

DATE: November 1, 2023

TO: Honorable Chris Sununu, Governor
Honorable Sherman Packard, Speaker of the House
Honorable Jeb Bradley, President of the Senate
Honorable Paul C. Smith, House Clerk
Honorable Tammy L. Wright, Senate Clerk
Michael York, State Librarian

FROM: Hon. Mindi Messmer, Chair

SUBJECT: Interim Report of the Commission to Study Environmentally Triggered
Chronic Illness RSA 126-A:73-a (SB 85, Chapter 229:2, Laws of 2019)

Pursuant to RSA 126-A:73-a (SB 85, Chapter 229:2, Laws of 2019), please find enclosed the interim report for the Commission to Study Environmentally Triggered Chronic Illness. This report details the progress and recommendations of the Commission thus far.

If you have any questions or concerns about this report, please do not hesitate to contact me.

Sincerely,

Hon. Mindi Messmer
Chair

Attachment A: Reports on Data Sharing (DHHS and DES, 2023)
Attachment B: Meeting Minutes

**COMMISSION TO STUDY ENVIRONMENTALLY-TRIGGERED CHRONIC
ILLNESS**

establishing the commission to study environmentally-triggered chronic illness.

INTERIM REPORT

11/1/20223

Overview:

Active Statutory Committee (2019)
SB85
Effective Date: 7/12/2019

Chapter Law: 229:2
RSA Chapter: 126-A:73-a
Final Report Due: 11/1/2024

Membership:

James Murphy– House
Erica Layon - House
Representative Chris Muns-House
Senator Denise Ricciardi– Senate
Senator Sue Prentiss - Senate
Karen Craver – NHDES
Dan Tzizik, PA – NH Medical Society
Margaret DiTulio – NH Nurse Practitioner Assoc
Honorable Nancy Murphy– Community Member appt by the Speaker of the House
Michelle Roberge – DHHS
Amy Costello – IHPP
Robert Timmons – NHHA
Dr. Louis Kazal, NH Medical Society
Mindi Messmer, Chair – Community Member appt by the President of the
Senate

Charges of the Commission:

- (1) Determining which entities may report confirmed cases of chronic conditions or other health-related impacts to the public health oversight program.
- (2) Recommending ways to alert public health officials regarding higher-than-expected rates of chronic disease or other health-related impacts which may be related to exposures to unrecognized environmental contaminants.
- (3) Recommending a method to inform citizens regarding programs designed to manage chronic disease or other environmental exposure health-related impacts.
- (4) Recommending data sources and a method to include data compiled by a public or private entity to the greatest extent possible in the development of the public health oversight program.
- (5) Defining by codes, the health status indicators to be monitored, including chronic conditions, medical conditions, and poor health outcomes.
- (6) Studying current health databases, including years available, the potential for small area analysis, and privacy concerns.
- (7) Researching currently existing health data reports by agency, bureau, or organization.
- (8) Creating a model of desired data outputs and reports for chronic conditions and other health-related impacts.
- (9) Identifying the gaps between what currently exists and the model output.
- (10) Recommending the organizational structure responsible for the oversight function and mandatory reporting requirements.
- (11) Reviewing results of stages 1, 2, and 3 of the pilot study recommended by the previous commission established by 2017, 166 and identifying changes to subparagraphs (8), and further identifying items in (9) and (10).
- (12) Identifying technology system changes necessary to carry out the charge of the commission.
- (13) Collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for the department of health and human services to educate and provide guidelines for physicians and other advanced health care practitioners to identify and evaluate appropriate diagnostic screening tests to assess health effects from exposure to emerging contaminants.
- (14) Collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for programs to streamline education and outreach to healthcare providers about how to implement the guidelines specified in subparagraph (13). The protocols shall include education relative to methods to reduce further exposures and eliminate contaminants if effective methods are available.
- (15) Recommending legislation, as necessary, to carry out the charge of the commission.

- (b) The commission shall solicit information from any person or entity the commission deems relevant to its study.
- (c) The commission may, with input from a state agency or agencies, decide whether additional appropriations are necessary to complete the work of the commission. The commission may recommend additional appropriations for approval by the general court.

Overview and Progress:

Please note that members of the Commission on Environmentally Triggered Disease agree to the filing of this interim report by the Chair. This action should not be construed in any way as the adoption of any agency or organization positions.

This report builds on information and findings documented in prior Interim Reports of the HB511 and the extension (SB85) Commissions.

Meetings of the SB85 Commission

The SB85 Commission met seven times in 2023. Meeting minutes for the February, March, April, May, June, and August 2023, meetings are provided in Attachment B.

In March 2023, the Commission entertained a presentation by the Department of Education relating to special education spending in New Hampshire.

In May 2023, individuals from the NHDES Waste Management Division and the Air Division made presentations to the Commission regarding landfills and air permitting issues.

Education Subcommittee

The Education Subcommittee successfully organized and implemented a plenary session presentation at the Northern New England Nurse Practitioner Annual conference on April 14, 2023. Dr. Jonathan Petali, Dr. Megan Romano and NH Representative Nancy Murphy presented "Environmental Contaminants: An Important Topic for Patient Conversations."

The Educational Subcommittee is currently exploring avenues to reach the physician community in New Hampshire. Discussion is also ongoing about how best to target additional clinician groups for training- such as NH Medical Society, NH Hospital Association, primary providers (especially in environmentally contaminated areas of the state), Nursing Associations, local hospitals, and related specialty areas.

Given the interest and feedback from the Northern New England APRN Association conference presentation in 2022, the 2nd presentation was made at this year's annual conference (April 2023), with the 3rd scheduled for April 2024.

Coakley Landfill Superfund Site Subcommittee

A primary goal of the Coakley Landfill Superfund Site Subcommittee is to focus on the progress of the site cleanup. Below is a summary of the subcommittee activities and meeting notes are provided in Attachment B.

In late March 2023, subcommittee members met to organize the subcommittee and on March 28, 2023, attended a site walk lead by the NHDES.

In April of 2023, the subcommittee heard presentations from the NHDES and USEPA regarding the cleanup progress.

In May 2023, the subcommittee heard a presentation by Mr. McMorran of Aquarion Water who provided an update on incidences of PFAS discovered in water supplies by Aquarion to local committees on the Seacoast as well as an overview of ongoing monitoring efforts to protect the health and safety of Aquarion customers.

Discussion of Legislative Priorities. Representatives Muns and Dr. Lopresto shared their concerns that there appears to be a focus on “monitoring” PFAS contamination, both at the Coakley Landfill and other sites on the Seacoast and around the state rather than remediating (i.e., “solving”) the problem.

Representative Meuse shared that in 2019 HB 494 (see Attachment 3) was signed into law mandating that specific actions were required to be taken by the NH Department of Environmental Services with respect to the Coakley Landfill by November 1, 2019, and January 1, 2020. Representative Muns agreed to follow-up on the status of those actions. Those discussions have been ongoing, and the members of the subcommittee hope that NH DES will be providing a comprehensive update of activities at the Coakley by the end of this year.

The subcommittee decided that it might be desirable to reach out to other legislators who have been involved in PFAS issues elsewhere in the state to “compare notes” and discuss a coordinated approach to introducing any possible new legislation. Representative Muns agreed to initiate that outreach effort. In July the Public Health/Environmental Toxins Caucus was formed to facilitate this coordinated approach.

Uncompleted Tasks

Going forward, the commission will develop recommendations related to the following core topics: Surveillance, Reporting, Communications, and Capacity Building.

Suggestions for Future Presentations:

- Air quality in schools.
- Lead in drinking water in schools.

Members of the subcommittee began addressing the need to create an NH-centered database of environmental threats and environmentally triggered diseases based on the list maintained by the National Institute of Health (NIH) until 2017 (see Table 1). The subcommittee continues to develop the NH-centered list.

Table 1. NIEHS Summary of Disease or Condition and Environmental Toxin

Disease or Condition	Subtype Diagnosis	Environmental Toxin(s)
Asthma	Asthma	Air pollution, ozone, fine particulates, allergens
Autism	n/a	Air pollution,
Autoimmune diseases (i.e., Lupus)	Diabetes Lupus Multiple sclerosis Rheumatoid Arthritis Celiac disease	Solvents Smoking Silica Mercury
Cancer	Breast cancer Endometrium Kidney Colon Lung Esophagus	Acrylamide (fried food) Arisotolochic acids (herbals) Tobacco Obesity Pesticides Solvents Silica Dioxins PAHs Arsenic Beryllium
Lung disease	COPD	Tobacco Allergens Air pollution Asbestos
Obesity (Obesogens)		Tobacco Tribuytin Pesticides PCBs Phthalates Flame retardants
Parkinson's disease		Pesticides DDT
Reproductive Health		Lead Mercury

The DHHS and DES progress reports on data sharing are provided in Attachment A.

Progress on 2023 Recommendations

1. The commission supports efforts to inform communities impacted by environmental contamination with direct responsiveness by state environmental and public health agencies responsive to collective citizen concerns and needs.
2. Request presentation on lead in schools update during next year.
3. The DHHS and DES signed a Memorandum of Understanding (MOU) in May 2023 relating to data sharing between the agencies. The MOU is effective for five years through June 30, 2028.

The following recommendations are made for NH Legislative actions:

1. File legislation to create a state-wide repository to collect and monitor health impacts cited in scientific literature as being linked to PFAS exposure. The registry will not contain patient identifiers.
2. File legislation to create a feasibility study to understand how existing health data collection processes can be leveraged to collect data of PFAS-linked health impacts.

The following non-legislative recommendations are made:

1. Track the final EPA MCLs to issue within the next 12 months and other scientific studies and standards to develop recommendations for MCL/AGQS standards for PFAS compounds in addition to PFOA, PFOS, PFHxS, and PFNA and or develop recommendations for aggregate MCL/AGQS standards for PFAS compounds.
2. Continue to support data modernization efforts and enhance environmentally triggered illness tracking, surveillance, and data sharing across agencies.
3. Support healthcare provider education efforts to nurses, and extend to nursing associations, physicians, hospital staff, and other healthcare providers.
4. Request agencies to present on findings on lead in school drinking water in response to HB 1421.
5. Continue outreach efforts to the Board of Education to provide a presentation to the commission on special education spending, facility upgrades, including school drinking water and ventilation.

Attachment A: Reports on Data Sharing (DHHS and DES, 2023)

9th Progress Report for SB85

Submitted by:

New Hampshire Department of Health and Human Services

Division of Public Health Services

&

New Hampshire Department of Environmental Services

October 2023

Introduction

This is the ninth report related to Senate Bill (SB) 85 (2019), which directs the New Hampshire (NH) Department of Environmental Services (DES) and the Department of Health and Human Services (DHHS) to improve coordination and collaboration as it relates to environmental health, with a specific focus on data sharing.

Background

Senate Bill (SB) 85 (2019), re-established a legislative commission to study environmentally-triggered chronic illness. The objectives of SB85 build on previous work related to House Bill (HB) 511 (2017) and HB 1356 (2018). The work of this Commission is focused on conducting environmental health surveillance and improving coordination and collaboration between DES and DHHS to allocate resources efficiently to reduce exposure to environmental contaminants and prevent disease.

The SB 85 Statement of Intent reads as follows: “The general court recognizes that nearly half of adults in the United States have at least one chronic health condition and chronic diseases are responsible for increased health care costs. Seventy percent of health care costs in the United States are for chronic diseases. Some chronic diseases are known or thought to be associated with environmental causes. According to the Centers for Disease Control, the state of New Hampshire has the highest rates of people with bladder, breast, esophageal, and pediatric cancer in the country. In addition, a double pediatric cancer cluster was identified in the seacoast of New Hampshire in 2014. Therefore, the general court hereby establishes the commission to study environmentally-triggered chronic illness.”

HB 511 (2017) established a legislative commission to study environmentally-triggered chronic illness.

HB 1356 (2018) charged DES and DHHS to develop and implement a method by which the departments share certain health outcome and environmental data. The HB 1356 Preliminary Report submitted in August 2018 includes more information on the status of the activities listed below.

Specifically, the departments were tasked to:

- Update a memorandum of agreement related to data sharing.
- Sign a joint standard operating procedure on how data layers can be shared between the two departments to identify linkages between environmental contaminants and health outcomes.
- Hold a presentation on the departments' ongoing, joint efforts under the Centers for Disease Control and Prevention environmental public health tracking cooperative agreement; and
- Compile a report describing and estimating the cost to perform a 2-way pilot project between the departments on arsenic in drinking water, where both health effects and environmental data exist.

Updates on the Data Sharing Memorandum of Agreement

After the previously established data sharing Memorandum of Agreement (MOA) between NHDES and NH DHHS expired on June 30, 2022, the two-agencies collaborated to establish an updated Memorandum of Understanding (MOU). The change in terminology between MOA and MOU is not substantive and is reflective of Manual of Procedure updates established by the NH Department of Administrative Services. The MOU was signed in May of 2023, and is effective for a five-year period through June 30, 2028. It reflects NHDES' and NH DHHS continued commitment to collaborative efforts to protect and promote health.

Updates from NH Department of Health and Human Services (NH DHHS), Division of Public Health Services (DPHS)

BiomonitoringNH Program

In collaboration with the US Geological Survey (USGS) and support from NH Environmental Public Health Tracking Program (EPHT), BiomonitoringNH launched the Evaluating Metals in Private Wells and people for Exposure Reduction - Uranium (EMPOWER-U) Study in November 2021. The study was conducted in areas of NH with increased probability of elevated uranium in groundwater. Enrollment for the study closed in May 2022 with 271 participants from 199 homes in which private well water was the primary source of drinking water. Testing of urine, water, and air samples was completed in August 2023. Preliminary analysis of the overlapping water and clinical testing data supports that exposure to contaminants in drinking water increases the amount of those contaminants found in the body.

Water testing was provided by the USGS but the agency is unable to provide water testing reports to participants. For this reason, BiomonitoringNH is collaborating with NHDES to establish a data sharing agreement (DSA) that will allow for use of a NHDES water reporting template (also developed in collaboration with BiomonitoringNH). The report provides water testing results to homeowners in an easy-to-read format. Privacy of study participants is critical so water testing information will be stripped of all identifiers; however, this town-level data may be used by NHDES for future water quality assessments of NH residents who use private wells as their primary drinking water source.

BiomonitoringNH has significant testing capabilities including clinical assessment of environmental chemical exposures to per- and polyfluoroalkyl substances (PFAS) in serum, nicotine in serum, metals in blood and urine, and pesticides in urine. Volatile organic compounds (VOCs) in whole blood and polycyclic aromatic hydrocarbons (PAHs) in urine will soon be added to that list. Many NHDES programs are involved and actively participate in the BiomonitoringNH Technical Advisory Committee, which meets annually to discuss collaboration opportunities, get buy-in for upcoming studies, provide an update on current work, and help plan for future biomonitoring initiatives in NH. BiomonitoringNH will continue to work closely with NHDES subject matter experts for planning of the next five-year grant application to fully utilize NH's biomonitoring capabilities and make good use of the biomonitoring data.

Merrimack Cancer Investigation

In January 2018, the DHHS released a report of their analysis of cancer incidence in Merrimack, NH that was completed in response to community concerns related to the detection of perfluorooctanoic acid (PFOA) in drinking water. This report showed that cancers associated with PFOA were not higher in Merrimack when compared with the rest of New Hampshire.

In December of 2021, DHHS shared the results of an updated analysis of cancer incidence in Merrimack which showed a statistically significant excess of kidney cancer cases in Merrimack, when compared to the rest of the state. No other cancers had a statistically significant excess in Merrimack. Results of these analyses were shared with the 737 Commission on the Environmental and Public Health Impacts of Perfluorinated Chemicals.

Slides from HB737 Commission Meeting on 12/6/21 available here:

<https://www.dhhs.nh.gov/dphs/cdpc/documents/737-dec102021-merrimackdata-final.pdf>)

Recording of virtual community meeting on 1/27/22 available here:

<https://www.youtube.com/watch?v=Rx0bdocLUIU>).

Further analysis of kidney cancers in Merrimack and surrounding towns was subsequently performed to provide information about kidney cancer diagnoses and identify any unusual patterns, for the purpose of making a decision about whether to continue further investigation and whether to include additional towns in next steps. On January 13, 2023, the Department presented the [Cancer Incidence Report Merrimack, New Hampshire](#) to the HB737 Commission. The Department serves on the Commission as a resource to the communities represented by the Commission, which includes Merrimack.

Based on the findings in the January 13th report, the Department recommended that the investigation move to Phase 3, in accordance with NH's [Cancer Concern Investigation Protocol](#), which includes a feasibility study to determine whether a hypothesis of a common exposure can be developed to be tested in an epidemiological study. The feasibility study would require additional funding and partnership with an academic or research organization.

HB614, *An Act relating to making an appropriation to the department of health and human services to fund the Merrimack, New Hampshire Kidney Cancer Incidence Phase 3 Feasibility Study* was proposed last session that provided an appropriation of \$500,000 for the biennium ending June 30, 2025, to DHHS to enter into a contract with an academic or research organization to complete the Feasibility Study. This bill was a culmination of collaborative efforts by the bill's sponsor, Representative Nancy Murphy, the HB737 Commission (which was established in 2019 to study the environmental and public health impacts of PFAS substances in Merrimack and surrounding communities), the Department of Health and Human Services and Representative Erica Layon, Vice Chair of the Health, Human Services and Elderly Affairs Committee. During the legislative session, HB614 was incorporated into HB2, SFY24-25 State Budget, along with a requirement for prior review by the Joint Legislative Oversight Committee on Health and Human Services before the funds could be used by the Department. The \$500,000 appropriation was approved into the SFY24-25 State Budget in June of 2023 and the Department met with the Joint Legislative Oversight Committee on Health and Human Services on September 22, 2023. The next step for DHHS includes establishing a contract with an academic partner to complete the Feasibility Study. Once an academic partner has been selected, DHHS will begin planning outreach efforts.

NH Environmental Public Health Tracking (EPHT)

The NH Environmental Public Health Tracking Program is developing a new project focused on children's environmental health under the current 5-year Cooperative Agreement that started in August 2022. This project will explore environmental exposures and health outcomes most relevant to children such as lead, asthma, and well water quality. We continue to build on previous projects to integrate data and explore environmental exposures and health outcomes across the State, including supporting the DHHS Healthy Homes Lead Poisoning Prevention Program and the BiomonitoringNH program. In addition, the Radon program recently finalized a [radon data brief](#) summarizing the results of over 32,000 air samples collected from homes in NH, which indicate that 37% had elevated levels above the recommended action level. We anticipate creating a dashboard for these data in the coming year. The EPHT program also recently launched a [radiation monitoring dashboard](#) that includes monitoring data for airborne radiation and radioactivity in farm feed, water, milk, ocean sediment, biota, and seawater from the areas around the Seabrook Nuclear Power Station and the decommissioned Vermont Yankee Nuclear Power Station. The program is collaborating with NHDES Get the Lead Out of Drinking Water program and is establishing a remediation grant program to provide funding to childcare providers to address lead in drinking water.

NH Environmental Health Conference

2023 will mark the second year that the NH Division of Public Health Services and the NH Department of Environmental Services has collaborated on a full day annual Environmental Health Conference. This year's [2023 NH Environmental Health Conference](#) is scheduled for October 26, 2023, and will be centrally located at the Grappone Center in Concord, NH. An anticipated 150 participants will attend, and topics focus on contaminants in air, water, soil and the built environment. Speakers from the private sector along with State agencies will talk about lead in housing, water and soil, PFAS and other drinking water contaminants, policy development, Asthma triggers and other air quality concerns, along with Radon and much more. The planning committee for this event has been meeting regularly since December and includes staff from both the NH Division of Public Health Services and the NH Department of Environmental Services.

Updates from NH Department of Environmental Services (NH DES)

NH Water Well-ness Initiative: Distribution of Filter Pitchers to Vulnerable Populations

NH DES, in cooperation with DHHS and the state's network of Women, Infant, and Children (WIC) clinics, is providing free water testing and filter pitchers to low-income pregnant women using private wells with elevated levels of contaminants. The project, known as NH Water Well-ness Initiative, is funded by the NH DES Drinking Water & Groundwater Bureau. WIC Nutritionists throughout the state are trained to introduce the project to their pregnant participants who use private wells. Participants then take a water sample from their kitchen faucet, and it is analyzed by the NH Public Health Lab Water Dept for arsenic and other metals common in NH groundwater. If any contaminants exceed health limits, participants are sent a filter pitcher to remove contaminants from their drinking water.

ATSDR's (Agency for Toxic Substances and Disease Registry) Partnership to Promote Localized Efforts to Reduce Environmental Exposure (APPLETREE):

New Hampshire Department of Environmental Services (NHDES) was awarded a new, five-year cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) in 2023. APPLETREE stands for the Agency for Toxic Substances and Disease Registry's Partnership to Promote Local Efforts to Reduce Environmental Exposures; a formal partnership enabling us to be successful at our work is established between ATSDR, NHDES, and the Department of Health and Human Services, Division of Public Health Services (NH DHHS DPHS).

The grant's efforts include work from both partnering NH agencies; we have expertise in health risk assessment, environmental health, toxicology, health education, community engagement, and project management. APPLETREE's primary goal is to help reduce NH residents' exposure to hazardous chemicals, with a focus on National Priority List (e.g., Superfund) sites and other state and community identified sites. A component of the grant largely staffed by NH DHHS DPHS, Choose Safe Places for Early Care and Education (Choose Safe Places), is specifically focused on assuring safe siting of childcare facilities. The goal of reducing exposure to hazardous chemicals is accomplished by identifying and assessing potential exposures, summarizing findings, developing health-based recommendations, and engaging community members to promote action to reduce exposure.

There have been several program activities and successes to date, all of which involved cross-agency collaboration as well as collaboration with partners external to state agencies. More information can be found on the [APPLETREE webpage](#), and a few examples that highlight programmatic capacity and collaboration with partners are included below:

- Routine sampling conducted in Hooksett for a State project showed uranium present in groundwater at high levels. NHDES worked in coordination with NH DPHS, and with the United States Environmental Protection Agency (EPA) to develop and implement a plan to sample residential well-water in the Hooksett Community. The goal of the sampling was to understand the extent of exposure to harmful

contaminants, and to develop health-based recommendations to reduce exposure and risk. APPLETREE staff have presented findings and recommendations to the community and health-based recommendations include additional well-water testing, testing of home air for radon gas, and installation of treatment to reduce exposure where contaminants are found in water and/or air. The Hooksett town Administration continues to engage the APPLETREE program when in need of environmental health assistance and agency introductions, and this has led to successful funding applications through NHDES for water system infrastructures, water treatment and remediation. This relationship serves as a model for future state-identified communities facing exposures. Indeed, APPLETREE's increased capacity has created new opportunities within NHDES to provide risk assessment and exposure reduction support at sites like Hooksett not covered by Superfund status, and work is ongoing.

- APPLETREE established lasting academic partnerships that have created state resources for public use. Through a contract established with the Trustees of Dartmouth, the APPLETREE team finalized training and resources aimed at supporting local leaders in response to community environmental health concerns. This work was conducted in coordination with the NH DHHS DPHS Cancer Program and with stakeholder engagement to inform the development of training and resources. Stakeholder feedback has resulted in the development of three trainings on environmental health topics to be offered in series as well as a resource tool called the "New Hampshire Environmental Health Guide (NH-EHG). Now in its second year of use, the NH-EHG has been updated to include new and topical resources (including new state PFAS resources). Our partners at Dartmouth continue to work with NHDES on environmental health training as a result of this collaboration. Through a second contract, established with the University of New Hampshire, the APPLETREE team worked with the UNH Survey Center to develop and implement data collection tools to inform the program's efforts. Statewide surveys and targeted focus groups resulted in summary products that help APPLETREE understand community need in the areas of environmental health knowledge, risk prioritization trends, and recreational habits. Links to training videos, the NH-EHG, survey results, and more resources can be found on the NHDES website here: <https://www.des.nh.gov/new-hampshire-appletree>.
- One critical function of the APPLETREE team is to provide support to state and local programs working at the 23 Superfund sites designated by the Environmental Protection Agency (EPA). APPLETREE meets quarterly with NHDES site managers for Superfund sites to evaluate progress together and to provide technical support when exposure risks are present. These meetings have expanded to include EPA community involvement coordinators and remedial project managers and now serve an added function to streamline communication between the agencies and promote a shared understanding of the community's evolving environmental health concerns. A new risk assessor, Dr. Kelly Thrippleton-Hunter, was hired in 2022 to complete the team's planned roles, increasing capacity for State evaluation of exposure data. Moreover, collective promotion of upcoming educational opportunities, public meetings, trainings, and administrative news ensures that we are providing the most up to date opportunities to the public.
- NH APPLETREE has contributed to several public meetings for Superfund sites, acting as environmental health subject matter experts in conjunction with EPA risk assessors. For example, EPA, NHDES Waste Division, and APPLETREE collaborated to host an event for the Coakley landfill Superfund site. The resulting public meeting offered remediation updates and other site activity from EPA and NHDES

partners. The meeting, regarding new sampling data near the landfill, and potential impacts of PFAS contamination to residential well owners and other concerned community members, was held as a "station style" event. Stakeholders were given a presentation and then allowed to interact the state and federal agency staff present. APPLETREE responded to health concerns and shared online resources to the ~40 people in attendance. This meeting exemplifies a growing partnership between the state and federal agencies on outreach coordination. Similar events are being considered for other active Superfund sites.

- Recently, towns with historical or known environmental exposures have received a lot of communication regarding drinking water quality. To clarify the messages of multiple reports, written for distinct and separate purposes, APPLETREE engaged the Agency for Toxic Substances and Disease Registry (ATSDR) and these communities. Having a state program present during federal presentations has positively resonated with community members in particular. Examples include moderating ATSDR's public presentations at federally managed sites holding "fire-side chat" meetings with the communities themselves, and proactively communicating with concerned individuals. It is anticipated that APPLETREE will continue to strengthen community trust through these and similar methods for outreach in its next grant cycle with a goal of connecting communities to academic institutions and partners. Currently, we are working with NHDES water engineers and water systems records in Merrimack as ATSDR completes work on a report of drinking water exposures and recommendations for the community. This type of focus will become increasingly important given the national attention shining on potential PFAS contamination.
- New Hampshire APPLETREE coordinated with Region 1 teams from ATSDR and EPA to pursue a Region 1 goal of a 2023 SoilSHOP event in each participating state. Nashua NH was selected as a pilot location due to: its large, urban population; the increased likelihood of the presence of Lead in soil; and the existence of local environmental justice concerns. Several meetings were held between stakeholders to strategize location, approach, and division of responsibilities. The NH Healthy Homes and Lead Prevention Program contributed significantly to both resource availability and technical support, as they offered to run the sample analysis in house. The NH Get the Lead out of Drinking Water similarly contributed resources and a parallel avenue to drop off water for analysis of any Lead present. [Results were posted](#) using a stoplight scale, in which participants were given specific recommendations based on their quantitative screening results. As a result, residents with concerns about Lead in soil (and water) received tailored messaging and recommendations based on their own direct participation and Lead exposure risks.

[New Hampshire's Choose Safe Places for Early Care and Education Program, an APPLETREE Program:](#)

Because ATSDR is committed to promoting the healthy development of children, ATSDR expanded the scope of APPLETREE in 2017 to include Choose Safe Places for Early Care and Education (CSPECE). The [NH Choose Safe Places Program](#) (NH CSP) is working to protect children from harmful chemicals in child care facilities by: resource sharing with and training for local governments including health officers, completing a private well-water testing initiative, providing opportunities for professional development for child care providers via an environmental health and lead training that counts toward training clock hours for child care providers, working with state child care licensing and development agencies to identify best practices to improve the inspection and

siting process, and developing safe siting criteria while improving environmental health guidance and best practices for early care and education programs.

The NH CSP work is carried out using a multi-disciplinary approach. A statewide advisory team was created to provide guidance to the CSP program. Committee members include childcare providers and provider-based regional organizations, health and human services staff (Child Care Licensing, Bureau of Child Development and Head Start Collaboration and the Division of Public Health Services), local health officers, staff from the NH Department of Environmental Services, the NH APPLETREE program, and NH Child Care Aware of America representatives. Advisory meetings are held virtually on a quarterly basis, which has been a plus for partners who live remotely.

Local health officers' outreach has occurred via surveys and focus groups and through the health officer liaison with the Division of Public Health Services at the NH Department of Health and Human Services. Engagement enabled the assessment of gaps and opportunities within the child care landscape. Partnering with local health officials has also increased understanding of the resources available to educate child care providers on environmental health--leading to more providers receiving education and resources. Children's environmental health has become a greater priority at the local level due to the NH CSP work. Through this local work, the NH CSP staff learned more about child care licensing and inspection processes and identified potential opportunities for action and improvement.

To improve local child care providers' knowledge of environmental health, NH Choose Safe Places provided free training by purchasing usages of the Eco-Healthy Child Care®'s Protecting Children's Environmental Health e-course for state child care providers. The three-hour course is approved for adult learning clock hours in the state of NH. To date over 190 courses have been taken for free through this collaboration. A one-hour lead training has also been developed by NH CSP and made available and has been taken by over 900 child care providers. Our partnership with the Bureau of Child Care Development has enabled us to renew this opportunity to provide these trainings to New Hampshire at no cost.

Finally, the NH CSP program has completed the 2022 Private Well Water Testing Initiative to provide free water quality testing (including the NH Public Health Lab standard testing package plus radon, VOCs and PFAS) for NH child care facilities. Voluntary sampling was provided to licensed child care facilities using private wells as their water source. Providers also received a 22-page [toolkit](#) with well water testing and treatment information with links to additional resources, to provide them with a long-term support. This free testing effort was coordinated with the New Hampshire Department of Environmental Services lead testing for schools and child cares via EPA's WIIN grant. For child care facilities that required remediation, funds were provided through the Bureau of Child Development and Head Start Collaboration American Rescue Plan Act or other sources. A [final report](#) on the results and recommendations from this Initiative is available online. NH CSP will use data gathered from sampling to add to existing data bases and identify areas of concern for elevated contaminants in water and direct efforts towards outreach and education in these areas. A follow-up survey was sent to all child care providers using private wells to determine how to identify the barriers to participation, prioritize the next steps of support for providers, and to improve on future Initiatives.

Current endeavors will increase the number of educational resources available to providers, particularly in the area of safe siting for new and existing facilities. For example, NH Choose Safe Places is working with accredited labs to define a private well testing package specific to facilities applying for licenses. Further, the process by which child care providers can petition the program for technical assistance on safe siting will be streamlined and more thoroughly incorporated into applications, inspections, and home visits. Outreach to regional health officer meetings in 2023-2024 will continue to facilitate partnership and growth. The APPLETREE Program is also hiring a health educator who will contribute significant staff time to Choose Safe Places.

Lead in Drinking Water at NH Schools and Child Care Facilities:

On July 8, 2022, Governor Sununu signed House Bill 1421, which made several significant changes to the 2018 law that requires all public and private schools and licensed child care facilities to sample for lead in their drinking water. Most notably, the new law decreased the action level for lead in drinking water at schools and child care facilities from 15 parts per billion (ppb) to 5 ppb. Three rounds of sampling are required before June 30, 2024, and all drinking water outlets available to children for consumption must be sampled. These requirements apply in addition to any sampling that may be required at facilities that operate as public water systems. The majority of facilities have already completed two rounds of sampling.

To support schools and child care facilities in meeting these requirements, NHDES launched the Get the Lead Out of Drinking Water Program. The program provides resources and technical support to schools and child care facilities to complete sampling and remediation, including a helpline available via phone and email, how-to videos on our website, and template communication letters.

Sample results are available on the website in a user-friendly format, and NHDES has issued a data brief summarizing the findings from Round 1 of sampling which is available on our website. In addition, the University of New Hampshire (UNH) GRANIT has created a GIS-based web portal / data dashboard to visualize and analyze lead in drinking water data that will be linked from the website.

