

## COMMISSIONER'S COLUMN

### Collaboration key to Southern NH PFAS investigation

Since March 2016, the New Hampshire Department of Environmental Services (NHDES) has been actively engaged in an unprecedented investigation into contamination of groundwater by emerging contaminants perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), which are part of a larger group of chemicals known as per- and polyfluoroalkyl substances (PFAS). The investigation began when voluntary water testing conducted by Saint-Gobain Performance Plastics (Saint-Gobain) at its plant in Merrimack revealed low levels of PFOA contamination in the drinking water supplied to the factory by Merrimack Village District Water Works (MVD).

At the time, there were no state or federal drinking water standards for PFOA, and all that NHDES had to base its findings on was a short-term, provisional health advisory standard that was much higher than the levels detected in the MVD drinking water. However, based on growing concerns about similar contamination situations in New York and Vermont, NHDES and Saint-Gobain collaboratively initiated a full-scale public response.

Since that time, NHDES, Saint-Gobain and thousands of New Hampshire residents have been on a journey that has mushroomed into the largest drinking water investigation related to a single site in the history of the state. And at the end of March 2018, NHDES, represented by the New Hampshire

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### Investigating ice-out trends in New Hampshire lakes and ponds

Spring is upon us and for New Hampshire lakes and ponds, this time of year is a period of transition from an ice-covered surface to open water. This phenomenon is typically described as "ice-out" and many lake associations closely monitor their particular waterbody for the day ice-out arrives.

Ice-out can be defined in different ways. Some groups declare ice-out when the ice has melted and broken up enough to navigate a boat from one end of a lake to the other; others wait until a lake is entirely ice-free. Many New Hampshire lakes have decades of historical ice-out records and some, like Lake Sunapee and Lake Winnepesaukee, date back to the 1800s. Ice-in, or when a lake is covered by ice in the fall or winter, is recorded less often.



*Ice-out on Lakins Pond in Hooksett, April 3, 2018.*

Records of annual ice-in and ice-out dates are valuable datasets. These data help scientists track long-term climatological trends and are used to determine total days of ice cover on lakes. A record of the day of ice-in and ice-out that extends for decades allows scientists to break through the "noise" of the dataset and determine trends.

An analysis of long-term ice-out records has documented that New England lakes are experiencing, on average, earlier ice-out days. Ice-out is largely determined by air temperature, but can also be influenced by snow cover, cloudiness and

*Ice, cont. page 3*

**Commissioner's Column** *continued from page 1*

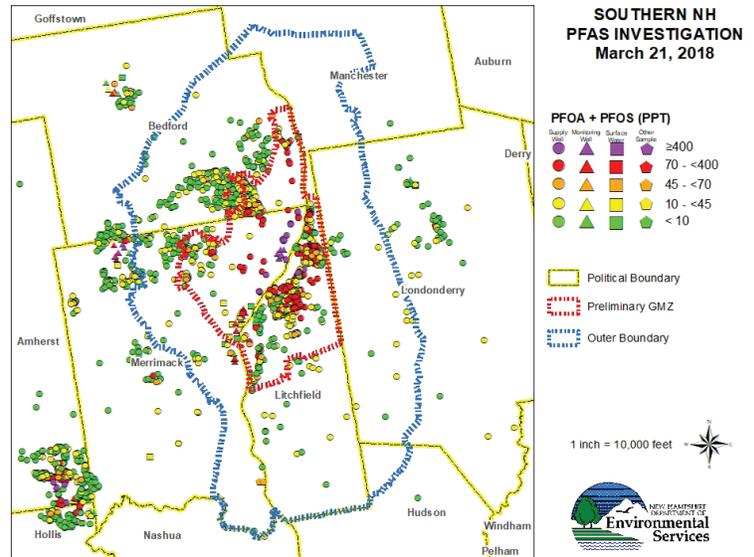
Attorney General's Office, and Saint-Gobain reached agreement on a monumental consent decree that would provide for hundreds of properties to be connected to public water and would lay the groundwork for the longer-term site investigation efforts.

