NH WATER POLLUTION CONTROL ASSOCIATION

THE COLLECTOR

Share Your Thoughts

NHWPCA 2023 Winter Meeting

One Water - City of Manchester Water Treatment Facility Tour

Robert J. Robinson, P.E. and David G. Miller, P.E.

The City of Manchester welcomes you to celebrate the NHWPCA's Winter Meeting at the Water Treatment Plant (WTP) on December 8, 2023 in the spirit of "One Water". The newly constructed facility is located along the Merrimack River in Hooksett, NH.

Newly Constructed Water Treatment Plant located at 18 Kimball Drive, Hooksett, NH

The facility is operated by the Manchester Water Works (MWW). MWW supplies water to nearly 180,000 citizens in Manchester, NH and surrounding communities. The water source for the past 150 years has been Lake Massabesic, located in Manchester and Auburn. The facility on Lakeshore Road provides on average 18 MGD of potable water to the community. This is approximately 90 percent of Lake Massabesic's safe yield of 20.2 MGD.

The demand for clean water in the southern tier of the state brought forth a need for additional supply and infrastructure. MWW identified the Merrimack River decades ago as the best source for an additional water supply. Water professionals at MWW worked with their engineers to design and construct a facility in multiple phases.

The first phase was to determine the withdrawal method from the Merrimack River. MWW considered a traditional intake, vertical wells adjacent to the river, and the potential to utilize Riverbank Filtration technology. Ultimately, Riverbank Filtration through a radial collector well was selected based on favorable geological conditions for this technology.

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In This Issue

Editor's Words

Stephanie, Somersworth WWTF

For this edition of The Collector, we had a theme handed to us – One Water. I love that theme! The Somersworth WWTF is proudly located right on a fairly busy road. The side of the main building that faces the road proudly announces what we do here. However, I've learned that the general public may drive by on a regular basis, but still have no idea what a "water pollution control facility" does. (Yeah, we haven't updated our sign…)

In my own little way, I try to educate people as much as I can. I've recently given quick tours to members of the public who thought they were stopping by just to sign for and pick up a commercial user wastewater discharge permit.

I also educate people who think I work at the Safe Drinking Water side of the City. I get questions about drinking water on a regular basis, and from people who don't even live in Somersworth! When I get a question or complaint about "that horrible chlorine taste" I reply that residual chlorine is the taste of safe drinking water. We all know that wastewater effluent has to have a certain amount of time in our chlorine contact tanks in order to ensure that we kill enough e-coli to meet our permit limits. Similarly, the drinking water has to have enough chlorine residual to last until the end of the distribution system. The closer you live to the water treatment facility, the more chlorine you'll taste. But, it's never an un-safe amount. This simple explanation makes sense to people.

The Girl Scout Brownie-level Journey, Wonders of Water, truly embraces the One Water theme. I love volunteering with the young Scouts who are working on this journey. We learn about the environment's water cycle and about the waste involved in single-serve disposable bottles of water. I talk about the Clean Water Act and all the work that has been done since 1970. Of course, I have to spend a few moments talking about what NOT TO FLUSH! That's not exactly part of the programming, but what do you expect when you get a wastewater operator as a volunteer?!

In these few paragraphs, I've talked about several of the hats that I wear – industrial pretreatment, tour guide, wastewater operator and Girl Scout volunteer. Just for fun, I've included a photo of myself wearing my favorite witch's hat. It's almost Halloween, which means that the newsletter committee is on the final push to get this edition to you before the Winter meeting. Hopefully, I'll see a bunch of y'all there!

Upcoming Events

Go to **www.nhwpca.org** for live links to online registration

Dec. 8 - Winter Meeting w/ Business Meeting

Mar. 6 - Legislative Breakfast

Mar. 14 - NHWPCA, NEWEA, GMWEA Ski Day

NEWSLETTER COMMITTEE

Stephanie Rochefort, Mary Jane Meier, Steve Clifton, Ryan Peebles, Dylan Delisle, **YOUR NAME HERE**. We welcome additional members. We are looking for meaningful articles for the Wastewater Operator in a timely fashion. Send submission articles for *THE COLLECTOR* to: Stephanie Rochefort via email at srochefort@somersworth.com.

Editor: Stephanie Rochefort

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The second phase was to design and construct the radial collector well. The radial collector well would draw water from beneath the riverbed and take advantage of the filtration that the natural gravel provides. The third phase was to design and construct a raw water pumping station and water treatment facility to purify the water. The raw water pumping station is located ¾-miles north of the treatment facility. The two facilities are connected by a 20 inch main to convey the water from the river to the treatment plant.

The WTP was designed and constructed with a maximum capacity of 7.2 MGD. An important design goal was to produce water from the Merrimack River source that matches the quality and characteristics of the water from the WTP at Lake Massabesic. The facility was completed and began operation on August 2, 2023.

To treat the water, the facility has the following process equipment:

- Greensand Filters
- Granular Activated Carbon Contactors
- Primary disinfection with UV and free chlorine
- Ammonia is added prior to point of entry to form monochloramine for residual disinfection

The City of Manchester would like to welcome all visitors to tour the newly constructed WTP located at 18 Kimball Drive in Hooksett, NH. The City, engineers, equipment vendors, and contractors will provide tours and share project contributions. Coffee and morning snacks will be provided. Following the facility tours, guests are invited to join us at the Puritan Backroom, located at 245 Hooksett Road, Manchester, NH. Stop by for lunch, a presentation on the plant, and a business meeting.

Blurbs, Blurbs, & More Blurbs

Fall Meeting

We had a successful fall meeting in Durham this year. There was a great turnout and the staff at the facility did an excellent job. I would like to thank them for taking the time to give the tours and answer any questions we all had. I would also like to thank all the sponsors because your support and partnership plays a key role in the success of our events, and we appreciate your participation. The luncheon was held at the Three Chimneys Inn & Frost Sawyer Tavern where the Town of Durham and Wright-Pierce gave a presentation followed by a buffet lunch. Thank you to all that attended for your support and membership.

Fall Meeting Sponsors:

Clean Waters, Inc.

EJP

Hayes Pump, Inc.

Trillium Flow Technologies

Underwood Engineers

Bruce Kudrick's Retirement Party

by Ken Conaty

As I'm sure you all remember too well, we had to forgo many things during COVID. One of the things that was sadly passed over was celebrating the retirements of many of our long-time colleagues. On Wednesday September 27th the Hooksett Wastewater Treatment Plant was able to make up for one of those lost events. We honored Bruce Kudrick with an official retirement party for all his years of service to both the Hooksett Sewer Commission and the NHWPCA.