Funding for these efforts is from the U.S. Environmental Protection Agency (USEPA) Water Infrastructure Improvement for the Nation (WIIN) Act. WIIN funding will also cover testing costs for public schools and licensed child care facilities. Round 2 sampling began in fall 2022, and since that time, over two-thirds of schools and half of child care programs have completed round 2 sampling and begun remediation efforts. Round 3 testing has commenced. To support remediation efforts, the New Hampshire Department of Environmental Services (NHDES) secured a grant totaling \$1.6 million from the New Hampshire Drinking Water and Groundwater Trust Fund (DWGTF). A 100% Lead Remediation Grant is expected to be available later this fall and will reimburse public and nonpublic schools and licensed child care facilities for 100% of the costs of remediation of drinking water locations with lead results at 5 ppb or higher.

NHDES is collaborating with programs at NH DHHS, including Child Care Licensing, Environmental Public Health Tracking (EPHT), Healthy Homes and Lead Poisoning Prevention program, and the Choose Safe Places program, as well as NHED, on ways to most effectively analyze and share data and coordinate messaging with schools and child care facilities.

Statewide Private Well Sampling Initiative:

The Statewide Private Well Sampling Initiative is a NHDES project funded by the New Hampshire Drinking Water & Groundwater Trust Fund to provide homeowners with information about the quality of their drinking water, and when necessary, steps that can be taken to improve water quality. The project collected approximately 490 samples from randomly selected private drinking water wells and analyzed the samples for over 250 chemicals. It was the first statewide assessment of bacteria, nitrate, lead, fluoride, manganese, arsenic radionuclides, and salt to be conducted in the state. The battery of tests also included several emerging contaminants, including perchlorate, 1,4-dioxane, PFAS, and pesticides and their breakdown products. All of the sampling and analysis have been completed and participants have been provided their result. Data review and summation will be completed by NHDES in the coming months. More information is available about the study at the following link: https://www4.des.state.nh.us/nh-dwg-trust/?page_id=998

NHDES and DHHS partnered to leverage the impact of this study by including nearly 100 homes that were also randomly selected to participate in DHHS's TrACE biomonitoring study. The collaboration provided information about the relationship between chemicals measured in drinking water and in the bodies of the study participants. Findings have been presented in several settings, including at the Commission to Study Environmentally-triggered Chronic Conditions, and at the NHDES Drinking Water Source Protection Conference in May of 2021.

NHDES Private Well and Risk Communication:

NHDES recently created and filled a position within the Water Division, the Private Well and Risk Communication Coordinator. Having a full-time person dedicated to private well work and risk communication has enabled NHDES to start making greater inroads into the challenges issues posed by the fact that nearly half the state's population is served by water supplies for which there is no oversight with respect to safety.

Targeted Education and Sampling for Private Well Owners

In 2021-22, NHDES conducted free targeted private well sampling in three towns: Auburn, Pelham, and Bethlehem. These areas were chosen due to the suspected presence of high levels of naturally occurring uranium in well water. Residents were invited by mail to participate in the free well testing, and those that participated were mailed sample bottles, collected their own water samples, and mailed them to the lab. A summary report on results for each town was distributed to participants and town officials. NHDES also held a workshop for each town, where residents learned about contaminants in their area, potential health impacts, and how to treat their water if contaminants were found above health limits. Workshop participants learned about follow-up testing for their well water and were encouraged to test for radon in the air of their homes. Over 300 private well owners participated in the program. Collaboration with Environmental Public Health Tracking (EPHT) Program was key to the success of this program, analyzing data, preparing a report on outcomes for each town, and assisting with survey/data collection from participants.

Seacoast Private Well Initiative

In 2022, NHDES launched the Seacoast Private Well Initiative, which includes educational workshops and free water testing to all private well users in 12 Seacoast towns. The Seacoast Private Well Initiative was created by the Seacoast Commission on Long-Term Goals and Requirements for Drinking Water (The Seacoast Commission)

and received funding from the Drinking Water and Groundwater Trust Fund. All private well owners in the 12 towns are invited to participate in an educational workshop, followed up by free water testing. Local coordinators are recruited to assist with promotion and logistics such as identifying workshop venue and hosting water sample drop offs for participants. Four workshops have occurred, and water testing has been completed for residents of Madbury, North Hampton, Exeter, Hampton, Seabrook and Stratham. Over 500 private well households so far have had their wells tested for the most common NH well water natural and human-made contaminants. They have received their results, a report detailing which ones are above health limits, and recommendations on water treatment system(s) if applicable. The Initiative also provides free filter pitchers to low-income participants, and those with PFAS exceedances are encouraged to utilize the PFAS treatment rebate program. NHDES is collaborating with several partners on this important project including the NH DHHS EPHT program, NH DHHS Public Health Lab Water Dept, and town governments in Madbury, North Hampton, Exeter, Hampton and Stratham.

Legionella Emergency Response

NHDES and DHHS responded to two clusters of Legionnaires illnesses in 2022 and 2023. NHDES' Drinking Water and Groundwater Bureau, DHHS' Infection Disease Surveillance Section in the Division of Public Health Services and DHHS' Public Health Drinking Water Laboratory led investigations to identify possible sources of Legionella and response actions to eliminate exposure to the bacteria.

PFAS Testing Laboratory Grant

NHDES' Drinking Water and Groundwater Bureau and DHHS's Public Health Drinking Water Laboratory successfully applied for federal grant funds to obtain PFAS testing equipment and fund laboratory scientists for at least six years to establish and operate testing equipment for PFAS in drinking water.

Seabrook Station – Drinking Water Emergency Preparedness

NHDES' Drinking Water and Groundwater Bureau and DHHS' Radiation Safety Program have initiated improved emergency planning and response initiatives to address potential impacts to drinking water in the event an incident occurs at Seabrook Station.

Extreme Precipitation Emergency Preparedness

In anticipation of extreme precipitation during a period in the summer of 2023, NHDES and DHHS coordinated press releases to educate the public on the risks these type of events pose. The agencies also coordinated to ensure that there was adequate staff capacity to assist with collecting a large number of drinking water samples and to process the samples at the DHHS Public Health Drinking Water Laboratory.

Response to Localized Antimony Contamination in Madbury

Antimony is generally not detected in groundwater in New Hampshire and is rarely present at levels that exceed the Maximum Contaminant Level (MCL). For this reason, it is typically not tested when conducting analyses on drinking water for private wells. However, an alert chemist can notice if non-targeted metals are present while they complete tests for other metals such as manganese, arsenic and lead. The DHHS Public Health Drinking Water Laboratory while processing samples the Seacoast Private Well Testing Initiative that antimony was present at levels at fifty times the MCL for a cluster of wells in Madbury. NHDES and DHHS are coordinating

follow-up work to identify where private well owners may have antimony in their drinking water above the MCL and to collect additional information to determine if the antimony is from natural or man-made sources.

Recommendations

We look forward to continuing to engage in this work as we further refine our data sharing practices and find innovative ways to use data to drive decision making, while also recognizing the limitations of the data and resources available to support this work. In collaboration with the Commission, we will explore further opportunities to improve data sharing and analysis of environmental exposure and health outcome data.

References Used in this Report

NH DES OneStop Data Portal: <https://www.des.nh.gov/onestop/>

NH Environmental Public Health Tracking Program: <https://www.dhhs.nh.gov/programs-services/environmental-health-and-you/environmental-public-health-tracking>

NH Health WISDOM Data Portal: <https://wisdom.dhhs.nh.gov/wisdom/#main>

BiomonitoringNH Program: <https://www.dhhs.nh.gov/programs-services/population-health/public-health-laboratories/biomonitoring>

2019 NH TrACE Study: <https://tinyurl.com/2019TrACEStudy>

State of New Hampshire

Interagency Memorandum of Understanding

(For use between an executive branch agency and another agency or branch of government of the State of New Hampshire)

Whereas, the New Hampshire Department of Environmental Services (AGENCY 1) is a duly constituted agency or branch of government of the State of New Hampshire;

Whereas, the New Hampshire Department of Health and Human Services, Division of Public Health Services (AGENCY 2) is a duly constituted agency or branch of government of the State of New Hampshire;

Whereas, pursuant to NH RSA 126-A:76,I(a), the Department of Environmental Services (NHDES) and the Department of Health and Human Services, Division of Public Health Services (DHHS/DPHS) are entering into a memorandum of understanding (MOU) to foster on-going cooperation and data sharing between the parties to support environmental health initiatives involving both Agencies. This Memorandum of Understanding (MOU), along with the attached MOU Exhibit(s), describes the environmental health programmatic and data sharing activities that have been agreed to between the parties.

Whereas, NHDES and DHHS/DPHS desire to support existing initiatives and expand existing state capacity and expertise to make information-driven decisions to educate and protect the public;

Whereas, NHDES and DHHS/DPHS desire to design, implement, and evaluate environmental public health actions and interventions which are supported by data and information which are scientifically valid, useful, and meaningful;

This MOU covers the period from April 25, 2023, through June 30, 2028. The MOU contains the option to renew for an undetermined period based on agreement of the parties. This MOU replaces any other agreements that have been established between NHDES and DHHS/DPHS relative to the intent of data sharing and shall be supplemented with project specific data sharing agreements and/or data use agreements as appropriate.

NOW, THEREFORE, the parties enter into this Memorandum of Understanding to their mutual benefit, the benefit of the State and in furtherance of constitutional or statutory authority and objectives.

1. The New Hampshire Department of Environmental Services agrees to *[check all that apply]*:

- A. Pay **AGENCY 2** the amount of \$ N/A for the services described in the attached MOU Exhibit A, which is hereby incorporated by reference.

Execute the following if Box 1., A is checked: Payment shall be provided from *[IDENTIFY FUND]*:

- B. Perform the services described in the attached MOU Exhibit A, which is hereby incorporated by reference.

2. The New Hampshire Department of Health and Human Services, Division of Public Health Services agrees to [check all that apply]:

- A. Pay **AGENCY 1** the amount of \$ N/A for the services described in the attached MOU Exhibit A, which is hereby incorporated by reference.

Execute the following if Box 2. A is checked: Payment shall be provided from [IDENTIFY FUND]:

- B. Perform the services described in the attached MOU Exhibit A, which is hereby incorporated by reference.

3. The method of payment and payment amount for the above-referenced services, if any is required, is described in the attached MOU Exhibit B, such exhibit being here by incorporated by reference. No funding is being exchanged under this MOU.
4. All obligations here under are contingent upon the availability and continued appropriation of funds. The agencies shall not be required to transfer funds from any other account in the event that funds are reduced or unavailable. No funding is being exchanged under this MOU.
5. The Memorandum of Understanding is effective until **June 30, 2028**.
6. This Memorandum of Understanding may be amended by an instrument in writing signed by both parties. Either party may terminate this agreement by providing written notice to the other party at least **30** days prior to termination.
7. The Parties agree that the obligations, agreements, and promises made under this Memorandum of Understanding are not intended to be legally binding on the Parties and are not legally enforceable.
8. Disputes arising under this Memorandum of Understanding which cannot be resolved between the agencies shall be referred to the New Hampshire Department of Justice for review and resolution.
9. This Agreement shall be construed in accordance with the laws of the State of New Hampshire.

- 10. The parties hereto do not intend to benefit any third parties and this Memorandum of Understanding shall not be construed to confer any such benefit.
- 11. In the event any of the provisions of this Memorandum of Understanding are held to be contrary to any state or federal law, the remaining provisions of this Memorandum of Understanding will remain in full force and effect.
- 12. This Memorandum of Understanding, which may be executed in a number of counterparts, each of which shall be deemed an original, constitutes the entire Memorandum of Understanding and understandings between the parties, and supersedes all prior Memoranda of Understanding and understandings relating hereto.
- 13. Nothing herein shall be construed as a waiver of sovereign immunity; such immunity being hereby specifically preserved.

14. FOR AGENCY 1: New Hampshire Department of Environmental Services



 Robert R. Scott, Commissioner
 New Hampshire Department of Environmental Services

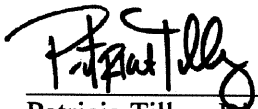
5/9/23

Date

Robert R. Scott

 Robert R. Scott, Commissioner
 New Hampshire Department of Environmental Services

15. FOR AGENCY 2: New Hampshire Department of Health and Human Services, Division of Public Health Services



 Patricia Tilley, Director
 Division of Public Health Services
 New Hampshire Department of Health and Human Services

5/03/2023

Date

Patricia Tilley

 Patricia Tilley, Director
 Division of Public Health Services
 New Hampshire Department of Health and Human Services

PLEASE
NOTE

1. **MOU Exhibit A** (MOU Terms) and, if applicable, **MOU Exhibit B** (Payment Terms) must be attached to this form.
2. This form is intended only/or use with Interagency Memoranda of Understanding ("MOUs"). Please refer to the MOU 1 checklist and instructions when executing this document. For Interagency MOUs, Department of Justice review and execution is only required if the MOU involves an expenditure of funds in an amount which is equal to or greater than the approval threshold established by the Governor and Executive Council in Chapter MOP 161 of the Department of Administrative Services Manual of Procedures.
3. If more than two agencies or branches are involved in the agreement, please include all information listed above for each agency or branch, identifying them as, for example, "Agency 3, " "Agency 4, " and so forth.
4. No changes may be made to the preprinted terms of this form without the approval of the Department of Justice.
5. **The Department of Justice and Governor and Council approvals appearing below are only required if this MOU is submitted to the Governor and Council for approval.**

Approved by the New Hampshire Department of Justice for form, substance, and execution:

By: _____
[Name of Assistant Attorney General]

On: _____
Date

Approved by the Governor and Executive Council

By: _____

On: _____
Date

Interagency Memorandum of Understanding Exhibit A

For the purposes of the MOU, the New Hampshire Department of Environmental Services (NHDES) and the New Hampshire Department of Health and Human Services, Division of Public Health Services (DHHS/DPHS) agree to cooperate as follows:

I. Department of Environmental Services

The Department of Environmental Services agrees to:

1. Assist DHHS/DPHS with project planning and implementation when appropriate.
2. Assist DHHS/DPHS staff with access to environmental monitoring data via NHDES OneStop and explore opportunities for direct access to database systems as deemed appropriate by NHDES staff.
3. Agree to the terms and conditions of a Department of Health and Human Services (DHHS) Data Sharing Agreement relating to any sharing of DHHS data necessitated by a particular effort under this MOU, and negotiate and sign a Data Sharing Agreement and an End User Agreement before accessing any DHHS data.
4. Abide by the DHHS confidentiality policies applicable to any DHHS data shared under the MOU or Data Sharing Agreement in order to protect the identity of all personal information within health records.
5. Share technical expertise on data interpretation, including, but not limited to explanations of limitations and appropriate data use.
6. State data limitations and utility of analysis on publications.

II. Department of Health and Human Services/Division of Public Health Services

The Department of Health and Human Services/Division of Public Health Services agrees to:

1. Assist NHDES with project planning when appropriate.
2. Assist NHDES staff with access to aggregated public health data via the NH Health and Human Services Data Portal.
3. Share technical expertise on data interpretation, including, but not limited to explanations of limitations and appropriate data use.
4. State data limitations and utility of analysis on publications.

III. Mutual agreements of the parties

It is further understood and agreed between NHDES and DHHS/DPHS:

1. The parties will maintain communication via regular meetings between program staff to ensure collaboration on work that is being conducted.
2. The parties agree to facilitate the exchange of information and appropriate data sets to support work in the field of Environmental Health. Project specific data sharing agreements and/or data use agreements will be developed as appropriate based on release of data.
3. That this MOU may be modified in writing at any time by mutual consent of both parties.
4. In the event that changes in either State or Federal laws or regulations occur which render the performance of the activities set forth in this MOU illegal, void, impractical or impossible, this MOU shall terminate immediately.
5. The parties will review this MOU at least once each year to determine whether it should be revised, renewed, or terminated.
6. The parties shall obtain partner agency approval prior to attribution of work or work products.

Attachment B: Meeting Minutes

Environmentally-
Triggered
Disease and
Chronic Illness
Commission

RSA 126-A:73-a (SB 85,
Chapter 229:2, Laws of
2019)

Agenda

- Introduction of members
- Overview of charge
- Scope of commission
- Past meeting material orientation
- Updates
- Next meeting topics

Environmentally-
Triggered
Disease and
Chronic Illness
Commission

RSA 126-A:73-a (SB 85,
Chapter 229:2, Laws of
2019)

- Website
(<https://www.gencourt.state.nh.us/statstudcomm/committees/default.aspx?id=1468>)
- November 2022 Commission Interim Progress Report
- July 2022 DHHS Progress Report (on website)
- Past meeting: videos on youtube

NH and Cancer

- Pediatric Cancer Cluster – 5 towns of Seacoast designated in 2016
- Highest rate of pediatric cancer in the nation (CDC, 2018)
- Highest rates of breast, bladder, and other cancers in nation
- Elevated rates of kidney cancer and other cancers in Merrimack
- Elevated cancer risks in other southern NH towns
- **Other chronic illness?**

DHHS: Merrimack Cancer 2009-2018

Standardized Incidence Ratios (SIRs) for cancer in Merrimack, NH 2009-2018

Cancer Type ¹	Observed	Expected ²	SIR	Lower Confidence Interval ⁵	Upper Confidence Interval
Brain and Other Nervous System	20	21.1	0.95	0.58	1.47
Colon and Rectum	122	101.8	1.20	1.00	1.43
Esophagus	19	19.8	0.96	0.58	1.50
Gall Bladder ⁴					
Hodgkin Lymphoma	7	7.7	0.91	0.37	1.88
Kaposi Sarcoma ⁴					
Kidney and Renal Pelvis	66	46.5	1.42	1.10	1.81
Larynx	8	10.0	0.80	0.35	1.58
Leukemia	39	37.9	1.03	0.73	1.41
Liver and Intrahepatic Bile Duct	16	18.5	0.86	0.49	1.40
Lung and Bronchus ³	167	181.0	0.92	0.79	1.07
Melanoma of Skin	77	83.5	0.92	0.73	1.15
Mesothelioma ⁴					
Myeloma	22	16.9	1.30	0.82	1.97
Non-Hodgkin Lymphoma	73	59.0	1.24	0.97	1.56
Oral Cavity and Pharynx	35	37.3	0.94	0.65	1.30
Pancreas	30	34.4	0.87	0.59	1.24
Stomach	11	15.5	0.71	0.35	1.27
Thyroid	44	42.9	1.03	0.75	1.38
Urinary Bladder, invasive and in situ	91	74.8	1.22	0.98	1.49
Prostate ³	207	185.0	1.12	0.97	1.28
Testis	10	8.6	1.16	0.55	2.13
Breast (Female)	231	221.7	1.04	0.91	1.19
Cervix Uteri	7	6.9	1.02	0.41	2.09
Ovary	17	16.8	1.01	0.59	1.62
Uterus	55	53.3	1.03	0.78	1.34
Other	118	113.4	1.04	0.86	1.25

Commission charge

This bill reestablishes the commission to study environmentally-triggered chronic illness.

III.(a) The commission's study shall include, but not be limited to:

- (1) Determining which entities may report confirmed cases of chronic conditions or other health-related impacts to the public health oversight program.
- (2) Recommending ways to alert public health officials regarding higher than expected rates of chronic disease or other health-related impacts which may be related to exposures of unrecognized environmental contaminants.
- (3) Recommending a method to inform citizens regarding programs designed to manage chronic disease or other environmental exposure health-related impacts.
- (4) Recommending data sources and a method to include data compiled by a public or private entity to the greatest extent possible in the development of the public health oversight program.
- (5) Defining by codes, the health status indicators to be monitored, including chronic conditions, medical conditions, and poor health outcomes.
- (6) Studying current health databases, including years available, potential for small area analysis, and privacy concerns.
- (7) Researching currently existing health data reports by agency, bureau, or organization.
- (8) Creating a model of desired data outputs and reports for chronic conditions and other health-related impacts.

Commission charge (cont)

This bill reestablishes the commission to study environmentally-triggered chronic illness.

(9) Identifying the gaps between what currently exists and the model output.

(10) Recommending the organizational structure responsible for the oversight function and mandatory reporting requirements.

(11) Reviewing results of stages 1, 2 and 3 of the pilot study recommended by the previous commission established by 2017, 166 and identifying changes to subparagraphs (8), and further identify items in (9) and (10).

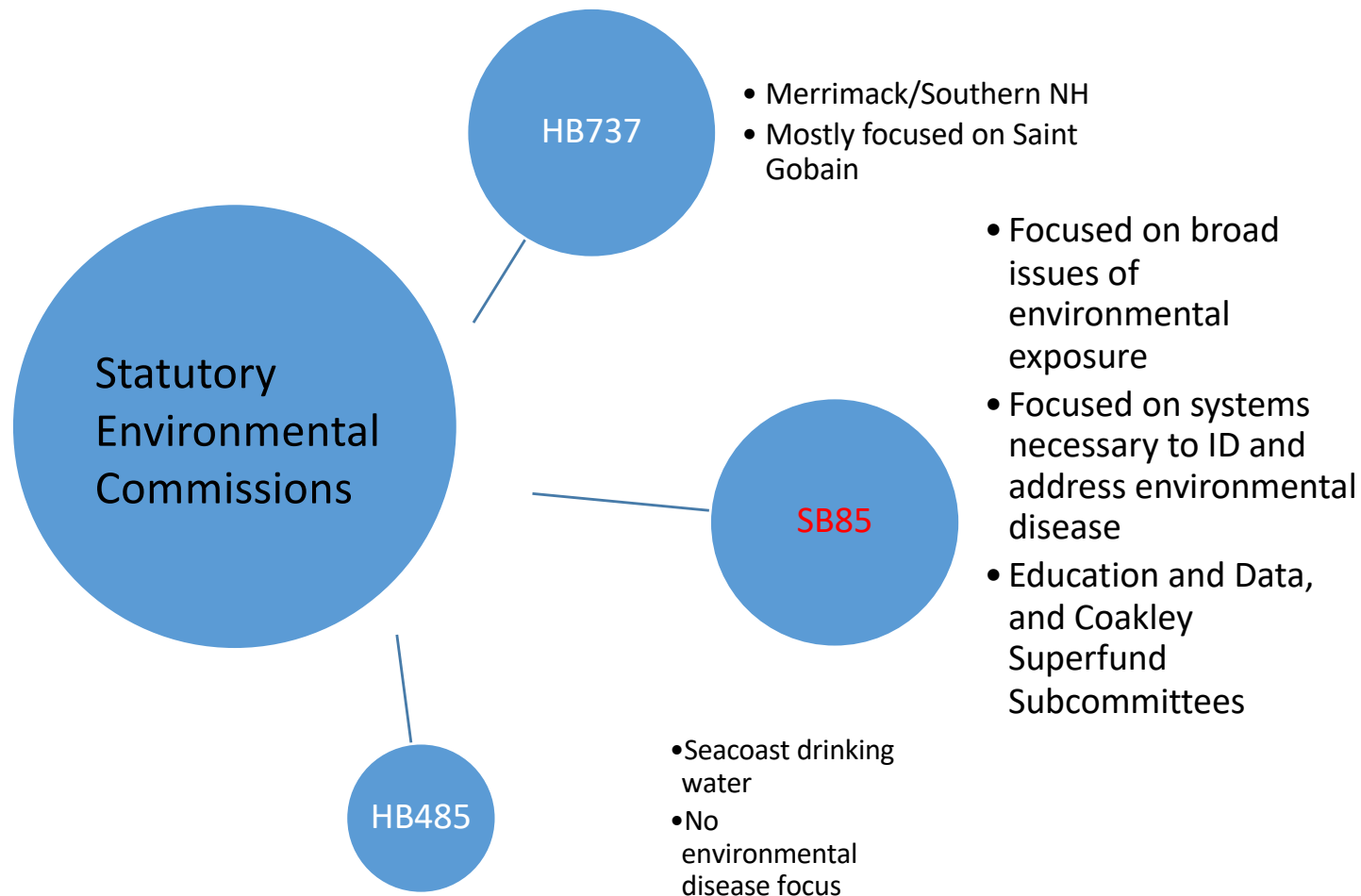
(12) Identifying technology system changes necessary to carry out the charge of the commission.

(13) Collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for the department of health and human services to educate and provide guidelines for physicians and other advanced health care practitioners to identify and evaluate appropriate diagnostic screening tests to assess health effects from exposure to emerging contaminants.

(14) Collaborating with the National Institutes of Health, the United States Environmental Protection Agency, and the Centers for Disease Control and Prevention to develop protocols for programs to streamline education and outreach to health care providers about how to implement the guidelines specified in subparagraph (13). The protocols shall include education relative to methods to reduce further exposures and to eliminate the contaminants, if effective methods are available.

(15) Recommending legislation, as necessary, to carry out the charge of the commission.

Other commissions/overlap



NH-Centered Index of Environmental Exposures

Table 1. NIEHS Summary of Disease or Condition and Environmental Toxin

Disease or Condition	Subtype Diagnosis	Contaminant Stressor	Clinical Markers	Citations	Source	Disease Outcomes/Conditions with condition codes (I Citations)
Asthma	Asthma	PFAS	T3		EMR	
			High Cholesterol		EMR/HDD/APCD	CVD
Autism	n/a					Thyroid
Autoimmune diseases (i.e., Lupus)	Diabetes					Pre-eclampsia
	Lupus					Low birth weight
	Multiple sclerosis					Ulcerative Colitis
	Rheumatoid Arthritis		PSA		EMR	Prostate Cancer
	Celiac disease					Kidney Cancer
Cancer	Breast cancer Endometrium Kidney Colon Lung Esophagus	PFAS				Thyroid Disruption/Cancer
		Cyanobacteria				Prostate Cancer
						ALS
						Breast Cancer
			Elevated liver enzymes		EMR	
		Tobacco				Lung cancer
		Radon				Lung Cancer
		Lead				Cardiovascular Disease (adults)
		Lead				Lower IQ, Behavioral issues (children)
		Lung disease	COPD	COVID-19		
Lyme						
Flame Retardants						
VOCs						
Obesity (Obesogens)		Climate Change - Cold, heat stress				
		Natural gas appliances				Asthma
		Mercury				
		Air pollution/particulates				Asthma
		Arsenic				Bladder Cancer
Parkinson's disease					Lung Cancer	
Reproductive Health		Lead				
		Mercury				Lung Cancer

SB85: Commission to Study Environmentally-Triggered Chronic Illness

Monitoring & Surveillance	Reporting	Communicating	Capacity Building
<ul style="list-style-type: none"> Identifying relevant programs (1) Identifying relevant databases (1, 4, 6) Identifying outcomes of interest (5) 	<ul style="list-style-type: none"> Reviewing existing reports (7) Generating new reports that summarize findings (2, 3, 8) 	<ul style="list-style-type: none"> Getting information from concerned stakeholders (1) Sending information to public health officials (2) Sending information to citizens (3) 	<ul style="list-style-type: none"> Developing a surveillance program to track the outcomes of interest (4, 8, 9, 10, 11) Identifying program and technology gaps (9, 11, 12)
<h3>Community Engagement Process</h3>		<ul style="list-style-type: none"> Develop materials and a process to inform healthcare providers relevant to environmentally triggered disease and illness in affected communities (13) Streamlining outreach and education to reduce exposures (14) 	<ul style="list-style-type: none"> Improving interoperability of data systems to support surveillance program (8, 11) Recommending legislation to support the work of the Commission (15)
<p>Collaborating with local, state, and federal partners (7, 13, 14) Routinely monitoring and communicating results to stakeholders (2)</p>			

Past meeting topics

- Cost of inaction – arsenic, Bob Woodward presentation
- Biomonitoring TRACE program
- Birth defects registry
- Lead in NH children
- Radon
- Community Health Outlooks, DPHS
- Synthetic populations
- National environmental analysis
- Cancer cluster analysis

- Ms. DiTulio – Nurse P education efforts update –
 - 4/14 plenary session, ~150 clinicians, Dr. Megan Romano (Dartmouth), Dr Petali (DES), Rep. Murphy (NH House)
- DHHS/DES –
 - update on MOA/MOU (2018 HB1356) working on updating it – lapsed, data use agreements,
 - Progress report – last one in September updating it now – submit in March 2023 maybe our next meeting
- Reorganization of subcommittees (next meeting)
 - Data (M. Messmer)
 - Education (formerly Rep. Salloway) – outreach NHMED, Gary
 - Health officer (DHHS) program manager, Peg, Rep Murphy, Dr. Timmons, Dr. Kazal
 - Coakley (Rep. Meuse), Muns
- Department of Education – cost of special needs across NH Senator Riccardi, send email to Senator
- Other topics?
 - Data privacy
 - 5G subject – Environmental Health Trust
 - DHHs update on biomonitoring trace?
 - Prevalence of everyday products carcinogens
 - Melanoma - ?
 - TURI U Mass Lowell (Karen Craver ID someone?)
 - Europe v. US? Cost of Inaction (?)
 - Emergency alerts – state-wide, NIXEL, DOS Homeland Security Emergency management, NH Alerts
 - Media – WMUR, radon, PSAs, public access government channels in NH(Exeter public channel)?
 - Area agency system – birth to 3 years early intervention (developmental delay) [Community Bridges] 10 across the state - Medicaid reporting Bureau of Devel Services DHHS
 - Pediatric cancer distribution across the state
 - Asthma PM2.5 Air quality, Climate change, EPA Karen Craver
 - Pediatricians funds to get info to patients
- Legislative ideas
 - CME (NPs get CMEs, Pease CME)
 - HB391 in NH legislature (sponsor – Nancy) OK
 - HP614 finance this week then to house floor
 - Lead bill

AN ACT reestablishing the commission to study environmentally triggered chronic illness.

SB85, Chapter 229, 126-A:73-a, Laws of 2019

Meeting Notes

Friday April 21, 2023, 3:15PM to 5PM

A. Attendance

Katie

Peg

Karen

Denise

David

Rosalie

B. NHDHHS/NHDES

a. update on MOA

b. questions from commission on progress report

C. Subcommittee updates

a. Education – Peg DiTulio

b. Legislative – Rep. Murphy, Sen. Prentiss and Sen. Ricciardi

c. Coakley landfill – Dr. LoPresto

D. Legislative Work Session

a. Private well bill – bring back in fall? Requirement to test in fall Rep. Meuse, education of legislators

b. HB614 –

c. Repository of health outcomes starting – broadening a subcommittee? Or restart data

d. Lead on consent in senate

E. Future meetings – ideas for presentations

a. Radon – drinking water, inhalation Oct 2019 Owen David, radon air program Lynn Clement - radon in water

b. MS – Cyanobacteria – Rep Rung, Karen (commission) cyanobacteria. HB276 mitigation and loan fund, ALS Dr Strommel, Dartmouth, national research project

c. Rockingham Co. Air quality C – Karen Craver, CAMP program

d. Turf –

e. Landfills - waste management, Branden public water and private water, 80% exceed standards.

- f. Sludge – waste, bio sludges, residuals
- g. Pediatric cancer -

F. Meeting Adjournment

Karen – updates on MOA – final stage

Clarification on process with final draft – following related bill HB391 as of last week passed out of Senate 4-0 vote, no timeline – AG office to ask for process, how under new Dashboard.

DHHS/DES progress report

Education – medical society, hospital association
Evaluations

Education – subcommittee – replicate for docs?
NYU training – children’s health and

The following bills have been heard regarding landfills:

HB56 relative to permits for the siting of new landfills. ITL by Senate did not support ITL

HB226 enabling municipalities to regulate the distribution and disposal of certain solid waste within landfills. ITL by House.

HB602 -FN relative to landfill siting. Retained by House

SB61 relative to surface water setbacks for landfills. In House Environment and Agriculture.

SB159 -FN-L establishing a committee to study unlimited service area permits for landfills and out of state waste coming into New Hampshire. In House Environment and Agriculture.

