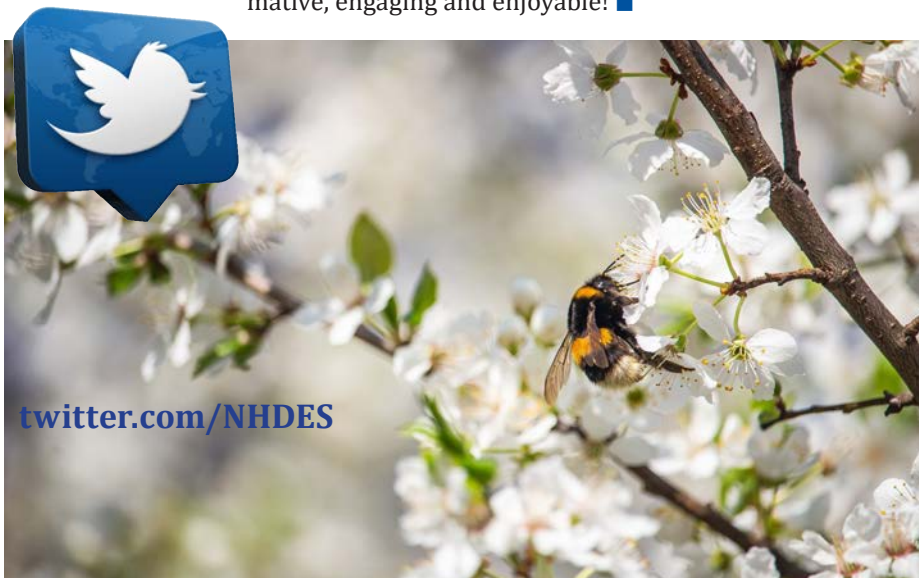
New Hampshire's municipalities own 218 dams. Forty-nine of them are classified as High Hazard Dams because their failure would cause flooding that would inundate houses or other occupied structures downstream and likely cause loss of life. Of these, 16 are currently rated in Poor condition, thus are eligible for this grant program. There are no municipally owned dams currently rated in Unsatisfactory condition. NHDES is prioritizing these critical dams rated in Poor Condition in this grant round, but if more money becomes available in the future, NHDES may use it to address less-severe deficiencies at other dams, currently rated in Fair Condition, across the state.

NHDES continues to update the status of infrastructure projects being funded through ARPA and the Bipartisan Infrastructure Law on our [NHDES Infrastructure Funding website](#). Potential grant applicants can also find information on applications, deadlines and more on the site. ■



2022 Lakes Congress

Several NHDES employees attended the 2022 Lakes Congress hosted by New Hampshire Lakes Association (NH LAKES). The event was hosted in Meredith on the shoreline of Lake Winnepesaukee. The Lakes Congress featured panels and presentations led by scholars and in-field experts that explored the problems facing our lakes here in New Hampshire. NHDES' Kate Hastings, Director of the NHDES Harmful Algal Bloom Program (HAB), gave a presentation on the harmful effects of cyanotoxins and the presence of cyanobacteria here in New Hampshire. Additionally, NHDES Toxicologist Jonathan Petali co-hosted a presentation on microplastics and PFAS. We would like to thank NH LAKES for hosting this event and all of the presenters and attendees who made it so informative, engaging and enjoyable! ■



ENVIRONMENTAL NEWS

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Source Water Protection Awards



NHDES presented several awards at its annual Source Water Protection Workshop. This year's recipients recognized for exemplary efforts to protect our water resources were the Southeast Land Trust of New Hampshire (SELT), the Emerald Lake Village

District Commissioners, and Aquamen Water Solutions, as well as NHDES Source Water Protection Program Director Paul Susca.

The 2022 Source Water Protection Award was presented to the Southeast Land Trust of New Hampshire (SELT). SELT protects valuable water supply lands, which directly affect the water supplies of 52 towns including Manchester, Portsmouth, Rochester, Somersworth, Newmarket, Durham and Salem, and Pennichuck Water Works. Of the land conservation projects supported by the New Hampshire Drinking Water and Groundwater Trust Fund since 2017, SELT has been behind nearly one out of every four projects!

