

Preparing for a Changing Climate: Resources for Municipalities

By Pete Walker

When turning on the news, it's hard to miss the seemingly near-daily stream of warnings and images related to extreme weather events resulting from a changing climate. The messages often appear bleak, but New Hampshire municipalities can take action now to prepare us for the future.

The Impact on Municipal Infrastructure

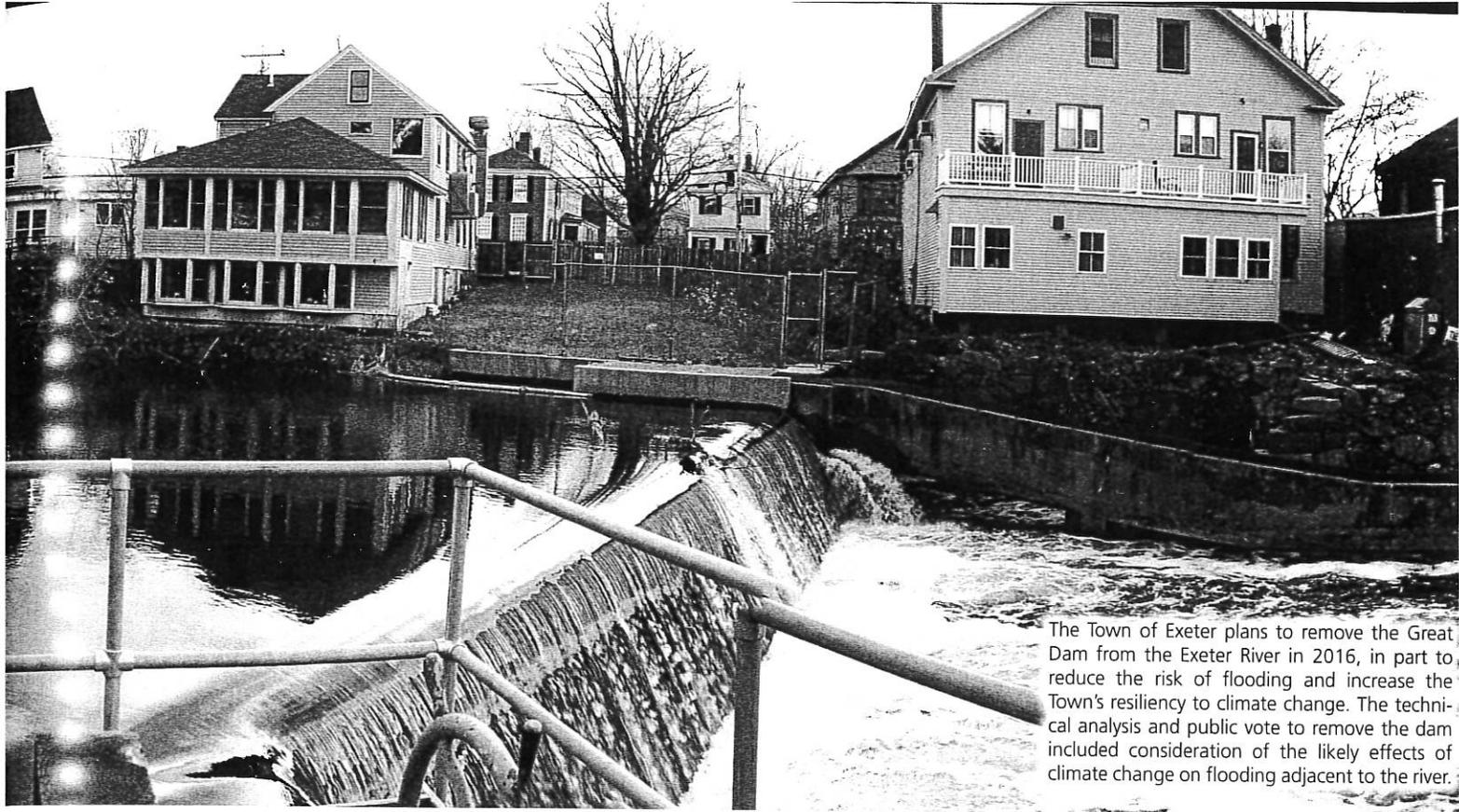
According to numerous academic and government studies, New Hampshire can expect to feel impacts related to the changing climate. Perhaps the most obviously vulnerable communities are those along the coast. Here, climate change is already resulting in increased flooding from intense precipitation events, coastal storm surges, and sea-level rise. Coastal communities are not the only ones who will be impacted, though: Inland areas will also experience changes, most notably increased precipitation and more extreme precipitation events. In fact, climate data already show an increase in the frequency and magnitude of significant flood events throughout the United States, including New England. Interestingly enough, the National Oceanic and Atmospheric Administration (NOAA) cites several studies that find this increase in flooding has occurred not as a slow progression over many years or decades, but rather as a step-change that took place around the year 1970. Meanwhile, temperature increases will impact everyone across the state, raising the likelihood of heat waves and more frequent extreme heat events that have serious implications for public health, natural resources, and industries like agriculture and forestry.