The following bills deal with PFAS:

HB212 -FN-A appropriating funding for investigations, testing, and monitoring relative to per- and polyfluoroalkyl substances. Retained in House.

HB242 -FN relative to banning PFAS in food packaging. Retained by House.

HB398 relative to notice of PFAS and other groundwater contamination prior to the sale of real property. Retained in House.

HB414 -FN relative to health insurance coverage for preventative PFAS care. Retained in House.

HB465 -FN restricting use of perfluoroalkyl and polyfluoroalkyl substances in certain consumer products. Retained in House.

SB138 -FN-A making an appropriation to PFAS remediation fund grants. Senate Table.

The following bills deal with water:

HB236 relative to condominium conversions under water and waste disposal laws and municipal ordinances. ITL by House.

HB310 requiring developers to secure hydrology analysis certifying adequate water capacity and potability when building new subdivisions. ITL by House.

HB311 -FN-A making an appropriation to the department of environmental services for eligible wastewater projects. Retained by House.

HB398 relative to notice of PFAS and other groundwater contamination prior to the sale of real property. Retained by House.

HB534 -FN-A relative to water assistance for natural disasters. In Senate ENR.

HB641 -FN relative to clearance inspections following identification of a lead exposure hazard. Retained by House.

SB60 relative to water quality. In House Resources, Recreation, and Development.

SB123 -FN relative to the adoption of ambient groundwater quality standards by the department of environmental services. In House Recreation, Resources, and Development.

SB169 -FN-A making an appropriation to the department of environmental services to fund a water main interconnection project between Nashua and Litchfield. Senate Table.

SB230 -FN-A making an appropriation to the department of environmental services for wastewater infrastructure projects. Senate Table.

HB614 – Cancer investigation in HB2 trailer bill

HB391 DES/DHHS agreement

HB342 – pediatric lead bill – despite House push back passed to Senate consent calendar

HB205 PFAS in house transfers, DES showed them a heat map of private well contamination – heat map of PFAS in private wells

<https://www.dhhs.nh.gov/reports-regulations-statistics/data-reports/data-requests>

Cancer concern investigation protocol

<https://www.dhhs.nh.gov/programs-services/disease-prevention/cancer/cancer-concerns-and-investigations>

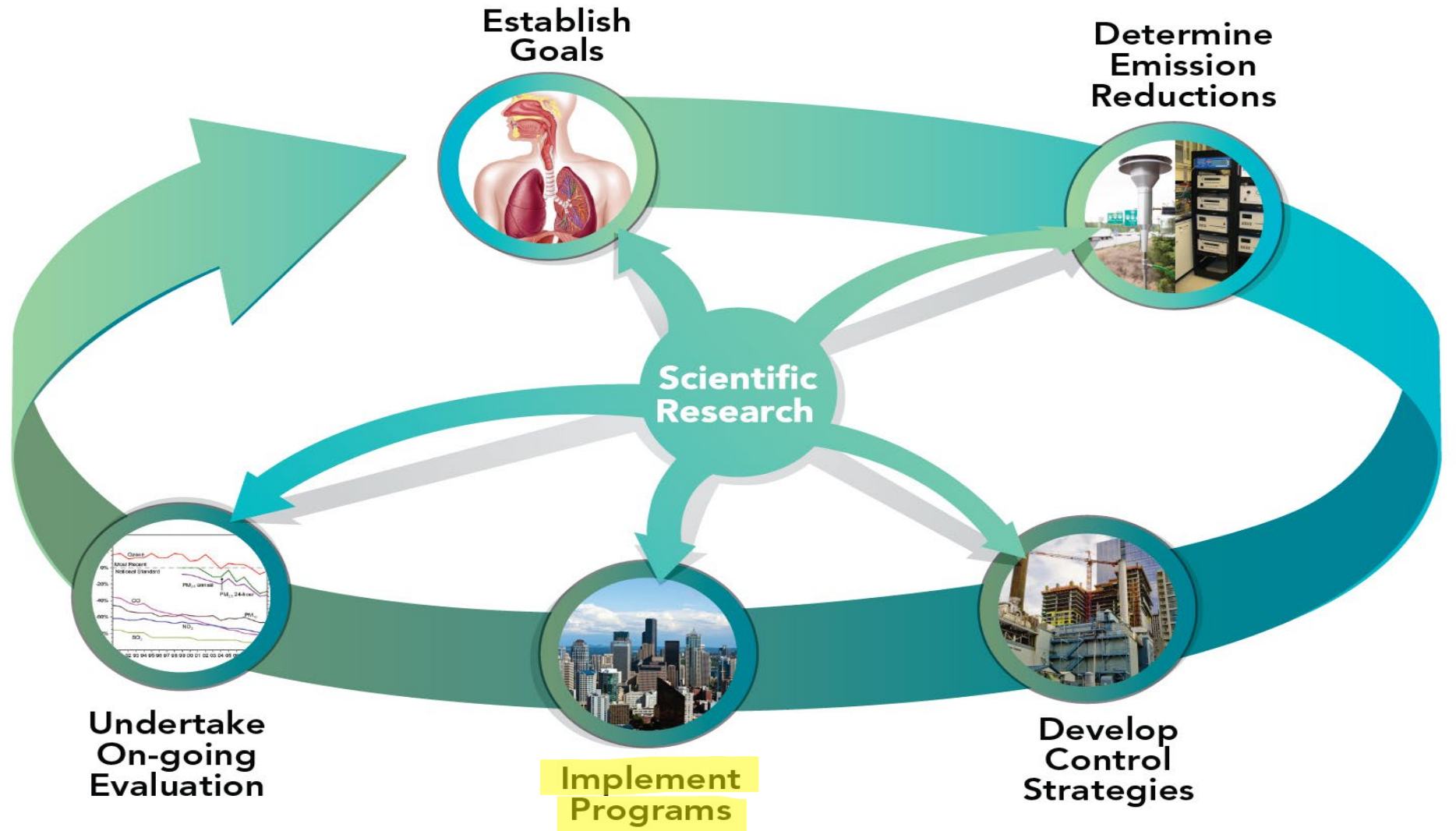
NH Air Emissions Permitting Program

Todd A. Moore
Air Permit Programs Manager

NH Department of Environmental Services
Air Resources Division
Permitting & Environmental Health Bureau



AIR QUALITY MANAGEMENT CYCLE



Examples: Regulated Air Pollutants

Federal

- Criteria Air Pollutants
- Hazardous Air Pollutants

State

- Regulated Toxic Air Pollutants



Criteria Pollutants

Carbon Monoxide (CO)

Particulate Matter (PM_{10, 2.5})

Nitrogen Dioxide (NO₂)

Sulfur Dioxide (SO₂)

Ozone (O₃)

Lead



NAAQS

National Ambient Air Quality Standards

Primary Standards

- Protect public health
- “overall health and safety of the general human population at large”

Secondary Standards

- Protect public welfare
- “well-being of animals and vegetation and the maintenance of property”



NSPS

New Source Performance Standards

Emission standards for new or modified sources

Uniform national standards set by USEPA

Device/category specific

- E.g., Hot Mix Asphalt Plants
 - Total Suspended Particulate limit = 0.4 grains/dry standard cubic foot
 - Baghouse

~70 Source Categories



EG

Emission Guidelines

Emission standards for existing sources

- Similar to NSPS standards

Uniform national standards set by USEPA

Device/Category specific

Existing sources comply or shut down

Many of ~70 NSPS Source Categories



HAP

Hazardous Air Pollutants

HAP = Pollutant known or suspected to cause:

- Cancer
- Reproductive effects
- Birth defects
- Adverse environmental effects

Examples: Beryllium, mercury, toluene, vinyl chloride, benzene

CAA 1970 = 8 HAPs

CAAA 1990 = 189 HAPs



NESHAP

National Emission Standards for Hazardous Air Pollutants

Control Technology Requirements

~270 Source Categories



* - list of 187 compounds in Section 112(b) of the 1990 Clean Air Act Amendments

RTAP

Regulated Toxic Air Pollutants (New Hampshire)

Ambient Air Limits (AALs)

- Human health/risk-based standards
 - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices
 - American Conference of Governmental and Industrial Hygienists (ACGIH)
- Conservative factors for
 - General safety factor
 - Time of exposure
 - Chronic, Acute, Nuisance



RTAP

Regulated Toxic Air Pollutants

Regulated Toxic Air Pollutants (RTAPs)

- 750+ pollutants

All subject sources must comply with NH RTAP regulation

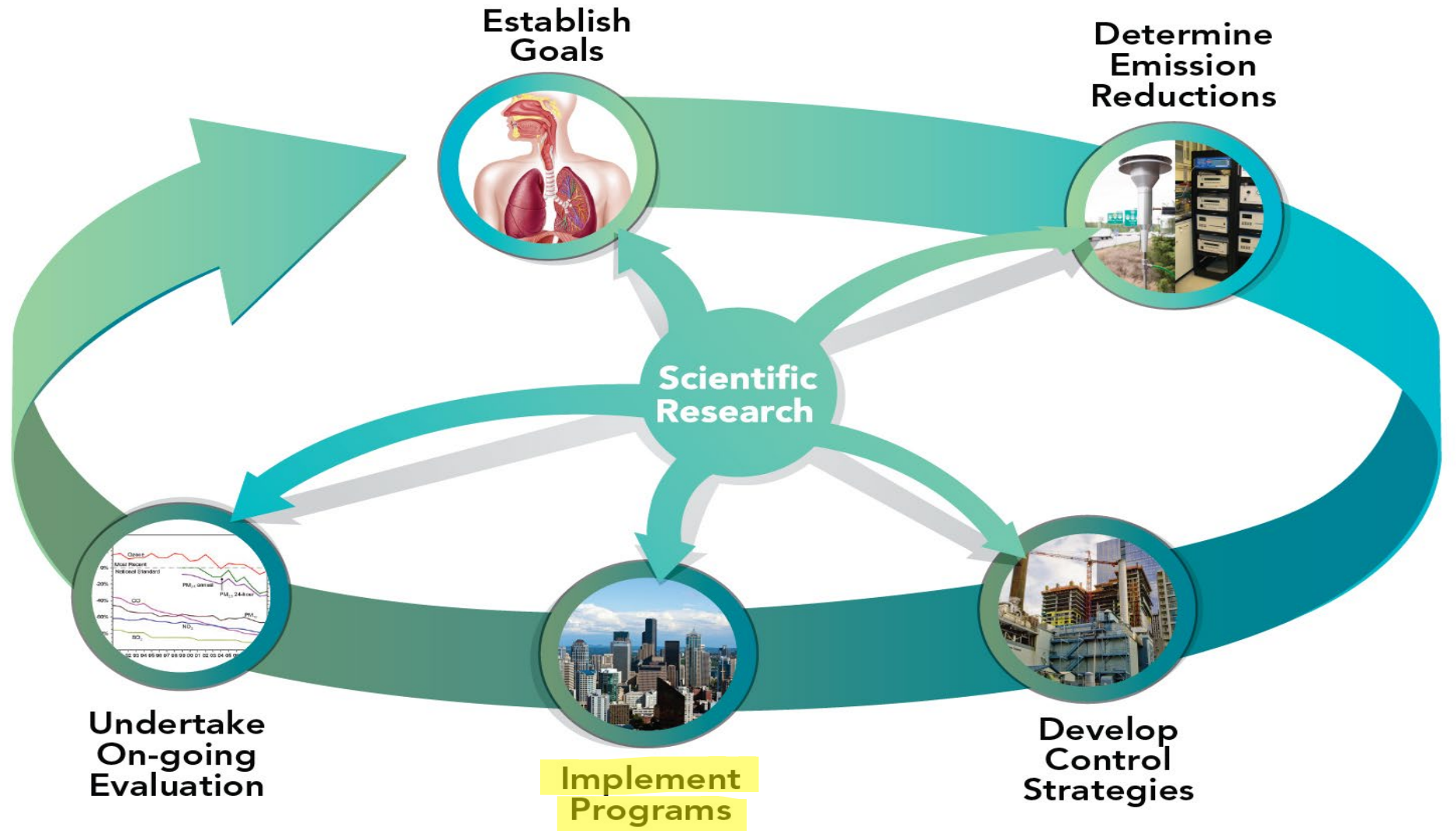
“manage emissions of RTAPs such that the concentrations of RTAPs in ambient air resulting from those emissions shall not exceed the AALs for those RTAPs at and beyond the compliance boundary for the stationary source”

Some sources need permit conditions to make compliance enforceable

- Operating limitations
- Control devices



AIR QUALITY MANAGEMENT CYCLE



What is an air permit?

- Title V program intended to improve sources' compliance with other Clean Air Act requirements.
 - Include all *applicable requirements* required under the CAA in one permit
 - Does not add new pollution control requirements
- State Permits based on same concept
- Clearly state sources air pollution control obligations
 - Source, regulators, interested parties

Air Emission Permits

- Applicability/Permitting Thresholds
- Types of Air Permits
- Application Requirements
- Application Review Process
- Permit Conditions
- Timelines (Permit Applications, Reporting)
- Costs/Fees

Devices/Sources That Need A Permit

ARD Fact Sheet #17

<https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/ard-17.pdf>



PTE

Potential to Emit

The maximum capacity of a stationary source to emit a pollutant under its physical and operational design.

Limitations:

- air pollution control equipment
- restrictions on hours of operation
- Restrictions on the type or amount of fuel combusted
- Limitations on production

Federally Enforceable

- Permit Limitation

Potential to Emit Major/Minor Source

Major Source

- PTE \geq threshold
- Permitted \geq threshold

Synthetic Minor Source

- PTE \geq threshold
- Permit limits $<$ thresholds

True Minor Source

- PTE $<$ thresholds

Types of Permits

Temporary Permit (TP)

Permit to construct/startup a new or modified stationary source or device

- Must be obtained **prior** to commencement of construction
- Contains startup/testing requirements
- Valid for 18 months from issuance
- Sources then either
 - Apply for State or Title V Operating Permit or
 - Request a reissuance of Temporary Permit (must meet certain criteria)

Types of Permits [cont.]

State Permit to Operate (SPO)

- “Minor Sources” of air pollution
- Valid for 5 years from issuance
- Renewal application due 90 days prior to expiration

Title V Operating Permit

- “Major Sources” of air pollution
- Valid for 5 years from issuance
- Renewal application due 6 months prior to expiration

Types of Permits [cont.]

General State Permit (GSP)

- Permit established by NHDES
- Sources register to be covered by GSP
- GSP – Emergency Generators

Permit by Notification (PBN)

- Operating conditions established by NHDES in the air rules
- Sources register to be covered by PBN
- PBN – Rock Crushers

Application Requirements

Temporary Permits/State Permits to Operate

- ARD-1 Form (for all applications)
- ARD-2 through ARD-6 forms (as applicable)
- Site Plan
- Emission Calculations
- Monitoring Plan
- Modeling (as applicable)
- Designation of Responsible Official
- Application/modeling fees (as applicable)

Application Review Process

Completeness Determination

- If complete, 2nd copy of application forwarded to town/city

Technical Review

- Check calculations
- Check source of emission factors
- Review applicable requirements in the regulations
- Air dispersion modeling (if necessary)
- Determine operating/emissions limitations to maintain compliance
- Determine appropriate monitoring, recordkeeping and reporting requirements

Air Dispersion Modeling

Criteria air pollutants

- National Ambient Air Quality Standards (NAAQS)
- Increment Consumption

Regulated Toxic Air Pollutants (RTAPs)

- Ambient Air Limits (AALs)



Permit Conditions

Emission rate limitations

- Hourly, daily, annual
- lb/hr, ppm, lb/MMBtu

Operational and/or fuel use limitations

Stack specifications

- Height, diameter

Control device

- Monitoring/maintenance

Monitoring, Recordkeeping, and Reporting



Application Review Process

Draft permit

- Internal review by Permitting staff, Compliance/Enforcement staff, stack testing group
- Pre-public notice review by applicant

Draft permit/ public notice issued

- Copies to town/city, USEPA
- Public notice – 1 state-wide, 1 local newspaper
- 30-day public comment period

Application Review Process

Draft permit

- Pre-public notice review by applicant if requested

Draft permit/ public notice issued

- Copies to town/city, USEPA
- Public notice – 1 state-wide, 1 local newspaper
- 30-day public comment period

Public hearing (if requested)

Final determination/permit issuance



Application Review Process

Public hearing

- Can be requested by public, town/city, etc.
- Additional 30-day public notice of hearing
- Public comment period typically extended beyond hearing

Final decision

- NHDES issues decision after consideration of comments and testimony
- Opportunity for public or applicant to appeal decision
 - Appeals to Air Resources Council



Timelines: Applications

New permits and Significant Modifications

- 90 days prior to planned start of construction
- Cannot start construction until permit issued

Renew permits

- 90 days prior to current permit expiration for (Temporary and State)
- 180 days prior to current permit expiration for (Title V)
- Application shield if renewal application is timely

Timelines: Reporting

Annual emissions report and emission-based fees

- Annual

Excess emissions (permit deviations)

- 24-hour phone/fax/email notification
- Written follow-up w/in 10 days (Title V sources only)

Other requirements

- Some semi-annual, quarterly, monthly reporting

Compliance Tips

Obtain permits prior to start of construction

Consider a consultant to assist with permitting strategy, application prep, modeling, etc.

Draft permits

- Read and comment as necessary
- Can you comply with all requirements?
- Drafts somewhat generic – can be tailored (within limits) to your facility

Have a record to show compliance with each permit condition

Submit renewals on time to maintain “application shield”



Todd A. Moore

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Air Resources Division

Permitting & Environmental Health Bureau

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New Hampshire Air Quality and Monitoring

Kathleen Errington and Marcus Chase
SB85 Legislative Commission Meeting
June 16, 2023



In order to understand the air quality in New Hampshire, or anywhere really, we need to understand what pollutants affect the air and which are of most concern to the environment and to the health of the public.



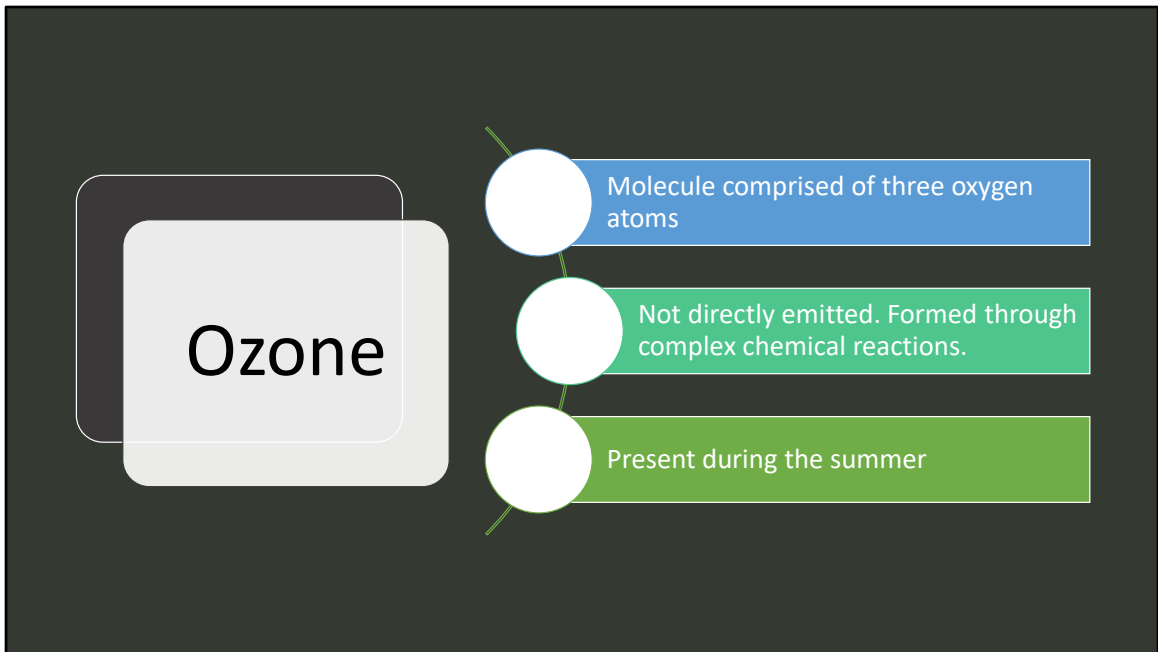
Ozone

Particulate
Matter

Here in New Hampshire, and for most of the country, the two pollutants of most concern are ozone and particulate matter.

What is ozone? It is a molecule that consists of three oxygen atoms, and it is not directly emitted like some other pollutants.

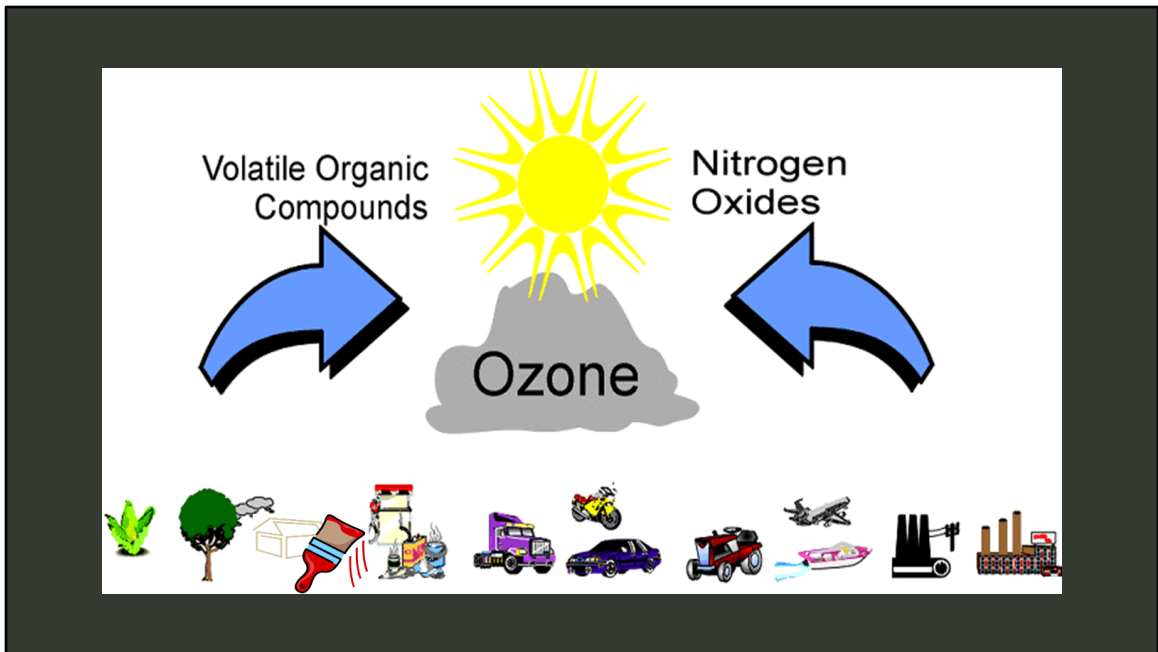
It is chemically formed in the atmosphere in the presence of heat and sunlight which makes this mostly an issue during the summertime.



Here in New Hampshire, and for most of the country, the two pollutants of most concern are ozone and particulate matter.

What is ozone? It is a molecule that consists of three oxygen atoms, and it is not directly emitted like some other pollutants.

It is chemically formed in the atmosphere in the presence of heat and sunlight which makes this mostly an issue during the summertime.



The first ingredient needed to form ozone is volatile organic compounds, or VOCs, which are emitted anthropogenically from personal care products, paint and cleaning supplies as well as biogenically emitted from vegetation.

The second ingredient needed is nitrogen oxides which are emitted from both gasoline and diesel vehicles, industrial sources, electric utilities. Now, in order to chemically react, these two precursors need to be in the presence of sunlight and heat which all together forms ozone.




You don't typically see ozone but under certain conditions and in combination with other pollutants you may have seen it as SMOG.

Ozone Health
Effects: *General
Population*

Not as water soluble → can travel deeper into lungs



Ozone is not as water soluble as other pollutants and can therefore travel deeper into the lower respiratory tract. Once there it is highly reactive and can kick off a series of events that lead to lung inflammation.



Ozone Health
Effects: *General
Population*

Coughing

Throat
Irritation

Reduced Lung
Function

Chest
Tightness

Shortness of
Breath

So for the general population, health effects that can be experienced include:

Particulate Matter

Either directly emitted or formed through complex reactions

Mixture of solid particles and liquid droplets

Can be very small and therefore, inhaled → PM_{10} and $PM_{2.5}$

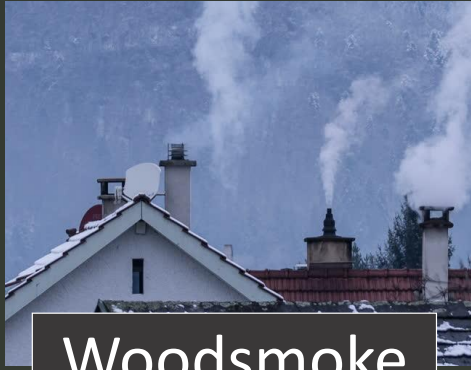
The second pollutant, particulate matter, can be both directly emitted and formed through complex chemical reactions. It is a mixture of both solid particles and liquid droplets. Some particulate matter is large enough that it can be seen but others are so small that they cannot, and these can be inhaled, contributing to several health effects. When we are referring to particulate matter, we refer to what is known as PM_{10} and $PM_{2.5}$.

PM ₁₀	PM _{2.5}
<ul style="list-style-type: none">• 10 microns or less in diameter• Inhalable Particles• Dust, Pollen, Mold, etc.	<ul style="list-style-type: none">• 2.5 microns or less in diameter• Fine Inhalable Particles• Combustion Particles, Organic Compounds, Metals, etc.

PM10 refers to particles 10 microns, or micrometers, in diameter and smaller and due to their size, they can be inhaled. Examples of PM10 would be dust, pollen, and mold particles.

PM2.5 refers to particles with a diameter of 2.5 microns or smaller and these can be inhaled as well but can travel even further into the respiratory tract depositing onto surfaces in the deeper part of the lungs causing more extensive health effects. Due to this reason, PM2.5 is the particle pollutant that we are most concerned about.

Sources of PM2.5 can include particles from combustion processes, organic compounds, and even metal.



Woodsmoke



Wildfires

Here in New Hampshire, since wood combustion is a major source of residential heating PM2.5 is mostly an issue during the winter. However, wildfires can produce enough smoke to impact locations across the country as we have very recently. Therefore, we can experience higher levels of PM during other times of the year.

PM_{2.5} Health
Effects: *General
Population*

Can travel
deep into
lungs

May get into
bloodstream

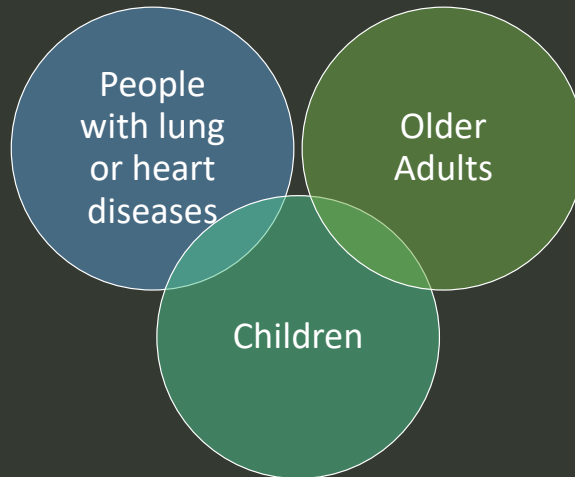
Decreased
lung function

Nonfatal heart
attacks

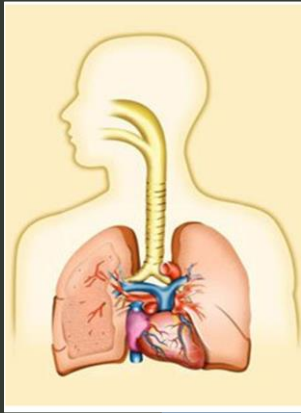
Aggravated
asthma

As mentioned, PM_{2.5} is incredibly small and can be inhaled deep into the respiratory tract leading to numerous health effects.

Ozone and PM_{2.5} Health Effects: *Sensitive Groups*



Now that we have discussed the health effects caused by ozone and PM_{2.5} for the general population, there are additional health effects experienced by those in what are considered sensitive groups. This would include people with lung and heart diseases, children, and older adults.




Effects on Respiratory Health

- Narrowing of Airways
- Decreased Airflow
- Excessive Mucus Production
- Increase in Medication Usage
- Increase in Asthma Attacks
- Increase in Hospitalizations and ER visits

For individuals in those sensitive groups, negative impacts can be much greater...including...

This is why it is important for the general public, but more importantly those who are more sensitive to air pollution to pay attention to what the air quality is on any given day and take certain measures to ensure that they are best protecting themselves.

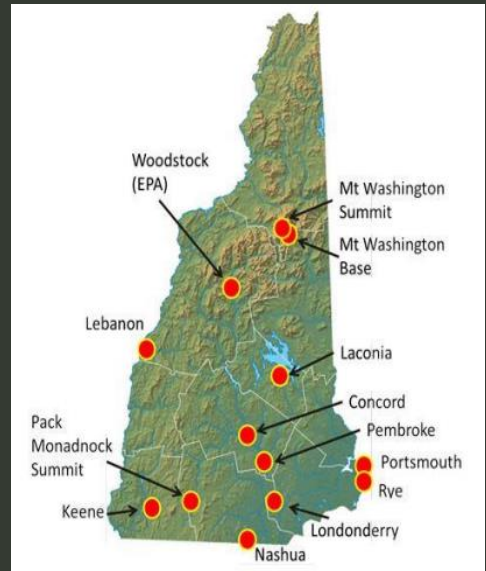


Air Quality


Now with a better understanding of what pollutants are out there and how they are emitted to or formed in our ambient air, how do we know what the levels are of ozone and PM2.5 and at what point should we have concern for our health? Especially those who are more susceptible to effects from air pollution such as children and asthmatics.

NH Ambient Air Monitoring Network

- 11 Ozone Monitors
- 6 Particulate Matter Monitors
- 4 Sulfur Dioxide Monitors
- 2 Nitrogen Dioxide Monitors
- 2 Carbon Monoxide Monitors
- 2 Photochemical Assessment Monitors (PAMS) - VOCs



New Hampshire DES has a network of ambient air monitoring stations throughout the state. The various locations of these monitors can be seen on the map and they each monitor for different parameters. The data that we receive from these monitors is used to assess the quality of the air and is reported out to the public informing them about whether the air quality is good or bad.



National Ambient Air Quality Standards

NAAQS define the maximum amount of a pollutant that can be present
without harming human health

In order to determine good or bad air quality we compare the current levels to the NAAQS.

The National Ambient Air Quality Standards are set by the EPA as a requirement of the Clean Air Act, in order to protect the health of both the public and the environment. Based on extensive research and review of scientific literature, these standards define the maximum amount of a pollutant that can be present without harming human health

National Ambient Air Quality Standards

PM_{2.5}

24 hour
Averaging
Time

35 µg/m³

PM_{2.5}

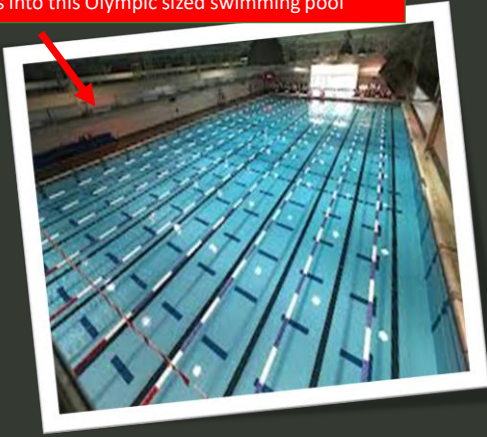
Annual
Average

12 µg/m³

PM_{2.5} is based on two averaging periods: This first is a 24-hour standard of 35 micrograms/m³ and the second is an annual standard of 12 ug/m³.