The 2022 Source Sustainability Award, recognizing work to

preserve the sustainability of drinking water resources, was presented to the Emerald Lake Village District Commissioners and Aquamen Water Solutions. The Emerald Lake Village District in Hillsboro, NH, provides drinking water from eight active bedrock wells to over 1,300 people. Aquamen Water Solutions of Northwood, NH, has conducted repairs and replacements of 64 active leaking water mains since 2020, in addition to developing a better zone metering program, which drastically increases leak detection. Both groups have made great progress in improving drinking water access to New Hampshire residents.

NHDES Commissioner Bob Scott presented Paul Susca with a recognition plaque. Paul is retiring this August from NHDES after 28 years of public service, having made an indelible mark on the agency's efforts to protect drinking water resources and public health. Paul played a pivotal role in legislative efforts to reduce New Hampshire's drinking water standard for arsenic from 10 parts per billion (ppb) to 5 ppb and has been a leader in New Hampshire's effort to permanently conserve critical water supply lands that protect sources of drinking water. He was also one of the founding architects of the Salmon Falls Collaborative (SFC), an ambitious and visionary interstate partnership nationally recognized in 2012 by the Clean Water America Alliance (CWAA) that selected the Collaborative for its prestigious U.S. Water Prize. At the national level, Paul has been active in the Association of State Drinking Water Administrators (ASDWA), serving as the chair of the organization's Source Water Protection Committee. ■

Instream flow *continued from page 1*

River LAC. It was a beautiful day to walk through the Surry Mountain flood control land.

The next day we met in Swanzeey with Hinsdale High School's environmental science class, two members of the Ashuelot River LAC, and a few others for a short presentation and discussion of the previous year's data collected on the Ashuelot, and to deploy a second temperature datalogger. One of the students pointed out several trends in the temperature data over the last year including the slightly cooler temperatures and higher water levels from last summer resulting from the higher-than-average precipitation rates. The students asked questions about the deployments, such as if we see poison ivy a lot (yes!), and if the dataloggers are ever stolen or tampered with (occasionally), and how that affects our data set. If you see equipment in the river, please leave it there. However, if you see equipment on the bank or out of the water, please call the phone number on the datalogger to let us know.

We would like to thank all those who joined us for these sessions for their curiosity and questions! We enjoyed sharing our work and how we help to protect New Hampshire's designated rivers. ■

Photo contest winner



Congratulations to Becca Katz, Instream Flow Program intern, for her winning photograph in an internal photo contest recently held at NHDES! Her photo has been uploaded as the cover photo for both our Twitter and Facebook profiles! ■

35 Years at NHDES: perspective from staff who have helped shape the agency from the beginning

In honor of NHDES' 35th anniversary, we are asking staff who have been here since the agency's formation to look back at their time here and what they see for our future. In this edition, we hear from John Duclos, Planning, Projects, and Communications Administrator, who began working for the state Water Supply and Pollution Control Commission, one of the agencies that consolidated to become NHDES in 1987, in September 1979. He started as a water pollution sanitarian in that agency's Drinking Water and Groundwater Bureau. Then in 1981, he joined the fledgling Hazardous Waste Program, where he served in several roles over the years – minus a one-year stint in the Superfund Program as an on-site coordinator doing emergency removal actions. After that year, John went back to the Hazardous Waste Management Bureau as a program administrator, and then as the administrator of the full bureau for many years. John shifted to the Commissioner's Office in 2020 to serve as an administrator in that office before taking on the new position as the Planning, Projects, and Communications Administrator.

What made you want to work at NHDES in the first place?

Well, I was an outdoors type of kid, did a lot of camping with the family. I would say I was very fortunate to do a lot of camping, both with the family up north and through the Scouting program, and I got an early appreciation of the beauty of the outdoors.

