

## COMMISSIONER'S COLUMN

### Final PFAS drinking water standards established

The State of New Hampshire's dedication to being proactive and protective in its investigation of per- and polyfluoroalkyl substances (PFAS) in our environment has led to new, lower drinking water and groundwater standards for four PFAS, established in July and scheduled to take effect September 30, 2019. Now, we prepare to enter the next phase: implementation, which means facilities such as public water systems and groundwater discharge permittees, and contaminated sites will need to start testing for the compounds in their next round of sampling.



PFAS are part of a large class of chemicals that have been used for decades in commercial, industrial and household products and applications, including production of water resistant materials, fire suppression foams (a.k.a. aqueous film forming foam or AFFF), non-stick cookware, stain removers, etc. Because of their wide use, persistence in the environment and bio-accumulative properties, these compounds have been detected in blood serum levels in humans and other animals everywhere. [The health effects linked to PFAS exposure](#) have been identified through epidemiological studies and animal studies, and continue to be researched extensively by toxicologist and epidemiologists worldwide to provide greater specificity, especially to additional compounds beyond those which have been most studied to date. According to the Agency for Toxic Substances and Disease Registry,

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### Statewide private well sampling initiative

NHDES is sampling 500 randomly selected private wells that are evenly distributed statewide for over 250 chemicals and parameters, including volatile organic compounds, metals, radionuclides, per- and polyfluoroalkyl substances (PFAS) and pesticides. The sampling is funded through a grant from the [New Hampshire Drinking Water and Groundwater Trust Fund](#). The program will offer important information to homeowners about the quality of their drinking water and, when necessary, steps that can be taken to improve water quality.

This information will be used by state officials and scientists to evaluate the occurrence, concentration and sources of certain emerging contaminants in drinking water, including perchlorate, 1,4-dioxane, PFAS and pesticides, and their breakdown products. Additionally, this sampling program will deliver the first statewide assessment of bacteria, nitrate, lead, fluoride, manganese, arsenic, radionuclides and salt in water obtained from private wells, and it will build upon previous statewide assessments that have been conducted on other contaminants such as arsenic and radon. The data collected will provide a holistic snapshot of the quality of water in private wells and identify trends and patterns of the water quality relative to location of the well, nearby land uses, geology, well type and other factors that can impact water quality. Based on this information, strategies will be developed and implemented to mitigate and

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some known health effects may include interference with the body's natural hormones, increased cholesterol levels, effects to the immune system and increased risk of certain types of cancer.

Using the most recent and best science available, the department established drinking water standards, called maximum contaminant levels (MCLs), and ambient groundwater quality standards (AGQS) that are protective for the most sensitive populations over a lifetime of exposure, and on July 18, the New Hampshire Joint Legislative Committee on Administrative Rules (JLCAR) approved them. The new standards for the four PFAS, include:

- 12 parts per trillion (ppt) for perfluorooctanoic acid (PFOA)
- 15 ppt for perfluorooctanesulfonic acid (PFOS)
- 11 ppt for perfluorononanoic acid (PFNA)
- 18 ppt for perfluorohexanesulfonic acid (PFHxS)

When I last wrote in this space about our proposed MCLs, in the January/February issue, I announced that the department had submitted its initial proposed levels to the state Legislature. Shortly after that, new studies and models became available that indicated that the initial proposed MCLs should be further lowered to reduce exposure to be protective of health over a lifetime. Specifically, a peer-reviewed exposure model was developed and published by the Minnesota Department of Health. This new model influenced the department's decision to reconsider the proposed rules. Using this tool, NHDES continued developing the MCLs, and on June 28, proposed the levels that are now being implemented. A complete description of the [development of the proposed MCLs](#) is available on the [NH PFAS Investigation website](#).

The final MCLs apply to non-transient public water systems (water systems serving the same 25 people more than six months per year). An AGQS is the standard used to require remedial action and the provision of alternative drinking water at a contaminated site. It also dictates the conditions under which treated and untreated wastewater may be discharged to groundwater. Current law requires AGQS be the same value as any MCL established by NHDES.