Bruce worked in Hooksett for 47 years and he was Superintendent since 1980. He is a past President of NHWPCA. He served on many committees and spent countless hours always trying to better benefit all the operators in NH. Even in retirement he continues to share his knowledge by speaking on subjects as requested.

Bruce was honored by several speakers at his retirement, including Andre Garron (Hooksett Town Administrator), David Campbell (former NH senator), Tracy Wood (NHDES), Sidney Baines (Hooksett Sewer Commission Chair), and Ken Conaty (Hooksett WWTF Superintendent). All the speakers had one thing in common-they spoke of Bruce's commitment to cooperation and integrity.

The retirement party was well attended by family members, friends, colleagues, vendors, regulators, co-workers, and many other people that Bruce interacted with throughout his long career in Hooksett and in the State of NH.

NEWEA Fall Golf Tournament

New England Water Environment Association (NEWEA) held its annual Fall Golf Tournament on September 29, 2023 at the Derryfield Country Club in Manchester, NH. Despite the rather damp

weather, the tournament was sold out with 117 golfers registered.

NEWEA would like to extend our gratitude to all golfers and sponsors for making this year's tournament a success. Over $4,500 was raised to support NEWEA's education, scholarship, and training programs. We appreciate the participation and support and look forward to seeing everyone next year.

Thank you to our 2023 NEWEA Fall Golf Tournament Sponsors:

- Aqua Solutions, Inc.
- Arcadis
- Carlsen Systems, LLC
- CDM Smith Inc.
- Ferguson Waterworks
- Flow Assessment Services
- Hazen and Sawyer
- Jacobs
- Kleinfelder
- Multiple Hearth Services, IFCO
- Pare Corporation
- Smith & Wilkinson
- Stantec
- Victaulic
- Weston & Sampson
- Woodard & Curran

Announcements

SAVE THE DATE

NHWPCA will be hosting a legislative breakfast on March 6, 2024 at the Holiday Inn in Concord. More information will be coming out soon!

2024 Ski Day – Save the Date

Join NHWPCA, MEWEA, and GMWEA for the 15th Annual Ski Day.

Date: March 14, 2024

Location: Saddleback Mountain; Rangeley, Maine

Photo from 2023 Ski Day at Loon Mountain in Lincoln, NH

Nashua WWTF Receives 2023 EPA Industrial Pretreatment Program Excellence Award

Congratulations are in order for the staff at the Nashua WWTF for being awarded a 2023 EPA Industrial Pretreatment Program Excellence award. The award was presented at the New England Regional Pretreatment Coordinators' Association (NERPCA) annual conference. Justin Pimpare from EPA New England presented this award and spoke highly of Nashua's program. Not only did they have a stellar EPA-audit, they've also gone above and beyond with other aspects of their program, such as inspecting amalgam separators at dental offices. Visit NERPA.org to learn more about the association and the annual conference.

Safety Corner

Winter Will be Here Soon! Is Your Workplace Prepared?

By Patty Chesebrough, NHWPCA Safety Committee

The onset of winter in New England brings cold temperatures, ice, snow, sleet, freezing rain, and high winds – all of which add to the hazards associated with our daily routines, both on and off the job. It also leads to an increased risk of illness from bacteria and viruses. Practice some of these steps to help reduce the impact of winter on your workplace:

- Keep current on the latest information and recommendations from the Center for Disease Control (CDC).
- Ensure your employees are equipped with proper clothing and equipment to perform their work in winter weather.
- Plan for extreme weather and allow extra time for warm-up breaks during the work day.
- Train employees to recognize when they are getting too cold, which can not only increase the chance of illness, but also lead to more serious conditions such frostbite and hypothermia.
- Promote and practice good hand washing. Most people don't wash their hands long enough to properly kill germs. A good rule of thumb is wash with warm soapy water for as long as it takes to sing "Happy Birthday" twice. To keep hand-washing front and center in your workplace, provide educational materials such as signage and light-hearted videos (e.g., CDC's Soap in the City).

- Teach and encourage hygienic coughing and sneezing. The CDC recommends coughing and sneezing into the sleeve, instead of the hand, to prevent the spread of germs. Use readily available and fun teaching tools such as the CDC 's video, Why don't we do it in our SLEEVES, to reinforce proper hygiene.
- Encourage employees to stay up to date on vaccinations for common illnesses such as influenza and COVID-19, but also more serious illnesses such as pneumonia, respiratory syncytial virus (RSV), and hepatitis.
- Have a plan to handle widespread illness in your workplace. COVID-19 showed us all how a pandemic can impact utilities, but illness can impact your workplace on a much more localized level as well. A bad flu or stomach bug can spread across your entire staff in just a few days to a week, crippling your operation.

We all know how to reduce winter hazards. This article just serves as a reminder for us all to take the time to actively practice and promote these tips so we can all reduce the impact of winter on our workplace.

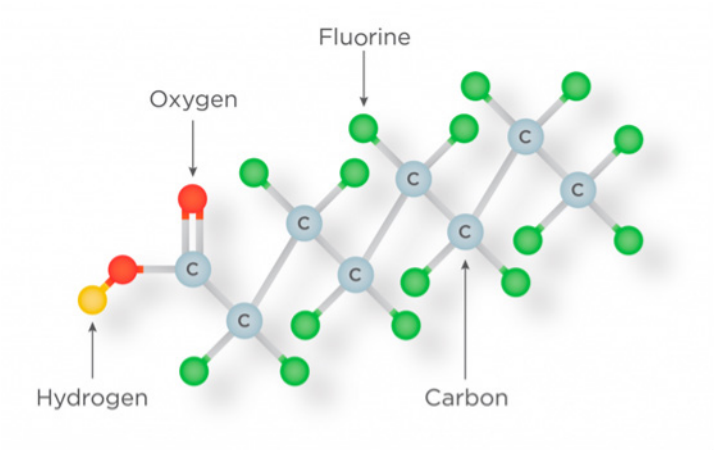
This article is brought to you by the NHWPCA Safety Committee. We are still seeking Near Miss ideas. If you or someone you know have had a Near Miss, please let us know by sending the incident to Patty Chesebrough at pchesebrough@neiwpcc.org. All submissions are confidential. We just want to keep a Near Miss from becoming an accident. Thank you in advance for your submissions.

Thoughts from the Bench

By Stephanie Rochefort, City of Somersworth WWTF

It wasn't very hard to come up with some thoughts from the bench that fit into our "One Water" theme for this newsletter. PFAS sampling is a hot topic for both drinking water and wastewater. And not just our wastewater effluent, but also influent, biosolids and wastewater from various industrial and commercial sectors. I thought that I knew a lot about proper sampling techniques. After all, I have learned all about low-level sampling for mercury with the clean-hands/dirty-hands technique. I have learned the importance of acid-washing my sampling equipment. I have learned how to properly grab a sample for e-coli analysis. But WOW, sampling for PFAS is just over-the-top something else!