And then I got a little older, and in junior high school, I was learning about environmental type stuff. EPA had just come into existence in 1970 and they had an Earth Day – April 22, 1970, the very first Earth Day. I learned about all of the bad environmental contamination that the world was seeing. (I learned) the Merrimack River was on the 10 most polluted rivers in the world list; that we were just barely treating anything for wastewater. It hit a note with me where I decided that that's what I wanted to do. I finally found a purpose of what a lifetime of work could do for the betterment of the environment, and so I chose to get into that field.

What were the biggest environmental challenges of the day when you first started here?

When I started out in the hazardous waste program, people were dumping chemical wastes, you know, burying drums out in the back 40, and I set my sights on identifying those sites and cleaning them up – by getting the tanks and the drums excavated. I spent at least one long summer doing a drum and bulk waste removal project at a pre-superfund site in Epping. That was a six-day-a-week job, sun-up to sun-down. We were dealing with a lot of contractors and the issues of cleaning up the site on a time and materials contract,



so there was a lot of interesting work in the hazardous waste program in the earliest days of it. That was the biggest environmental challenge of the day for me, cleaning up hazardous waste sites and responding to hazardous waste disposal complaints. It fit my interest of making a difference to the land and water in the state, and I was also interested in doing environmental enforcement work.

What are some of the biggest changes you've seen at the agency over the last 35 years?

The agency's gotten a lot bigger, and it has a lot more complex problems. Most of my years have been in the hazardous waste program and I've seen it change from the model of enforcement as being a goal to compliance as being the goal. I had to learn that over time, that we really want good businesses in New Hampshire – hiring a lot of people, making a lot of money and complying with our environmental rules and regulations. And those are very difficult and complex things, and we have to be there as a collaborative agency to assist our regulated businesses through the process of compliance. I was able to do that in the hazardous waste program by instituting a training and certification program for large quantity generators, and I think that opened a door between enforcement being a goal as originally set by EPA at the time and New Hampshire's way of "compliance is our goal, enforcement is only a tool."

What are some of the biggest changes you've seen in the state over the last 35 years?

Growth.

A lot of big manufacturing businesses were in the state and that allowed for the hazardous waste program to deal with industrial compliance at many different types of facilities with many different types of hazardous waste. Then in the

35 Years, cont. pg 5

35 Years *continued from page 4*

last 35 years, a lot of those businesses closed or moved, and we became more of a small-business state, and now we have many emerging high tech areas.

One of the big things that the state was dealing with in the early days was electroplating facilities, where they used to have direct discharges of chemical wastes into rivers and surface impoundments. We had a lot of work to do with electroplating facilities, and the regulations put a lot of those facilities out of business because it got too expensive to properly treat and dispose of their wastes, comply with new regulations, and remediate any past contamination.

What environmental successes have you seen or been a part of?

There are two things that really come to mind when I look back at my career that I'm really happy with. One of those would be the lesson that enforcement isn't the goal of the agency, it's compliance, and having a collaborative relationship with industry as long as you are fair to each other is vital to that success. An example of that is the Large Quantity Generator Certification Program, which allowed industry to learn the hazardous waste rules from those that would be doing the inspections and any enforcement, so they knew up front what they needed to do to comply. I've seen a lot of improvement in the knowledge base of industry, how they talk and feel more comfortable with the state regulators, understanding that we're generally there to help them comply with the rules.

The second one was working more directly with industry. I won't say any names, but a business came in that wanted to have 100% American-made product, but they were getting their circuit boards from an outside source. They wanted to have a circuit board manufacturing facility on site. We've lost a lot of electroplating facilities due to environmental contamination, and then this company wanted to build one. We worked with them, and they ended up constructing a state-of-the-world, I'd say, electroplating operation, fully automated, computerized and doesn't generate hazardous waste. That's almost impossible to do in an electroplating facility. But they started from scratch and researched the best technologies to use from around the world. We told them the

things that would generate hazardous waste and they came up with a fix to not generate it. I learned that working with industry, especially at the earliest possible time, was a great benefit not only to the industry but also to us and the environment.

