

## COMMISSIONER'S COLUMN

### Focus on infrastructure: the case of the road culvert

When most of us think about “infrastructure,” what comes to mind are highways, bridges, power lines or water towers. But, in driving around the state, you have no doubt crossed over a very important piece of infrastructure, probably without even knowing it – the road culvert. Lying out-of-sight under roads, culverts are critical in passing small rivers and streams under the road from one side to the other. There are at least 17,000 such culverts under municipal and state roads. A fatal flood in Alstead in 2005 highlighted the fact that failed culverts likely pose increasing flood risks when a culvert that became plugged with material failed and sent a literal wall of water downstream. The risks come from not only becoming plugged, but also by their aging and condition. Since 2009, NHDES has partnered with three other state agencies to assess culverts statewide and to develop priorities for replacement. A key goal is to upgrade old culverts that are too small by today’s standards with larger culverts that will handle and withstand floods, transport river material, and that are fish-friendly, enhancing passage for fish and other aquatic animals within watersheds. The culvert collapse in Bow in October serves to remind us that there are many culverts deserving of attention and in need of replacement.

The New Hampshire Geological Survey (NHGS) at NHDES has served as the technical lead for this effort in the Granite State since it began in earnest in

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*An under-sized culvert that became blocked during the October 2017 flooding. It caused water to leave the channel and wash over the road farther downstream.*

### A good summer for air quality

There were only five days in summer 2017 when the air quality went over the regulatory threshold, compared to the usual eight – so this was a good year. Ozone, the principle ingredient of summertime smog, is typically a warm-weather air pollutant that forms when nitrogen oxides and volatile organic compounds mix in the presence of strong sunlight and warm weather. Once formed at ground level, ozone can aggravate respiratory conditions such as allergies, asthma and emphysema. It can have pronounced effects to all exposed, even healthy individuals. The months of March through September are considered “Ozone Season.”

The first two ozone exceedances in 2017 occurred on consecutive days on the summit of Mt. Washington in March. There was one additional exceedance at the summit of Mt. Washington in April. The final ozone exceedance for the season occurred in June; none in July, August or September. The Mt. Washington exceedances were of particular interest because they were a result of stratospheric ozone folding down into the lower atmosphere in what is called a stratospheric intrusion. While there is ground-level ozone at lower elevations, ozone is also a critical component of the chemical and thermal balance of the stratosphere (the layer of Earth’s atmosphere, higher than the troposphere where we live). Stratospheric ozone is commonly referred to as the “ozone layer,” which protects us from ultraviolet rays from the Sun. While stratospheric ozone usually stays well above us, sometimes atmo-

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

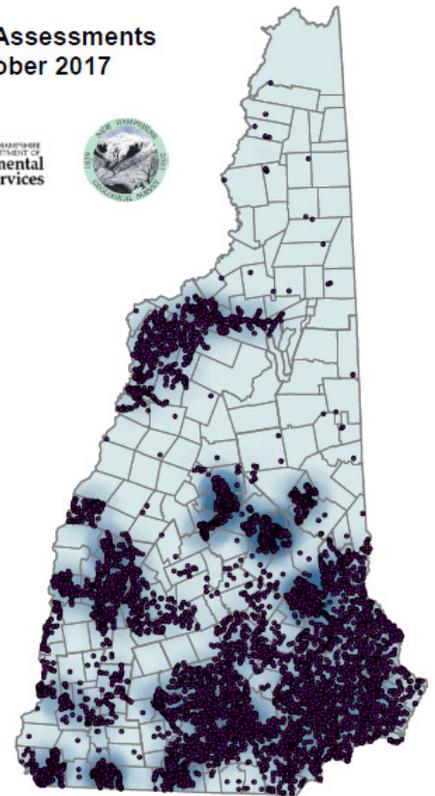
2009, and it ensures that all collected data placed into the statewide database is of the highest quality. Before 2014, about 1,100 culverts had been assessed. Since 2014, the number of assessments has grown to about 6,000, thanks to the combined efforts of NHGS, other programs in NHDES (Wetlands Bureau, Coastal Program), New Hampshire Department of Transportation (NHDOT), New Hampshire Fish & Game Department, and the New Hampshire Department of Safety – Division of Homeland Security and Emergency Management. NHDOT has provided critical support that has made the assessments very efficient, through use of real-time, all-electronic data collection. Today, NHDES has been working in partnership with all of these agencies, in addition to the Clean Water State Revolving Fund program and the regional planning commissions, to leverage the assessment data into funding for towns to upgrade those culverts identified as having the greatest risks.