From the beginning, NHDES and Saint-Gobain worked collaboratively to undertake the investigation. NHDES and Saint-Gobain were not always in agreement on the scientific and technical details, but we both shared the common goal of ensuring that residents had access to a safe drinking water supply. This effort is proven by the work completed prior to the consent decree, including more than 1,500 water samples collected from groundwater, surface water, and water supply wells in the affected towns (portions of Merrimack, Litchfield, Bedford and Manchester). In addition, Saint-Gobain paid for bottled water for hundreds of residents living in those towns, provided point-of-use treatment systems for more than 50 properties, and connected more than 450 properties to municipal water lines. During this time, NHDES established an Ambient Groundwater Quality Standard (AGQS) for both PFOA and PFOS of 70 parts per trillion, which was based on a US EPA Health Advisory. When contaminants that have an AGQS are found in drinking water, it becomes a drinking water standard for remediation purposes.

The consent decree announced in March was welcome news for many affected residents because it was an agreement to connect additional properties in the towns of Bedford, Litchfield and Merrimack that had been in dispute between NHDES and Saint-Gobain over the source of the contamination. In the consent decree, Saint-Gobain agreed to connect all of the properties to public water lines that NHDES requested, including 121 properties in Bedford (plus point-of-entry treatment systems for four properties in Bedford where it was not feasible to extend municipal water lines), 41 additional properties in Merrimack and 27 additional properties in Litchfield. Beyond the water line connections,

the consent decree included a preliminary groundwater management zone (GMZ) of 14.5 square miles, the largest in state history. Within the preliminary GMZ, Saint-Gobain remains responsible for PFOA and PFOS groundwater contamination, including a long-term site investigation of air emissions, and soil, groundwater and drinking water sampling. Active site remediation will likely be needed at the Saint-Gobain facility as well. While there is a tremendous amount of work that needs to be completed over the course of the next two years related to the extension of public water lines, the signing of the consent decree helps to signal a transition of NHDES' management of the site from that of an emergency response to a greater site investigation effort.

I referenced earlier that this PFAS investigation was like a journey; a journey that is no way near its completion. I think it is also important to recognize that we would not have accomplished as much as we have to date without dozens of dedicated NHDES staff, as well as New Hampshire Department of Health and Human Services staff, that have met this challenge head-on. I also want to offer my sincere appreciation to the attorneys at the New Hampshire Department of Justice for their critical guidance and timely assistance with fashioning a comprehensive consent decree to which all parties could agree. I think it is appropriate to recognize Saint-Gobain as well. I know that I have used the word collaboration throughout this article, but if it weren't for Saint-Gobain's willingness to work closely with NHDES on our response, we wouldn't have been able to accomplish as much work in such a short period



of time. I also want to thank the local officials from the affected towns for all of their assistance, cooperation and collaboration. Their help has been critical throughout this process. And finally, I want to thank all of the affected residents and concerned citizens who have helped NHDES throughout this investigation with their patience, questions, and the sharing of their knowledge and concerns. We look forward to continuing our collaboration with you most of all. ■

**ENVIRONMENTAL NEWS** 

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wind. Earlier ice-out is associated with a changing climate and can have recreational, economic and environmental implications. Thinner ice and fewer days of ice cover reduce the time period for winter recreational activities on our lakes, which can negatively affect winter tourism activities. Environmentally, earlier ice-out allows lake water to begin warming sooner, stimulating plant and algal growth. Earlier ice-out will result in higher summer water temperatures, lower water levels due to increased evaporation, and prolonged summer lake stratification, which can lead to depleted oxygen in lake-bottom waters. These changes are favorable for enhanced growth of invasive plants and the likelihood of cyanobacteria blooms.

In 2011, through the Volunteer Lake Assessment Program (VLAP), NHDES began asking individuals and lake associations for historical ice-in and ice-out records after realizing that a central, statewide repository for this information did not exist. Since then, NHDES has acquired records for 101 New Hampshire lakes. Collecting ice-in and ice-out information is ongoing and online data entry is easy. Once the data are entered, historical records for each lake are stored electronically and are available upon request for use in lake association publications and scientific research.