What are the biggest challenges you see for the next five, 10, 15, or 35 years?

Well, I think on the world map you have climate change issues that are obviously affecting everyone: we had a bad drought, a multi-year drought; we've had 100-year floods that aren't every hundred years anymore; we have a rising sea level and more storm surge issues. Those are big things that are going to challenge us all. We're going to lose land to the ocean. We have to prepare for the inevitable, I think. So those are what I envision as the biggest challenges not only globally, but also what does it mean to New Hampshire and its environment and resources.

From an inland perspective, this kind of gets back to my roots of saying "clean water." We are what we drink, and drinking water is very precious. When I started, I don't think there were very many gas chromatographs around or a large understanding of groundwater or groundwater contaminated with various chemicals, and the sensitivity of those instruments has improved over time. The health risk assessments have also advanced, so that it doesn't take very much contamination of certain chemicals to have a health impact on people. So, dealing with the contamination that we have, learning more about other chemical wastes from an emerging contaminant perspective, is a challenge that we're going to see for the next five, 10, 15, 35 years.

I think we have to do a better job nationally to look at the types of chemistry that is developed and put into the marketplace and have an environmental review before they get distributed to the public, I figured we'd learn our lesson, you know, given our past history on that, but it never seems to surprise me how we find one thing that's good, but we lose sight of what does that mean in its life cycle to produce it, to use it, and then how does it get disposed of. And what happens if it leaks or gets into the environment. So, emerging contaminants and the effect that it has in our air, water and lands. ■



A river runs through...

"The river has great wisdom and whispers its secrets to the hearts of men." – Mark Twain

From the beginning of human history, rivers have been an important part of our survival. Rivers provide important ecologic functions, are habitats for many species of plants and animals, and can provide a critical means of transportation. People gathered around rivers to make use of their natural resources and it can be argued that in many cases rivers gave us the ability to grow as a civilization. Evidence of this importance is signified in river towns throughout New Hampshire which experienced rapid growth in the middle of the 19th century after newly constructed railroad corridors connected rural farm towns to the rest of New England, fostering the development of numerous profitable mills along the banks of rivers throughout the state.

Over time, the rail lines stopped running and many mill operations failed. By the close of the 20th century, formerly bustling towns experienced the abandonment or closure of the mills along their riverbanks. Some towns have prospered and found new uses for their mills as housing or other industrial, commercial, cultural or educational space such as mills in Manchester and Dover. Unfortunately, for a variety of reasons, many of the other mills have remained abandoned, particularly in rural small towns. With no occupants or use for these former buildings, the properties and derelict buildings often have become a nuisance to some communities, many with windows broken, graffiti on walls, and parking lots overgrown with weeds.



Up and down river valleys across the state, mills can be found on a continuum from structurally sound but empty or underutilized mill buildings, to buildings that have fallen into disrepair due to flooding or neglect, to vacant lots. Many towns continue to wrestle with this legacy and struggle to identify the means and options available to adequately address and restore these sites. Two such mills, coincidentally

both along the Contoocook River, have recently been the focus of efforts to rescue the river from hazards associated with these buildings, and pursue a new vision for these sites. These recent steps forward are the direct result of a commitment from many partners, primarily the towns where the mills are located and most recently, with assistance from the EPA Removal program.



The Contoocook River flows for 71 miles from Poole Pond in Rindge, New Hampshire, north-northeasterly to the state capitol, Concord, where it enters the Merrimack River. This river is often associated with boating, paddling and scenic views and was designated into the New Hampshire Rivers Management and Protection Program in June 1991. Historically, the Contoocook River's north-northeasterly flow pattern made it an important travel and communication corridor in pre-colonial times and during settlement. The area was home to the Kon-wa-teg-ok trail, which connected the Native American villages along the [Contoocook River](#) north to the river's confluence with the Merrimack River. The river was later harnessed for energy as mills were built along the river. Hillsborough was one of the first communities to harness the power of the Contoocook and by the 1950s, a half dozen mills in Hillsborough had thrived using energy from the Contoocook. One of these mills was the Woods Woolen Mill.