Town officials, emergency management directors, road agents and conservation commission members are becoming more aware

of the dataset. One concern expressed by towns has been the initial upfront higher replacement cost of a culvert sized to modern standards, rather than one of the same size. NHDES recognizes this concern, not only for culverts, but from the larger perspective of aging infrastructure. However, NHDES believes that larger culverts will have a much greater likelihood of surviving the next flood while improving passage for fish and other wildlife. Mechanisms to address funding concerns are continually being addressed by the partners involved in this project.

As a road agent, emergency management director, or citizen, you may be wondering how to access the collected data. NHGS, with the UNH Technology Transfer Center, is presently working on an updated, user-friendly interface that is expected to go “live” in the near future. Once available, a link will be placed on NHGS’ Flood and Geologic Hazards webpage. Go to [www.des.nh.gov](http://www.des.nh.gov) and search the “A to Z” list for Flood and Geologic Hazards.

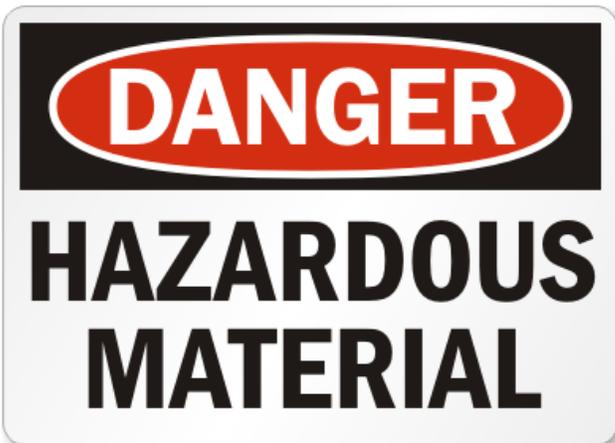
## Culvert Assessments October 2017



For more information, please contact Shane Csiki at [shane.csiki@des.nh.gov](mailto:shane.csiki@des.nh.gov) or (603) 271-2876. Working in partnership, we can continue to address these silent sentries of infrastructure that are deserving of our attention while enhancing public safety and our environment. ■

## Recently adopted hazardous waste rules

On August 14, 2017, NHDES readopted the NH Hazardous Waste Rules in Env-Hw 100 – 1100 and adopted a new chapter Env-Hw 1200. In addition to revising the rules for better clarity, NHDES adopted the federal Land Disposal Restrictions, added numerous federal hazardous waste listings, and updated the edition dates of federal regulations cited in the rules. To find all of the updates, go to [www.des.nh.gov](http://www.des.nh.gov), click on the A-Z List and look for “Recently Adopted Rules.” A document summarizing all of the changes has been created to provide a brief overview of those changes. This document can be found on the Hazardous Waste Management Bureau’s main web page: <https://www.des.nh.gov/organization/divisions/waste/hwcb/index.htm>. If you have specific questions about the adoption of the rules or any other questions concerning the hazardous waste rules, call 271-2942 or (866) HAZWAST. ■



## ENVIRONMENTAL NEWS

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spheric conditions will create folds that bring ozone down into the lower atmosphere, causing a stratospheric intrusion.

The fourth exceedance day occurred in April in both Londonderry and at the summit of Pack Monadnock in Peterborough. Pollution transport into New Hampshire contributed to the final exceedance of the 2017 ozone season at Odiorne State Park in June.

At times it seemed a little strange to not have corresponding air quality action days issued by NHDES when heat advisories were issued by the National Weather Service. But recent events have taught us that hot weather can occur in New Hampshire without accompanying air pollution. While heat acts to speed the chemical reaction that creates ground level ozone, the ingredients needed to form ozone must already be in the air when things heat up.

It has been a longtime goal of NHDES to reduce pollution emissions so that we always meet air quality health standards. Ozone-forming air pollution emissions were down in 2017, but only a portion of that decrease was regulated and locked-in for the future, in part because of the advancement of natural gas as a fuel. Throughout the Eastern United States and Canada, industry and electrical companies have found it cheaper to burn natural gas rather than oil or coal. No one knows for sure how long this will remain true, but in 2017, we benefited. ■



## Planting dune grass for coastal resilience

On October 5, 2017, the NH Coastal Adaptation Workgroup hosted a workshop where residents from coastal communities gathered dune grass for replanting from the Common Garden at Hampton Beach State Park. At the Common Garden, native dune grasses have been planted for use in dune restoration efforts on public and private property.