First of all, I'm just going to use the term "PFAS". By now we all know that PFAS stands for per- and polyfluoroalkyl substances which contain a strong carbon-fluorine bond that allows them to accumulate over time in the environment and in the bodies of animals and people.



There's a LOT of PFAS compounds! EPA method 1633 is in its fourth draft and is now the recommended method and grab samples are the recommended sample type. Always confirm the most up-to-date rules before collecting and sending a PFAS sample out for analysis. And make sure that you use laboratory-provided sample bottles! The bottles must be made out of HDPE or PP, not LDPE or glass. The easiest way to not mess up this step is by using the laboratory-provided bottles.

If you have a sampling location where you can't safely collect directly into the laboratory-provided sample bottle, you need to be cautious about your sampling equipment. If you need to collect with a pump, all tubing must be HDPE, LDPE or silicone. Teflon and other fluoropolymer containing materials are not allowed. Don't use pipe thread seal tape. This all seems easy enough. You want to preserve the sample COLD until pick-up by or delivery to the lab. Don't use chemical ice packs. Seal regular ice in plastic (polyethylene) bags to prevent the melt-water from contaminating the samples.

As we do with any sample, we need to document and label our samples. Don't use waterproof/treated paper or field books. Don't use plastic clipboards. Don't use any markers unless they are Sharpie® brand. Don't use Post-it® notes or other adhesive paper products. Honestly, Post-it® notes don't belong anywhere near a WWTF lab. What you can use is plain paper, a metal clipboard, Sharpie® brand markers and pens. OK, this isn't too difficult, you just need to take a little time to get it right.

Things get a little trickier with PFAS sampling because we need to pay attention to what we're wearing for clothing. I love dressing up for a theme, but that's not what I'm talking about. "PFAS Sample Collector" is not a good Halloween costume! The best clothing to wear is made of synthetic or 100% cotton material that has been laundered more than six times without using fabric softener. Wow, that's a lot of rules! Would it be easier to just put on a Tyvek® suit? NOPE, unless you make sure that it is uncoated Tyvek®. Steel-toed boots are okay, as long as they're not coated with any synthetic water-resistant materials.

Now we get to the really crazy rules. You are not supposed to wear cosmetics when collecting PFAS samples and there's only a short list of sunscreens and insect repellents that are acceptable. I'm not sure to be more upset about not being allowed to wear cosmetics or the idea that apparently, I AM PUTTING PFAS ON MY FACE EVERY DAY!!!

I like my cosmetics and my lotions so I think that I'm going to ask one of the men here to collect needed PFAS samples. Of course, it'll need to be a man who

has a beard because shaving cream is on the list of things not to use before collecting PFAS samples. Or a man who uses an electric razor. Nope, that probably won't work either because of pre-shave and after-shave products. Back to a man with a beard. I learned from my ex-son-in-law that some men use products to keep their beard looking nice. So, I'll need a co-worker with a beard who doesn't use any products. This is TOO MUCH INFORMATION to know about a co-worker…you think?

Probably by now you're wondering if all of these sampling precautions are truly important? Is it really that easy to contaminate a PFAS sample? Will the results be high because I'm wearing lipstick? I'm wondering these same things, but for now I'm just going to follow the rules. After all, it took a long time for the simple change in BOD sample holding time to be approved…

Residuals Report

By Wade Pelham, Water Division - Wastewater Engineering Bureau, NHDES

As the years go by, we see more and more veterans of the wastewater field make plans for retirement. While we know these sorts of things are inevitable, it can still be difficult to fathom when a long-standing industry veteran lets you know they have their last day marked on their calendar. You are happy that they are looking forward to a new chapter in their lives, while you also reflect on all the great work they have done and know that they will be missed. It is with that sentiment that we bid a NH farewell to Vinnie Melendez, the longtime Wastewater Specialist with the Granite State Rural Water Association. Vinnie wrapped up his time with GSRWA in September of this year. Vinnie assisted countless utilities over the years in his time with GSRWA, along with coordinating trainings throughout New Hampshire, including some in partnership with the NHDES Wastewater Engineering Bureau's Residuals Management Section. Vinnie has also been a familiar face over the years manning the GSRWA booth at industry shows throughout the region, like the NHWPCA Spring Conference. The good news for the wastewater industry is that Vinnie isn't retiring. While many folks plan to retire and head south to places like Florida, Vinnie plans to shift his focus only slightly south, to Massachusetts, and continue his work with the Massachusetts Rural Water Association. So we say thank you to Vinnie for all his time and effort spent in New Hampshire over the years, and we know the folks in Massachusetts are in good hands.

Energy Matters

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

NHSaves® Your Source for Energy Efficiency | EVERSOURCE | Liberty | New Hampshire Electric Co-op | Unitil

Congratulations to the 2022 NHDES and NHSaves® Utility Partners' Wastewater Treatment Facility Energy Efficiency Award Winners!

Our first energy efficiency awards were presented in 2019 and we are ready to announce some new energy efficiency champions based on 2022 energy and operations data. The New Hampshire Department of Environmental Services (NHDES), in partnership with the NHSaves Utility Partners, has been making a concerted effort to help NH wastewater treatment facility (WWTF) operators and owners improve the energy efficiency of their facilities. This effort started in 2016 with a grant from the US Department of Energy and continues using funding from the Clean Water State Revolving Fund (CWSRF), American Recovery Plan Act (ARPA) and a continued partnership with the NHSaves Utility Partners. We have also expanded the program to include drinking water facilities (DWFs) using both ARPA and Drinking Water State Revolving Fund (DWSRF) monies. Since the start of the program, a few of our accomplishments include:

- Continued annual electric energy benchmarking of 69 municipally owned WWTFs.

- Offered numerous educational workshops for wastewater and drinking water facility owners, operators, managers and engineers **(Save the Date: April 3, 2024 Pump Optimization class for operators and engineers)**;
- Performed 56 comprehensive energy audits (CEAs) of selected WWTFs with repeat CEAs at selected facilities once all the initial measures were implemented.
- Performed 6 CEAs of wastewater pumping station-only facilities.
- Performed 42 CEAs of selected DWFs.
- Developed energy efficiency design guidance manuals to assist design engineers with incorporating energy efficiency into wastewater and drinking water facility upgrades.