When ice-out data from all 101 lakes were examined together, a significantly decreasing trend was detected (Figure 1). In other words, ice-out is occurring significantly earlier in recent years than it has in the past (Figure 1). For individual lakes, ice-out trends on Canaan St. Lake (Canaan), Spofford Lake (Chesterfield), Stinson Lake (Rumney), Lake Sunapee, and Lake Winnepesaukee have all shown a similar pattern towards earlier ice-out. Each of these lakes

have over 50 years of ice-out data demonstrating the value of a long-term dataset.

So what are you waiting for? Find out if ice-in and ice-out data are being collected and submitted to NHDES for the lake you visit most frequently. If the data aren't being collected, work with your community to start collecting!

To view ice-in/ice-out records, visit the NHDES VLAP webpage: <https://www.des.nh.gov/organization/divisions/water/wmb/vlap/ice-in-out.htm>. You can enter your own ice-in/ice out records online here: <https://forms.nh.gov/onlineforms/?FormTag=NHDES-W-07-028>. ■

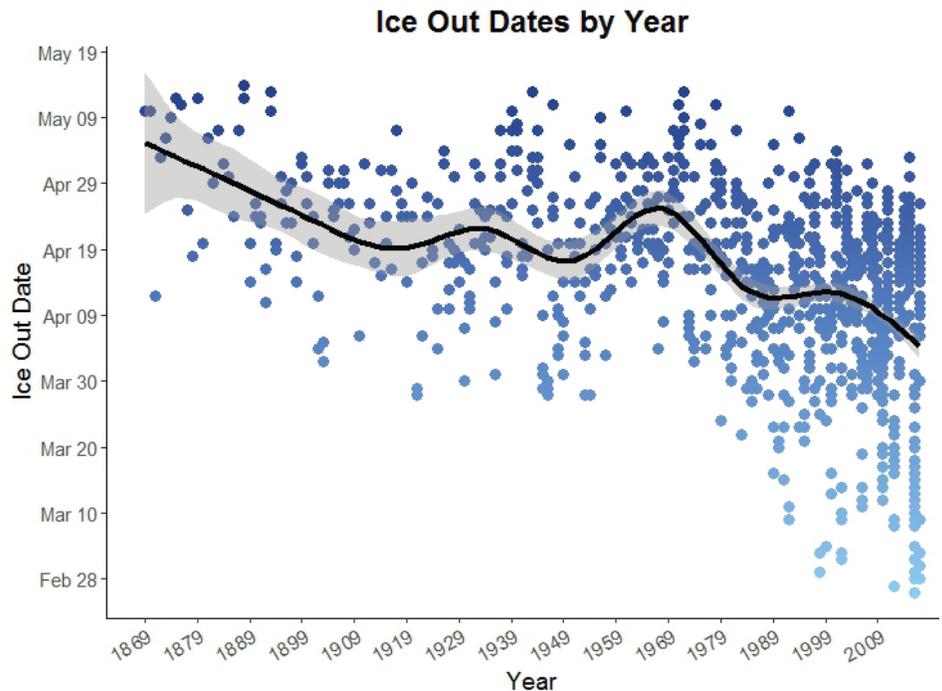


Figure 1. All ice-out date records for New Hampshire lakes and ponds stored at NHDES as of 2017. Dates are displayed as individual points while a Loess smoothing curve with a 95% confidence interval depicts the overall trend.

## NHDES conducts its first-ever fugitive dust workshop

Did you know that one car traveling on a dirt road one mile every day can create one ton of dust in one year? Fugitive dust is more than just a nuisance – it is air pollution that affects respiratory health, pollutes surface water, reduces visibility and can be a driving hazard. NHDES conducted its first fugitive dust workshop in March. Participants included public works employees, road and construction personnel, and private consultants. They learned about the health and environmental effects of small particulate pollution and various strategies for controlling fugitive dust on construction sites, road projects, and sand and gravel operations. One attendee noted, “Dust is something that I have not put much thought into until now. I will think about what I am doing and how it is affecting others.” For more information on fugitive dust, visit <https://www.des.nh.gov/organization/divisions/air/cb/ceps/dust/index.htm>.