National Ambient Air Quality Standards

70 drops into this Olympic sized swimming pool



Ozone

8 hour
Averaging
Time

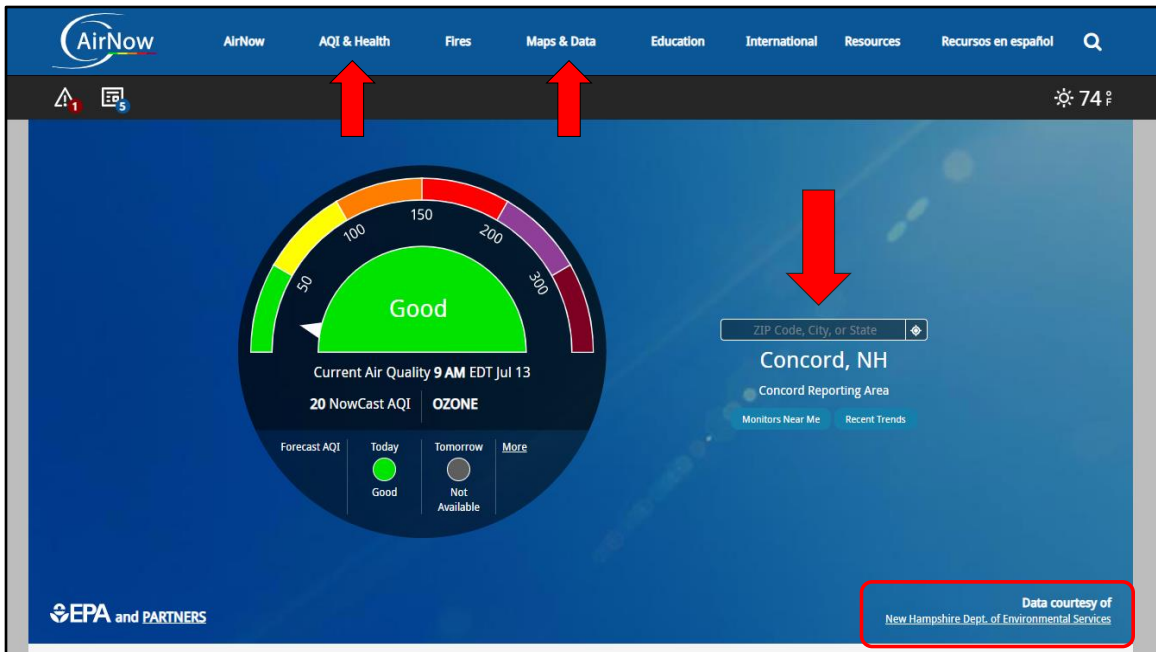
70 ppb

Ozone is based on an 8-hour averaging period with a standard of 70 ppb, or parts per billion. Imagine 70 drops into this Olympic sized swimming pool. It may not seem like a lot but it can have profound effects on the health of the public.

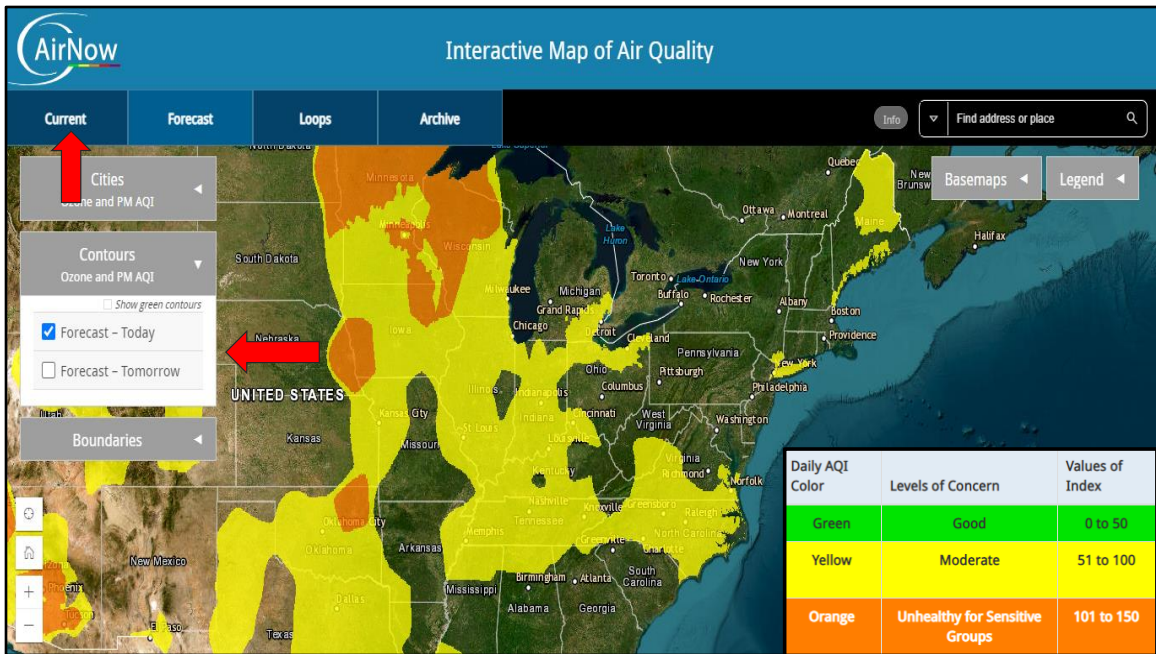
Air Quality Index (AQI)

AQI Basics for Ozone and Particle Pollution			
Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

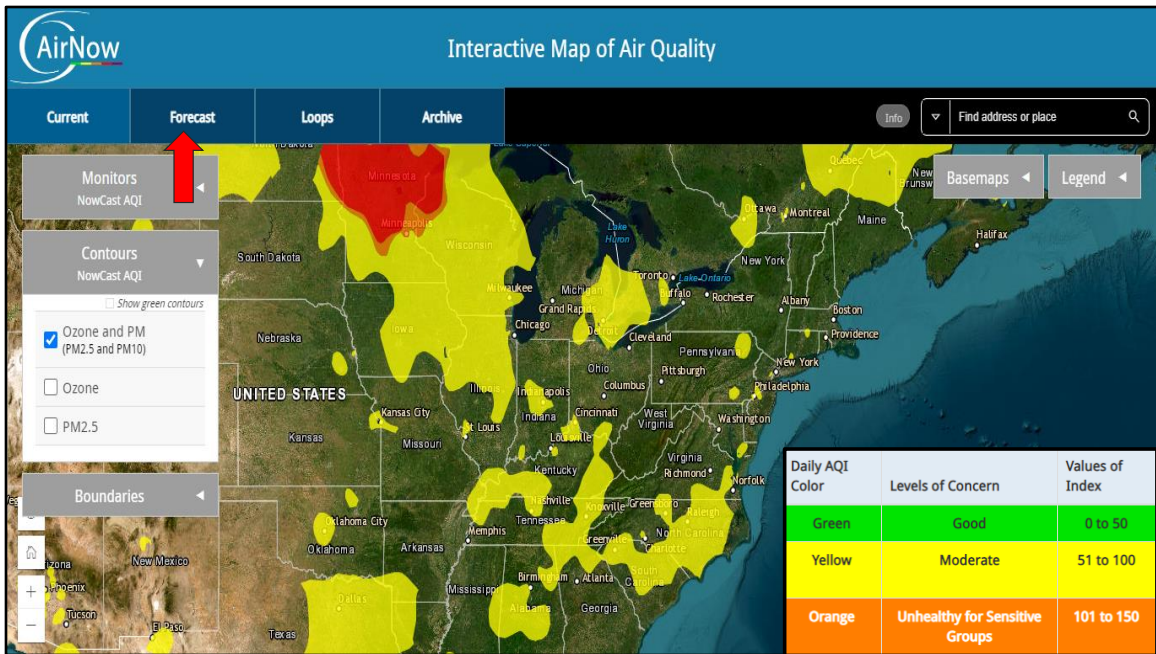
Since the pollutants are based off different units of measurement, the EPA created a scale that works for both ozone and PM2.5 called the Air Quality index, or AQI. It is also color coded for easy understanding and visual aid when looking at a map.




The air quality index is used on the AirNow webpage, where the general public can go to find information on their local air quality. This is an example of what the webpage looks like for Concord, NH but you can enter any zip code, city, or state and it will show you the current air quality for your area of interest. It will also show you where the data comes from and again, for example, the data here is from us, the NH DES. You can also find further information on the AQI and health effects here and you can look at the AQ on a ma.



This is what the map looks like, and it is interactive so you can choose which pollutant you are most interested in, or you can choose to look at both ozone and PM2.5 simultaneously. It also uses the coloring of the AQI so it is easy to understand what the air quality levels are. This map is showing the current air quality.



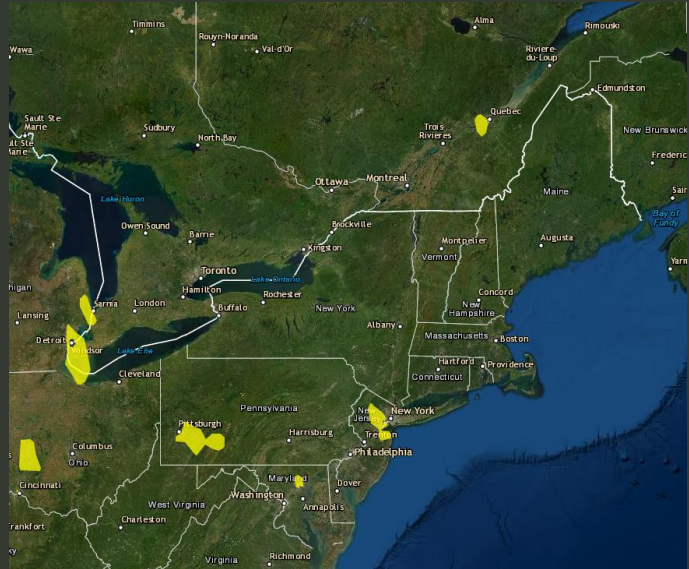
This map is showing the forecasted air quality.



Air Quality Forecasting

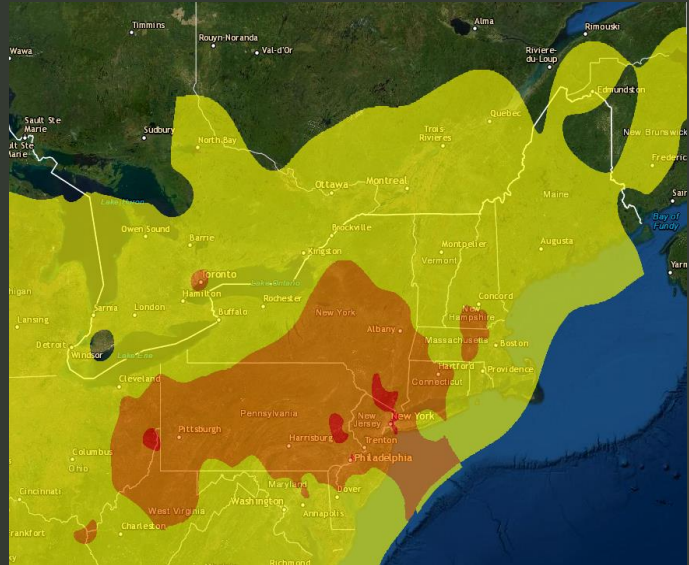
As I mentioned, the maps I just showed have data and forecasts provided by us here at NHDES. But what exactly goes into an air quality forecast?

Current Air Quality



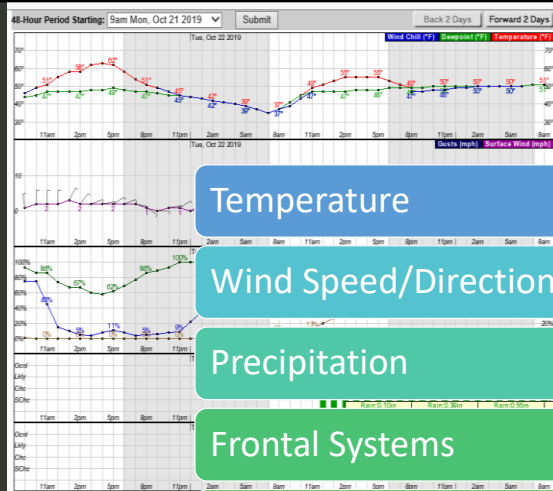
One of the first steps we take is to see what the current AQ is. Not only is it important to know what the AQ is for NH but it is important to know what pollution levels are in New England, the northeast, and the entire country. Though NH has its own emissions sources, pollution from other locations can be transported in and contribute to higher concentrations of ozone and PM. Sometimes the air quality can be this – pretty clean with little to no pollution.

Current Air Quality



And other times, the air quality can be this... a lot of regional buildup with pollution levels in the moderate, USG, and even unhealthy levels.

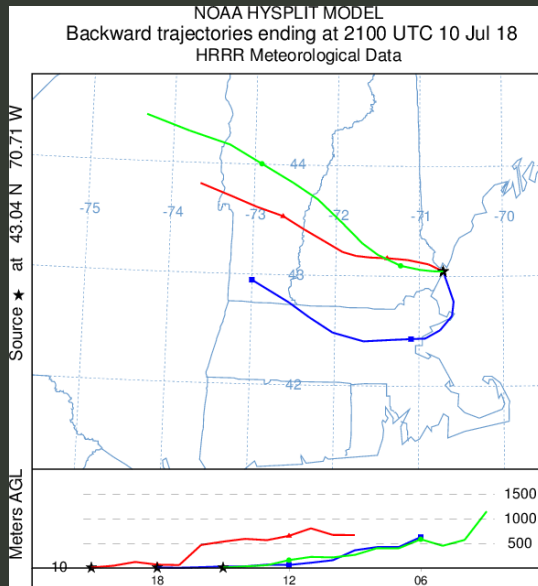
Meteorology



- Temperature
- Wind Speed/Direction
- Precipitation
- Frontal Systems
- Cloud Cover
- Humidity

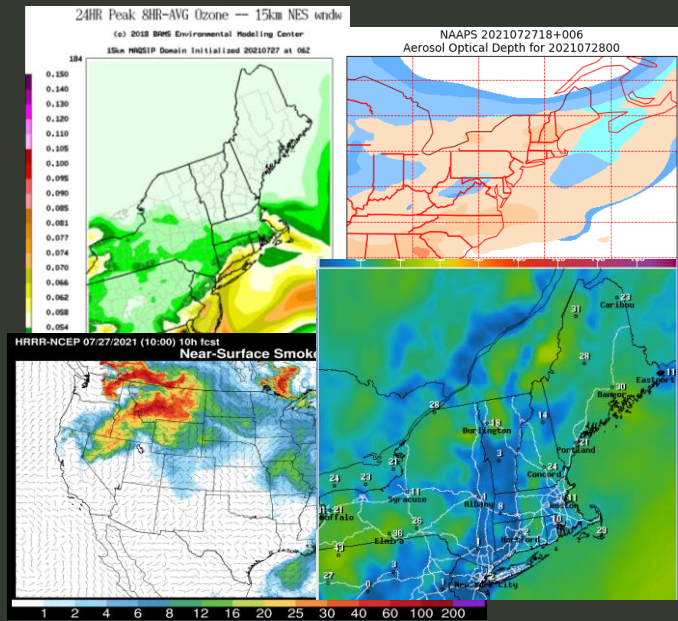
The next step we would take would be to look at the meteorology. This graph shows some of the meteorology that is used for forecasting. We look at several factors including... All of these and more play a major role in what the air quality is going to be for any given day.

Trajectories

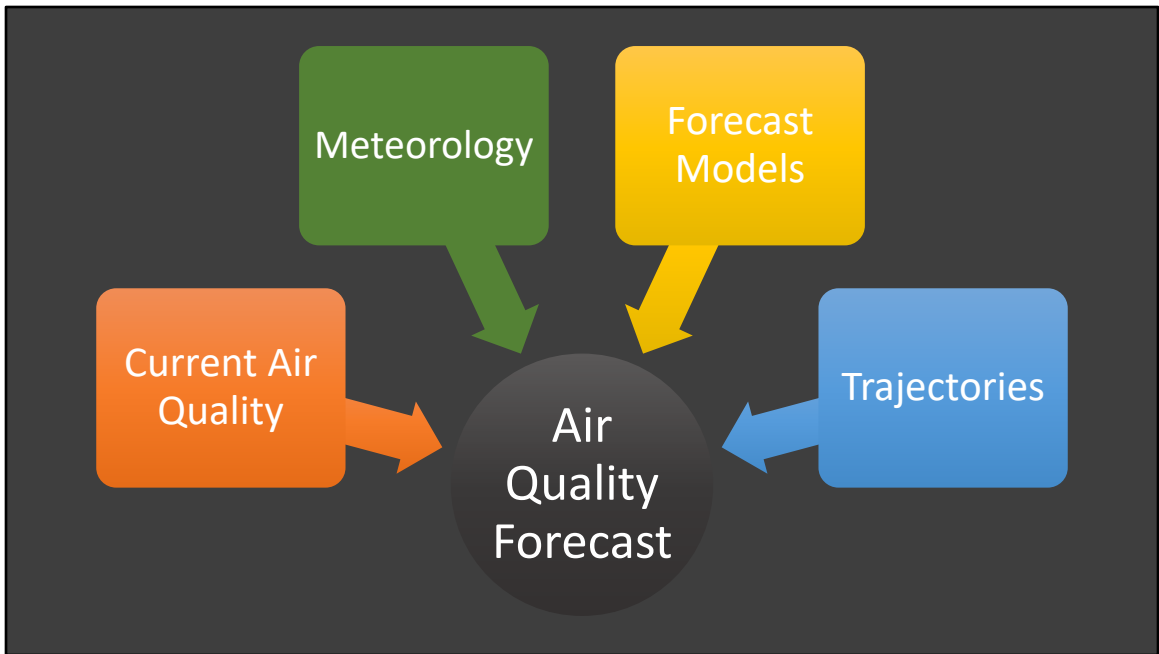


We also use tools called “trajectories”. This is an example of what is called a backward trajectory. These help us see where the air mass is coming from and where it is going in order to better understand what pollution could be transported into the state from other regions. The bottom portion shows a vertical profile so we can see if the air mass will be traveling along the surface or from more aloft.

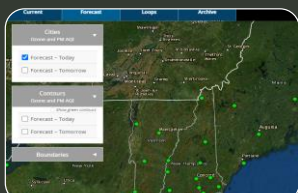
Air Quality Models



A very useful tool that we use daily are the air quality models that show forecasted ozone, PM, and smoke. We can see, based on modeling, what pollution levels are expected to be and use this to help with our forecast.



New Hampshire's Daily Forecasts



AirNow.gov

Air Quality Forecast					
Station	Location	Wednesday 6/15/11	Thursday 6/16/11	Friday 6/17/11	Saturday 6/18/11
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52
Acworth	Acworth	52	52	52	52

NHDES
Website



Sign up for
EnviroFlash

How can you access the forecast? There are three main ways to find out what the air quality is forecasted to be:

<https://www.airnow.gov>

<https://www4.des.state.nh.us/airdata/AirQualityForecast.html>

<https://www.enviroflash.info/>



Now that we have learned about the two main pollutants, what their health implications are, and how we as atmospheric scientists forecast for them, what happens when levels are expected to be above the NAAQS?

Air Quality Action Days



Issued when levels of either ozone or PM_{2.5} are forecasted to be above the standard



If our final forecast determines that either ozone or PM_{2.5} concentrations are expected to be above their respective standards then at that point we will issue what is called an air quality action day, or AQAD.

News from the New Hampshire Department of Environmental Services

FOR IMMEDIATE RELEASE

DATE: August 3, 2022

CONTACT: David Healy (603) 419-0330

Jana Ford (603) 848-0765

NHDES Declares Air Quality Action Day

**Air Pollution Levels Unhealthy for Sensitive Groups
Predicted for Thursday**

Concord, NH – The New Hampshire Department of Environmental Services (NHDES) is expecting air pollution concentrations to reach unhealthy levels for sensitive individuals in **Hillsborough and Rockingham Counties on Thursday August 4**. NHDES officials are calling for an Air Quality Action Day and advise sensitive individuals in these areas to take precautions to protect their health by limiting prolonged outdoor exertion. Sensitive individuals include children and older adults; anyone with lung disease such as asthma, emphysema, or bronchitis; and people who are active outdoors. Even non-sensitive individuals could experience mild health effects and may want to consider limiting strenuous or prolonged outdoor activities.

NHDES forecasts that concentrations of **ground-level ozone** (the main component of smog) will rise to levels that are unhealthy for sensitive individuals during afternoon and evening hours in the above-mentioned regions. The predicted air pollution comes from winds transporting pollutant emissions into New Hampshire from surrounding areas, which combine with local emissions. High temperatures and sunny skies then enhance the creation of ozone from these precursor pollutants. Air quality is expected to improve on Friday as cloud cover and precipitation chances increase.

Symptoms of ozone exposure may include coughing, wheezing, chest tightness, shortness of breath or pain when inhaling deeply. People with asthma and other existing lung diseases may

This is an example of a press release that NHDES issues...

We tell you right at the top that we are issuing an AQAD, so we expect air quality levels to be in the USG range.

Further in the body of the press release it explains in more detail where these levels are expected to occur, who is at most risk and actions that can be taken to best protect yourself.

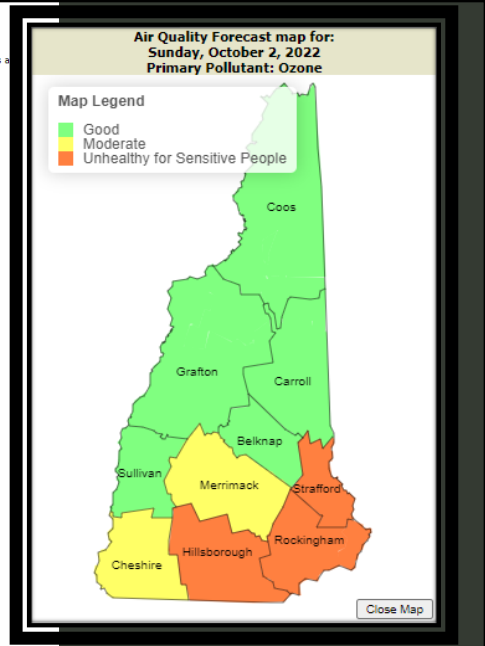
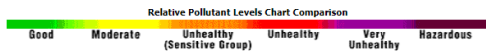
Air Quality Forecast

This page provides forecast information on New Hampshire's air quality. The information can be used to help you plan your daily activities and protect your health. You can also learn what the current air pollution levels are in your area by clicking on the Current Air Quality link.

Air Quality Forecast The pollutant of concern for the period: Fine Particles

County	Sunday October 16 view map	Monday October 17 view map	Tuesday October 18 view map	Wednesday October 19 view map
Belknap	GOOD	GOOD	GOOD	GOOD
Carroll	GOOD	GOOD	GOOD	GOOD
Cheshire	MODERATE	GOOD	GOOD	GOOD
Coos	GOOD	GOOD	GOOD	GOOD
Grafton	GOOD	GOOD	GOOD	GOOD
Hillsborough	UNHEALTHY FOR SENSITIVE PEOPLE	GOOD	GOOD	GOOD
Merrimack	MODERATE	GOOD	GOOD	GOOD
Rockingham	UNHEALTHY FOR SENSITIVE PEOPLE	GOOD	GOOD	GOOD
Strafford	UNHEALTHY FOR SENSITIVE PEOPLE	GOOD	GOOD	GOOD
Sullivan	GOOD	GOOD	GOOD	GOOD
Region	Sunday October 16 view map	Monday October 17 view map	Tuesday October 18 view map	Wednesday October 19 view map
Seacoast*	UNHEALTHY FOR SENSITIVE PEOPLE	GOOD	GOOD	GOOD
High Elevations**	GOOD	GOOD	GOOD	GOOD

* coastal Rockingham county
** elevations above 3000 ft in Carroll, Coos and Grafton counties

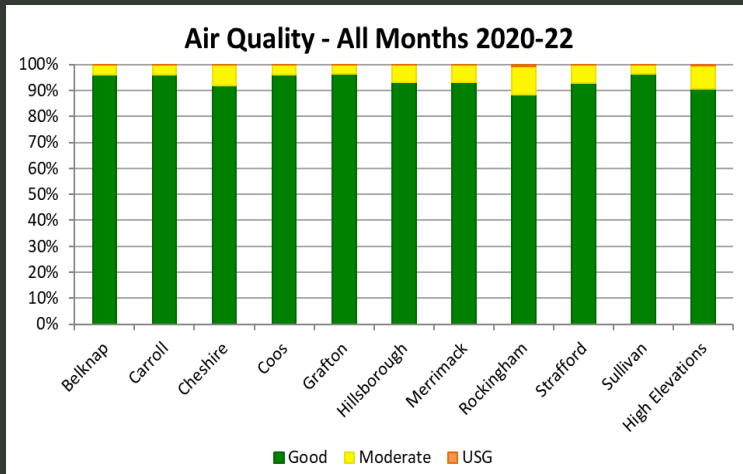


This is an example of what the NHDES forecast page would look like during an AQAD. In the table you will see the orange coloring for the USG levels and which county it is for, as well as the map view.



Air Quality Trends

Though we do experience days where air pollution levels are above the standard and we declare AQADs, how *many* do we experience here in New Hampshire and how have conditions changed over the years?

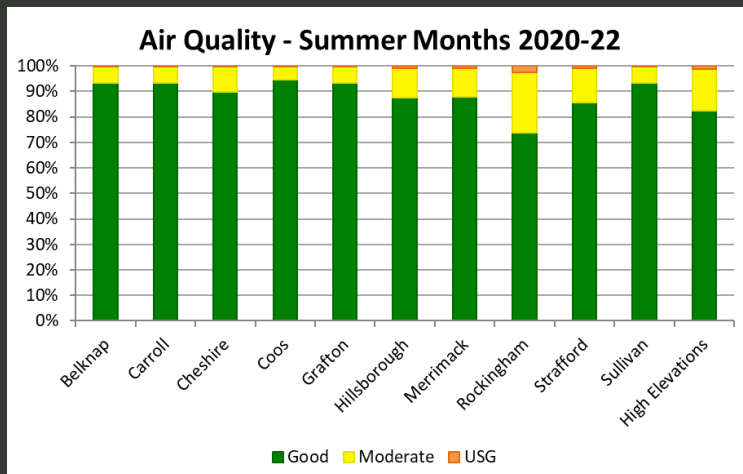


93.8%
Good Days

6.0%
Moderate Days

0.2%
USG Days

Looking at data from the past three years, 2020 to 2022, this chart shows the percentage of days NH experienced varying levels of air quality. NH saw over 93% of good air quality days, 6% of moderate days and just 0.2% of days with levels in the USG category which would equate to only about 2-3 days.

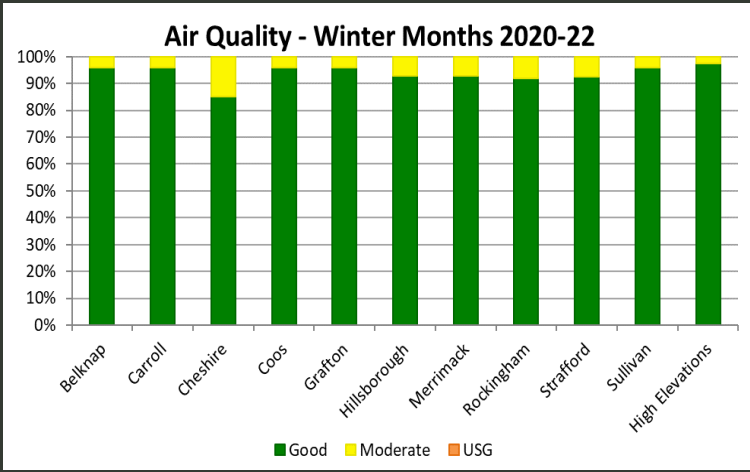


88.7%
Good Days

10.6%
Moderate Days

0.7%
USG Days

This is the same type of chart but focusing on just the summer months – so the time of year where we would expect to see higher levels of ozone, NH saw slightly less good air quality days but still over 88%. Moderate days jump up to 10.6% and USG days were 0.7%. So even when we focus on just the months where we would see ozone, we still see less than 1% of USG days.



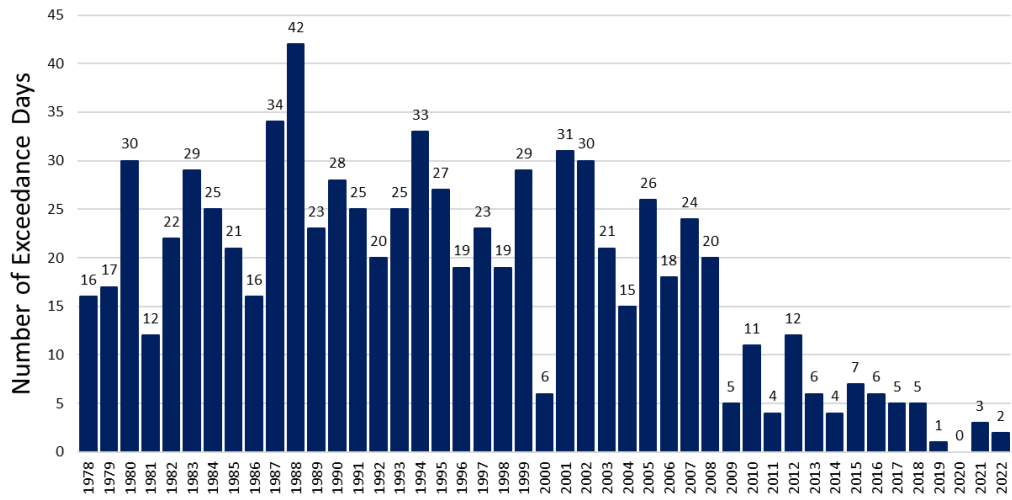
93.9%
Good Days

6.1%
Moderate Days

0%
USG Days

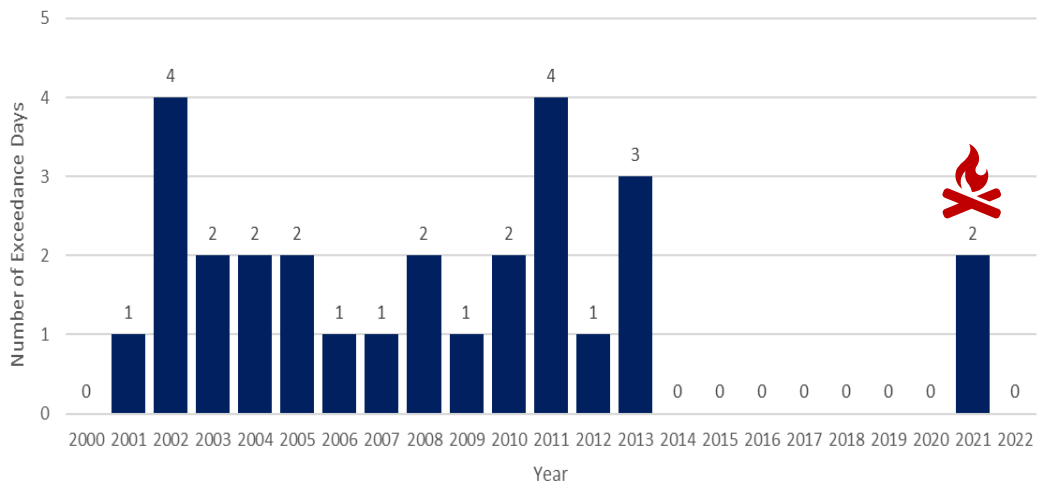
Shifting to look at just the winter months, so when we would expect to see higher levels of PM from woodsmoke, our percentage of good days is still above 93% and moderate days are at 6.1 but you can see that we have zero USG days.