Over 20 participants, including beachfront property owners and municipal officials from Seabrook, Hampton,

and Rye, attended the workshop to learn about how dunes protect homes and infrastructure from storm surges. When hurricanes or nor'easters occur off the East Coast, large waves can batter our shores and cause damage to homes and other infrastructure. Healthy dunes in front of these homes can provide critical and sustained storm protection, eroding naturally with the storms and then building back up in calmer periods. Participants learned about the Common Garden and were able to harvest plants to take home and

replant on their properties. Residents shared stories of how they appreciate the dunes and how the recent storms and other community activities have been eroding New Hampshire's dunes. When replanted, the dune grasses will collect sand and allow the dunes to rebuild before the next storm.

The Common Garden is part of a project run by NH Sea Grant and UNH Cooperative Extension, in partnership with the Department of Natural and Cultural Resources. The project is funded in part by NOAA's Office for Coastal Management, in conjunction with the NHDES Coastal Program. For more information about the Common Garden and related dune restoration efforts, visit <https://seagrant.unh.edu/DuneRestoration> and <http://www.nhcaaw.org/>. ■



## NHDES celebrates 30 years

2017 marks the 30<sup>th</sup> anniversary of NHDES. Much has changed in the last 30 years to help sustain a high quality of life for all citizens by protecting and restoring public health and our beloved environment. While the work in this effort is not complete, NHDES wanted to take a moment to recognize 30 accomplishments/achievements that have impacted our environment and public health for the better over the past 30 years. Each of the six issues of our Environmental News newsletter will focus on five of these achievements, under a specific theme for each issue. For this issue, the following five achievements for “Our Future” will be the focus.

### Soak Up The Rain

*Why it matters:* People are often shocked to learn that over 90% of the water pollution problems in New Hampshire are caused by pollutants carried in stormwater runoff (water from rain or melting snow that does not soak into the ground) from the roads we travel, the buildings and parking lots we visit, and even the homes in which we live. While stormwater runoff from roads and large developments is often regulated, runoff from single lots is not. Soak Up the Rain NH (SOAKNH) was created as a tool to inform homeowners about the positive effects of reducing stormwater runoff from their properties. While one homeowner’s actions may not make a huge difference, the cumulative effect of neighbors reducing runoff can certainly protect or restore the health of the lake, river, estuary or other water body in their community and beyond.

*Progress in 30 years:* SOAKNH was created in 2013 and has its roots in the *New Hampshire Homeowner’s Guide to Stormwater Management: Do-It-Yourself Stormwater Solutions for Your Home*. The guide was first published in 2011 to promote Stormwater Solutions such as rain gardens, dry wells and vegetated buffers, which capture or slow down stormwater and allow it to soak into the ground. Homeowners and watershed associations became interested in implementing these practices on a wider basis to protect their waterbodies. SOAKNH was created as a tool to answer that interest

and comprises a website ([soaknh.org](http://soaknh.org)), [Facebook page](#), presentations, trainings to interested groups and demonstration installations. It has grown to include almost 15 partners and has installed or facilitated almost 30 stormwater solutions. In 2017, a second edition



of the guide was released, incorporating the SOAKNH logo, updated stormwater solution instructions, and all the latest information about the effects of runoff and why it matters. As we’ve seen with recycling over the past 30 years, SOAKNH aims to make soaking up the rain an everyday aspect of homeownership over the next 30.

### New Hampshire Envirothon

*Why it matters:* The New Hampshire Envirothon is a competition designed to challenge students in crafting creative solutions to contemporary environmental issues. The program emphasizes the overall goal of preparing and educating the environmental leaders and stewards of the future. By participating in the New Hampshire Envirothon, the students’ involvement with examining real world problems that affect their local communities helps to lay the groundwork for preparing active and informed adults for the future.



*Progress in 30 years:* In 1990, a group of New Hampshire professionals from the environmental and natural resource management fields got together and decided to run the NH Envirothon program. In the fall of 1991, the New Hampshire Association of Conservation Districts assumed sponsorship of the program, based on a model created by the Pennsylvania Conservation Districts in 1979 and the subsequent development of a national Envirothon program. As a result, the first New Hampshire Envirothon competition was held in 1992 at Fox Park in Plymouth. Since that time, it has provided upwards of 3,000 middle and high school students with exciting, practical challenges outside of the classroom. This experience has inspired these teenagers to make responsible environmental and natural resource decisions and motivated them to pursue careers in environmental studies, environmental law, natural sciences and natural resource management. The competition has served to create the environmental stewards of our future. <http://nhenvirothon.org/>

### Modernizing the Business of Environmental Protection

*Why it matters:* If you wonder why you can’t do business with government in the same manner that you do business

online when shopping, banking, etc., you should know you aren't alone. In fact, there is a group of environmental officials from across the country working hard to enable you to do so when interacting with environmental agencies, and NHDES has been in the forefront of this effort. While their initial scope was fairly narrow, focusing on electronic reporting, it quickly became apparent to the group that there was an opportunity – and a pressing need – to look more broadly at how the “environmental protection enterprise” can move into the 21st Century.