# Monitoring harmful cyanobacteria blooms with the New Hampshire Beach Inspection Program

The New Hampshire Beach Inspection Program monitors over 200 public beaches each summer to ensure safe swimming for beach goers. Bacterial contaminants from humans and wildlife can cause serious illness when levels are high. NHDES posts beach advisories when sample analyses result in bacteria levels above the state criteria, indicating the possible presence of disease-causing organisms, or a toxic cyanobacteria scum. These advisories are recommendations to the public to avoid water contact and activities at the beach until further analyses reveal safe conditions.



Silver Lake State Park, Hollis, NH – credit: Department of Natural and Cultural Resources

While routine inspections are performed, Beach Inspection Program staff are also making visual observations on the color of the water and collecting samples when there are apparent cyanobacteria blooms occurring at an inland waterbody. Cyanobacteria (formerly known as blue-green algae) form surface scums, and may appear blue-green, green-yellow, red, purple or even white at times. These surface scums can easily be confused with pollen. The blooms are often elusive, seemingly coming and going, dispersing where the currents and wind may take them. The surface scums form when cyanobacteria rise to the surface, getting caught in the surface tension and accumulating along shorelines and beaches. Though they are not truly algae, cyano-

bacteria use photosynthesis to facilitate their growth. Warm and stagnant conditions help them to proliferate, but these organisms can survive a wide range of environmental conditions. There are numerous types of cyanobacteria and they are ubiquitous in nature.

Many of the cyanobacteria contain a range of toxic properties that may be unsafe for public health in high concentrations. It is often found that when a bloom is visible, the concentrations are elevated and the larger the bloom is, the more likely there are cyanotoxins present. Cyanotoxins range from targeting dermal, neural, nervous system, liver and digestive system structures. Due to the extensive list of potential cyanotoxins and the complexity of the secondary metabolite production by the cyanobacteria, many monitoring strategies hone in on the concentration of a bloom.

The Beach Inspection Program is expanding and improving methods to learn more about the cyanobacteria blooms occurring in New Hampshire. Bloom samples that come into the lab will be identified and enumerated for cyanobacteria. Samples will be further tested for a common cyanotoxin, known as microcystins, which are responsible for affecting the liver and digestive systems of animals and humans. The program is also trialing the use of field screening devices to

predict the concentrations of blooms. Handheld fluorometers, equipped to measure chlorophyll and phycocyanin (pigments associated with freshwater cyanobacteria), may be useful in quickly determining when a bloom is highly concentrated. An ongoing effort with USEPA Region 1 and the New England states highlights this technology. Please visit [www.cyanos.org](http://www.cyanos.org) to learn more about the Cyanobacteria Monitoring Collaborative with EPA.

It is important to recognize cyanobacteria blooms. Several calls are made each year related to cyanobacteria bloom events. New Hampshire citizens are encouraged to call the NHDES Beach Inspection Program when a bloom has been spotted: (603) 848-8094. Staff ask that you take a photo, *Cyano, cont. page 5*

# Celebrate Air Quality Awareness Week with clean air for New Hampshire

Keeping our air clean and meeting US EPA's health-based air quality standards are always priorities for NHDES. Looking back over this past winter, there is good news! There were no exceedances of particle pollution this past winter. In fact, there has not been an exceedance of the particle pollution standard since 2013. This is great news for New Hampshire residents and visitors.

Particle pollution is typically considered a wintertime air pollutant because it comes from the combustion of fuels. In winter, many New Hampshire residents burn wood to heat their homes. Ongoing air quality monitoring and scientific studies have demonstrated that areas relying on wood stoves for winter heating, like New Hampshire, can be prone to an increase in particle pollution. Valley communities have seen higher levels of particle pollution during winter temperature inversions. Temperature inversions occur on calm, cold nights when warm air rises and traps cold air, and any associated pollutants, in the valley. Studies have found that

particle pollution in New Hampshire is mainly attributed to wood burning. NHDES has worked with valley communities to educate wood stove users about proper wood storage and burning habits, and has also supported wood stove change-out programs. Wood stoves built before 1988 are a lot less efficient and put out more particle pollution than modern EPA-certified wood stoves.