The 62 wastewater CEAs have identified over $6.3M worth of projects that are estimated to save over $1.9M annually in energy costs. This works out to an overall average 3.2-year simple payback on project implementation **prior** to any of the available, very generous, incentives being applied. On the drinking water side, so far, we have identified $1.3M worth of projects that are estimated to save approximately $0.46M annually in energy costs. For the drinking water facilities, this comes out to an overall average 2.8-year simple payback **prior** to incentives. We continue to use available incentive programs provided by the NHSaves Utility Partners and CWSRF principal forgiveness to encourage the implementation of the wastewater projects. Currently, on the drinking water side, the NHSaves Utility Partners' incentives are being used to encourage implementation of the identified drinking water energy projects.

Electric energy use can be quantified in many ways. For wastewater treatment, energy use intensity is typically based, most commonly, on the volume of flow treated by a WWTF in million gallons per day (MGD). Another measure is based on the strength of the wastewater in pounds of biological oxygen demand (lbs BOD). The driving factor, flow or waste loading/strength, for each WWTF varies.

Energy efficiency is only as successful as those that lead the way, so identifying champions is critical. Now that the program has been in place for eight years, we are really seeing the benefits for those who have implemented the findings of their facility's CEA. Using the energy and operational data for 2022, NHDES has identified numerous energy efficiency champions that are front runners of this effort. To recognize their hard work, we are proud to announce the winners of the 2022 NHDES/NHSaves WWTF Energy Efficiency Awards in two categories: **Most Improved** and **Overall Most Efficient**. Due to significant process differences, we are recognizing Lagoon Facilities and All Other Secondary/Advanced Facilities separately. One big difference for the 2022 awardees relative to the 2019 awardees is that we are awarding **Overall Most Improved** and **Overall Most Efficient** instead of separating out awards for kWh/MGD treated and kWh/lb BOD removed.

Most Improved WWTFs

Due to the significant differences in operating a lagoon versus other types of WWTFs, along with the large number of lagoon facilities in New Hampshire, we decided that the fairest way to compare and determine the overall most improved WWTF was to separate lagoon and non-lagoon facilities. Therefore, there were two winners for the 2022 Most Improved category!

Most Improved Lagoon Facility: Lisbon

Lisbon operates a small (0.32 MGD) lagoon facility. Since their CEA was conducted in 2016, they have reduced the energy use by **42%**! Their benchmark values have been reduced as follows:

Lisbon Energy Benchmarks		
Year	**Metric – kWh/MG**	**Metric – kWh/#BOD**
2016 (year of CEA)	**4559**	**2.27**
2022	**3089**	**1.93**

Lisbon made this improvement by optimizing their blower operation and based on their continued energy use reductions over the past 8 years, they are still paying attention to their facility. And the cost for that 42% reduction in energy use? **$0!!!** Keep making improvements and remember to contact CWSRF and NHSaves for incentives before you spend any money! **WAY TO GO LISBON!**

Most Improved Activated Sludge Facility: Peterborough

The Peterborough WWTF is a 0.62 MGD sequential batch reactor (SBR) facility. The staff at the Peterborough WWTF have long shown a

commitment to continuous improvement by making steady changes at their WWTF over time, selecting and implementing projects that improve both the operation of the facility as well as its efficiency. The measures from the CEA that were implemented were all low to no cost measures resulting in instant payback in savings. In addition, one of the key elements that helped Peterborough achieve energy savings was the willingness of staff to explore alternative approaches to develop the most cost-effective energy measure that fit their needs the best.

The implemented projects have reduced Peterborough's energy use by 33.9% since their CEA was conducted in 2016, bringing their metrics down to the following.

Peterborough Energy Benchmarks		
Year	Metric – kWh/MG	Metric – kWh/#BOD
2016 (year of CEA)	11,044	3.88
2022	6,438	3.39

Peterborough also has a large solar array installed in the area of the former lagoons to support a portion of the energy used by the WWTF as well as other municipal buildings. We will encourage Peterborough to continue being an energy efficiency champion and see how much more energy they can save over the coming years! By implementing energy efficiency measures, the solar array now covers over 30% of the energy used by the WWTF vs only 25% previously. Keep making improvements and remember to contact CWSRF and NHSaves for incentives before you spend any money! **WELL DONE PETERBOROUGH!**

Overall Most Energy Efficient WWTFs

For the selection of the two overall most energy efficient WWTFs in New Hampshire, this year we compared all the lagoon facilities (WWTF + main pump station) and all the other non-lagoon facilities (WWTF + main pump station). We did not separate and compare facilities based on each benchmark metric but looked at both metrics together.

Overall Most Efficient Lagoon Facility: Bethlehem

The Bethlehem WWTF is a 0.34 MGD lagoon facility. Since the CEA was completed, the operations staff in Bethlehem has completed the replacement of leaky aeration piping resulting in a **29.7%** reduction in their energy use. This reduction brings their 2022 benchmark metrics down to the following:

- 2,112 kWh/MG treated, and
- 1.22 kWh/#BOD removed

Bethlehem's benchmarks are well below other available national benchmark data for lagoons treating less than 1 MGD from NYSERDA (2,530 kWh/MG and 1.5 kWh/#BOD) and Wisconsin Best Practices (3,540 kWh/MG). **CONGRATULATIONS BETHLEHEM!!!**

And, the best news, Bethlehem is not done yet! They are currently on their way to reaching net zero energy use for the WWTF through the replacement of aging and inefficient motors as well as installation of a solar array. This project is being partially funded through an ARPA grant from NHDES.

Overall Most Efficient Activated Sludge Facility: Claremont

The Claremont WWTF is a 3.89 MGD conventional activated sludge facility. Since the CEA was

completed in 2019, the implemented improvements have resulted in a 23% reduction in total energy use which brings their 2022 benchmark metrics down to the following:

- 1,130 kWh/MG treated, and
- 0.48 kWh/#BOD removed.

Claremont's benchmarks are well below other available national benchmark data for activated sludge facilities treating 1-5 MGD from NYSERDA (1,340 kWh/MG and 2.2 kWh/#BOD) and Wisconsin Best Practices (1,650 kWh/MG).

As excerpted from the Claremont case study prepared by Process Energy Services, the project scope increased from what was originally cited in the CEA with a final project costs/funding as follows:

Peterborough Energy Benchmarks	
$651,635	Loan from NHDES CWSRF
-$200,000	Principal forgiveness for Energy Audit Measure Implementation (EAMI)
-$37,638	Principal forgiveness based on afford-ability criteria
$413,997	Adjusted loan amount post principal forgiveness
$46,344	10 annual loan payments due

Eversource also incentivized the project with a $50,000 custom project incentive, which more than covered the first-year loan payment. **The actual/ projected energy savings to date have exceeded estimated savings with the resulting savings covering most of the loan payments.**

Claremont has also added a solar array to provide for a portion of the energy used by the WWTF and the City is currently considering adding additional solar capacity. Through the improved efficiency with the aeration upgrade, the solar array has gone from providing about 25% of the energy used at the WWTF to providing about 33% of the energy used.