Days Exceeding the 8-Hour Ozone Standard in New Hampshire 2015 Ozone Standard is 70 parts per billion (ppb)



1978 - 2022

Days Exceeding the 24-hour PM_{2.5} Standard in New Hampshire (35 µg/m³)



Design Values

Air Quality Statistic

Describes the air quality status relative to the NAAQS

Used to determine nonattainment areas

In addition to the number of exceedances, design values are another air quality statistic that describes how the air quality is in relation to the national standards. These values are used to determine whether areas within a state are in attainment or not in attainment.

Design Values

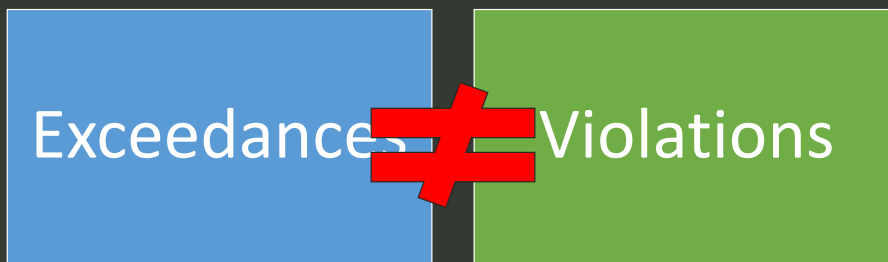
Attainment Areas

- AQ in an area meets or is cleaner than the national standard

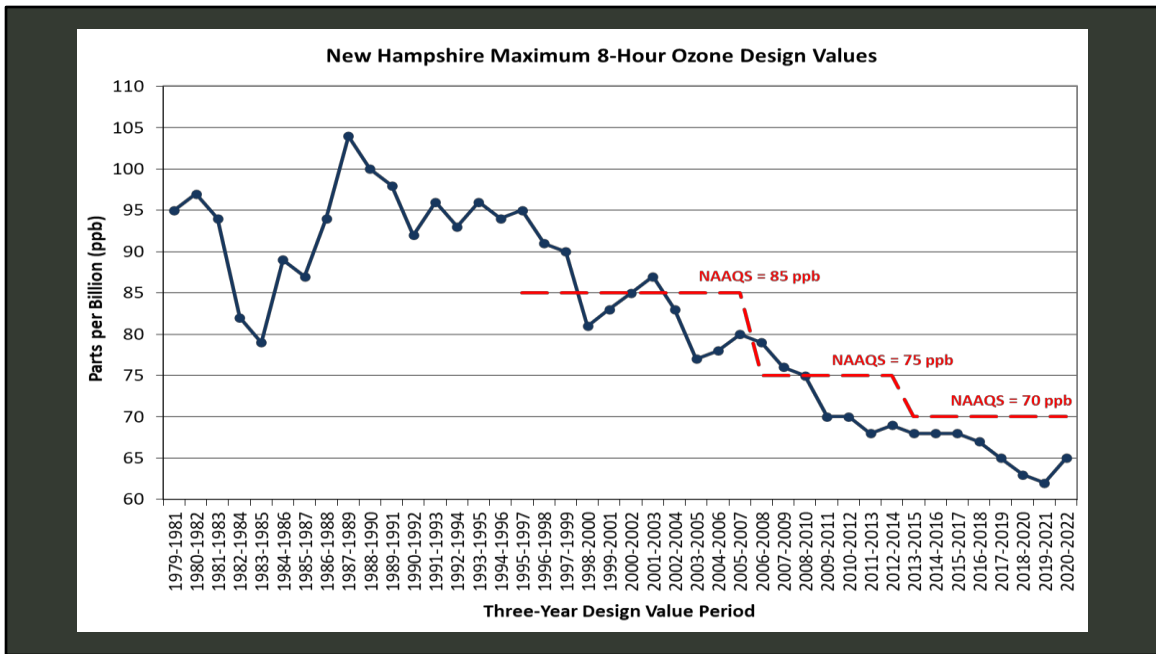
Nonattainment Areas

- AQ in an area does not meet the national standard

Design Values

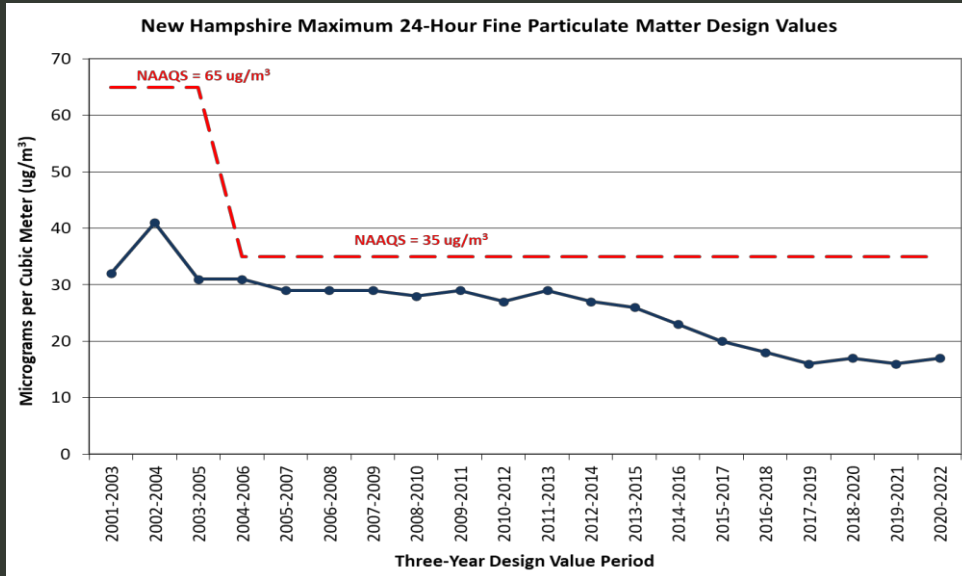


It is important to note that when we experience exceedances, we are not in violation of the standard. It is only when an area's calculated design value is above the standard that we are in violation.

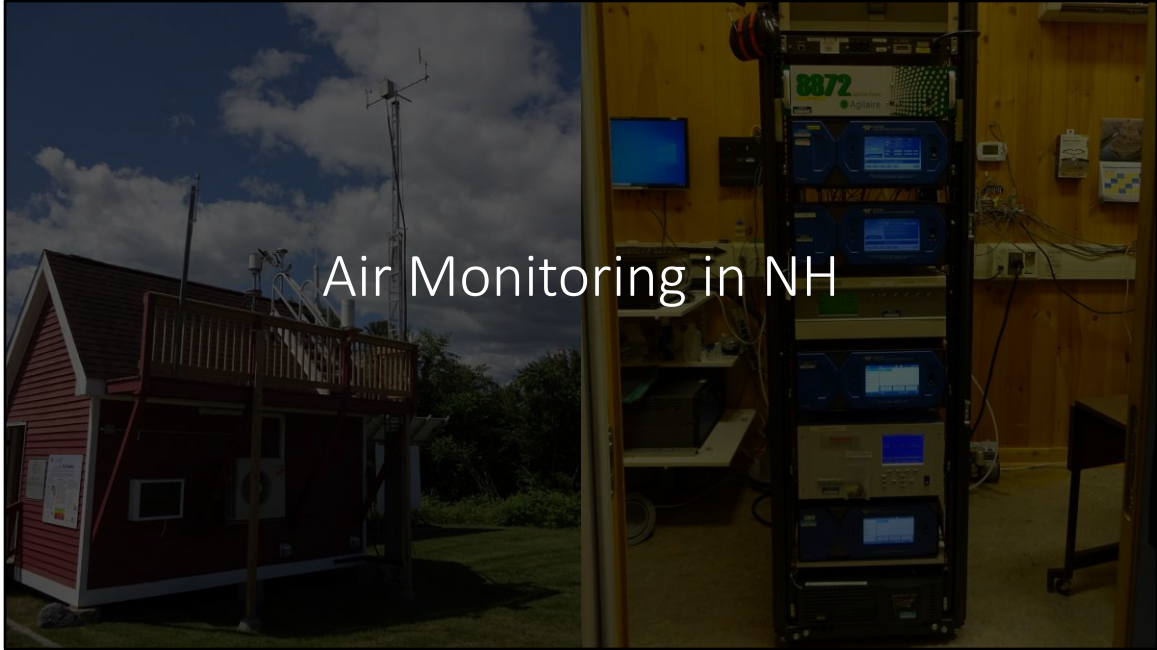


This chart displays the maximum 8 hour ozone design values for NH from 1981 to 2022.

The blue line shows the design values while the red dashed line shows the NAAQS and how it has changed over the years.



One of the ways we can improve.... Through citizen science



- Required by the clean air act to operate a network of air quality monitoring stations to ensure we meet federal NAAQS compliance.
- The 12 air monitoring stations in NH were carefully configured and located based on air pollution emission patterns to provide air quality data in areas which are potentially at risk for unhealthy air quality of one or more pollutants.
- Most populated areas are represented by an air monitoring station unless previous monitoring has demonstrated that either the community is not considered to be at risk or can be adequately

- represented by a nearby monitor.
- Further, in determining location, NHDES also considered topography, geographic coverage, and air pollution modeling in the current network design.
 - All of the locations were carefully chosen by NHDES air quality scientists in conjunction with Federal EPA oversight.

THE NEW HAMPSHIRE
AMBIENT AIR MONITORING PROGRAM
2023/2024 ANNUAL
NETWORK REVIEW and PLAN

June 2023

New Hampshire Department
of Environmental Services



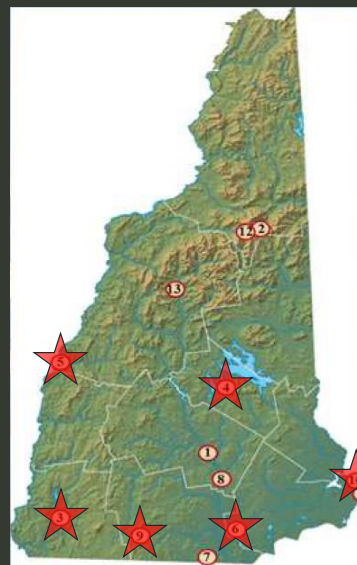
Goals of Air Monitoring

- Protect public health by measuring and tracking the most common air pollutants and to support forecasting and real-time mapping and air pollution alert initiatives.
- Determine attainment status with the NAAQS.
- Guide future air quality policy decisions at the state and national level.

- This network is reviewed every year, and the document is made available to the public.
- Every 5 years a further detailed analysis is performed to determine proper monitoring coverage.
- Ensures we are still providing comprehensive monitoring to determine NAAQS compliance and that the air the people of NH is breathing continues to be of good quality.

State Monitoring for PM_{2.5}

	Ncore IMPROVE	CASTNET	NADP	PAMS Laboratory	Carbon Monoxide (CO)	Nitrogen Dioxide (NO ₂)	Nitrogen Oxides (NO _x)	Ozone (O ₃)	PM _{2.5}	PM ₁₀	PM Coarse	Sulfur Dioxide (SO ₂)	Wind Direction (WD)	Wind Speed (WS)	External Temperature (ETP)	Barometric Pressure (BP)	Relative Humidity (RH)	Precipitation (PT)	Solar Radiation (SolRad)
Summer 2022																			
1. Concord																			
2. Greens Grant - Camp Dodge	•																		
3. Keene																			
4. Laconia																			
5. Lebanon																			
6. Londonderry	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7. Nashua	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
8. Pembroke																			
9. Peterborough - Pack Monadnock	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
10. Portsmouth																			
11. Rye																			
12. Sargents Purchase - Mt Washington Summit																			
13. Woodstock - Hubbard Brook		•	•																



As far as PM_{2.5} goes...

- PM_{2.5} is the pollutant most likely to affect a person's health in NH today
- Six monitoring stations measure for PM_{2.5} on a year-round basis.
- As mentioned, these stations are strategically located for measuring ambient, statewide, background conditions to ensure that NH stays in compliance with the NAAQS and ensures that the air in NH is of good quality (and if not, alert people of that).



One way we can go well above and beyond our comprehensive monitoring efforts is by taking advantage of monitoring being performed by the public, otherwise known as citizen science monitoring. And I'm excited to soon talk about a new program we just started up in which we hope to utilize citizen science for the sake of better understanding hyper-local PM2.5 emissions to improve further local air quality and public health.

Air Monitoring for Particulate Matter



- EPA Compliant
- Testing & Criteria
- Costly



- Easy to Use
- Effective
- Affordable!



Why not install thousands more monitoring stations?

- Running these pieces of equipment is incredibly labor intensive; having to meet strict EPA requirements, testing, siting, and validation criteria.
- Equipment is incredibly expensive to run and maintain.
- These stations are there for the reasons mentioned prior, and they do just that.
- In last 5-10 years, small and inexpensive air monitoring sensors have entered the market and have proven to be a very efficient tool in measuring PM pollution.
- Easy to set up and use, and anyone can buy one and

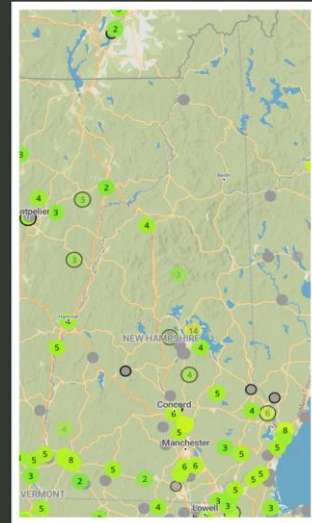
be measuring their local air quality in a matter of minutes.

- Don't have the accuracy or meet the requirements to be used to ensure EPA NAAQS compliance, they can be a very helpful tool in measuring local air quality

PurpleAir Particle Sensors



- Laser particle counters
- Dual sensors
- 2-minute averaging
- Wi-Fi connectivity



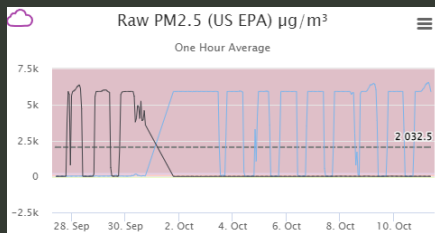
Real-time Mapping

PurpleAir

- Small and effective
- Wifi and power is all that's needed
- Live data gets streamed to the PurpleAir website (green circles)
- Dozens of users already across NH
- We want the data included as a way of further analyzing ambient conditions...but we have to slow down and think....

Data...With a Grain of Salt

- Little QA
- Many unknowns
 - Setup
 - Location



- Anyone can buy these sensors – no idea if setup correctly or what super-local influences there may be.
- Installed next to a grill = big red circle on map. SOS!
- Data undergoes little quality assurance. Malfunctioning data can go to map
- We want to better be able to understand hyper-local conditions and use the PurpleAir data that's already being collected, but how?

NHDES Citizen Air Monitoring Program (CAMP)

Citizen Air Monitoring Program
Monitoring for fine particulate matter throughout New Hampshire using PurpleAir sensors.

Fine particulate matter (PM_{2.5}) is one of the most pervasive and widespread air pollutants in New Hampshire. These small particles come from many sources, but woodsmoke is the primary driver for elevated concentrations in the Granite State due to the common practice of burning wood for residential heating. Though considerable progress has been made in reducing PM_{2.5} from woodsmoke, largely in part to newer EPA certified wood stoves entering the market, there still exists room for continued improvement. In order to make additional progress in lowering PM_{2.5} levels, it is important to understand what current levels are, which can be done through monitoring. Currently, there are six PM_{2.5} monitoring stations throughout New Hampshire that are owned and operated by NHDES, but there are many areas of the state that are not covered by this monitoring.

Thanks to modern technology and initiatives to improve air quality, effective low-cost air quality sensors have come into the market, including PurpleAir monitors. PurpleAir is a private company that makes air quality sensors available for the public, measuring PM_{2.5} and providing local air quality data at an affordable cost. The unit is easy to install, and information is uploaded every 10 minutes to an online, publicly available map. Data provided can help households, businesses and municipalities better understand their local air quality.

Related Content

- PurpleAir
- Air Resources Programs
- Air Quality Information
- Current Air Quality
- NH Air Quality Forecast

PurpleAir Sensor Registration
VERSION 1.2

INSTRUCTIONS
NHDES-A-04-001
10/5/22
Voluntary

Your personal information will not be published, sold, or used in any way. You may opt out of contact and/or the program at any time after you register.

Should we come across any issues with your registration or any data quality concerns, communication will be vital to ensure your sensor remains part of our citizen science network. Nonetheless, you may opt out of communication in this form.

Click the "Begin Form Entry" link to register your device and become a citizen scientist.

[Begin Form Entry](#)

- Just went live with a new collaboration effort between DES and NH PurpleAir owners
- Completely voluntary and free program where citizens can go one step further and register their sensors with us once they've registered their unit on the PurpleAir website.
- They'll become part of a team of distinguished citizen scientists to have their data quality assured by NHDES air pollution officials.
- Their registration will detail how to go about setting up their sensors, like keeping it 5' off the ground and away from local sources, and give some detailed

information about why it is they're monitoring and what may be nearby that they're concerned about.

Benefits of Joining CAMP

Installation
Guidance

Quality Assured
Data

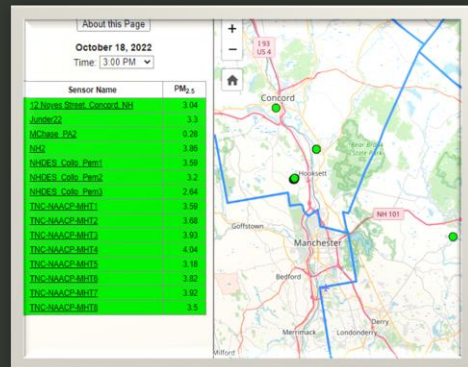
Data-Correction

NHDES Live
Map

Access to
Archived Data

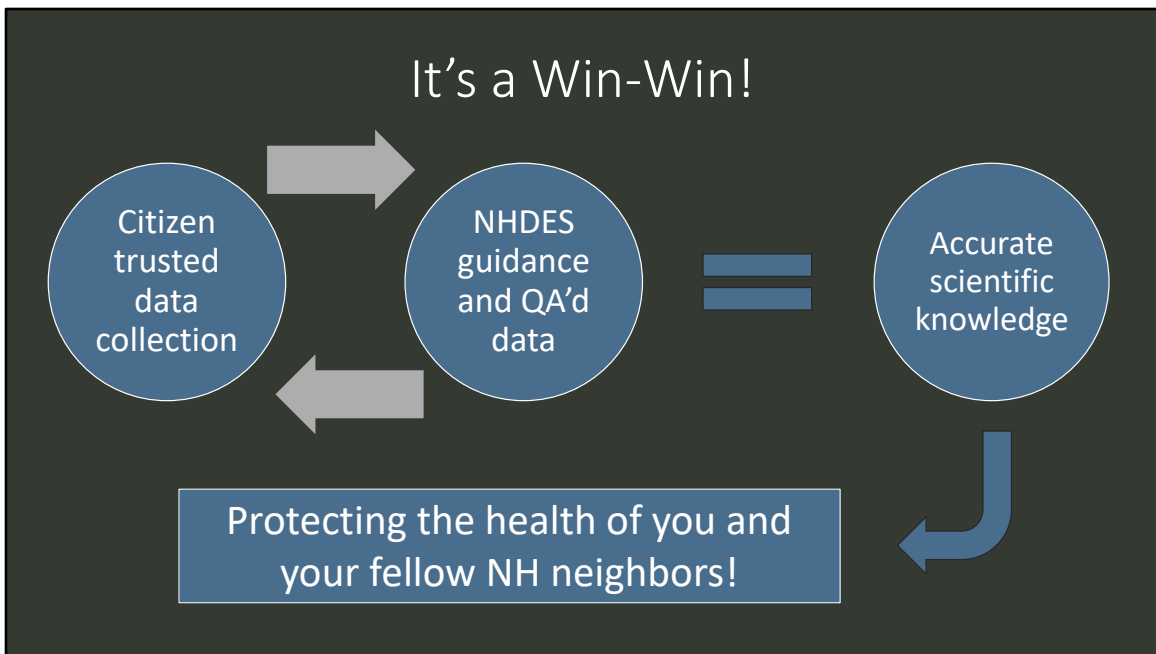
Troubleshooting
Assistance

Voluntary and Free!



- Apply a quality assurance algorithm to throw out any junk or erroneous data.
- We then apply an in-house correction formula in order to get the data closer to what may actual be a “real” reading based on collocation with EPA monitors.
- We then post your live, QA’d, data corrected concentrations to our DES map. And you can know when looking at this map that all of the sensors shown here are part of our citizen science family, so you can have more faith in seeing more accurate and reliable data.

- Can provide data archives to you.
- If your sensor goes down or you need help with troubleshooting, we are happy to assist with that as well.



A total win-win

- We help the user make sure the data they're collecting is done so properly, and in return, we provide quality assured, as accurate as possible, data.
- Accurate data collection is needed in order to help drive change to improve local air quality.
- By purchasing one of these sensors, you can help you, your neighbors, and the state in helping to improve air quality, and consequently your health.
- I'm not a salesman for PurpleAir, there are many great particle sensors out there that do similar things, but our program is specifically set up for PurpleAir

users.

- We will be including a brochure about our program with every PurpleAir unit sold to NH to try to get more citizens on board.
- So, if you or someone you know is interested in learning more about their local air quality, take a peek at the PurpleAir website. If you decide to order one, awesome! Just keep us in mind and help us help YOU!

Thank you!

Kathleen Errington

Air Quality Analysis Supervisor

Kathleen.N.Errington@des.nh.gov

(603) 271-0888

Marcus Chase

Air Quality Analyst

Marcus.A.Chase@des.nh.gov

(603) 271-6803





NHDES Residuals Management Section – History, Rules, and Future

Anthony Drouin

Supervisor; Residuals Management Section

Wastewater Engineering Bureau; NHDES

Outline

- Who is the Residuals Management Section?
- Why do we need Clean Water?
- History of sludge compliance in New Hampshire
- Education Outreach
- How is sludge and septage managed in New Hampshire?
- Sludge Quality Certificate PFAS Investigation data
- The future for sludge and septage management in NH

NHDES Residuals Management Section

- Water Division ↻
 - Wastewater Engineering Bureau ↻
 - Residuals Management Section

Anthony
Drouin
Supervisor
*Sludge Quality
Certification
Permitting*

VACANT
**Permitting &
Enforcement
Engineer**
*Site and Facility
Permitting*

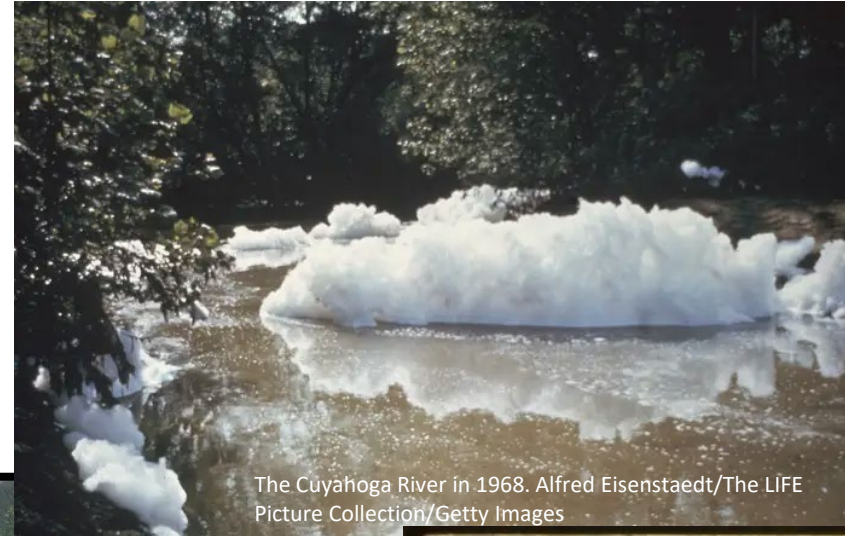
Wade Pelham
**Sludge & Septage
Coordinator**
*Training and
Outreach*

Jim Talvy
Inspector
*Sludge & Septage
Hauler Permitting*

Our Rivers prior to the Clean Water Act



A Cuyahoga River fire in 1952. Courtesy of Cleveland State University, Michael Schwartz Library, Special Collections.



The Cuyahoga River in 1968. Alfred Eisenstaedt/The LIFE Picture Collection/Getty Images

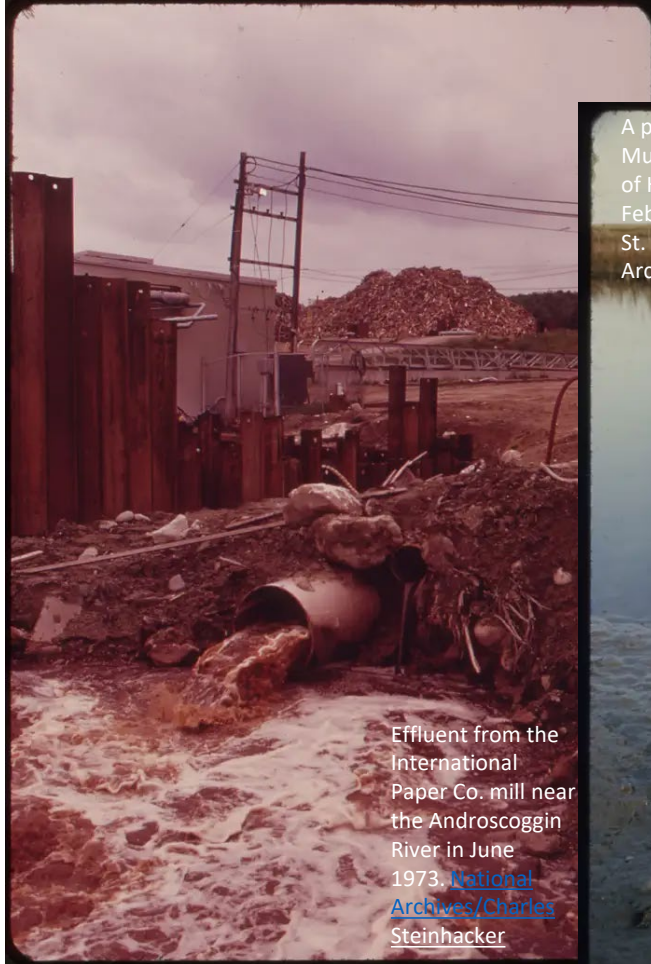


Automobile wreckage near Jaite, Ohio, in 1968. Alfred Eisenstaedt/The LIFE Picture Collection/Getty Images



An oil slick creeps up on the Statue of Liberty in 1973. Chester Higgins/Documerica/US National Archives

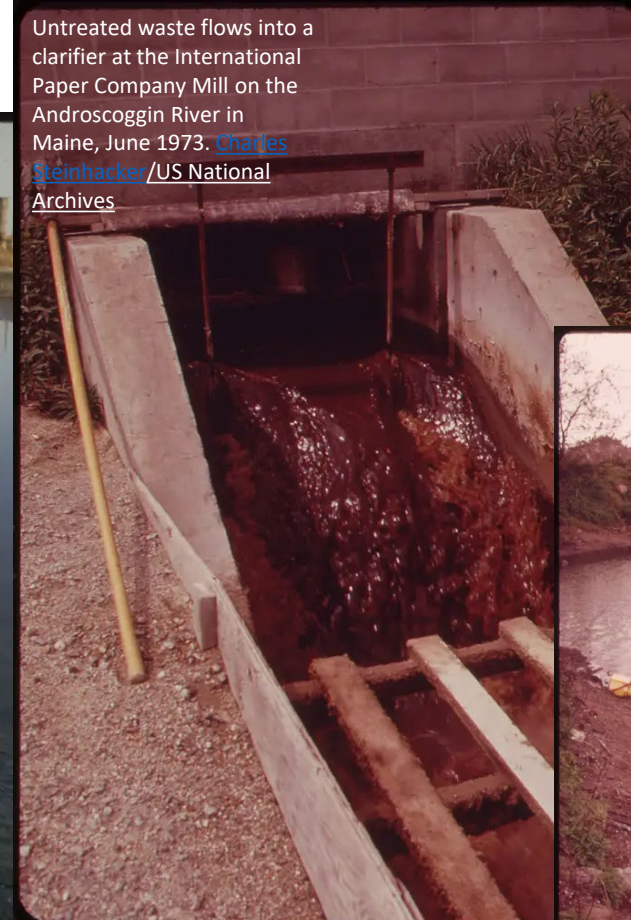
Our Rivers prior to Clean Water



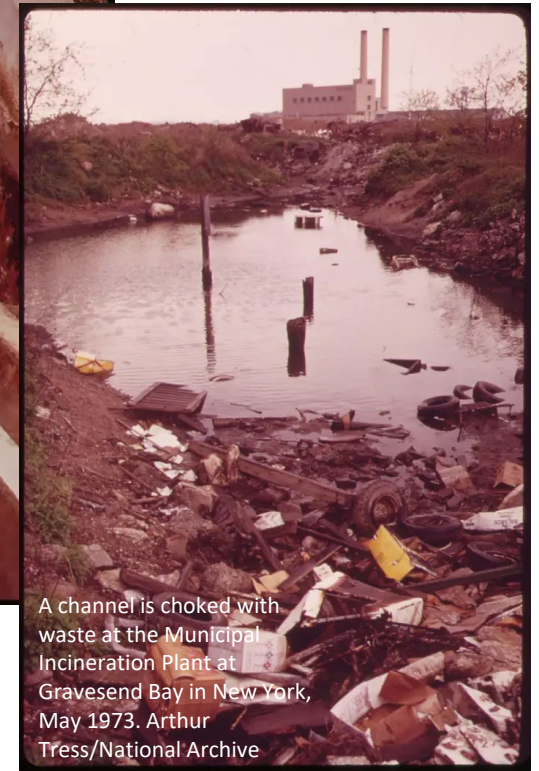
Effluent from the International Paper Co. mill near the Androscoggin River in June 1973. [National Archives/Charles Steinhacker](#)



A polluted area on Mustang Island, south of Houston, Texas, in February 1972. Marc St. Gil/National Archives

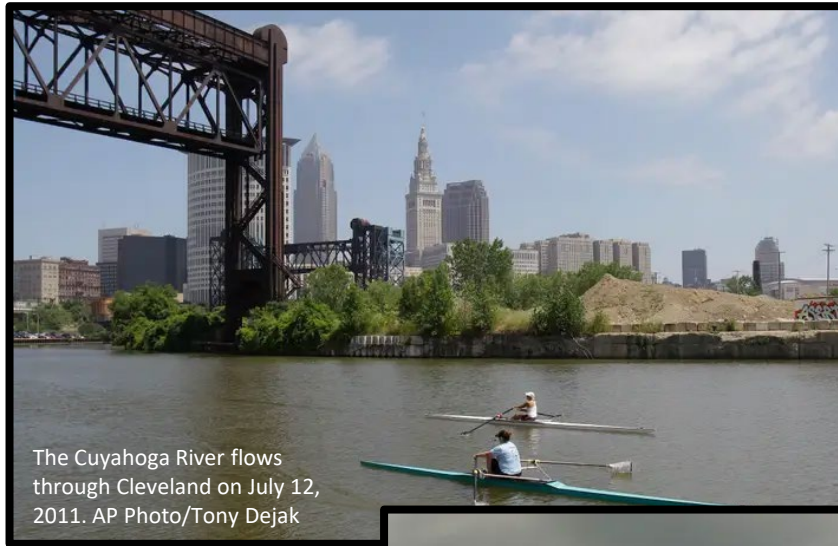


Untreated waste flows into a clarifier at the International Paper Company Mill on the Androscoggin River in Maine, June 1973. [Charles Steinhacker/US National Archives](#)



A channel is choked with waste at the Municipal Incineration Plant at Gravesend Bay in New York, May 1973. Arthur Tress/National Archive

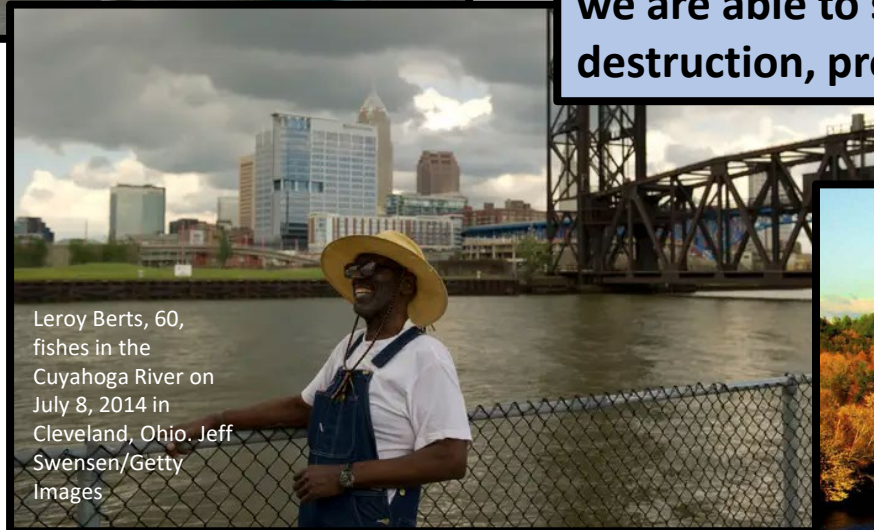
Today is a different story – but we are not finished



The Cuyahoga River flows through Cleveland on July 12, 2011. AP Photo/Tony Dejak

As President Ronald Reagan put it in his 1984 State of the Union address: "Preservation of our environment is not a liberal or conservative challenge, it's common sense."