The Woods Woolen Mill operated as a textile mill in the late 1800s, with textile manufacturing occurring for about the next 100 years. The mill diverted water from the river to power its machinery and thus was built essentially into the river over time. When the mill operations ceased in 1985, the site was sold and successive operations failed at the site. Eventually the site was abandoned. Following a fire, the buildings most in disrepair and presenting significant hazards were demolished in the early 2000s, leaving behind concrete foundations along the riverbank, and in the uplands, a small office building and a former boiler house. Since that time, the overgrown, vacant site has become the responsibility of the Town of Hillsborough through tax deeding.

The former boiler house contained significant quantities of asbestos and lead paint. Perched precariously next to the

river, it threatened to collapse into the river with a high likelihood of causing a release of hazardous materials to the air, surrounding soil, and the adjacent Contoocook River. As such, in the fall of 2021, an EPA Removal Action was initiated to remove the building. Removal of building debris and associated contaminated soil hot spots is currently underway and will be completed in the early summer 2022. The removal of the boiler house and the last remaining building positions the Town of Hillsborough at an important step towards progress for the future of this site.

From Hillsborough, the Contoocook River winds its way through Henniker, Contoocook, and Penacook and into Boscawen and Concord where it converges with the Merrimack River. Just upstream of this confluence, the remnants of another large mill remain. This site was established in 1820 as a sawmill and by the mid-1800s it was developed into the Stratton & Company Flourmill. At the turn of the 20th century, the mill was the largest flour mill in New England, producing 300 barrels of flour and 500 bushels of corn meal a day. In 1942, the site was sold and converted to a modern tannery known as Allied Leather, which processed split leathers and received hides. The Site, which was acquired by tax lien and transferred to the Town of Boscawen in 2009, has been vacant since Allied Leather filed for bankruptcy in 1987.

The site has remained vacant despite efforts from the Town of Boscawen to assess, revitalize and market the property. In late 2021, buildings had deteriorated to the point of creating a hazard to the adjacent road, which had to be closed to thru traffic. By early 2022, a large wooden wall had fallen onto the riverside and pieces were in the adjacent Contoocook River. The EPA Removal program had initiated response actions to address environmental hazards, but these new structural hazards elevated concerns. An EPA contractor deployed booms to capture debris in the river and steps were taken to secure a contractor to demolish the building before any further environmental or structural safety issues occurred. Given the presence of PCBs and asbestos in the building materials, demolition and disposal of associated debris from these buildings was beyond the resources of the Town of Boscawen.

Once the EPA Removal activities are complete at each of these sites, the NHDES Brownfields program and other project partners, including consultants, EPA and Central New Hampshire Planning Commission, will work with the towns to identify additional funding sources to further address issues precluding redevelopment. These tasks include environmental assessment work which may be necessary to identify remaining potential health risks and pursuing cleanup funding as necessary. Recent federal funding has created unprecedented opportunities for municipalities to revitalize legacy Brownfields sites in their communities, such as these former riverside mills. NHDES was recently awarded a \$2 million assessment grant from EPA that can assist municipalities in assessing properties they are considering acquiring or have acquired, often involuntarily through abandonment or tax deedding. This and other funding opportunities will be the subject of an

article in a future Newsletter.

While the history of these mills is rich and vivid, humans must find a way to evolve and ultimately they do. Over time, opportunities present themselves and communities can take advantage of them to build a better future. Given the mill's reliance on rail to transport goods, many sites are located along existing or potential rail trails in former railroad corridors. The Woods Woolen mill site is located near the eastern terminus of a section of a railroad right-of-way (ROW) owned by the State of New Hampshire, which has a high potential for recreational use. The proposed future use of the site would provide a greenspace and recreational trail for town residents and attract visitors from other nearby communities to access the trail. This improved use of the site would bring in additional income to the town's businesses since the site is located within proximity to the downtown that visitors will travel through to access the site. The site is also currently being evaluated for floodplain reconnection and improving resilience. The Town of Boscawen is currently evaluating potential uses for the Stratton Mill site. It is also within walking or biking distance to a rail trail that is actively being improved to ultimately connect to Concord. The Stratton Flour mill site reuse strategy will bring life back to this area and provide opportunities for the Town of Boscawen.