CONGRATULATIONS CLAREMONT!!!

Congratulations to all on a job well done! These awards will be formally presented during the joint NHWPCA/NHWWA Winter Meeting on December 8.

Wrapping It Up

The NHDES Wastewater and Drinking Water Energy Program is not done, so keep up the good work because other WWTFs will hopefully be trying to take your spots for future awards and the competition could be stiff! The program will always be encouraging energy efficiency first. However, we have started to include solar arrays or other renewable energy measures where they make cost effective sense. That said, we will only provide funding for the renewable energy measures if the energy efficiency measures are also implemented!

Related to renewable energy, we were hoping to give kudos to all the NH WWTFs that have reached net zero energy use status through energy efficiency and renewable energy combined. However, at this point, we don't have the data needed to make that determination except for a few facilities. We highly recommend (and require if we are funding) that metering be installed so you know how much power

is being sent to the WWTF vs how much power is being sent to the grid.

In addition to the congratulations to the 2022 Energy Award winners, there are two takeaways I want you all to remember!

1. **Energy Efficiency is an active process. Don't stop thinking about it, or your energy use will creep back up! The data doesn't lie! Any time you can take the human element out of the picture and automate your efficiency, you will be better off.**
2. **Any time you are planning to replace or upgrade equipment that uses energy, contact your energy utility representative to see if the project might qualify for incentives! Do this at the planning stage or you will miss out on potential incentives!**

Do you want to improve the energy efficiency at your WWTF, your pumping stations, or your drinking water facility? Email Sharon Nall at NHDES at Sharon.L.Nall@des.nh.gov to find out how.

Pretreatment Tales

After Alexis Rastorguyeff's recent retirement, Zach Lorch has filled the role of NHDES's Industrial Pretreatment Supervisor. The position works closely with municipalities and industries to ensure operations are in compliance with NHDES' pretreatment rules. Zach comes to the position with experience in industrial wastewater treatment, hazardous waste management, remediation and NPDES permit writing. Zach received his bachelor's degree in environmental engineering from Worcester Polytechnic Institute and recently obtained his professional engineering license. Working with industry, and now municipalities, has always been a passion of his even when he was an intern for NHDES.

Zach Lorch, NHDES's Industrial Pretreatment Supervisor

As a NH native, protecting the exceptional environment of his home state is paramount. Growing up in the Lakes Region on Winnisquam and having the mountains just a short drive away has always inspired a deep sense of appreciation for nature. So much so that Zach can often be seen taking his high energy Corgi mix for a walk on a local trail before work or playing a round of frisbee golf at a local course on the weekend. After recently moving with his wife and three dogs however, he's mostly been working on projects around the house.

Zach looks forward to working closely with the great people of NH to ensure our surface waters and environment remain protected and enjoyed for years to come!

Retiree Rave

We continue our salute to the wastewater and drinking water operators and administrators who are now enjoying retirement. Our newsletter committee would appreciate hearing from our readers to expand this list so we can recognize our loyal, hardworking associates and friends. Please reach out to any of the newsletter committee members with contact information for retirees and we'll take it from there!

Susan Snyder Milford Wastewater Laboratory Supervisor

Susan Snyder began working for the Town of Milford in September 1999 at the Wastewater Treatment Facility (when it was just wastewater operations).

Her retirement from the Milford Water Utilities Department began August 1st, 2023, almost 24 years later. She thoroughly enjoyed her Lab Supervisor duties, especially when requested by science instructors and residents to provide a guided tour of Milford's wastewater operations to students and residents, always happy to answer questions and to point out that organisms are nature's own built-in water purifiers, hungry to devour and digest organic waste material in wastewater. Susan's quiet manner and excellent analytical skills served her well. We wish her a long and healthy retirement and thank her for her dedication and years of service to the community.

Operator Profile

Vermont to New Hampshire Operator Exchange

By Carrie LaFond, Chief Operator, Fair Haven Wastewater Treatment facility

Recently I was awarded the honor of being the New Hampshire Water Pollution Control Association's Operator Exchange candidate from Vermont, which provided me the opportunity to explore New Hampshire's wastewater facilities. I would like to give a huge thank you to Nate Brown, the Utilities Superintendent from Peterborough, who was my tour guide for the entire adventure. Nate was a wonderful host, along with the operators that took time out of their busy schedules to show me their plants.

My first tour started with the Hanover Plant located on 121 South Main St. I was greeted by a very knowledgeable crew that gave me a very detailed tour of their wastewater facility, even though they were incredibly busy. The facility was very well maintained and had a spectacular view of the river. The Hanover plant reminded me of my own plant back home in Vermont, that has recently finished a complete refurbishment. Hanover too, is starting an upgrade, and they utilize the same process as our Fair Haven Plant (an activated sludge facility with aeration basins).

Next on the tour list was the Sunapee Wastewater Treatment Facility. The Sunapee plant was the smallest of the plants on the tour with its two oxidation ditches. The staff was extremely friendly and took great pride in their facility. Here I learned the many different ways that the operators were working to tackle the ever-growing phosphorus problem many plants are dealing with. Also, it was here that I got my first glimpse of a "classifier" a mystical piece of equipment that I need at my own plant. The classifier is a piece of equipment that works in conjunction with the grit remover system that helps dry the grit out and move it to a large receptacle for disposal.

The next day the tour started with Nate Brown's plant in Peterborough. The Peterborough plant was a spotless SBR plant. It was becoming very clear to me that the operators in New Hampshire take great pride in their plants and it shows. It was wonderful to see a new young operator at the plant as this is a field that has many operators getting ready to retire without replacements ready to step in and fill their shoes. Again, the staff was very competent and they gave me a detailed tour, answering all of my many questions without hesitation.

Jaffery was the second plant that I toured on my second day in New Hampshire. The Jaffery plant is contract operated by Veolia, and is set up with two oxidation ditches. I learned that by the way the plant is set up, taking in septage during the winter months can be quite a challenge.

My last day was spent at the Durham facility which was by far the largest on my tour. The Durham plant faces the incredible challenge of servicing The University of New Hampshire, which means preparing the plant for very different flow levels based on when the school is in and out of session. The Durham tour was a group tour because the plant was hosting the NHWPCA fall meeting. This gave me an opportunity to meet a large variety of individuals involved in wastewater from all over the state. After my tour of the Durham facility I attended the fall NHWPCA meeting at Three Chimneys where The Durham Wastewater Facility gave a very detailed presentation on their plant, followed by a wonderful lunch.