Meteorology has also played a big part in partial pollution reduction. For the past few winters, conditions that set up temperature inversions have not been seen. So, whether it is meteorology or the work done to change out older wood stoves and educate the public, there has been consistent improvement in New Hampshire's wintertime air quality. As Air Quality Awareness Week, April 30–May 4, 2018, approaches, New Hampshire residents can look back over this past winter and take a deep breath of satisfaction, knowing the air quality is very good! ■

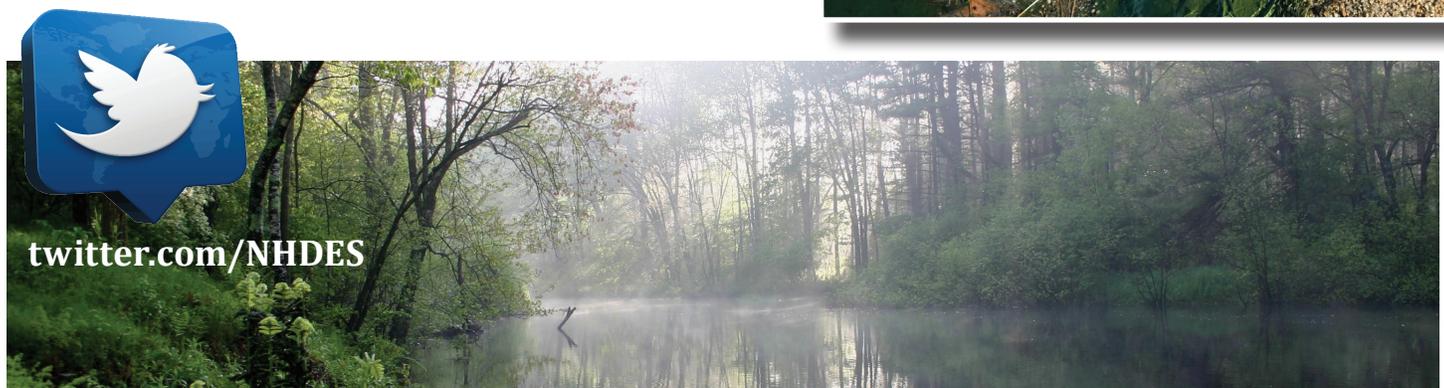
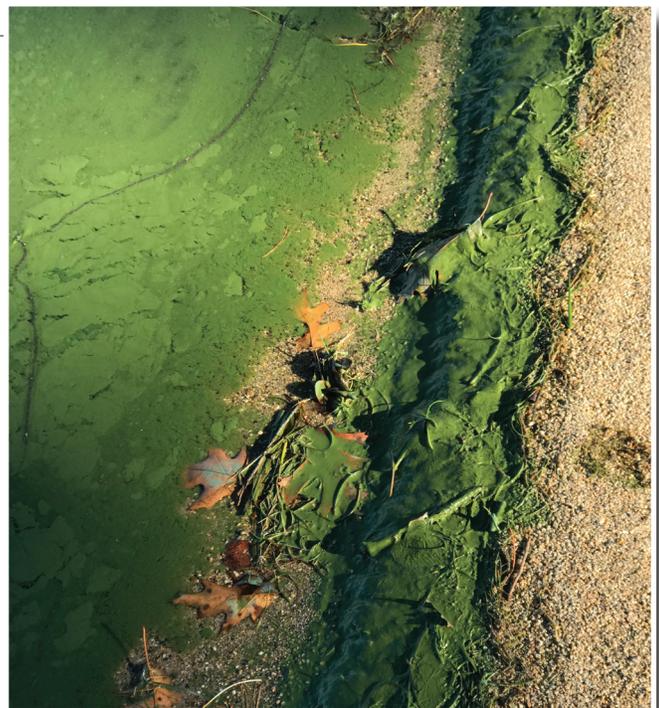
## Cyano continued from page 4

noting the specific location of the suspicious bloom and send it by email to [beaches@des.nh.gov](mailto:beaches@des.nh.gov). Staff will coordinate sample collection and inform the public of findings immediately.