To establish these standards, the department had to consider the extent to which the contaminants are found in New Hampshire, the ability to detect them in public water systems, and the ability to remove the contaminants from drinking water while considering the costs and benefits to affected parties that will result from establishing the standard. The non-transient public water systems will be required to test for these four PFAS compounds in their next quarter of sampling. If sampling results averaged over four quarters of sampling exceed the MCLs, a public water system will need to develop an action plan for achieving compliance with the standards. The work of reducing these compounds in drinking water across the state is expected to require substantive upgrades for facilities that exceed the new MCLs, such as adding filtration systems, and, at the time of filing the rule for approval, was estimated to cost at least \$190 million over the next two years.

It's important to note that the new drinking water standards do not apply to private well owners. We recommend that anyone with a private well should periodically have their drinking water tested for a number of different contaminants that can affect water quality and health, including common contaminants like arsenic, lead and radon. The NHDES [list of recommended tests for private well water](#) is available on the [Private Well Testing Program webpage](#). If you decide to test for PFAS and find levels above the MCLs, you should consider installing a treatment system. NHDES has posted [in-home water filtration information](#) on the [NH PFAS Investigation website](#).

Alongside the development of MCLs, New Hampshire took further steps to protect our residents from PFAS contamination and mitigate the effects of these chemicals. On May 29, the State filed two lawsuits against the original makers of PFAS chemicals, 3M and DuPont, and eight companies that manufacture AFFF (including 3M and DuPont), for the contamination of drinking water. This historic lawsuit represents the statewide effort to protect our citizens and environment from these harmful chemicals.

NHDES will also continue to investigate potentially impacted areas, and, as directed by the New Hampshire Legislature, develop a plan to establish surface water quality standards for the state. NHDES will continue to work with the Department of Health and Human Services to review the latest science and work to educate and inform citizens, healthcare providers, municipalities and other stakeholders about PFAS. For more information about the department's development of the MCLs and the overall PFAS investigation, visit the [NH PFAS Investigation website](#). ■

## ENVIRONMENTAL NEWS

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## Sampling *continued from page 1*

prevent exposures to unsafe levels of contaminants in drinking water obtained from private wells. NHDES will analyze the sampling results, working with stakeholders and the public, and publish the results over the next 12 months.

Furthermore, the program will collect samples and analyze the water from households that were randomly selected to participate in the 2019 New Hampshire Tracking and Assessment of Chemical Exposures Study. This biomonitoring study includes testing blood and urine from people for many of the same chemicals being analyzed in water. This collaboration will provide crucial information about the relationship between chemicals measured in drinking water and in the bodies of study participants, giving additional insight to the ongoing effort to improve drinking water quality in New Hampshire and beyond. ■

## Resilient tidal crossings

The NHDES Coastal Program recently released new mapping products and data that characterize tidal crossings for community and ecosystem resilience. This information is intended to be used by community officials and road managers to enact strategic repair or replacement of tidal crossing infrastructure, and to identify high-priority restoration and conservation opportunities at tidal crossing sites.

A tidal stream crossing (tidal crossing) is a bridge or culvert that conveys two-directional tidal flow. Tidal crossings are a unique and challenging class of transportation assets that have different engineering, regulatory and risk management considerations than their freshwater counterparts. For instance, properly designed tidal crossings need to convey enough tidal flow to periodically cover the salt marsh and at the same time be of sufficient size to accommodate freshwater flows from upstream sources. Additionally, tidal crossing infrastructure is especially vulnerable to coastal storm surge, flooding and sea-level rise.