Congress passed the Clean Water Act in 1972 to protect all "waters of the United States." Fifty years later, the law is still the main way we are able to safeguard our nation's waters from pollution and destruction, protecting public health and wildlife habitat. - NWF



Leroy Berts, 60, fishes in the Cuyahoga River on July 8, 2014 in Cleveland, Ohio. Jeff Swensen/Getty Images



<https://umlconnector.com/2022/01/diving-into-the-threats-to-the-merrimack-river/>

Applicable Laws and Rules for Residuals Management Options

Federal Law : Clean Water Act

State Law: RSA 485-a : Water Pollution and Waste Disposal Act

❖ Federal Regulation on Sludge Management : 40 CFR part 503

❖ Land Application:

❖ Env-Wq 800 – sludge management rules

❖ Env-Wq 1600 – septage management rules – septic systems are a different bureau & rules

Brief History of Regulations

- **1972** – Adoption of federal Clean Water Act
 - *Creation of wastewater sludge from treatment plants begins*
 - *Sludge disposal to surface water addressed and remediated*
 - *Section 405 (d) of CWA states the department (EPA) will promulgate rules to manage sludge*
- **Before 1990** – Sludge regulated as solid waste
 - *Sludge disposed in unlined town dumps, lined landfills, or stockpiled*
 - *Risk assessment begins with EPA on understanding the risk for land applying sludge*
- **1990** – Statute shifts regulatory responsibility to Water Division/DES
 - *Aligned with the Clean Water Act – section 405(d)*
 - *RSA 485a is adopted January 1st, 1990*

Brief History of Regulations

- **1991** – Rules promulgated as Env-Ws 800 for both septage and sludge
- **Before 1993** – DES considers more comprehensive regulation of both
- **Feb. 1993** – After adoption of 40 CFR Part 503 (federal EPA rules), DES drops rulemaking and regulation of biosolids

Brief History of Regulations

- **Aug. 1993** – DES amended Env-Ws 800, leaving a permit system only for septage and industrial sludge
- **1994 & 1995** – Sludge land application complaints increased, mostly associated with odor
- **Nov. 1995** – Adopted “Emergency Rules” to address key public concerns (odor, lack of DES oversight, out-of-state sludge)

Brief History of Regulations

- **March 1996** – Adopted permit regulations
- **March 1999** – Readopted Env-Wq 800 as the Sludge Management Rules
- **May 1999** – Adopted Env-Ws 1600 as the Septage Management Rules
- **Oct. 2005** – Re-adopt Septage Management Rules as Env-Wq 1600

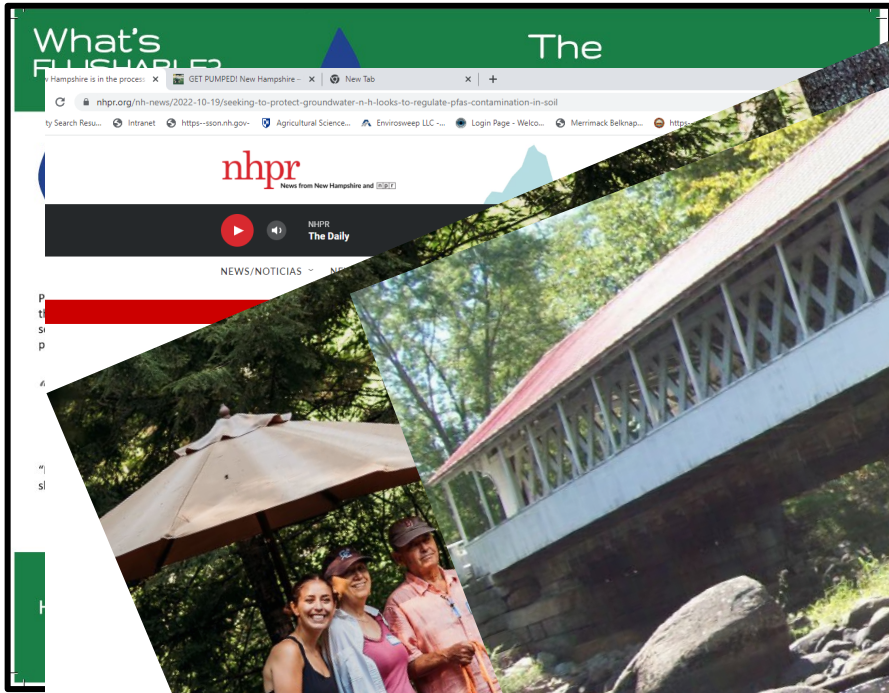
Brief History of Regulations

- **May 2007** – Readopt Sludge Management Rules as Env-Wq 800
- **2013** – Re-adoption of Env-Wq 1600
- **2014 to 2015** – Stakeholder input on re-adoption of Env-Wq 800
- **January 1, 2016** – Readopted Env-Wq 800 with amendments
- **June 2017** – Sludge Quality Certificate PFAS investigation begins (still ongoing, investigating sludge, septage, and collection systems wastewater)

Brief History of Regulations

- **May 2019** – Addition of PFAS monitoring and annual reporting for source pollution prevention tactics to reduce PFAS concentrations in sludge
 - *Full training for PFAS sampling analysis plan to permittees*
 - *NHDES PFAS sampling conducted to keep it to one sampling and one lab*
 - *Individual generator training with each inspection to ensure two operators are trained on sampling SOPs*
- **Dec. 2019** – Formation of Northeast Biosolids Improvement Program to create education outreach on impacts of PFAS on wastewater systems
- **Feb 2021** – USGS Soil and Sludge PFAS Leaching Study commences & wastewater collection system PFAS investigations begin
- **2022** – ongoing PFAS sampling training begins for all NH certified wastewater operators & address septage lagoon management
- **Goal by end of Nov 2023** – Adoption of amended Env-Wq 1600 rules per schedule
- **Goal by End of 2023** – Adoption of PFAS Soil Remediation Standards as sludge screening standards
 - Revision of Sludge Quality Certificate to state the approved test method once validated and monitored quarterly
 - Sludge Quality Certificate will state the PFAS screening standards

Education Outreach



Wastewater Operator and Septage Hauler PFAS* Guidance

*PFAS stands for "Per- and polyfluoroalkyl substances" and is a group of manmade chemicals considered 'contaminants of emerging concern (CECs)'

Drafted by:
[The Northeast Biosolids Improvement Program](#)

- Including...
- The importance of keeping PFAS out of biosolids
 - What is and isn't Domestic Septage?
 - How WWTF professionals do
 - Contaminants?

GET PUMPED!
New Hampshire
Don't wait for a *failure* to schedule a septic system pumpout

PFAS can be...
potentially...
emitted into the air...
into the ground wa...
crops are watered

er and gets into our...
PFAS usage at home

Sludge & Septage Management:

- Hauling
- Residuals Quality
- Sites/Land – Application
- Facilities
- Recordkeeping
- Reporting to NHDES



Sludge REGULATION

Env – Wq 800

- DRINKING WATER TREATMENT
- SHORT PAPER FIBER
- WASTEWATER TREATMENT
 - SLUDGE
 - BIOSOLIDS

Septage REGULATION

Env-Wq 1600

- SEPTIC TANK
- GREASE INTERCEPTOR
- PORTABLE TOILETS
- MARINE SANITATION DEVICE



Sludge

vs.

Biosolids

- NOT treated
- NO significant testing required
- NO CERTIFICATION
- ONLY for Landfill or incineration

- Treated
- Tested for 170+Analytes
- Beneficial Use
- NHDES CERTIFIED
- NHDES Annual Reports

Sludge Quality Certification

- Basic information
- Industrial pretreatment information
- Quantity
- Pathogen & vector attraction reduction options
 - Class A & Class B biosolids
 - Process to Significantly Reduce Pathogens: Class B
 - Process to Further Reduce Pathogens: Class A
 - Short Paper Fiber
 - Drinking Water Residuals
- Historical & current quality data



Sludge Quality Certification

- Annual Testing (frequency of testing based on volume generated)
- Recordkeeping
- Annual Report to NHDES by last business day in **January**, each year
- Renew certificate every 5 years



Sludge Quality Certification

Beneficial Use is the utilization of the nutrients and organic matter from the biosolids for the agronomic need as long as it does not pose a significant threat to human health or environment. Beneficial use applies to agricultural, forest, and land reclamation management practices

- Bulk biosolids must obtain an SQC to be distributed in NH
- Annual soil test determine crops nutrient demand supplied from biosolids (UNH BMP)
- Class B land application must obtain a site permit through RMS – many items covered in application process
- Concentration limits and screening standards set for VOC, SVOC, PCB's, Dioxin, & Metals – **168 analytes + PFAS**



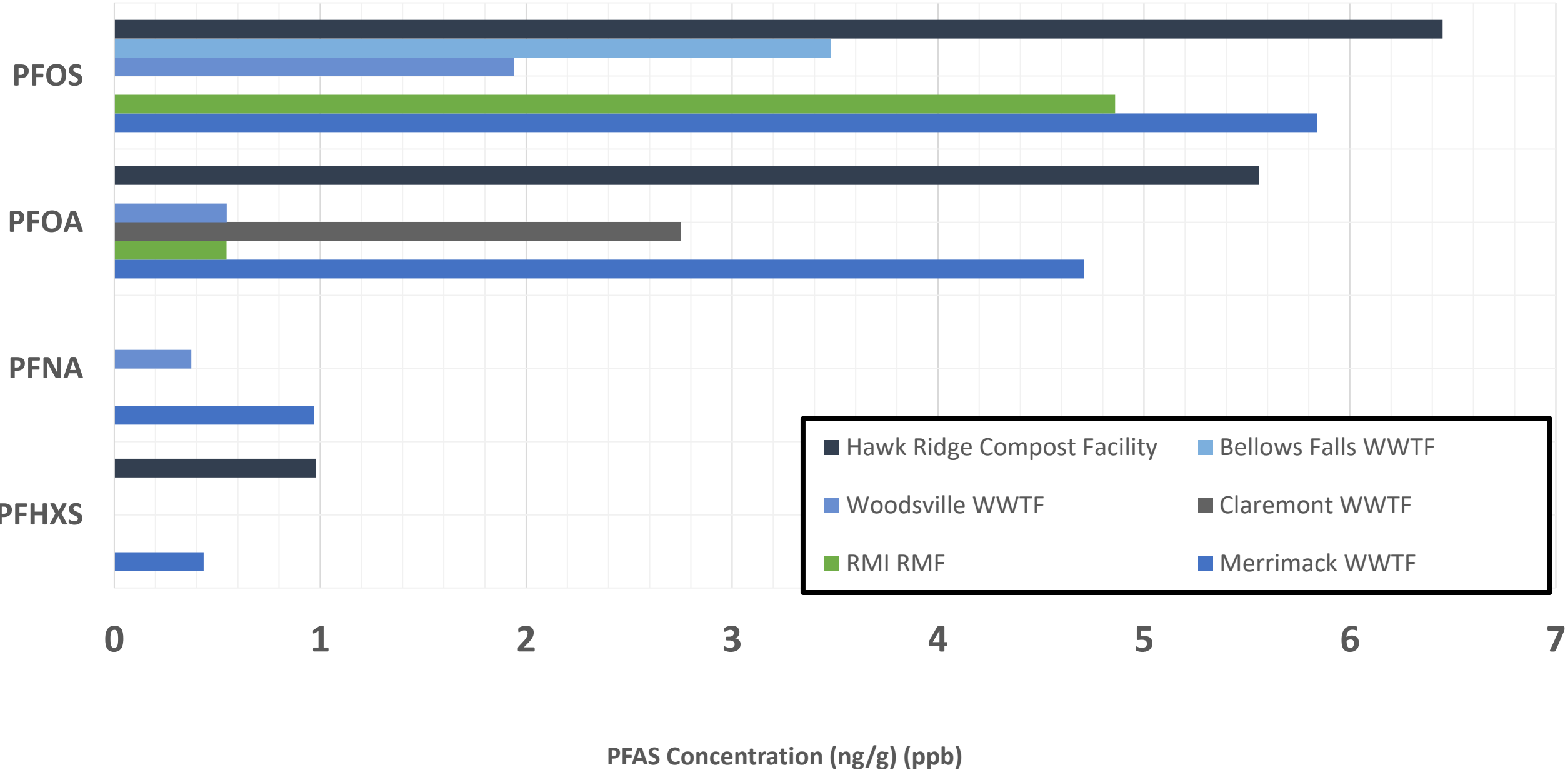
Average Annual NH Sludge, Septage, and Leachate

- NH Biosolids Recycled to Land Application : **>40,000 wet tons**
- NH Sludge that was disposed at a landfill : **>50,000 wet tons**
- NH Sludge that was incinerated : **>17,500 wet tons**
- Over **>100,000,000 gallons** of septage is managed in NH annually
- 6 Operating lined landfills in NH : **~100,000,000 gallons** of leachate
 - ~80,000,000 gallons** managed at WWTFs within state
 - ~20,000,000 gallons** managed at WWTFs out of state

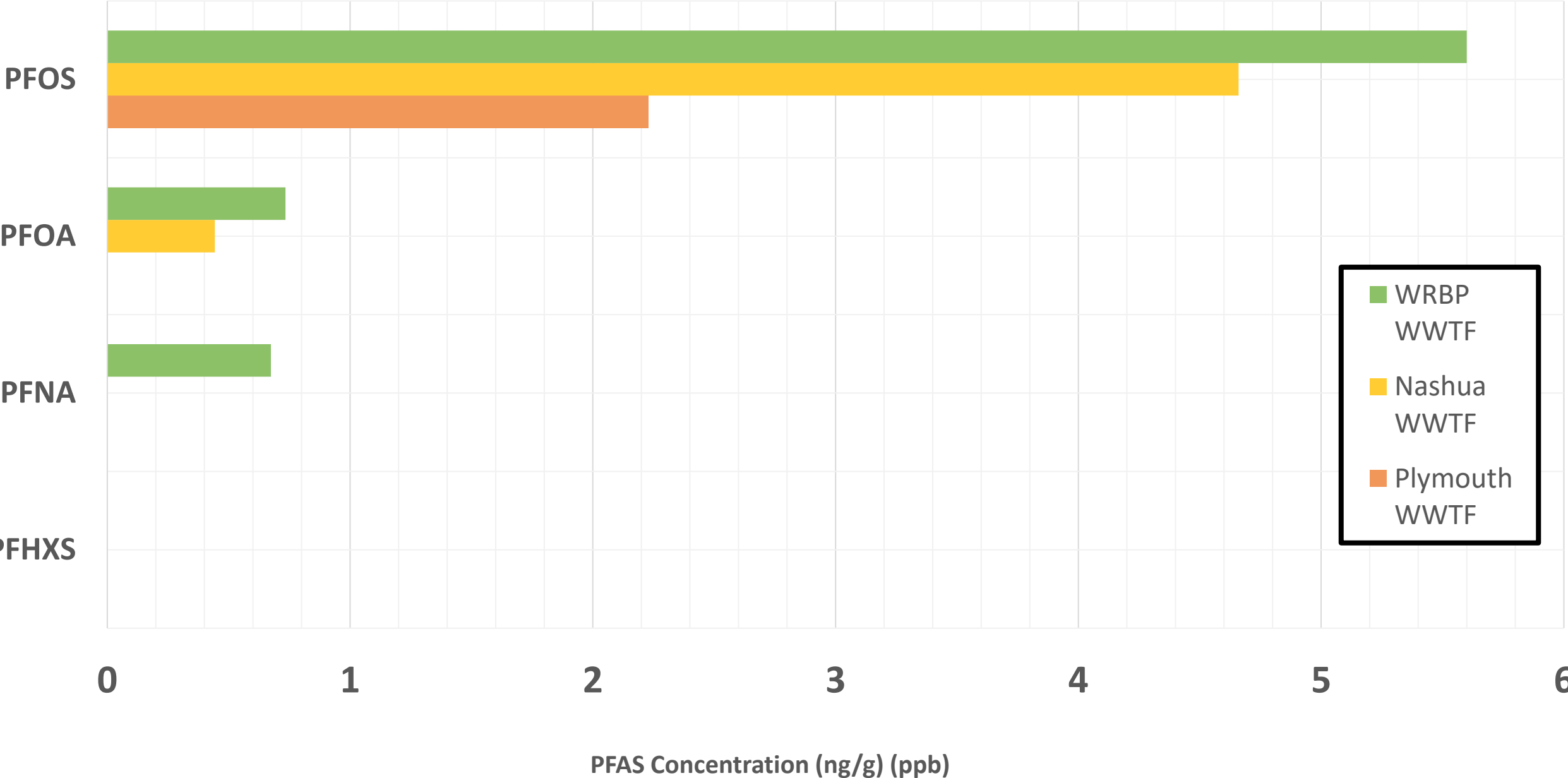


**2018 reporting values *Sludge managed to lagoon systems not accounted for **NH WWTF ONLY, no paper mill or drinking water treatment sludge accounted for*

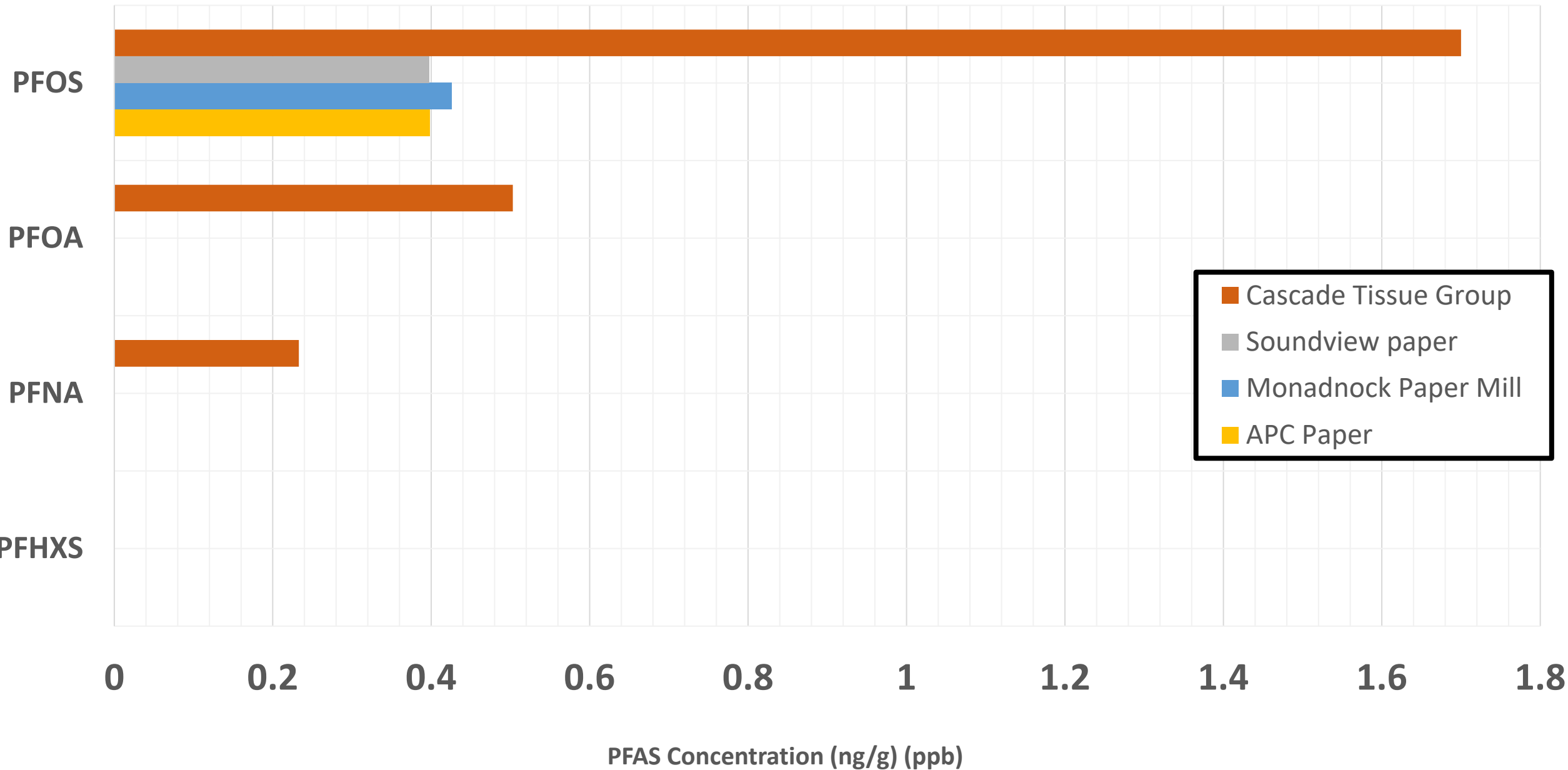
2022 NHDES RMS SQC Class A Biosolids PFAS Investigation Data



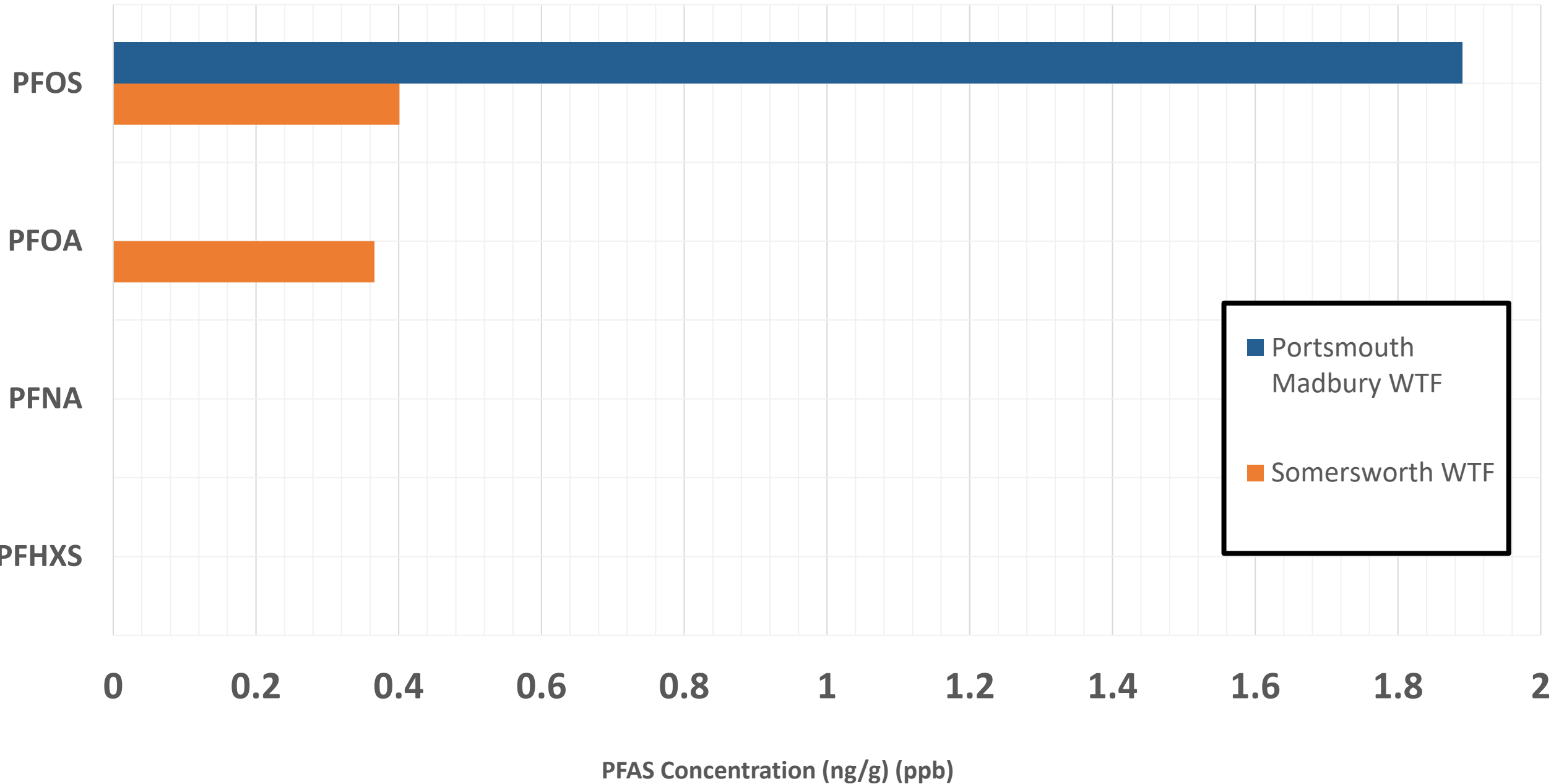
2022 NHDES RMS SQC Class B Biosolids PFAS Investigation Data



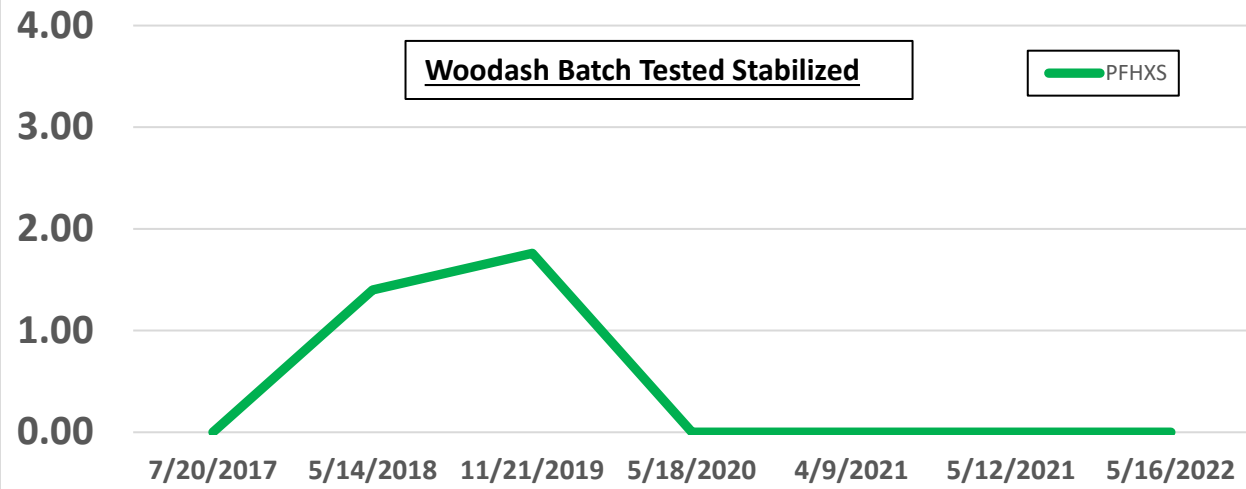
2022 NHDES RMS SQC Short Paper Fiber PFAS Investigation Data



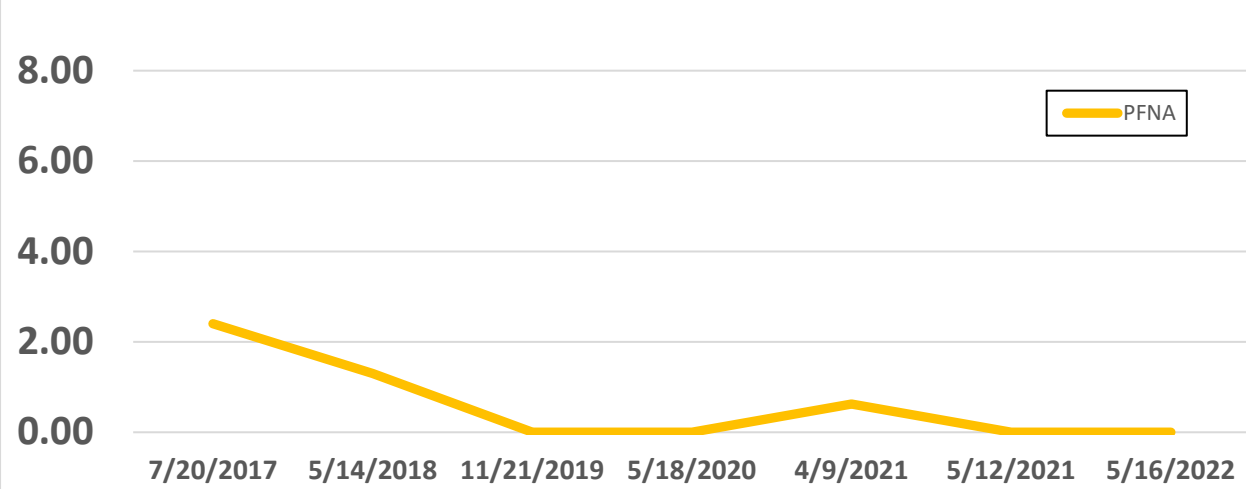
2022 NHDES RMS SQC Drinking Water Treatment Residuals PFAS Investigation Data



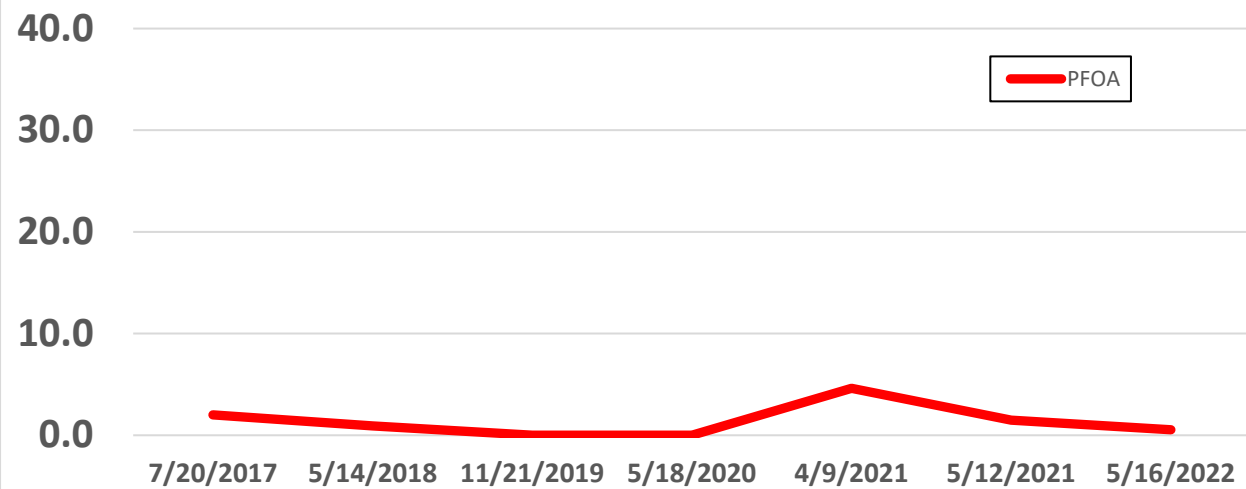
RMI - RMF (SQC13002) PFAS Concentrations (NH4)
(ng/g) 2017 - present