To learn more about the Beach Inspection Program and stay current on beach advisories and lake warnings, please see the following:

- New Hampshire Beach Inspection Program: <https://www.des.nh.gov/organization/divisions/water/wmb/beaches/index.htm>.
- Current Beach Advisories and Lake Warnings: [http://www4.des.state.nh.us/WaterShed\\_BeachMaps/WaterShed\\_Beach-Maps.aspx](http://www4.des.state.nh.us/WaterShed_BeachMaps/WaterShed_Beach-Maps.aspx).
- Follow us on Twitter: NHDES Beaches Advisories Twitter Feed @NHDES\_Beaches. ■

*Cyanobacteria surface bloom, Province Lake, Wakefield  
– credit: Acton Wakefield Watersheds Alliance*



# Green Your Fleet! 2018

The Granite State Clean Cities Coalition (GSCCC) proudly presents its 5<sup>th</sup> biennial Green Your Fleet! (GYF!) Workshop on Friday, June 1. GSCCC is once again partnering with the New Hampshire Motor Speedway in Loudon to bring this growing attraction back to their amazing location.

The success of GYF! has grown over the years. This free, one-day event is designed to help attendees take steps towards “greening” their fleets. The wildly successful 2016 GYF!, also held at the New Hampshire Motor Speedway, set records for attendance, number of vehicles exhibited and sponsorship fees collected. GSCCC attributes much of this success to the partnership with the Speedway and the allure of the racetrack.

With an electrifying agenda covering the latest in alternative fuels, advanced vehicles and technology trends, including Jamie Page Deaton, Managing Editor of *U.S. News & World Report’s* Best Cars rankings as Keynote Speaker, GYF! 2018 is set to be a record-breaker. New Hampshire is receiving



some Volkswagen Settlement funding and fleet managers will want to be at this event to hear more about what types of projects they can do.

You don’t want to miss this! For more information and FREE registration, visit: <https://www.granitestatecleancities.nh.gov/documents/gyf-registration-info.pdf>.

GSCCC is a public/private partnership with over 120 stakeholders statewide and is administered by NHDES. The primary goal of GSCCC is to reduce petroleum dependence in

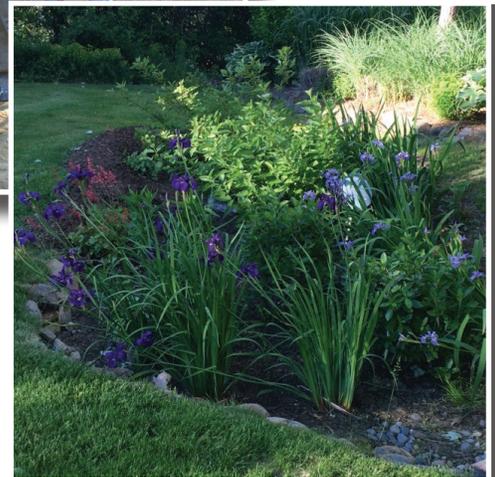
## SOAK Great Bay sustainability plan

The Soak Up the Rain Great Bay (SOAK Great Bay) Sustainability Plan is a new comprehensive tool for any group considering implementing a local Soak Up the Rain program in New Hampshire. Although this document was originally crafted as self-reflection for the Great Bay Stewards as they created the two-year SOAK Great Bay program, the key findings, outline of challenges, and recommendations are applicable to a wide audience considering a similar stormwater-related outreach effort. The Sustainability Plan showcases how the successful SOAK Great Bay program provided education about residential stormwater management and implemented 10 stormwater best management practices based on the New Hampshire Homeowner’s Guide to Stormwater Management.