In closing, I would like to encourage anyone new to the wastewater field, or anyone starting an upgrade to take advantage of the great opportunity to be a part of the Operator Exchange program. Rarely do operators have the time to go to other plants and tour them because of the heavy workload and staffing limit. The experience to see other plants and different process is unmeasurable. I came home full of ideas for our plant and I hope I was able to inspire others on my journey as well. Thank you again to NHWPCA for supporting this program, and thank you to all that took time out of their busy schedules to show me their plants.

NEW Wastewater Operator Rules Adopted

At a minimum, state rules need to be readopted every ten years but may be modified at any time as needed. This process provides the opportunity to periodically review and change rules to better implement the state statutes that underlie those rules. Furthermore, this allows for the opportunity to address the needs of the regulated community. **ENV-Wq 304 Certification of Wastewater Treatment Plant Operators** saw some key changes this re-adoption cycle. Those changes address both the needs of our wastewater treatment plants and operators, as well as ensures that wastewater treatment plants are operated by persons who have the necessary knowledge and skills to do so. The intent of this article is to give a brief overview of the adoption process and the major changes. The full text of the new rule can be found at https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/env-wq-304.pdf.

The rule making process took about two years. The process was introduced to the wastewater community at the NHWPCA 41st Trade Show on October 1, 2021, by way of a roundtable discussion. During this discussion volunteers were requested to be part of a 304 rules review group. An email was also sent out requesting help from others who might be interested, which ultimately provided a well-rounded rule review group. Members of that rule review group included Mike Carle (Hampton), Patty Cheseborough (NEIWPCC), Vinnie Melendez (GSRW), Noelle Osborne (Nashua), Rob Robinson (Manchester and NHWPCA), Ray Vermette (Dover), and NHDES WWEB Operation Staff (John Adie, Dick Emberley, and Mark Kondelis, Sr.) as well as Tracy Wood, NHDES Wastewater Engineering Bureau, Administrator. Please thank your peer volunteers for the countless hours they gave to the process.

The rulemaking process included extensive review and discussion of the text of the existing rule by the rule review group which resulted in initial proposed revisions. These initial proposed revisions underwent DES-Legal review prior to being ready to submit to the Water Council for its review. After approval by the Water Council a 'Financial Impact Statement' (FIS) was filed, and a 'Rulemaking Notice' (RMN) was published and distributed. Next was a Public Hearing and written comment period, after which the 'Final Proposal' was filed and the 'Joint Legislative Committee on Administrative Rules' (JLCAR) had its opportunity for review. After some back-and-forth final approval was given on 9/27/2023.

Electronic (online) application and data submittals

The revised rule requires electronic submittals for all applications, which provide the benefits of easy submission, improved data management, and the ability to pay with online payment where applicable. There will be five forms used to provide wastewater operator certification data to NHDES:

1. Certification, renewal, or operator information update: https://onlineforms.nh.gov/?FormTag=N-HDES-W-09-004
2. Multi-Plant endorsement application: https://onlineforms.nh.gov/?formtag=N-HDES-W-09-065
3. Designation of authorized representative and operator in responsible charge: https://onlineforms.nh.gov/?formtag=N-HDES-W-09-067
4. Reporting of responsible operator status:

https://onlineforms.nh.gov/?FormTag=N-HDES-W-09-055
5. WW training course approval: https://onlineforms.nh.gov/?formtag=N-HDES-W-09-068

Summary of major rule changes are as follows:

304.04 Operator-In-Training (OIT) status needs to be completed within 3 years, or you revert to your previous status.

304.06 Operator in Charge of Multiple Plants will now receive an endorsement (M) to certification after submittal and approval of a workplan detailing how they plan to provide proper operational oversight for the plants involved. There are also limits to the number of plants a person can provide operational oversight for based on plant complexity.

304.07 Operating Experience Requirements (c) (d) - Grade III requires 2 years of experience at a Grade II or higher WWTF and a Grade IV requires 3 years of experience at a grade III or higher WWTF.

304.07 Operating Experience Requirements (f) - Military experience has been added as an additional option for experience.

304.08 Education Requirements (g) (2) - One year of experience as an OIRC may be substituted for one year of education requirement for Grade III or IV.

304.08 Education Requirements (g) (4) - Recognition of relevant Military Operational Specialties (MOS) training as education.

304.15 Certification Renewal (f) - An Inactive/Retired status is available on request for 2 years. This will provide an operator with health problems or uncertainties about retirement the time to recover or decide.

304.16 (b) Continuing Education Required – 50% of required continuing education hours must be directly related to wastewater treatment. 20 hours continuing education required for all grades except I-OIT which isn't a certified operator until experience requirements have been met.

304.18 (d) (f) - Five-year sunset clause for approved training courses before reapproval is automatically required.

304.25 **Code of Professional Ethics** – provides support for operators facing ethical issues.

(b) The certified operator shall comply with the following:

1. Use reasonable care and judgement in the performance of their operational duties;
2. Ensure the integrity of the samples that they collect, prepare, or analyze to ensure that the results are a true representation of water quality;
3. Undertake only those jobs which they are qualified for by reason of education, training, and experience to perform;
4. Immediately advise the OIRC or the owner of the plant, as applicable, and document adverse conditions as they arise; and
5. If the certified operator's judgment is overruled by the owner of the plant or the certified operator's employer, in circumstances in which the safety, health, or welfare of the public or the environment are endangered, the certified operator shall inform and document that they informed the owner or employer, as applicable, of the possible consequences.

304.29 Wastewater Treatment Plant Owner Responsibilities (b) (2) – Designate an individual to be the **back-up OIRC**...This designated individual **shall be certified in the grade equal to or greater than the classification of the plant.**

304.29 Wastewater Treatment Plant Owner Responsibilities (b) (4) – **Define the important operating functions in Statute 485-A:2** Definitions (VII-a) (c).

(4) Ensure that all personnel performing the following important operating functions at wastewater treatment plants are certified under these rules:

a. Removal of all pollutants from wastewater in order to comply with permitted limits;
b. Maintenance of pumps, valves, and processing equipment;
c. Operation of chemical feeding devices, performance of laboratory analysis, and maintenance of required records; and
d. Monitoring of a Supervisory Control and Data Acquisition (SCADA) system, gauges, or other equipment that monitors process stability.

304.31 Certification Committee (a) (b) (c) – Restructure the certification committee to allow for a greater and more diverse number of members.

These rules are for the benefit of New Hampshire's wastewater operators and for the benefit of New Hampshire's municipalities. Additionally, these rules ensure that the significant investments made in wastewater infrastructure are properly operated and maintained in a way which ensures compliance with state and federal requirements, and New Hampshire's way of life!