The NHDES Coastal Program was awarded a \$187,500 grant from the National Oceanic and Atmospheric Administration for the Resilient Tidal Crossings Project in 2017. The grant enabled the NHDES Coastal Program to work with a team of partners, including The Nature Conservancy and the University of New Hampshire, to implement the New Hampshire Tidal Crossing Assessment Protocol at all 118 tidal crossings in New Hampshire during the summer of 2018. This collaborative project brought together robust technical expertise

and innovative remote sensing mapping products to implement an ambitious field and data analysis project. The project utilized the Statewide Asset Database Exchange System (SADES), New Hampshire's primary inventory of transportation assets, which enabled efficient data collection and establishes a digital inventory of tidal crossing infrastructure for reliable long-term asset management.

Tidal crossing assessment data were then used to score sites based on salt marsh migration potential, tidal restriction overall, vegetation evaluation, structure condition, inundation risk and tidal aquatic organism passage. The results of the Resilient Tidal Crossing Project show that among 118 tidal crossings, 23 were identified as highest replacement priority and 32 sites were identified as high replacement priority.



Although the data collection and assessment aspects of the project have concluded, there is still work to be done to leverage, implement and advance the project's findings. Initiatives include data sharing and maintenance, creation of crossing design standards, continuous research and advancing high priority tidal crossings through design and replacement. Implementation is already underway on the Lubberland Creek culvert replacement project in Newmarket to increase its climate resiliency. In addition, NHDES Wetlands Rules were recently updated to include a new category (Tier IV) within the stream crossing rules; creating for the first time in New Hampshire a regulatory standard for tidal crossing replacement projects.

More results, mapping products and other Resilient Tidal Crossings Project materials are available on the [Resilient Tidal Crossings webpage](#). ■



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## Gulf of Maine Visionary Awards

Two New Hampshire award winners, including a NHDES employee, were among the individuals and organizations honored by the Gulf of Maine Council at an international ceremony held in Nova Scotia for making a significant difference in protecting the health and sustainability of the Gulf of Maine watershed.

The Gulf of Maine Visionary Awards are given to two individuals or organizations within each state and province to recognize their innovation, creativity and commitment to marine protection.

Kevin Lucey, NHDES Coastal Program restoration coordinator, was recognized for his exemplary work and leadership on the coastal watershed region's most significant restoration efforts including the Resilient Tidal Crossings Project as well as multiple dam removal projects. Kevin recently led an on-the-ground effort to assess every tidal crossing in New Hampshire, which resulted in new mapping products and data that characterize tidal crossings for community and ecosystem resilience. This information can be used by community officials and road managers to enact strategic repair/replacement of tidal crossing infrastructure and to identify high priority restoration and conservation opportunities at tidal crossings sites.

Abigail Lyon, community technical assistance program manager at the Piscataqua Region Estuaries Partnership, was recognized for her outstanding commitment to improving the environmental state of affairs in the Gulf of Maine through her current position as well as many work and volunteer experiences sharing her love and enthusiasm for the natural world and how to care for it.

The Council, a U.S.-Canadian partnership dedicated to protecting environmental quality in the Gulf of Maine, annually recognizes extraordinary work in its five jurisdictions, which include the states of New Hampshire, Maine and Massachusetts as well as the Canadian provinces of New Brunswick and Nova Scotia.

Additional information about the [Gulf of Maine Council 2019 awards with detailed recipient bios](#) is available on the Gulf of Maine website. ■



## Walpole company honored for environmental stewardship

Chamberlain Machine Inc. of Walpole was recently awarded the national 2019 Small Business Environmental Stewardship Award for its work with the NHDES Small Business Technical Assistance Program (SBTAP) and Pollution Prevention Program (NHPPP) to significantly reduce or eliminate waste streams, and improve energy conservation and recycling.

The award, presented by the National Small Business Environmental Assistance Program, recognizes outstanding environmental leadership among small businesses and small business assistance providers.

“Chamberlain Machine is pleased to be recognized for our sustainability initiatives. Reducing or eliminating waste streams, energy conservation and recycling are key to our business success and demonstrate our commitment to environmental responsibility. SBTAP and NHPPP continue to be a valuable resource in pursuing our environmental goals,” said Scott Boynton, President of Chamberlain Machine.