View the full plan at <https://www4.des.state.nh.us/SoakNH/wp-content/uploads/2018/01/SOAK-Great-Bay-Sustainability-Plan.pdf>. Contact Lisa Loosigian at [lisa.loosigian@des.nh.gov](mailto:lisa.loosigian@des.nh.gov) or (603) 419-0322 for comments or questions. ■



*Left: SOAK crew with a Durham, NH homeowner in a freshly-dug rain garden pit. Below: the same rain garden one year later.*



# New Hampshire air quality report released

Concentrations of the most common air pollutants in New Hampshire are down significantly from 1990 levels. NHDES summarized these findings in the annual State of New Hampshire Air Quality report released last month. The comprehensive report notes the significant improvements in air quality, ongoing challenges, and how the state plans to maintain the progress made to date. Improvements have been noted for the most common air pollutants and pollution deposition (i.e., acid rain) as a result of reduced pollution emissions in, and upwind, of New Hampshire. This progress is great news, but it needs to be maintained and we still need to address the occasional periods of unhealthy air quality that still occur in the state, so we are not done yet.

In 2017, the largest air pollution source categories in New Hampshire included emissions from mobile sources (highway vehicles, off-road vehicles, and small engine devices such as lawnmowers, leaf blowers and snowmobiles); residential heating with wood; electric generation; industrial processes; and emissions from gasoline, solvents and coatings. Air pollution concentrations tend to be highest near an emission source and dissipate with increasing distance from the source, but in some cases wind patterns and chemical reactions among pollutants can cause higher pollution concentrations farther away from emission sources.

### Report highlights:

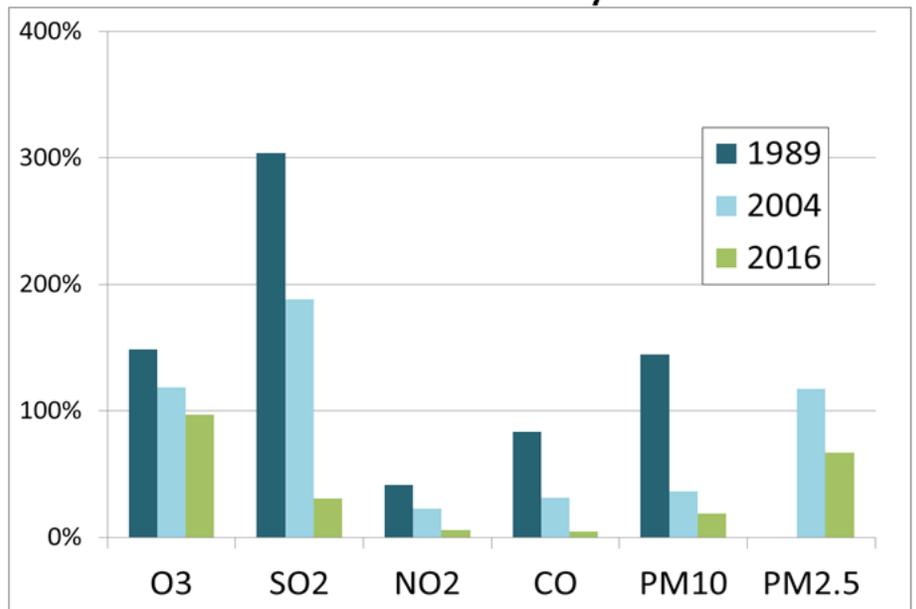
- Ambient (background) air concentrations of the most common air pollutants in New Hampshire, referred to as the air pollutants of primary concern, are down between 70% and 90% from 1990 levels.
- Despite lower air pollution levels, portions of the state still approach or exceed federal health standards for ozone and periodically approach those levels for winter fine particle pollution (wood smoke).
- New Hampshire is in compliance with all federal outdoor air pollution exposure standards.
- A recent modeling analysis estimates recent air pollution con-

centrations in New Hampshire caused over \$3 billion per year in health-related costs, mostly from fine particle pollution (including wood smoke). Although we meet federal health standards, there are remaining health impacts, especially for our most vulnerable populations.

- Deposition, including acid rain, mercury, and nitrogen has also improved significantly and environmental recovery is under way.
- Indicators of climate change have been observed and measured throughout New Hampshire, including warmer than average temperatures, increased precipitation, higher frequencies of severe weather, earlier “ice-out” on Lake Winnepesaukee, earlier maple sap flows and longer plant growing seasons.