The redevelopment of riverside mills across New Hampshire leads to a host of positive outcomes including increased economic development, community engagement, cultural and recreational opportunities, and offsetting impacts due to climate change. Through these activities, it is possible to honor the rich and vivid history of New Hampshire's mills while finding a way to evolve to meet the interest and need of today's communities, and protect and preserve our ecological and historical resources.

"The river moves, but it follows a path. When it tires of one journey, it rubs through some rock to forge a new way. Hard work, but that's its nature." – Kekla Magoon. ■

Environmental Health Guide

The New Hampshire APPLETREE Program – run jointly between NHDES, the Division of Public Health Services at New Hampshire Department of Health and Human Services, and the Dartmouth Cancer Center’s Community Outreach and Engagement team – have developed training resources to support local leaders that are responding to community environmental health concerns.

In November 2021, our project team met with town and legislative stakeholders to better understand the types of concerns they hear from their communities and the resources that could be helpful to them. We identified training topic areas and assembled the [New Hampshire Environmental Health Guide \(NH-EHG\)](#) – a table of resources designed to help legislators, city and town health officers, municipal officials, administrators, and other stakeholders find the appropriate State resource or agency to address environmental concerns raised by their community. We have also developed three trainings that will be available virtually, live and posted online on the [New Hampshire APPLETREE webpage](#).

- **Training 1: NH Environmental Health Resource Guide (NH-EHG) Introduction** introduces the audience to partners available to assist them (e.g., NHDES, APPLETREE, DHHS), and reviews an example of how to use the NH-EHG.
- **Training 2: Cancer Concerns in the Community** outlines the principles that underlie cancer concern investigations and describes an approach to use if someone in the community raises a concern about the numbers of cancers in their neighborhood.
- **Training 3: Understanding Environmental Contamination and Risk** introduces the audience to environmental contamination, environmental health hazards, and provides information on risk communication and risk perception relative to understanding and communicating the risk of environmental contaminants.

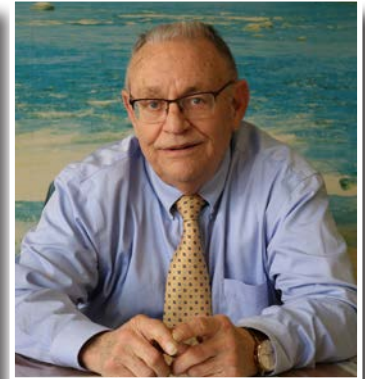
Contact New Hampshire APPLETREE by email at robert.thistle@des.nh.gov or phone (603) 271-1417. ■

SRF workshop

NEIWPCC will hold its first National State Revolving Fund Workshop in Portsmouth, NH, from July 27 to 29. The workshop focuses on relevant programmatic, financial and technical aspects of SRFs in EPA Region 1 and 2, and beyond. **Registration is extended until July 8.** The workshop will include environmental justice, PFAS, climate resilience, and source water protection, including several NHDES speakers from the Wastewater Engineering Bureau, Stormwater Management Program, and more. To register, see the [National SRF Workshop webpage](#). ■

NHDES reappointments

NHDES is pleased to announce that Commissioner Robert Scott was reappointed by the Governor and Executive Council for another four-year term in June. Water Division Director Rene Pelletier was appointed in January and reappointed for a four-year term in May.