City of Manchester - 20 Years of Challenges Met and Mastered

By Frederick J. McNeill, P.E., Chief Engineer, Environmental Protection Division, Department of Public Works, City of Manchester

As promised in the last edition of The Collector, here's the rest of the story!

Work at a WWTP is similar to painting the Golden Gate Bridge. You start at one end of the plant and by the time you reach the other end it's time to start all over at the other end. Carrying this theme forward the City has three more WWTP projects programmed to complete the facility Plan's recommendations. These projects are:

- Generators Upgrade – $24.0 Million - Construction 2024
- WWTP Pump Station – $10.7 Million - Construction 2025
- Operations Building Upgrade – $7.5 Million - Construction 2026

When the above projects are completed it will be 2030 and time to prepare a new WWTP Facilities Plan and start the process all over again.

CSO Mitigation Program

In addition to the WWTP work, the City has been working under a series of consent decrees to mitigate CSO discharges since the mid-1990s. The City completed a 10-Year $58.0 million Phase I program between 1999 and 2009. Under this program 15 drainage basins on the City's West Side were fully separated. This work was done under eight construction contracts that installed over 53 miles of new or rehabilitated piping from 8-inch to 60-inch diameter. The City essentially constructed a new drainage system and used the existing "combined" system for sewer. Phase I was very successful, achieving a 99% annual West Side CSO reduction from 53.2 mgd to 0.2 mgd annually. The consent decree specified a three-month level of CSO control and the program greatly surpassed that achieving a two-year level of control. As a result of this higher level of control, the Merrimack River water quality experienced immediate improvements. In addition to these critical water quality improvements, the residents of Manchester also received several other "concrete" benefits. As part of this Phase 1 program there were 26 miles of road reconstruction, 9 miles of new water mains, 14 miles of new gas mains, 8 miles of curbing, 6 miles of sidewalks, and ADA compliant pedestrian ramps. Amazingly, this ten-year $59 million program was completed on schedule and on budget.

After the successful completion of the Phase I program, the City took a proactive approach and continued with two more major CSO contracts. The Chestnut Street Project was a $16.6 million program from 2013 to 2017 that consisted of two construction contracts that installed over 26,500 linear feet of new pipe ranging from 6-inch to 60-inch with depths up to 24-feet.

Using lessons learned on Phase I, the City leveraged these two Chestnut Street Projects to provide a complete infrastructure upgrade that, besides the new drainage system, included new water mains, gas mains, fiber optics, and reclaimed/reconstructed roadways. The City was also able to leverage these projects for the first bike lanes in the City, decorative crosswalks in the theater district, and "Green Infrastructure" by constructing two bio-retention islands.

In September 2020 the City entered into a Phase II consent decree which called for $230 million investment over the next 20 years. This project has since grown to over $300 million and the centerpiece of this project will be the $200 million Cemetery Brook Drainage Tunnel. This tunnel will redirect the City's main drainage basin flows to a 2.25 miles long tunnel, 12.5-feet diameter and 30 to 80-feet deep. There will be seven drop shafts directing flows to the tunnel. This will be one of the largest civil engineering projects ever undertaken in the state. In addition to the tunnel, there will be seven separation contracts totaling over $100 million. Similar to the City's phase I and Chestnut Street projects, this Phase II program not only achieves improved water quality, but also address environmental justice within Manchester's inner city by providing urban revitalization through new sewer, drainage, water, gas, roads, curbs, and sidewalks. In addition, it will be ADA compliant, incorporate green infrastructure, and provide a positive impact to local economy.

CMOM Program

CMOM is an EPA-formalized sewer system maintenance program that stands for Capacity, Management, Operations and Maintenance. This program is an outgrowth of EPA's 1994 CSO Policy in response to continued SSO problems. The goals of the program are to reduce regulatory non-compliance, provide a higher level of service to customers, and to be proactive instead of reactive. This program was never adopted as national policy but regulators began to incorporate CMOM requirements in NPDES Permits, Consent Decrees, and as state regulations. Manchester's 2008 NPDES Permit contained the initial CMOM tasks of developing mapping, preparation of an O&M Manual, and annual reporting.

The City used this permit requirement as a catalyst to create a robust and sustainable CMOM program. With over 100 miles of sewer over 100 years old, and with 55% of it a combined system, this was the definition of aging and failing infrastructure. Add climate change-induced rain events and a lack of sustainable funding and the City had significant sewer system challenges to face. So in 2009 the City started Phase I of its CMOM program and for the next four years the City focused on developing mapping, preparing an O&M Manual, annual reporting, SOPs, criticality assessments, and the development of a long-term capital improvements plan.

To accurate assess a sewer system an internal TV Inspection Program is a critical component. The City executed multiyear contracts that averaged 120,000 LF (22.7 mi) of TV inspection annually, 425 manhole inspections, and a budget of $250,000. Based on the results of the TV inspection program, sewer repair, rehabilitation, or replacement contracts were developed. The first contract C-1 was awarded in 2015 for $6.30 million. In 2017 C-2 was awarded for $6.25 million. In 2019 C-3 was awarded for $7.65 million. In 2021 C-4 was award for $7.12 million. In 2023 C-5 will be bid and awarded. The City has made a ten-year investment of $30.70 million in its CMOM program. The City has also committed sustainable funding for this program by budgeting $3.25 million annually for the next 20 years. The

CMOM program has become a critical factor for the successful operation and maintenance of the City's sewer system.

As the City enters its 14th year of CMOM Program, it continues to complement other ongoing environmental infrastructure programs including MS4, CSO, root control, and catch basin cleaning.

MS4

Since the re-issuance of the MS4 stormwater permit in 2017, the City of Manchester has developed a comprehensive and sustainable stormwater management program that addresses operations, maintenance, upgrades, and permit compliance to improve water quality and flooding conditions in the City. The City of Manchester owns and operates both a separate stormwater system totaling approximately 190 miles of closed drainage and over 12,000 catch basins. About 25% of this infrastructure is over 100 years old and was not designed for today's population, impervious area, permit compliance, and climate change-rain events. As with many other large cities in New England, Manchester has a sizeable economically-disadvantaged population and must take special care when undertaking large-scale capital improvement projects. In response, using the MS4 permit as a catalyst, the City has established several initiatives that collectively comprise a fiscally responsible comprehensive and sustainable stormwater management program that addresses the aging infrastructure.