Copies of the main report and an executive edition are available on the Reports page of the NHDES website (Full report: R-ARD-17-01 and executive edition: R-ARD-17-01-E). ■

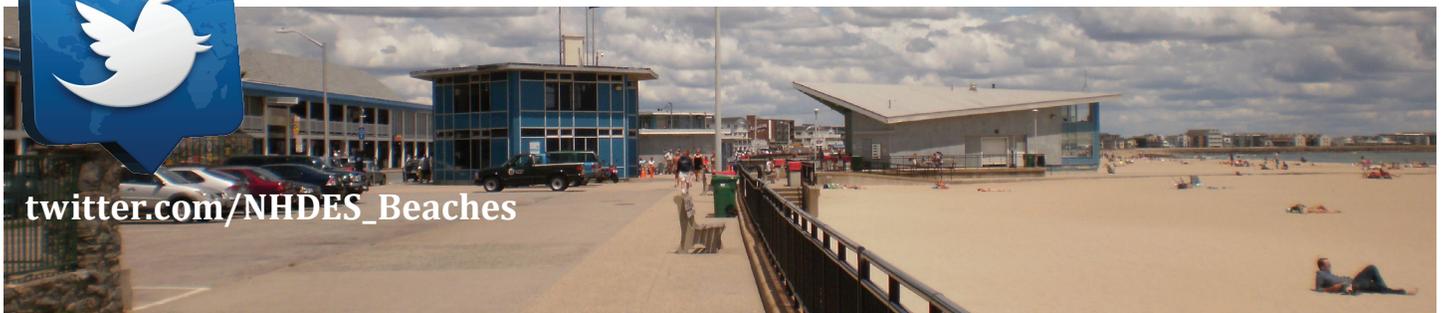
## New Hampshire Air Monitoring of Pollutants of Primary Concern



100% represents the federal health standard as of January 2018



[twitter.com/NHDES\\_Beaches](https://twitter.com/NHDES_Beaches)





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## Carroll Brown receives USCG Meritorious Public Service Award

On March 22, 2018, Carroll Brown Jr., a member of the NHDES Spill Response and Complaint Investigation Section, received the United States Coast Guard (USCG) Meritorious Public Service Award, bestowed upon Mr. Brown by Rear Admiral Steven D. Poulin, USCG. The Meritorious Public Service Award is the second highest USCG civilian award, given to recognize unusual courage in advancing a Coast Guard mission, substantial contribution to the USCG that produced tangible results, and/or specific individual accomplishments that provide unique benefits to the public.

Mr. Brown received the award in recognition of the lasting partnership he forged with the USCG during his 28 years of service to NHDES. In the award text, the USCG stated “The professionalism and cooperation with the Coast Guard exhibited throughout [Mr. Brown’s] career hallmarks the attitude of public service which is a model for all to follow. Mr. Brown has been tireless in his effort to plan for and make sure the region is equipped for a release of oil to the coastal waters of New Hampshire and Southern Maine.”

The USCG praise for Mr. Brown was based on his leadership as the New Hampshire chair for the Maine/New Hampshire Area Committee and for leading the formation of the Portsmouth Oil Spill Response Workgroup to improve response capabilities, maximize preparedness and emphasize safe work practices for oil spill response in the New Hampshire

and Southern Maine coastal areas. Mr. Brown served as the first Chairman of this active workgroup including oversight of the 5+ multi-agency sub-committees working under his leadership. To further the mission, Mr. Brown planned more than 20 Piscataqua River Oil Spill Exercises, leading to an unprecedented level of expertise and cooperation in multi-agency response along the coastline of both Maine and New Hampshire. This work was especially important for the preservation of the environmentally crucial Great Bay Estuary, one of the largest salt-water marshes on the East Coast, and home to numerous protected species including bald eagles and sea turtles.

This award was bestowed upon Mr. Brown just prior to his retirement from state service on March 30, 2018. ■



*Carroll Brown (left) with  
Rear Admiral Steven D. Poulin, USCG.*