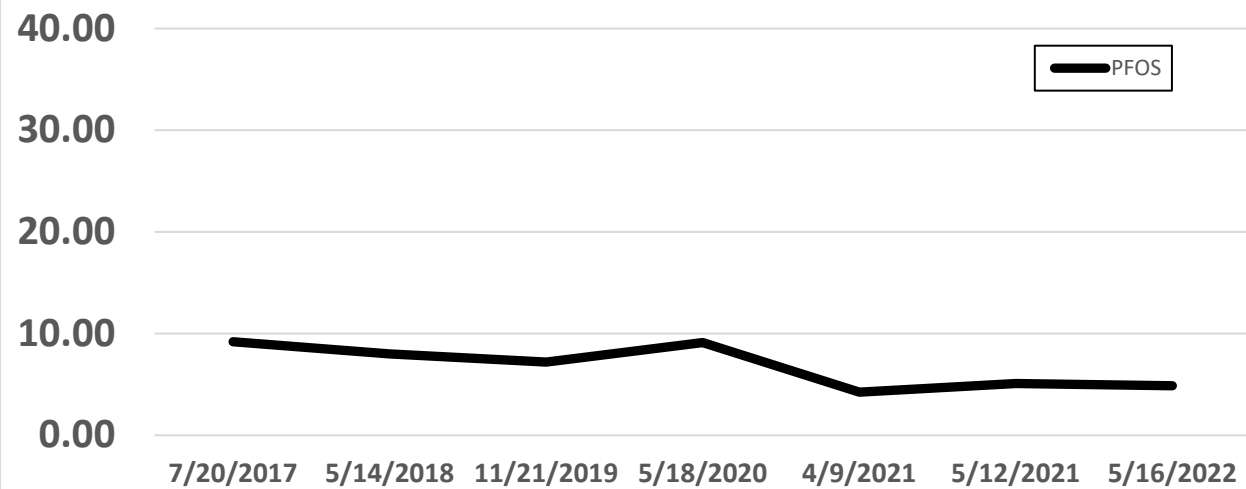
RMI - RMF (SQC13002) PFAS Concentrations (NH4)
(ng/g) 2017 - present



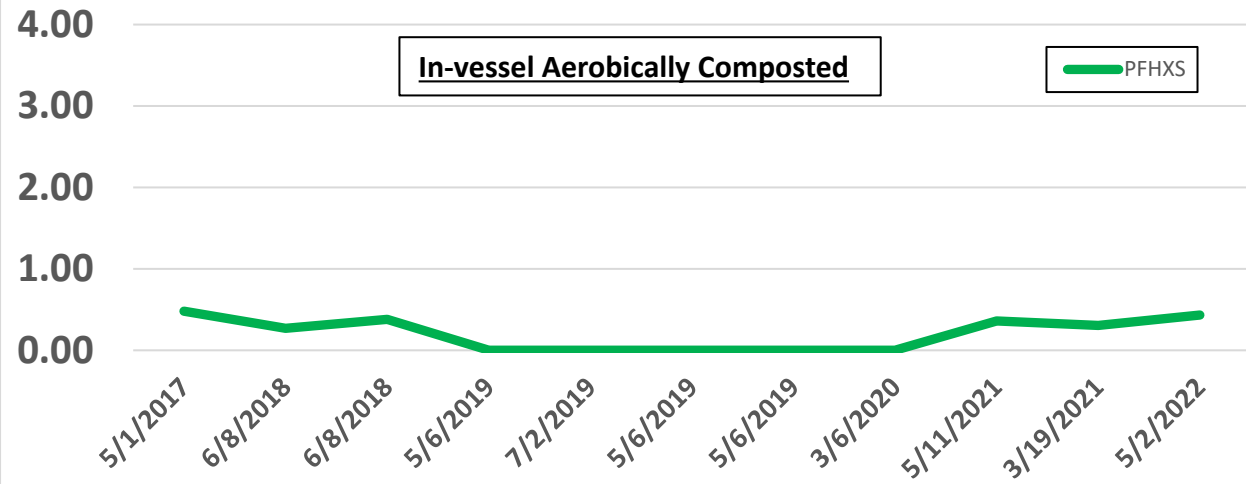
RMI - RMF (SQC13002) PFAS Concentrations (NH4)
(ng/g) 2017 - present



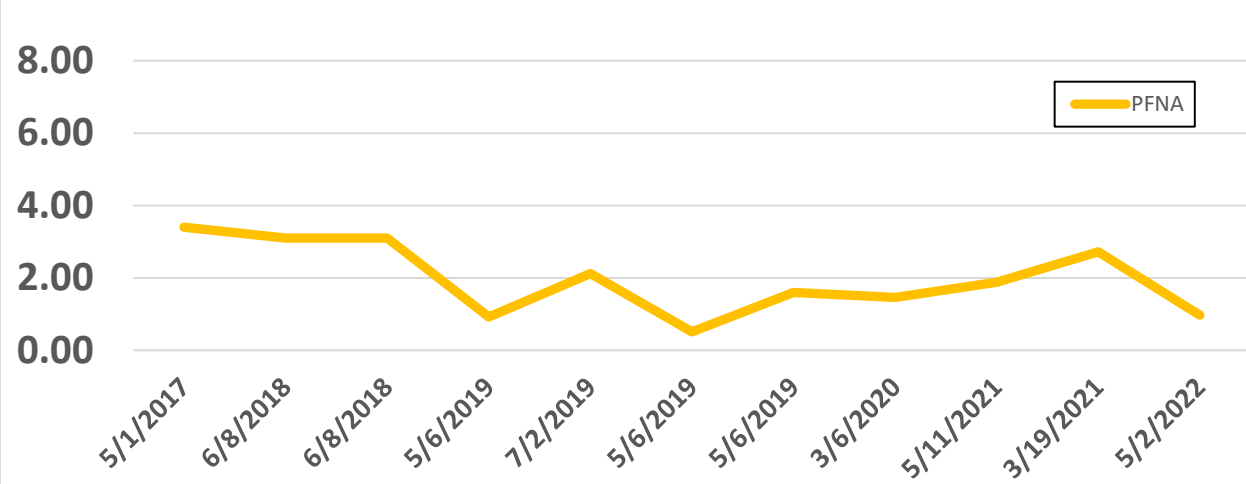
RMI - RMF (SQC13002) PFAS Concentrations (NH4)
(ng/g) 2017 - present



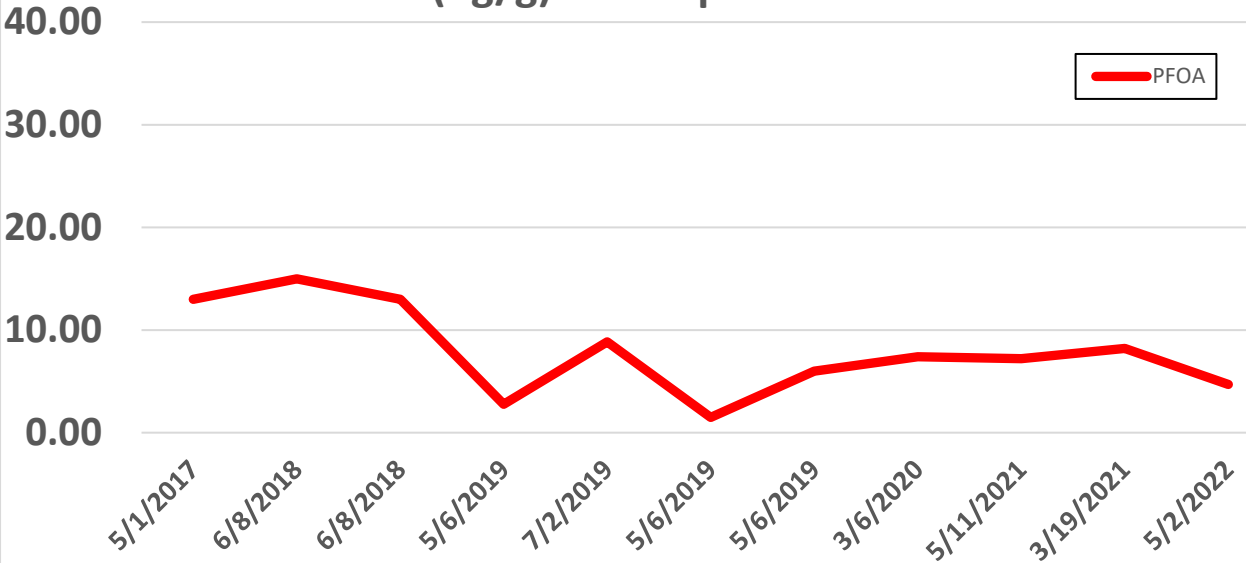
Merrimack WWTF (SQC9901) PFAS Concentrations
(ng/g) 2017 - present



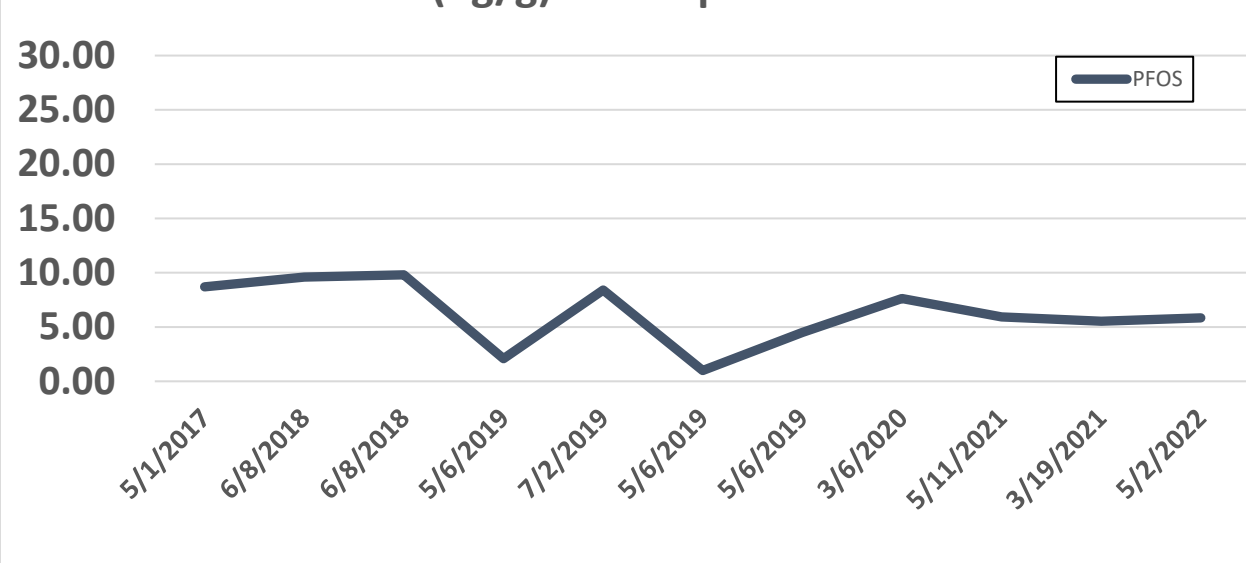
Merrimack WWTF (SQC9901) PFAS Concentrations
(ng/g) 2017 - present



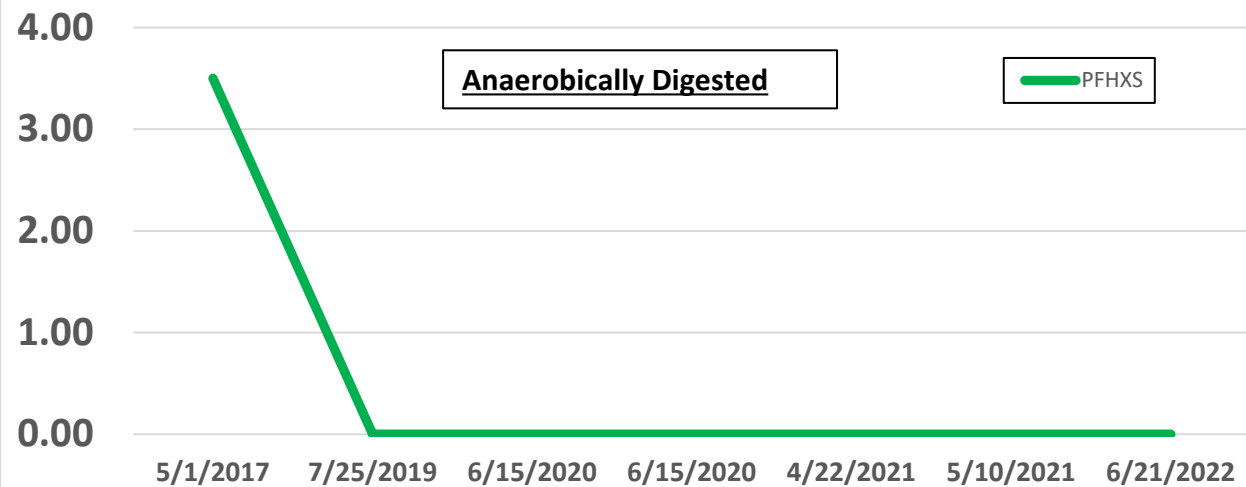
Merrimack WWTF (SQC9901) PFAS Concentrations
(ng/g) 2017 - present



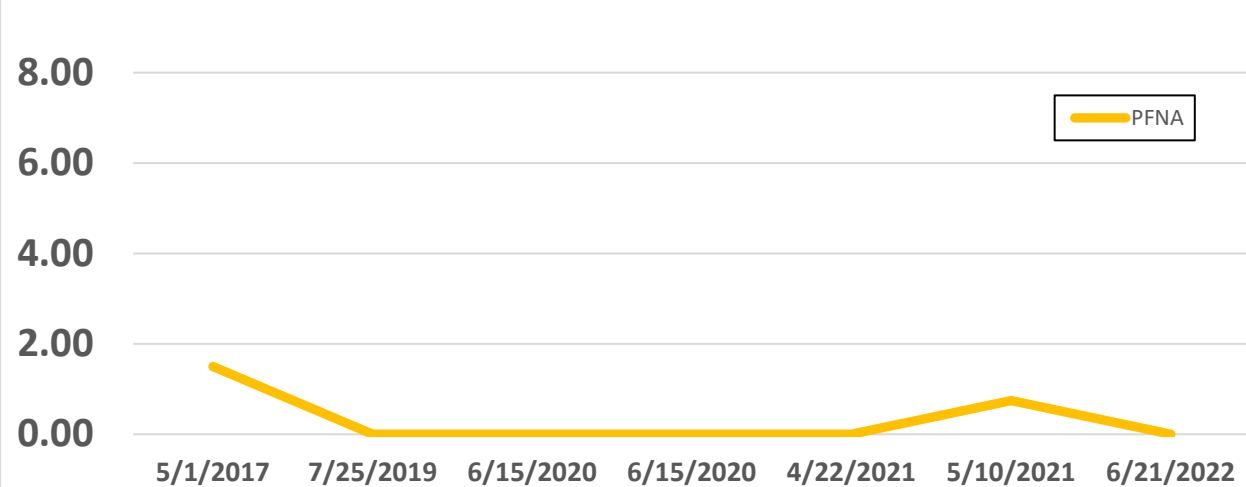
Merrimack WWTF (SQC9901) PFAS Concentrations
(ng/g) 2017 - present



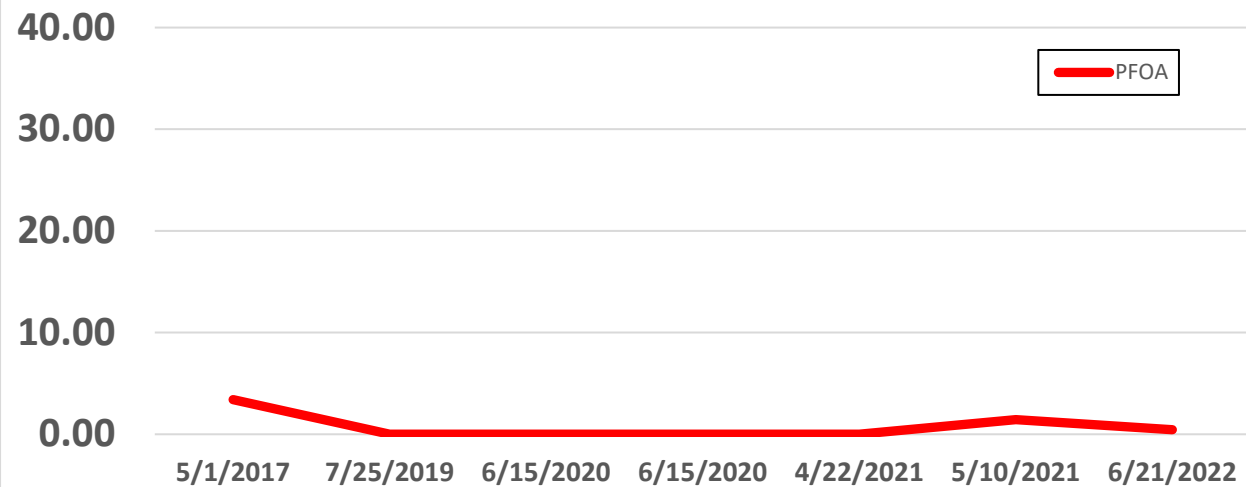
Nashua WWTF (SQC9908) PFAS Concentrations
(ng/g) 2017 - present



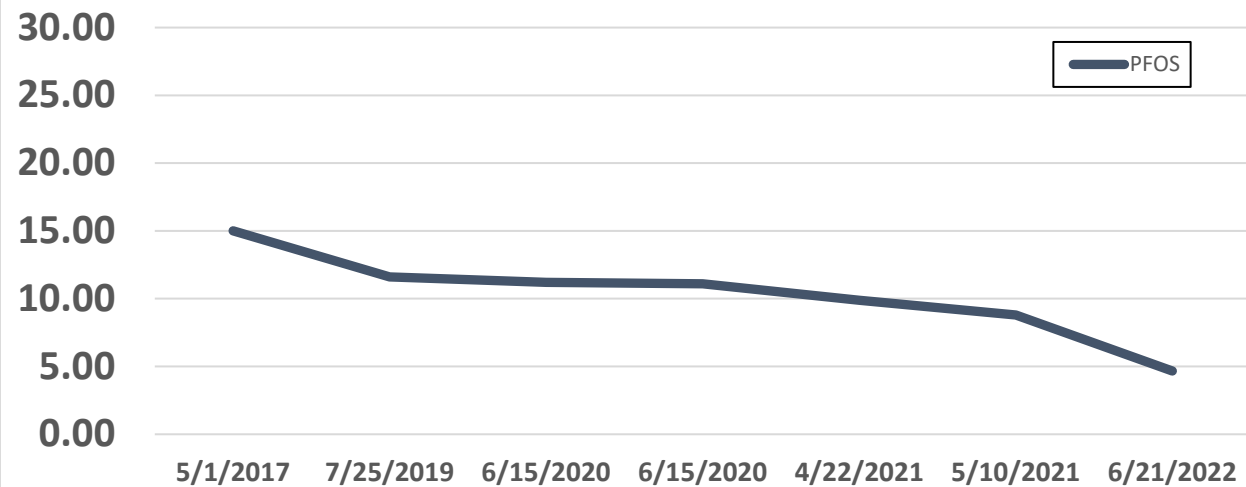
Nashua WWTF (SQC9908) PFAS Concentrations
(ng/g) 2017 - present



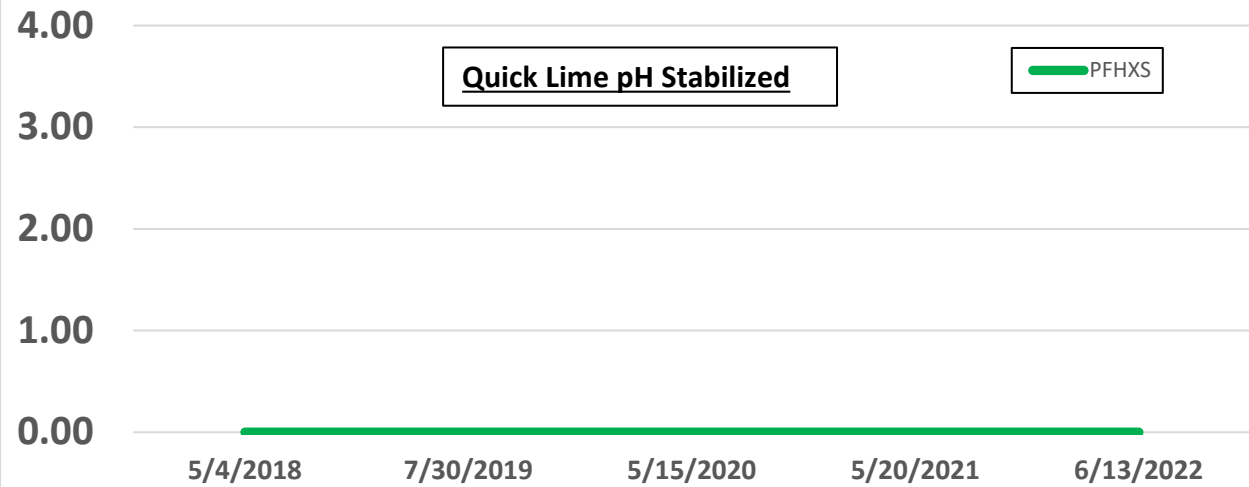
Nashua WWTF (SQC9908) PFAS Concentrations
(ng/g) 2017 - present



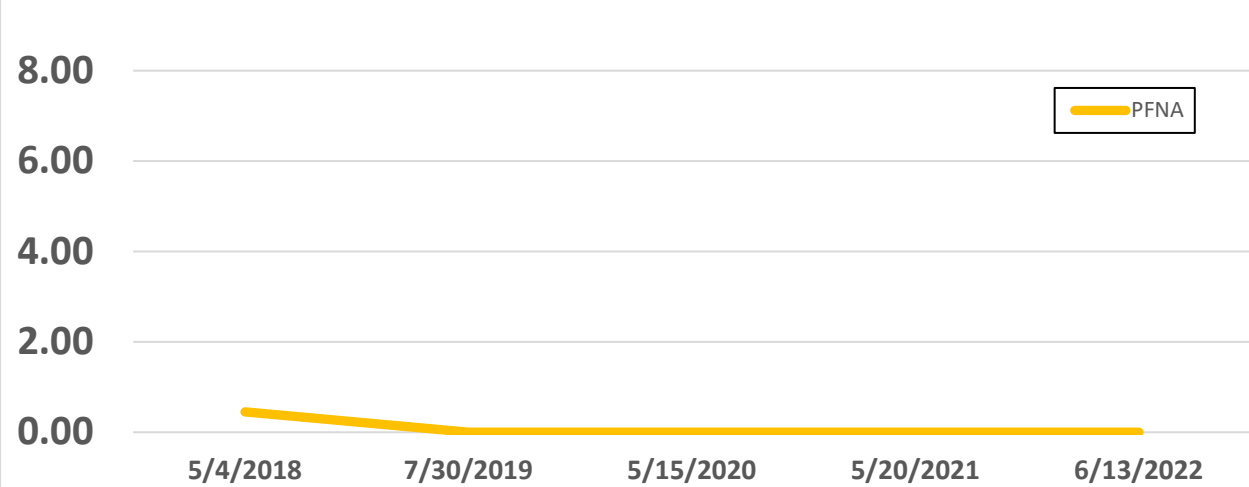
Nashua WWTF (SQC9908) PFAS Concentrations
(ng/g) 2017 - present



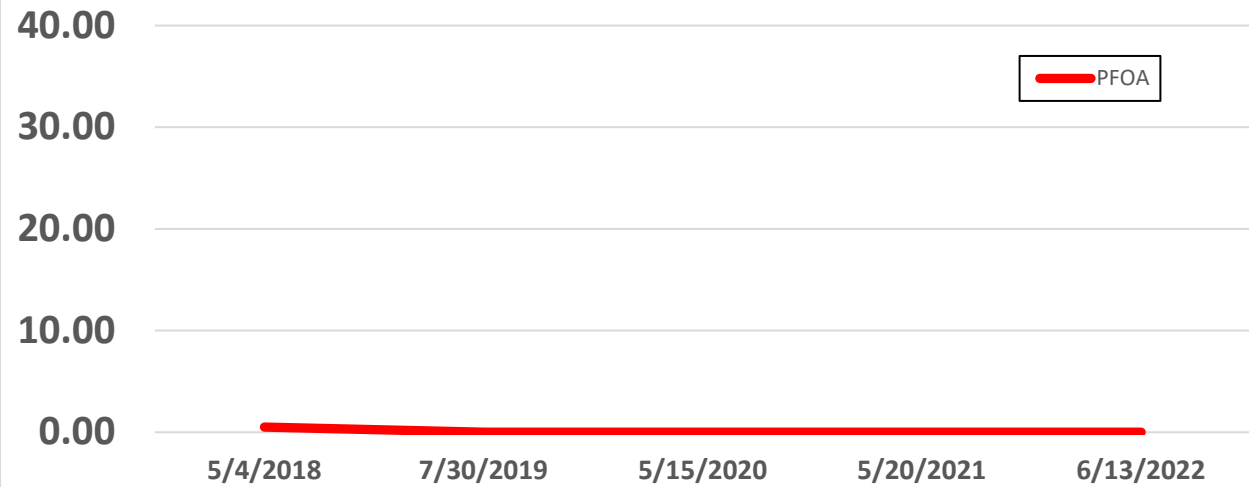
Plymouth WWTF (SQC9906) PFAS Concentrations
(ng/g) 2018 - present



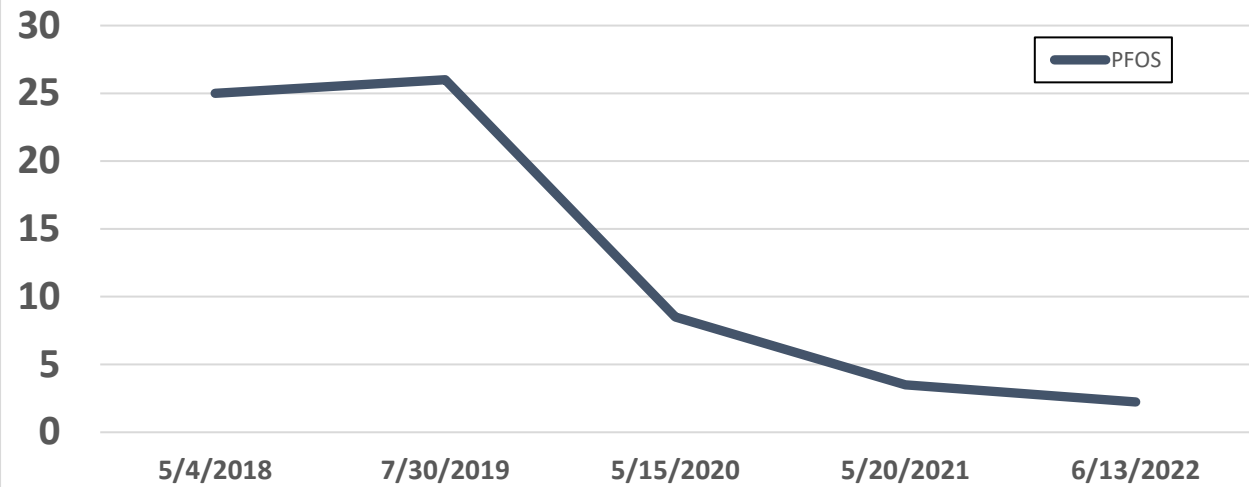
Plymouth WWTF (SQC9906) PFAS Concentrations
(ng/g) 2018 - present



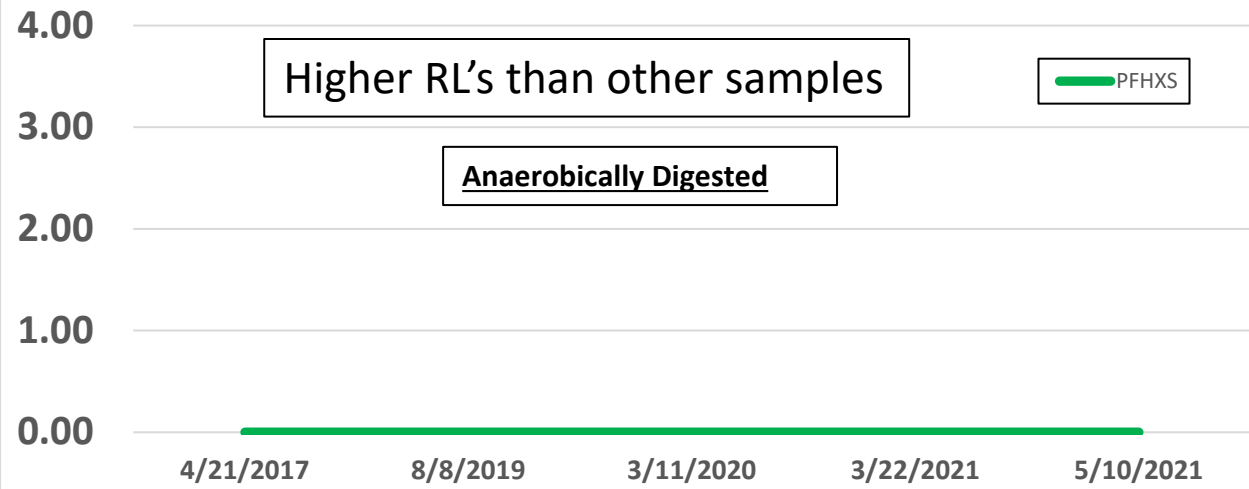
Plymouth WWTF (SQC9906) PFAS Concentrations
(ng/g) 2018 - present



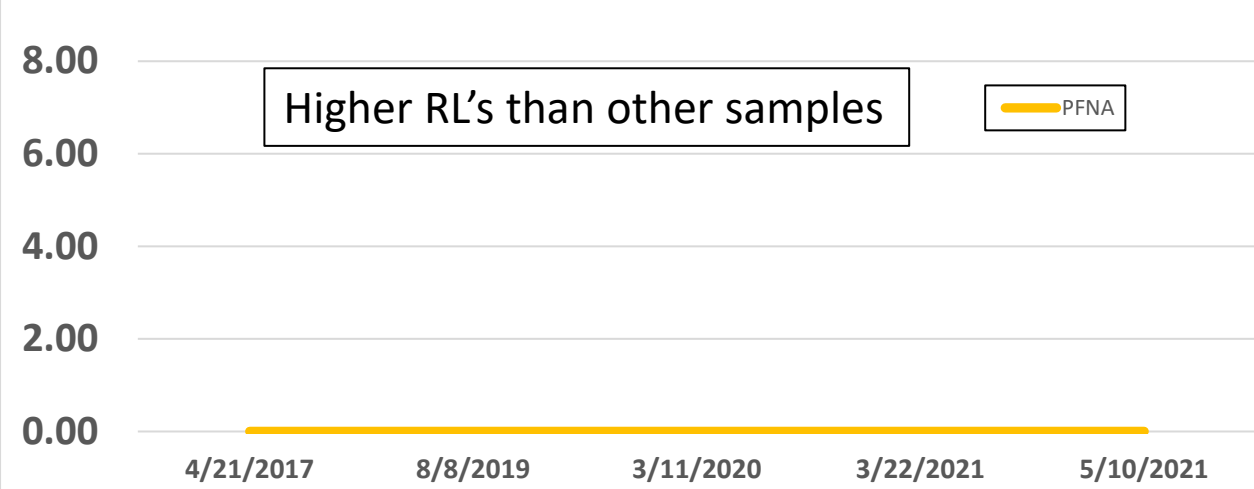
Plymouth WWTF (SQC9906) PFAS Concentrations
(ng/g) 2018 - present