*Progress in 30 years:* While the work group of State, Tribal and federal environmental officials from across the country was established fairly recently, in 2013, the problems it set out to address were nothing new. The “red tape” and antiquated system of taking in permit applications made it a slog for anyone to muddle through. The frustrations were understandable when someone, for example, would have to submit five different permit applications to five separate programs in the department for one project, and then try to navigate between them all. That's where the E-Enterprise Leadership Council comes in. The tag line for this effort is “Modernizing the Business of Environmental Protection.” This is being accomplished by streamlining programs, taking advantage of modern technology as appropriate and working in a truly collaborative fashion, and NHDES (and New Hampshire Department of Information Technology) staff are still actively engaged and helping to lead the way. An E-Enterprise Portal has been established that will be a single platform for e-business with the regulated community, sharing environmental information with the public and enabling shared app development among the co-regulators. Other projects include an effort to combine five different reporting requirements for facilities with air emissions into a single, streamlined reporting system – an identity “bridge” that would allow anyone doing business across States, Tribes and EPA to register once and then move seamlessly from one to another; and transforming the hazardous waste manifest system into something similar to what package delivery drivers use. E-Enterprise will not modernize the business of environmental protection overnight but, over time, will fundamentally change how you interact with environmental regulators and how they interact with each other.



## Project WET – Water Education for Teachers

*Why it matters:* Where there is water, there is life. It is all around us but only 2.5% of the world's water is drinkable freshwater. Most of this precious 2.5% is inaccessible to us, frozen in ice caps and glaciers – we can only get to roughly 0.6% of it. Are you thirsty yet? Why didn't we run out of water a long time ago? –because water is a renewable resource. It is cleaned as it moves through the environment in a process called the hydrologic cycle. Sadly, our waters are being polluted at an ever-increasing rate. Complex chemicals, in very small amounts, have made large amounts of water undrinkable. Some pollutants are prohibitively expensive to clean up while others simply cannot be removed. This further reduces the small amount we have to drink.

This series of articles celebrates 30 achievements by NHDES in the last 30 years – it details the efforts of dedicated staff to clean up pollution and protect New Hampshire's environment. What is striking is that, without exception, every issue in the series to date is inextricably and intimately connected to water. A few that may not have as obvious a connection include unlined landfills, air toxins and ozone, and solid waste operator training. Our actions make a difference and because of that, we need more people who understand water's essential role and how to protect it.

*Progress in 30 years:* Teachers to the rescue. In 1997, NHDES joined Project WET, an internationally-recognized leader in water education. Since then, NHDES has trained over 2,000 New Hampshire teachers and environmental educators in

water science education. Considering the average number of students in a classroom, those 2,000 teachers have, throughout the years, been force multipliers of impressive proportions. Many thousands of New Hampshire's students have benefitted from this essential education.

Today, New Hampshire Project WET is a member of New Hampshire Education and Environmental Team (NHEET). NHEET facilitators have developed a comprehensive curriculum and offer hands-on training to K-8

educators. Teachers entering this program admit to being intimidated by science and to having taught very little or no science. The three-year-long NHEET program is unique in the United States, providing inter-disciplinary professional teacher development in water, wildlife habitat, soil, weather, atmosphere and climate. As a result of this training, these teachers now understand how issues like unlined landfills, air toxins, ozone and solid waste operator training can

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### 30 for 30 *continued from page 5*

impact water health. In the end, these teachers are “pumped” – they cannot wait to share what they have learned with their colleagues and start teaching science. The intimidation is a forgotten memory, replaced by enthusiasm to teach about the importance water plays in our lives, today and in the future.

### Resilience in New Hampshire

*Why it matters:* Every New Hampshire resident lives in a county that has been affected by at least one federally declared weather disaster since 2010. Not only are these disasters inconvenient, they are very expensive from which to recover. The National Weather Service declared that the winter of 2015/2016 was the warmest winter recorded in New Hampshire history. Last year, we experienced a long and serious drought.

This took its toll on our surface waters and groundwater, which are our sources of drinking water. Sea level is rising, causing sunny-day flooding on the Seacoast. These gradual trends and extreme weather events, which indicate our increasingly changing climate, affect our economy, our tourism, our infrastructure, and our health and safety. But our ability to bounce back and learn from these trends and events is what makes us resilient.