Electric vehicle expo

As a member of [Drive Electric NH](#), the [Granite State Clean Cities Coalition](#), a clean transportation program hosted by NHDES, participated in an Electric Vehicle (EV) Expo at Unit-il’s new facility in Exeter on June 4. There was a great turnout from New Hampshire residents and visitors interested in the many new models of EVs available to the public. The EV showcase featured McFarland Ford Sales’ Electric Transit Van, EVs from Volvo Cars of Exeter, and many owner EVs from Rivian trucks to the VW ID.4 and Chevy Bolt EUV. Plus, ReVision Energy and Granite State Solar had tents and tables promoting solar and EV charging installation resources. Attendees had opportunities to speak with organizations supporting EVs in New Hampshire, talk directly with EV owners, and go on test drives. A big thanks to all of the participants and attendees who helped make this an exciting and informative event! ■



The weather forecast wasn't good for the day we were scheduled to do the July water sampling on Gregg Lake. I checked with NHDES to see if I could move the testing up a day. Would the equipment we borrow from them be available? Would they be able to handle sample analysis a day early? With permission secured, I raced to get everything ready, but the person who had volunteered to help couldn't make it. My backup was my cousin Suzy, who has gamely been my partner in many endeavors.

But Suzy had some somewhat unexpected guests. They had said they might stop by in late July, but when they called on the 15th to say they were in Boston, she gave them the okay to come on up. After all, her previous guests had left almost twenty-four hours before, and she had managed to get their sheets and towels washed... So, Suzy's late husband's sister's daughter arrived with her husband and a tall, gangly fourteen-year-old son named Gareth. As Gareth later explained, he'd been growing so fast he didn't know where his feet were.

Gareth's mother went for a quick dip with Suzy and me that first day, as the two of us headed out on our daily swim across the lake. Gareth showed no inclination to stick a toe in the water, but he was pleasant and willing to chat with the gray-haired old woman who showed up out of the blue to swim across the lake. He told me he liked science, but he was mostly into computers and gaming. He had had a great time at the Museum of Science in Boston. He lived in the city and walked everywhere. There were two parks near where he lived, but he had never been "out in nature" as we have it.

On his second evening, Gareth thought maybe he'd try taking a kayak out by himself while we swam. He had enjoyed kayaking with his parents earlier that day. We helped him get the kayak ready, and we all headed out, with Gareth going off to explore the shoreline on his own. The next day he took the kayak out again and mentioned that he might like to try Suzy's paddleboard. We pulled it to shore for him as we finished our swim so he wouldn't have to swim out to get it at its mooring if he worked up the courage to try it.

I raced to Concord the next morning to pick up the water sampling equipment. Usually, I pick up the equipment the day before; we'd be getting a late start. Suzy would be ready when-



Image credit: Frank Gorga (gorga.org/blog)

ever I got there. But on the drive back, I began to wonder if Gareth would like to join me instead. I called Suzy as soon as I got home. Did she think it would be okay to ask him? She could explain to him what would be involved. It would take me about thirty minutes to get everything ready; he had that long to decide. By the time I got to Suzy's, where the rowboat was moored, Gareth was ready and waiting.

Gareth helped ferry the equipment and pack up the boat. He said he could swim, but wasn't a good swimmer, so we got him seated before I climbed in to row. I handed him the GPS; his first job was to guide me to the flag marked "Deepest Spot" in the middle of the lake. He took me straight there, and I asked him to use the handheld sonar depth-sounder to confirm that we had found the right spot. When it said 46 feet, I suggested he hold the sounder absolutely vertical, to measure at a right angle to the bottom rather than a hypotenuse. He straightened it out, and his next reading of 37.2 feet told us we'd nailed the deep spot. We dropped two anchors and started collecting data and samples.

Gareth asked about everything we were doing and what the different samples were for. I tried to explain without lecturing; he had just finished eighth grade. He said he'd learned about watersheds and ecosystems in school, and he clearly loved relating what we were doing to what he'd learned. I explained that we had to follow strict protocols in gathering the data and collecting samples—the state depended on us to generate high quality data and would use it to determine the overall health of the lake. He was worried that he hadn't been trained; I assured him that I would make sure he did things the way they needed to be done, and he listened carefully.