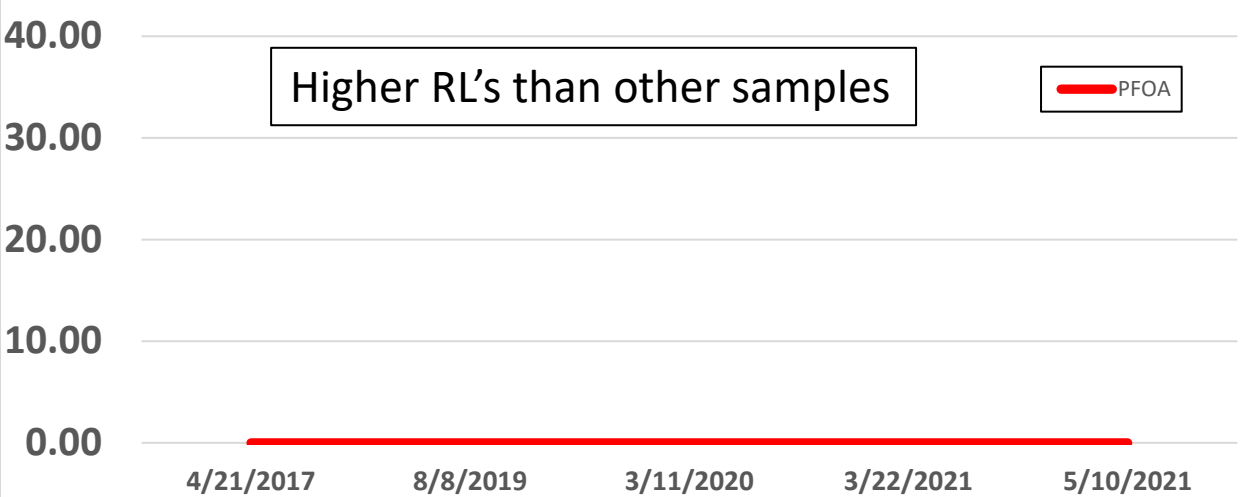
Winnepesaukee River Basin Program WWTF
(SQC9706) PFAS Concentrations (ng/g)



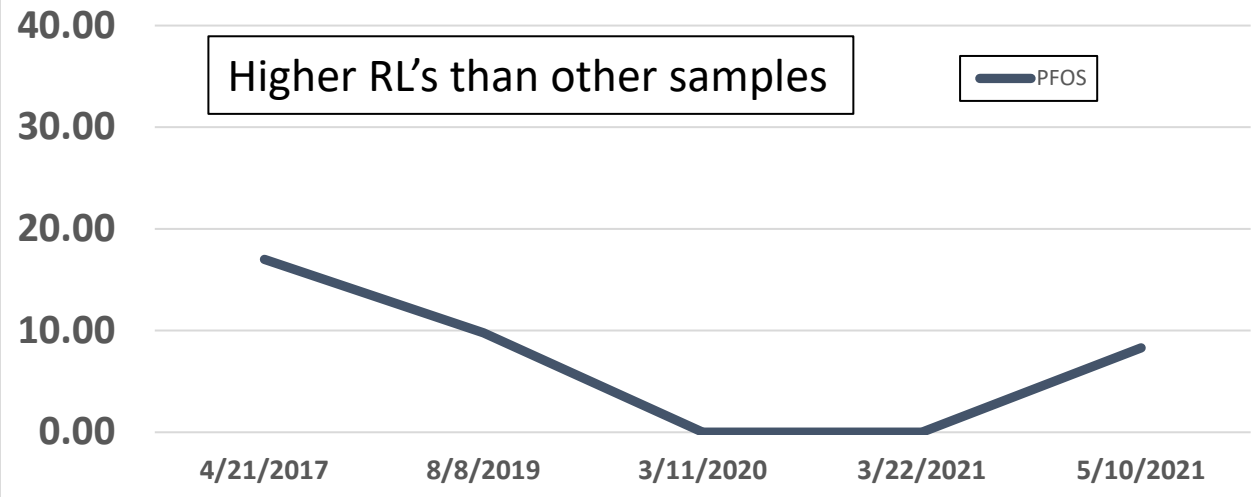
Winnepesaukee River Basin Program WWTF
(SQC9706) PFAS Concentrations (ng/g)



Winnepesaukee River Basin Program WWTF
(SQC9706) PFAS Concentrations (ng/g)



Winnepesaukee River Basin Program WWTF
(SQC9706) PFAS Concentrations (ng/g)



The Future?



<https://www.renewableenergymagazine.com/biomass/aries-clean-energy-receives-permits-for-worlda-20190716>



<https://rmirecycles.com/shincci-usa/>



<https://www.bioforcetech.com/>



<https://modernpumpingtoday.com/clean-energy-from-landfill-diversion-plus-the-bonus-of-biochar/>

The Future?



<https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.ec21.com%2Fproduct-details%2FElectrocoagulation-Water-Treatment-System--4324338.html&psig=AOvVaw13ecRf3aV4hqgGGOzuKemW&ust=1684603362541000&source=images&cd=vfe&ved=0CA8QjhxqFwoTCOjj-93ygf8CFQAAAAAdAAAAABAA>

COMMISSION TO STUDY ENVIRONMENTALLY-TRIGGERED CHRONIC ILLNESS

Contaminated Site Management for Hazardous Waste Sites in New Hampshire

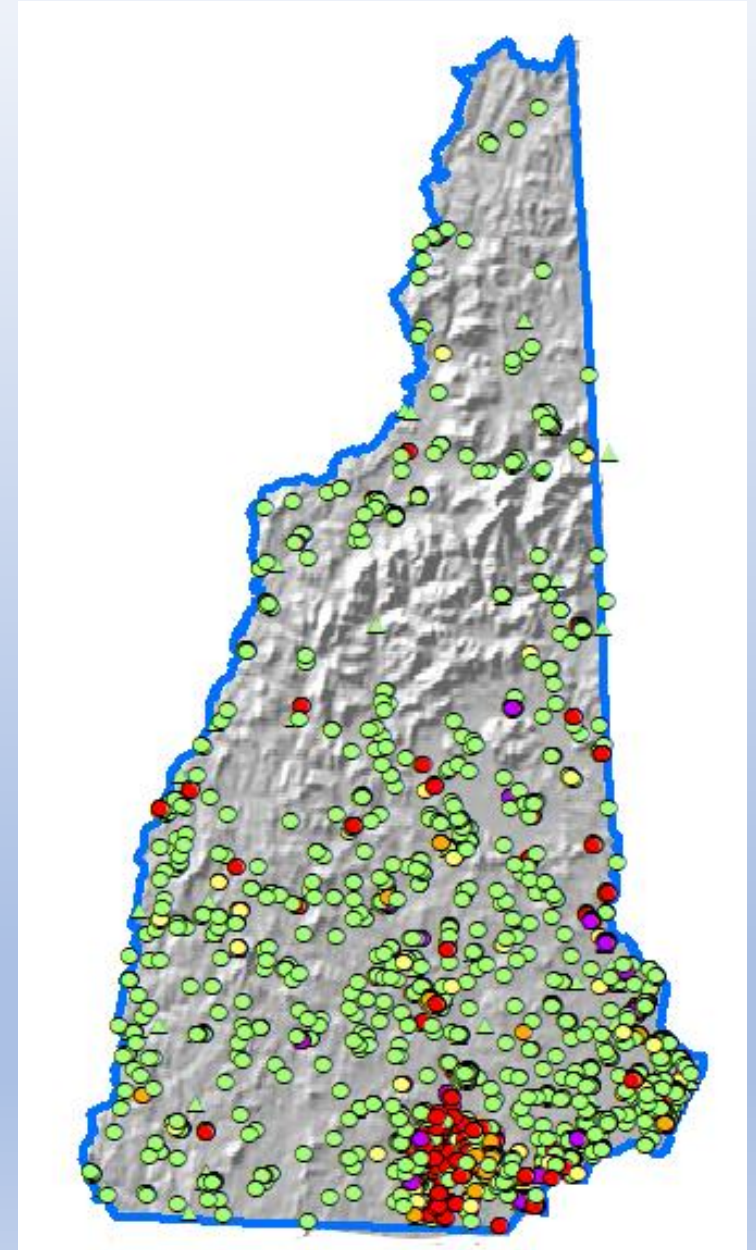
May 19, 2023

Jeffrey Marts, P.G.

Bureau Administrator / Hydrogeologist

NHDES Hazardous Waste

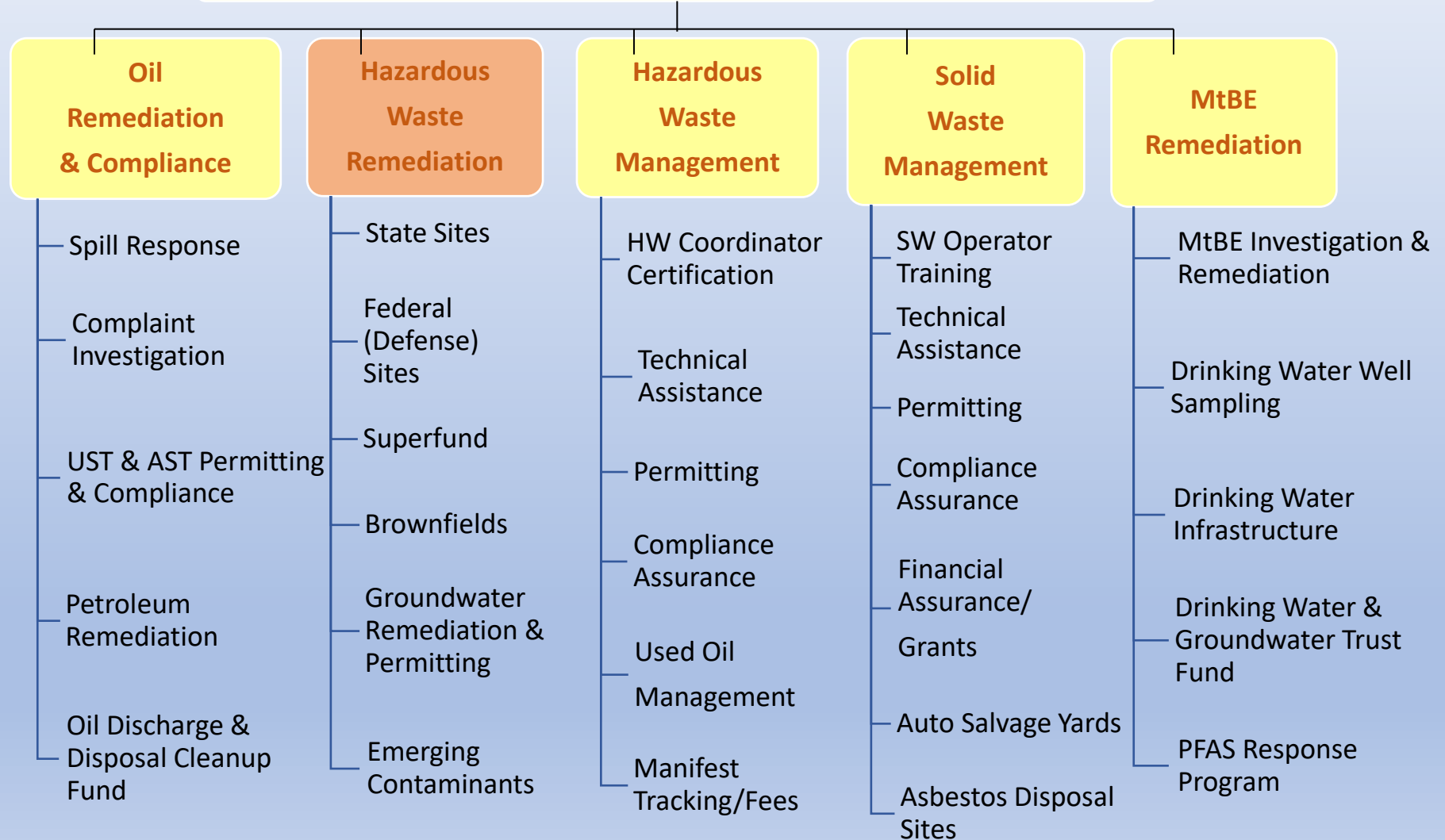
Remediation Bureau



Waste Management Division

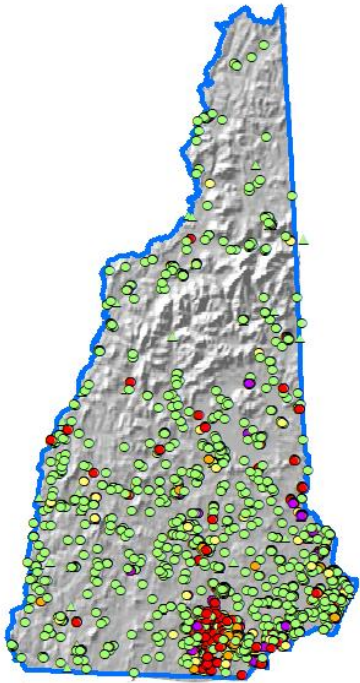
Mike Wimsatt, Director

Sarah Yuhas Kirn, Assistant Director



Hazardous Waste Remediation Bureau (HWRB)

Jeffrey Marts, P.G., Administrator



- Oversight of site investigations and remediation at hazardous waste contaminated sites
 - State lead sites
 - Superfund sites – in coordination with USEPA
 - Federal former defense sites – in coordination with USEPA and DOD
- 24 Positions - Mostly hydrogeologists and engineers

HWRB - State Lead Sites

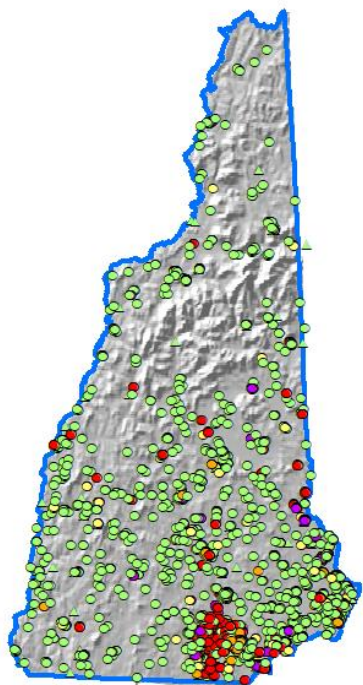
(~ 800 sites)

- State Hazardous Waste Sites (612)
- Closed Landfills (~180)
- Active Lined Solid Waste Landfills (6)

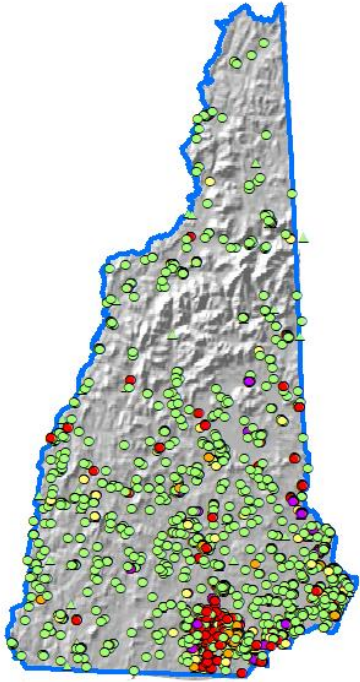
HWRB – Superfund Program

(22 sites)

- 8 Fund lead (USEPA and NHDES) sites
- 11 Potentially Responsible Party (PRP) sites
- 1 Combination Fund lead and PRP - Savage Well
- 1 Delisted – Londonderry Town Garage
- 1 Proposed for Listing - Mohawk Tannery



HWRB – Department of Defense Sites



- 6 Department of Defense Sites
 - Includes Pease Tradeport, that consists of > 100 individual sites
- 25 Formerly Used Defense Sites (FUDS)



Contaminated Site Management



Site Investigation



- Evaluate source, nature, location, and full extent of contamination
- Evaluate fate and transport mechanism
- Identify receptors and potential receptors
- Evaluate further investigation, remedial action, and/or no further action

Remediation

Provide for protection of human health and the environment



- Remove or treat the source of contamination
- Contain the contamination source to limit the impact to groundwater, surface water, and soil to the extent feasible
- Restore soil and groundwater quality
- Contain contaminated groundwater within the limits of a proposed groundwater management zone

Groundwater Management Permit (GMP)

Establish a Groundwater Management Zone (GMZ)



- Subsurface volume of contaminated groundwater contained within GMZ
- Requires ongoing groundwater monitoring
- Requires provision of a potable drinking water supply if wells are contaminated above AGQS
- Controls the use of groundwater (most commonly through recordation of a notice on the property deed)

Groundwater Management Permit (GMP)

Monitoring Requirements

Monitoring Locations	Sampling Frequency	Parameters
MW-1	November 2023 and 2025	Specific conductance @25°C, pH, chloride, nitrate, sulfate, TKN, arsenic, iron, manganese, and per- and polyfluoroalkyl substances
Water supply well: Map 11 / Lot 6-1A	November each year	Per- and polyfluoroalkyl substances
Water supply well: Map 11 / Lot 4-19, Lot 5-4 (supplies Lot 5-5) and 6-1	November 2024	Per- and polyfluoroalkyl substances
MW-1	November each year	Static water level elevation

- GMZ can expand or contract depending on groundwater conditions.
- Permits are issued for a period of 5 years and renewed as needed.
- Periodic Summary Reports and Permit Renewal Applications should include evaluation of remediation, groundwater conditions, and changes in groundwater use (e.g., new wells)



NEW HAMPSHIRE
DEPARTMENT OF
**Environmental
Services**

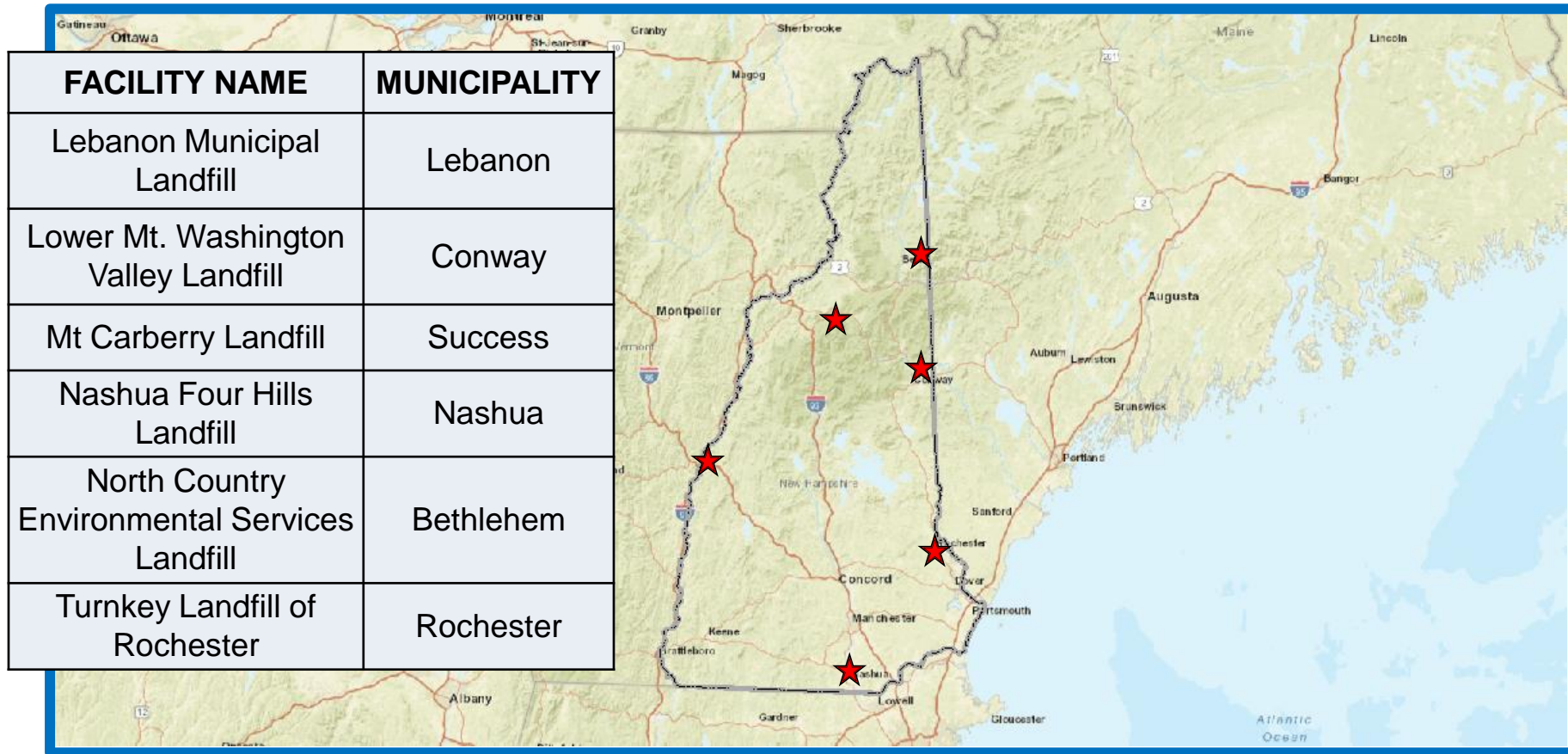
PFAS Occurrence in Leachate at New Hampshire Landfills

JOINT LEGISLATIVE
FISCAL COMMITTEE

October 14, 2022

Landfills in New Hampshire

6 Operating Lined Municipal Solid Waste (MSW) Landfills



Landfill Leachate Management

Facility Name	Year	Gallons
Lebanon Municipal Landfill	2019	4,795,889
	2020	3,892,219
	2021	2,633,564
Lower Mt. Washington Valley Landfill	2019	5,213,911
	2020	5,044,912
	2021	4,316,802
Mt Carberry Landfill	2019	23,166,211
	2020	14,681,242
	2021	11,093,176
Nashua Four Hills Landfill	2019	9,323,542
	2020	9,107,427
	2021	15,639,319
North Country Environmental Services Landfill	2019	8,190,236
	2020	9,091,897
	2021	11,410,376
Turnkey Landfill of Rochester	2019	44,967,483
	2020	45,421,203
	2021	48,129,260
Closed Lined Landfills		Location
Dummer Yard Landfill		Berlin
Franklin Ash Landfill		Franklin
Lamprey Ash Landfill		Somersworth
NH / VT Ash Landfill		Newport
Roketenetz Landfill		Pelham
Souhegan Regional Landfill		Amherst

Landfill Leachate Management

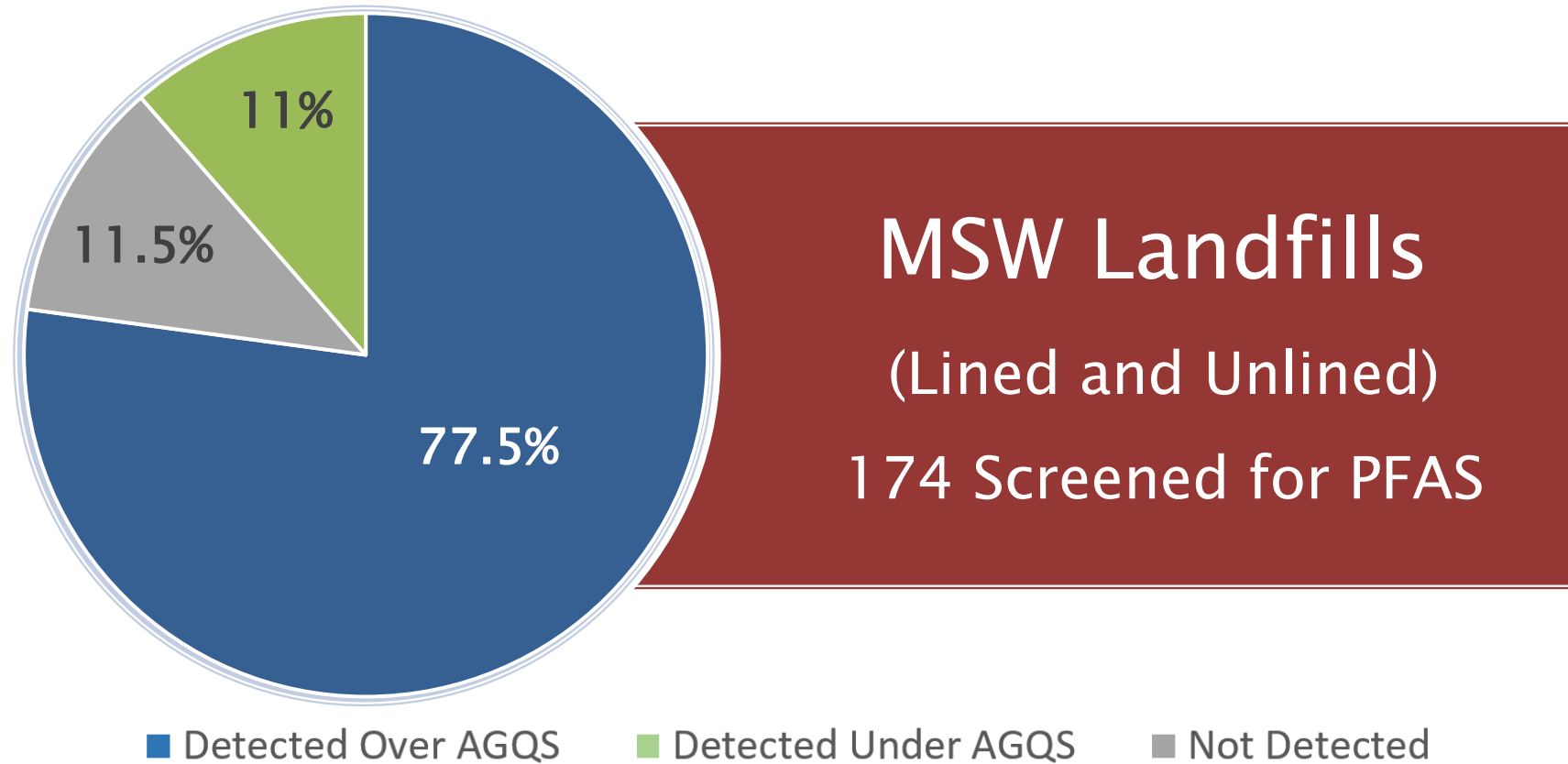
Current Management of Landfill Leachate

- ▶ Leachate captured in the landfill's liner system is shipped or piped to WWTPs.
 - Negligible destruction of PFAS – partitions to effluent and sludge.
 - Relative impacts on receiving water quality – rivers/groundwater.
 - Relative impacts on sludge – potentially limiting management options.
- ▶ One active landfill pretreats its leachate (not PFAS specific) - Turnkey Landfill of Rochester.

Cyclical Relationship between landfills and WWTPs.

- ▶ Leachate to WWTP.
- ▶ WWTP sludge to landfill.

PFAS Occurrence in Groundwater at NH Landfills



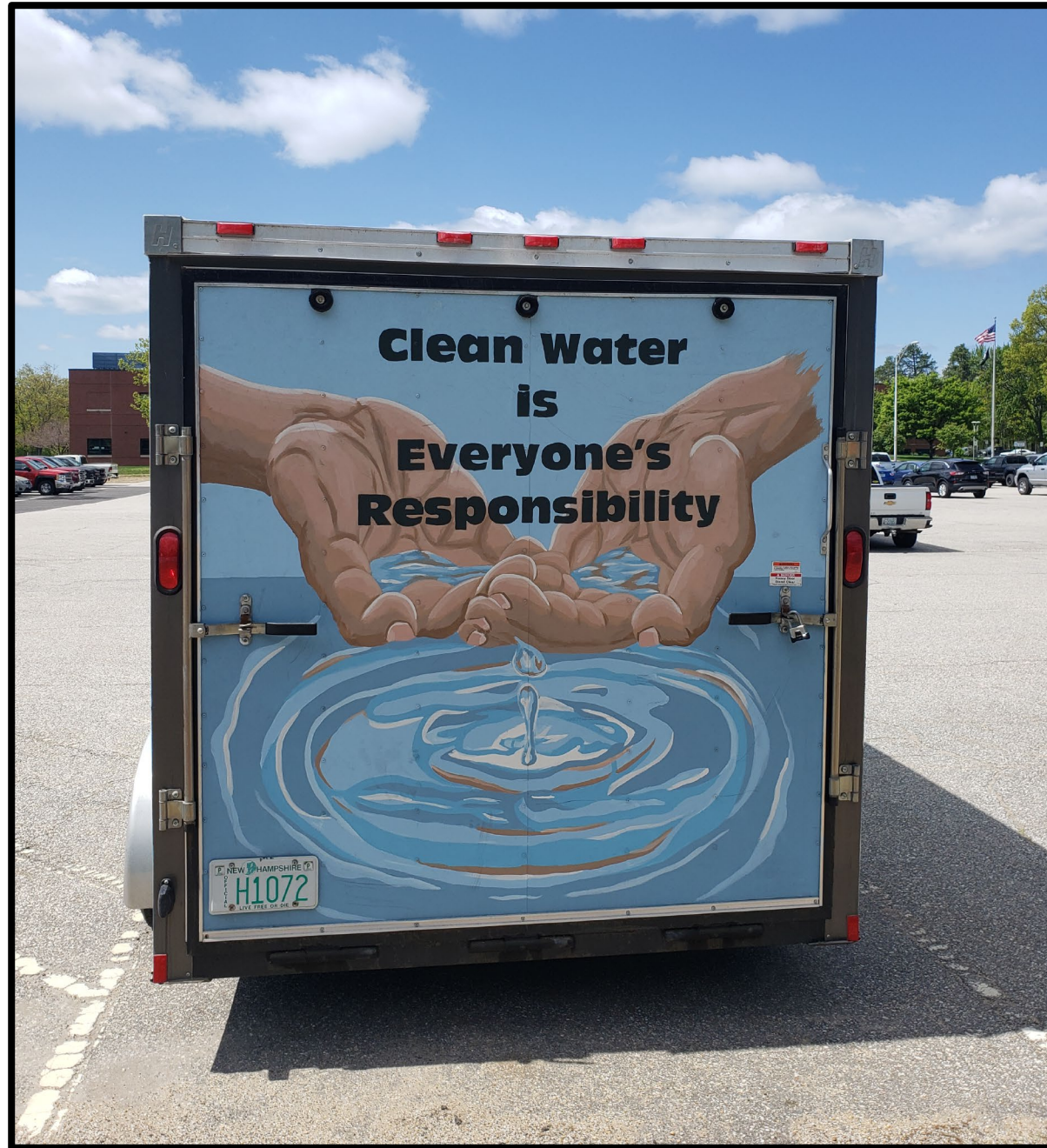
Data from "Status Report on the Occurrence of Per- and Polyfluoroalkyl Substance (PFAS) Contamination in New Hampshire", dated June 2022, prepared by New Hampshire Department of Environmental Services

PFAS Occurrence in Groundwater at NH Landfills

Water Supply Well Sampling at NH Landfills:

- ▶ PFAS has been detected in drinking water supply wells exceeding the AGQS at 6 closed landfill sites, totaling 24 supply wells.
 - Each has been provided a permanent potable water supply solution (treatment or connection to water utility) or are being provided bottled water until a permanent solution is provided by the responsible party.
 - In approximately half of the cases contaminants other than PFAS, were previously detected at the water supply wells above their respective AGQS.
- ▶ To date, there have been no detections of PFAS over AGQS in water supply wells that have been sampled near active landfills.

Thank You !



Any
Questions?