*Progress in 30 Years:* In 1987, when NHDES was first formed, scientists were discussing the accumulation of greenhouse gases in the atmosphere causing the climate to warm and cause potentially significant changes to sea levels. They weren't sure about the magnitude or timing of these changes, but they warned that planners should begin to think about adapting, so we could be resilient to these changes. Much has happened since 1987, and we know a lot more than we did then. Today, more than 99% of all climate scientists agree that climate change is real, is already occurring, and is caused by human activity. This level of consensus is greater than the percentage of physicians, cardiovascular scientists, and public health experts who agree that cigarette smoking causes lung cancer. Here in New Hamp-



*2014 King tide coastal flooding. Image credit Maren Bhagat.*

shire we published our State's Climate Action Plan in 2009; bringing people from across the state together to be a part of its creation and implementation. NHDES contributes to the regular updates of the State's Multi Hazard Mitigation Plan. State and local decision makers agree that we need to make our communities and infrastructure more resilient to the increases in flooding and winter storms. The NH Coastal Risk and Hazards Commission, established in 2013, published a vulnerability assessment alongside 35 recommendations for action that received unanimous bi-partisan support. NHDES works with our sister state agencies to increase awareness of the need to be prepared for storms and to design more resilient transportation projects. We also work directly with communities to help build resilience into their infrastructure projects (including culvert replacements), to protect buffers and wetlands because they help to absorb flood waters, and to incorporate adaptation priorities into their Master Plans. We have made many changes over the past 30 years that give us confidence that we can help New Hampshire stay resourceful, ready, and resilient in the face of the changes we know are coming. ■



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



## Drive Electric, New Hampshire

On September 9, 2017, a National Drive Electric Week celebration was held in Concord as part of a nationwide effort to increase awareness of the widespread availability and benefits of electric and plug-in hybrid-electric vehicles (EV and PHEV). Dozens of attendees were able to see multiple EV/PHEV models and talk with vehicle owners to learn more about them. These modern vehicles offer a superior driving experience, cost less per mile to operate and have far lower emissions than conventional gasoline or diesel vehicles, even when considering the emissions from electric power plants used to charge their batteries. EVs and PHEVs can be charged at home overnight or at one of the approximately 55 publicly-available charging stations around the state with universal (i.e., not exclusive to Tesla®) connectors. Five of these sites have “fast chargers” that can charge most EVs to about 80% of their full range in 20 to 30 minutes.

New Hampshire is seeing more sales of EVs each year and many dealerships in the state now sell them. As ownership of EVs and PHEVs increases in the Northeast, New Hampshire will need more charging stations to support residents who buy these cleaner cars and to make sure that out-of-state visitors can vacation in New Hampshire without getting “charge anxiety.” Massachusetts alone intends to have 300,000 EVs on the road by 2025!

Electric vehicle and battery technology has matured rapidly. Many car companies are now offering affordable models with electric ranges greater than 200 miles and many more



models will be coming to the market within the next several years. With a typical New Hampshire commute of about 25 miles each way, a lot of New Hampshire residents can now consider owning an EV. For those who need more range, PHEVs offer a great alternative. PHEVs combine a regular car engine with an electric motor and a rechargeable battery. The battery is recharged just like an EV, but when the juice runs out it operates like a typical hybrid-electric car.

The Concord National Drive Electric Week event was one of four held in New Hampshire between September 9 and 17. A total of 276 events were held nationally. The Concord event was organized and hosted by NHDES, the Granite State Clean Cities Coalition, the NH Sierra Club and the NH Automobile Dealers Association. ■

## King tide photo contest

Save the Date! The New Hampshire Coastal Adaptation Workgroup (CAW) is excited to announce the return of its annual King Tide Photo Contest on November 5-7, 2017. Photographing extreme high tides is an effective way to help coastal communities identify areas prone to flooding, visualize potential impacts of sea-level rise and start planning for the future. To view official contest rules and donated prizes, visit: <http://www.nhcaw.org/kingtidenh2017>. ■





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## Employee of the Year recognition art



NHDES is pleased to announce a new wall installation in the west wing of the first floor: The Employee of the Year (EOTY) Recognition Tree. This stained-glass collage in the image of a tree was created by Advantage Signs in Concord and installed on the wall in October. Past EOTY recipients' names and the year they were honored are applied to the glass in vinyl lettering. Each year, we will add the name of a new EOTY to another piece of glass.

As part of the internal NHDES Rewards & Recognition program, nominations for the Employee of the Year award are submitted by NHDES staff in order to highlight the outstanding work performed by fellow employees throughout the year. Recipients

of this award are honored for their innovation, initiative, leadership, cooperation, efficiency and excellent customer service. ■