The MS4 program, following the success of the City's CMOM program, expands on the requirements of the permit to collect and assess information on the condition and capacity of the City's stormwater, sewer, and combined sewer infrastructure including closed pipe drainage, open drainage channels and culverts. A streamlined, web-based field data collection system is used and combined with other initiatives such as catch basin cleaning, drainage outfall screening, and TV Inspection has provided an efficient, consistent and cost-effective approach to data collection. The data is used to identify and prioritize needed maintenance, repairs, and upgrades based on level of blockage, capacity issues for future anticipated flood conditions, structural condition, criticality, and water quality, while coordinating these improvements with other programs such as the City's repaving program. The result is a proactive versus reactive stormwater program, where funds are spent where they are needed the most to address issues within the system while mitigating the effects of ongoing climate change. Similar to the CMOM program, a sustainable funding commitment of $500,000 annually has been made. In addition, starting in 2024, $3.0 million construction drainage contracts will be issued every three years

Conclusions

In 2006 the City of Manchester reassessed its wastewater and stormwater environmental infrastructure needs to determine future goals and objectives. Through the preparations of four critical master plans the City was able to invest

in its environmental infrastructure in an efficient and effective manner. This has resulted in the City meeting and mastering the industry challenges of the past 20 years. Manchester will continue to take a proactive approach, secure sustainable funding, and ensure that we have the appropriate staffing to meet and master the environmental challenges of the next 20 years.

Some Fun Facts About Water

From the website www.treehugger.com

1. The average human body is made of 55 to 65 percent water.
2. Newborn babies have even more, ringing in at 78 percent water.
3. A gallon of water weighs 8.34 pounds; a cubic foot of water weighs 62.4 pounds.
4. A liter of water weighs 1 kilo; a cubic meter of water weighs 1 metric ton. (The rest of the statistics are in imperial units since they are U.S.-based and so is this site; but the original metric system was created with base units that could be derived from the weight of a specified volume of pure water ... hence the nice round numbers.)
5. An inch of water covering one acre (27,154 gallons) weighs 113 tons.
6. Water covers 70.9 percent of the planet's surface.
7. 97 percent of the water on Earth is found in the ocean; 2.5 percent is unavailable fresh water (trapped in glaciers, underground, etc); and 0.5 percent is available freshwater.
8. There is more water in the atmosphere than in all of our rivers combined.
9. If all of the water vapor in our planet's atmosphere fell as water at once and spread out evenly, it would only cover the globe with about an inch of water.
10. More than one-quarter of all bottled water comes from a municipal water supply – the same place that tap water comes from.
11. Approximately 322 billion gallons of water were used each day in the United States in 2015.
12. In a year, the average American residence uses over 100,000 gallons.
13. Since the average faucet releases 2 gallons of water per minute, you can save up to four gallons of water every morning by turning off the tap while you brush your teeth.
14. A running toilet can waste up to 200 gallons of water each day.
15. At one drip per second, a faucet can leak 3,000 gallons in a year.
16. A bath uses up to 70 gallons of water; a five-minute shower uses 10 to 25 gallons.
17. The first water pipes in the U.S. were made from hollowed logs.
18. Leaks in the New York City water supply system account for 33 to 37 million gallons of wasted water per day.
19. There are around one million miles of water pipeline and aqueducts in the U.S. and Canada, enough to circle the globe 40 times.
20. 748 million people in the world do not have access to an improved source of drinking water.
21. And 2.0 billion people do not have use of an improved sanitation facility.

Photo Gallery
Fall Meeting

30th Annual New Hampshire Fourth Grade Water Science Fair and Poetry Winners Announced

Winners from Durham, Harrisville, Keene, Manchester, North Hampton and Stoddard.

Over 275 students from 14 different schools across New Hampshire gathered in Keene in May to learn about keeping water clean at this year's New Hampshire 4th Grade Drinking Water Festival, State Science Fair and Poetry Contest.

Academic awards were presented to students who competed in the 4th Grade State Water Science Fair and the Water Poetry Contest.

4th Grade Water Science Fair:

Students from Gilsum, Harrisville, Keene, Manchester and Stoddard presented their science projects to panels of judges. Congratulations to:

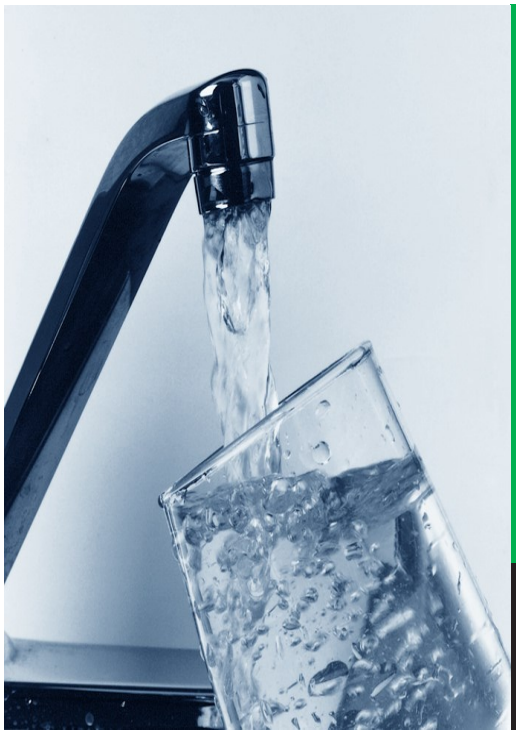
- **First Place:** Ardyn Washburn, Harrisville, for the project "How Clean is Rainwater."
- **Second Place:** Demi Dimos and Eve Turner, Manchester, for the project "Tsunamis."
- **Third Place:** Ruthie Lawlor, Keene, for the project "Saguaro Cactus."
- **Fourth Place:** Theo Martey and Quinn LaBranche, Manchester, for the project "Geothermal Heating."
- **Honorable Mention:** Harper Quigley, Harrisville, for the project "How Different Liquids Affect Plants."
- **Honorable Mention:** Gannon Lamoureux and Cooper Mullay, Stoddard, for the project "Comparing and Contrasting Beaver Dams and Human Dams."

3rd - 5th Grade Water Poetry Contest:

Students composed poems relating to the climate theme, "Water Rising." Competition was fierce as 237 students submitted thought-provoking poems. Congratulations to:

- **First Place:** Miriam Talcott, Durham, for her poem "World Warming."
- **Second Place:** Phineas Mitchell, North Hampton, for his poem "Our Earth."
- **Third Place:** Maksim Knezevic, Durham, for his poem "The Blues of the Ocean."
- **Honorable Mention:** Abigail McNamara, North Hampton, for her poem "Waters Ups and Downs."
- **Honorable Mention:** Kylie Sullivan, Keene, for her poem "Water Rising."

To read the poems, visit https://nhwaterfestival.org/poetry-contest/.



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