With the assistance of SBTAP and NHPPP, Chamberlain Machine thoroughly reviewed its waste streams, revamped an aqueous waste disposal process and installed a wastewater centrifuge. These updates and improvements proved to be successful: process-specific discharge was reduced by 93%. Moreover, the company installed a solar array that supplies 25% of its electricity needs and converted all lighting to LED, further reducing the company's electricity demand.

The awards program is sponsored by the National Steering Committee of Small Business Environmental Assistance Programs and Small Business Ombudsmen, in partnership with the EPA Asbestos and Small Business Office. ■



## Geologic mapping program

The New Hampshire Geological Survey (NHGS) at NHDES has been working since its inception in 1839 to map the bedrock geology and surficial deposits of the entire state. Two NHGS geologists, Greg Barker and Joshua Keeley, routinely go out in the field and map as part of this program.

Similar to the rest of the country, New Hampshire is divided into quadrangles, or areas defined by 7.5-minute grids, which are typically 49 to 70 square miles. In July, Greg and Joshua went out to the Hillsboro Upper Village quadrangle, which includes parts of the towns of Hillsborough, Henniker, Bradford and Warner.



At the Hillsboro Upper Village quadrangle, Greg and Joshua focused on surficial mapping, which is one of the program's main efforts. Surficial maps characterize the different earth materials of varying thicknesses that lie above the bedrock. In New Hampshire, these materials were at one time eroded and then transported by continental glaciers, the latest of which is known as the Laurentide Ice Sheet. The mapped sediments were generally deposited either directly by the ice (glacial till) or by streams of melt-water (stratified drift) as the glaciers melted, thinned and retreated. The sediment size of these materials varies greatly, and can tell us a lot about the geological history of the quadrangle. The size of the particles clearly reflects whether the water was flowing when deposition occurred; boulders, gravels and coarser sands indicate high-energy environments of deposition whereas fine sands, silts and clay indicate accumulation at the bottom of bodies of standing water. This particular map of Hillsboro Upper Village tells part of

the story of Glacial Lake Contoocook.

The only tools Greg and Joshua need for the day are a shovel, a compass and a geographic information system (GIS) handheld device. Based on previous maps, they already had an idea of where they wanted to look for the glacial tills and stratified drift. Additionally, the mappers use a new type of high resolution topographic data called LiDAR. Because of the detailed topography, these new data allow greater understanding and confidence of how sediments were likely deposited. Navigating through many unpaved and unmaintained roads, they examined the sediment size by digging holes a few inches to two feet deep and visually inspecting the sediments for finer materials, such as sand, silt and clay, throughout the quadrangle. They logged the results and data on the GIS device, which will be used to create maps and for other analyses. New mapping will be available to the public after September 15.

Geology may not get the attention it deserves; however, geologic maps are highly informative and important. For example, they may be useful in construction and engineering projects, and city planning. Dams, roads, buildings and bridges require geologic analyses, as well as other smaller projects like water wells and septic systems. Surficial maps play an important role in understanding the way the land has been influenced by glacial melting over hundreds of thousands of years. ■



[twitter.com/NHDES](https://twitter.com/NHDES)

## NHDES Snapshot: Fresh Water Beach Sampling

*NHDES staff can't fulfill the agency's mission only from our desks. To protect environmental quality and public health in New Hampshire, we are out in the field every day: testing water quality in our ponds and lakes, sampling private well water, monitoring air emissions, assessing storm damage, responding to oil and chemical spills, training water works and solid waste operators, and so much more. "NHDES Snapshot" is an occasional series that takes a quick look inside the day of one of those employees.*

Andrea hops out of the car, gathers three sample bottles and writes the time on each one. While walking toward this freshwater beach, she eyes the three sections of the lake that she will be taking samples from, which are established stations reported to the EPA. To collect a sample, she wades into the water to her knees and fills the bottle with water. She also determines the water temperature and makes an inspection, noting the number of people swimming, number of animals or birds, and overall conditions of the beach and water. Then she returns to the sand, collects her things and heads back to the car.