To find the three water layers, we quickly graphed temperature readings taken every meter (about 3 feet) from the surface to the bottom. Graphing on paper is a novelty to a true digital native! It was a challenge to get the Kemmerer bottle used to collect samples at different depths to function correctly—Gareth had to drop the messenger, a heavy chunk of metal, down a long chain to snap the bottle closed at depths of 5, 20 and 33 feet—but he persisted until it worked, and we pulled up a good clear sample from each of the water layers. He had heard about problems with phosphorus and other pollutants in lakes and appreciated the importance of the samples that went into the brown bottles containing acid. I told him those bottles had to be filled just to the shoulder and because of the acid in them you only had one shot at filling them; he didn't want to risk messing up a sample and wanted me to fill all those bottles. He told me about his learning disability—similar to dyslexia, but with some different features—and how he tried to work with it in school, as well as in other activities. He was encouraged to find that he wasn't hampered in what we were doing.

Every once in a while, Gareth would pause, look around and say in awe, "I've never been out in nature like this before."

We had some extra excitement when a large motorboat began cruising up and down the lake, creating huge wake. I'd never encountered this before while water sampling; the waves were the biggest I'd faced in that small rowboat and were coming at us from all sides. The motorboat came closer than it should have and made no effort to reduce its wake. Knowing Gareth wasn't a strong swimmer, I stopped the data collection for a little discussion about what to do if we were flooded or flipped by the waves—don't panic; hold onto the boat, it wouldn't sink, etc. He seemed okay with that, and we continued calmly with the job at hand, with all sorts of

discussion about school, video gaming, city life, growing so fast he wasn't sure of his balance, cars I'd never heard of—he was impressed that I drive a car with a manual transmission and informed me that there is a renewed interest in them (I'm hip!)—and all sorts of other topics. We were still being rocked by the big waves when I had to clamber up to the front of the boat to pull up one of the anchors. I warned Gareth that if we started to tip, I would leap out rather than let the boat flip; he was to stay low and hold on tight. Luckily, I got the anchor into the boat safely.

We headed back to shore to drive and walk to the various places where we collect tributary samples. This was Gareth's chance to bail out—Suzy had promised him she'd take over at that point if he'd had enough—but he insisted on sticking with it. We headed down Castor Lane to sample the stream flowing out of the big beaver meadows west of Gregg Lake. I decided not to mention how many times I've seen bears and moose in that area, thinking that maybe beavers were enough nature for a self-described geek, but he seemed to be having a great time and our discussions continued. We hiked down Hattie Brown Road to sample the stream draining the Willard Mountain-Tuttle Hill ridge. Again, he looked around in awe at being surrounded by nature. We dropped a bucket off the Craig Road and Gregg Lake Road bridges to collect samples of the water just before it flows into the lake. The last stop was at the dam to sample the water flowing out of the lake. We gathered the final samples just at the 2:00 deadline and called it a successful day. Gareth thanked me numerous times for inviting him along.

As Suzy and I swam across the lake together that evening, she told me Gareth had decided he liked the paddleboard even more than the kayak. He'd also gotten hot while paddling down the lake and jumped into the water to cool off. He'd headed out on the paddleboard again that afternoon. As we reached the middle of the lake, we saw him rounding a point a half-mile away, a confident young man exploring his new world. Was his visit to Gregg Lake a life-changing experience? It's hard to say right now, but I'm betting that he won't forget what it's like to be "out in nature" and that phosphorus samples are collected in brown bottles containing acid. ■



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ARPA funding update

More and more infrastructure projects are being approved by the Governor and Executive Council for funding assistance through the American Rescue Plan Act of 2021 (ARPA) and the state Drinking Water State Revolving Fund and Clean Water State Revolving Fund (SRF) loan programs. As projects are approved, NHDES will announce them on our Facebook and Twitter pages. Be sure to follow along for updates! #NHARPA ■