This summer she's working for the Beach Inspection Program, resampling fresh and marine waterbodies to update current beach advisories. The work takes her all across New Hampshire; she'll visit a different area of the state each day of the week. She and her co-workers, Tammi and Della, monitor about 100 public beaches between Memorial Day and Labor Day. These beaches are sampled throughout the month and, in the event of an advisory, they are resampled within two days.

They are testing public swimming beaches for fecal indicator bacteria, which is used to judge the water quality and possible presence of pathogens. They also collect samples when there is either a definite or suspected cyanobacteria bloom in order to test for species of toxic cyanobacteria. Toxic cyanobacteria can affect anyone who comes into contact with it, but it is particularly harmful to highly vulnerable groups such as children, dogs and people with compromised immune systems.

After Andrea returns to the car, she ensures the samples are labeled correctly and places them in the cooler. She'll repeat this process for the next few beaches she has to resample, returning to the office within six hours from the first sample taken.

When she returns to the NHDES Concord office, she drops off the day's fecal bacteria samples at the Department of Health and Human Services lab, where staff there will test and get the results back to her within 24 hours. The cyanobacteria samples are looked at immediately, identified and enumerated by Amanda McQuaid, NHDES Beach Program Coordinator.



July 22, 2019

If the bacteria amount for those they study exceeds the limits set by the State, NHDES issues an advisory, warning the public of the potential swimming hazards. Andrea will then resample the beach to find out if the levels have decreased enough for the advisory to be lifted.

After looking at the previous day's results to see what beaches require an advisory, she'll plan to revisit beaches with elevated fecal bacteria and prepare for the next day. Andrea also travels to locations with reported blooms and will resample where cyanobacteria samples are needed.

When talking to Andrea about the importance of her work at NHDES, she said it's all about protecting public health and making sure people stay safe: "Water quality sampling is important to the community because it is a preventative science. We sample and test for fecal bacteria to prevent the public from getting sick while enjoying the beauty of New Hampshire's beaches."

To stay up-to-date on beach advisories, [subscribe to the Beach Program's weekly newsletter](#), follow on Twitter (@NHDES\_Beaches) or view the [interactive map](#). ■

## Summer food drive

In June, NHDES hosted a two-week long internal food drive where NHDES employees donated more than \$300 and 2,760 food and hygiene items. The donations were delivered to the Friends of Forgotten Children, a local organization that provides assistance to children dependent on free and reduced-cost lunches. ■

## The hazy days of summer

Have you ever taken a summer trip to the New Hampshire White Mountains and wished you could see Mt. Washington or the many other mountains more clearly through the haze? One of the most basic forms of air pollution, haze, degrades visibility in many scenic areas. Haze is caused when sunlight encounters tiny pollution particles in the air, which reduce the clarity and color of what we see, particularly during humid conditions, which is why it is often worst during humid summer days. Of course, Mt. Washington is often covered in clouds, which is just part of the natural mystique of New Hampshire and has nothing to do with pollutants.



During hazy days, visibility reduction is normally caused by sulfate, nitrate and organically based particles. Air pollution emissions of sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and organic gases react in the atmosphere to create ammonium sulfate, ammonium nitrate and organically based particles. Higher concentrations of these particles results in lower visibility. These particles also affect our health, thus improving our visibility also improves our health. There are also some days where visibility is reduced by smoke particles caused by forest fires, sometimes thousands of miles away. Events such as these are due to accidents or natural events, such as lightning strikes, and are not part of normal human controlled air pollution emissions.

The federal regional haze rule seeks to make steady visibility improvement toward natural visibility conditions by the year 2064. Every five to 10 years, the state needs to provide status updates and an updated state implementation plan for making emission reductions designed to help visibility at federally designated Class I areas. In New Hampshire, the Great Gulf wilderness and the Presidential Range – Dry River Wilderness, located on the north and south flanks of Mt. Washington, are federally designated Class I areas. Lye Brook Wilderness Area in Vermont and Acadia National Park and Moosehorn Wilderness Area, both in Maine, are other Class I areas within reach of New Hampshire air pollution emissions.

NHDES is working with our neighboring states to develop plans to ensure we still have the views of our precious landscapes. We are already seeing signs of improvement. The

regional haze rule has been in place for 17 years. In that time visibility during the worst days has improved around Mt. Washington; you can now see about three times farther on these bad visibility days. Similar improvement has been noted at the nearby Class I areas, so we are clearly on the right track. With each passing year, your trips to the White Mountains will be greeted with better odds of a good view of Mt. Washington and the surrounding mountains. ■



Robert Fitzpatrick won the #ThisIsNH July photo contest with this photo of “A Beautiful Morning on Swanzey Lake.” The theme of the photo contest was “Lakes Appreciation Month.” Photos submitted to the [This Is New Hampshire](#)

[story map](#) were entered into the contest, and our Facebook and Twitter followers were invited to vote for their favorite. The prize was having the winning photo featured as the NHDES Facebook and Twitter cover photo, and the cover of the story map website. ■

## Charge Forward EV Relay

NHDES and Granite State Clean Cities Coalition are among the partners supporting a first-of-its-kind Electric Vehicle (EV) event in New Hampshire. On Monday, September 16, the Charge Forward EV Relay will showcase the diversity of EV models and the accessibility of charging stations to major destinations across the Granite State.

The relay will feature the latest EVs, driven by popular New Hampshire personalities, along each leg of the relay, demonstrating the power and practicality of the next generation in transportation. Each leg of the route will showcase a different EV model and highlight a unique New Hampshire landmark or destination. Public is welcome at all stops and EV drivers are welcome to “caravan” along the way. Visit the [Drive Electric NH – Charge Forward EV Relay website](#) for details. ■



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## GSCCC reports fuel and emissions reductions

Have you ever considering fueling your vehicle with something other than gasoline or diesel? Do you modify your driving habits to improve your fuel economy? Are you a stickler about turning off your engine to prevent unnecessary idling?

Clean Cities, a program supported by the United States Department of Energy, works with public and private fleets, and businesses to advance affordable, domestic transportation fuels and technologies. In New Hampshire, the Granite State Clean Cities Coalition (GSCCC) is made up of 140 stakeholders working to reduce petroleum use by adopting and advancing alternative fuels (such as biodiesel, natural gas and propane), advanced technology vehicles (such as electric and hybrid), and other fuel-saving strategies (such as idle-reduction). The GSCCC Coordinator works with stakeholders to support these efforts, promote their achievements and provide education and outreach around the state.

Each year, Clean Cities Coalitions across the nation perform stakeholder outreach for the Clean Cities Annual Report. This year, GSCCC stakeholders provided data on their use of alternative fuels, advanced technology vehicles and other fuel-saving strategies during 2018. The data reflect the impact of stakeholder efforts in reducing petroleum consumption and vehicle emissions.

In 2018, GSCCC Stakeholders reduced petroleum use by over 1.4 million gallons and Greenhouse Gas Emissions by over 8,500 tons! This goes to show that even small steps can make big impressions.

If you are interested in more information about alternative fuels and advanced technology vehicles, visit the [GSCCC website](#). The latest news includes the launch of Destination Electric, a program that promotes businesses and destinations in the Northeast that are near electric vehicle charging stations. ■

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## National Drive Electric Week

Join us at the Drive Electric kick-off event taking place in downtown Concord on Saturday, September 14 from 8:30 AM-1 PM. We'll be at City Plaza in front of the State House, next to the Concord Farmer's Market. Find out more details about our kick-off and other of free events scheduled around New Hampshire, on the [Drive Electric Week website](#). ■