What does this mean for our towns and cities? For one thing, thousands of parcels of land across the state—including municipally-owned, residential, and private properties—could be at moderate to high risk of flooding over the long term, potentially impacting property values and tax base. Moreover, the infrastructure that we rely so heavily upon for economic, recreational, and daily activities is left at risk. For example, increased damage from extreme water and heat can increase costs for staff and supplies to maintain or replace roadways, culverts, bridges, railways, harbors, and airport runways. Similarly, strong storm events may impact our access to essential transportation infrastructure—potentially for an extended period of time, depending on severity. For New Hampshire, where tourism, fishing, and agricultural-related activities contribute greatly to the local economy, these types of infrastructure vulnerabilities may translate to further lost revenue.

The list of potential impacts to municipal infrastructure continues. For instance, water events may stress dams and wastewater treatment facilities, also requiring more effort and funds. Extreme changes in temperature may result in higher costs for heating and cooling, placing further burden on our energy resources. Additionally, communities may need to invest more in emergency preparedness activities, including potential evacuation planning. By no means is this list of possible impacts exhaustive, either—not to mention exclusive of the many adverse ecological impacts that could be felt.

Planning and Adaptation Strategies

Fortunately for New Hampshire municipalities, there are



The Town of Exeter plans to remove the Great Dam from the Exeter River in 2016, in part to reduce the risk of flooding and increase the Town's resiliency to climate change. The technical analysis and public vote to remove the dam included consideration of the likely effects of climate change on flooding adjacent to the river.

actions that can be taken to strengthen our infrastructure and increase our resiliency to climate change impacts. Climate adaptation involves changing the management of human and ecological infrastructure to help offset adverse effects. To be most effective, adaptation planning should be guided by a collaborative process that evaluates community resources to identify vulnerabilities and opportunities, then incorporates adaptation recommendations into community plans (e.g., master plans, hazard mitigation plans, capital improvement plans), land use regulations, and future infrastructure projects.

Examples of first-step actions that communities can take include mapping areas impacted by rising sea levels and updating community plans. Similarly, communities can account for increased storm intensity in engineering design flows that guide infrastructure such as culverts and bridges. Communities have even planned for climate change when considering management of dam infrastructure, choosing to remove dams that no longer serve an important function in an effort to lessen the effects of increased flooding; such action has the added benefit of improving the ecological resiliency of the river system. Adaptation strategies can also involve the restoration of wetland, floodplain, and stream ecosystems, which helps to buffer the effects of increased precipitation and wave energy.

Over the last decade, the need for communities to take these types of actions to address the numerous potential impacts of climate change has been picking up steam. Critical to the effort was an executive order issued by Governor Lynch in December 2007. The order established a Climate Change

Policy Task Force and charged the Task Force with developing a Climate Action Plan for the State of New Hampshire, which was issued on March 25, 2009. While the plan focused on actions needed to reduce greenhouse gas emissions in an attempt to mitigate the magnitude of the predicted change, there is growing recognition that communities should also plan to adapt to the effects of climate change. More recently, the New Hampshire Coastal Risk and Hazards Commission (NHCRHC) released a draft report, *Preparing New Hampshire for Projected Storm Surge, Sea-Level Rise, and Extreme Precipitation*, that summarizes our state's vulnerabilities to projected coastal flood hazards and puts forth recommendations to minimize risk and improve resilience. Public comment is being accepted on the draft report, which is available on the Commission's website (<http://nhcrhc.stormsmart.org/draft-for-comment/>), as well as at public libraries and town and city halls located in coastal zone municipalities.

Resources Available to Communities

By preparing for climate change early and taking appropriate actions now, communities can avoid significant costs—whether economic, social, or ecological. From technical assistance to grant funding opportunities, a number of resources are available to help New Hampshire municipalities plan for the future, save money, and protect valuable infrastructure.

Information and Technical Resources

- *US Climate Change Resiliency Tool Kit*. This resource provides scientific tools, information, and expertise to

help manage climate-related risks and opportunities, and to improve resilience to extreme events. The website includes technical guidance and has a compendium of information on federal and non-governmental funding opportunities that New Hampshire communities can investigate. Further information can be found here: <https://toolkit.climate.gov/>.

- *NH Department of Environmental Services (NHDES) Climate Adaptation Toolkit.* This toolkit provides a variety of adaptation tools and resources for assessing and planning for climate change impacts. The toolkit allows a community to choose the path to take, starting with where it currently is in assessing and planning. Further information can be found here: <http://des.nh.gov/organization/divisions/air/tsb/tps/climate/toolkit/learn.htm>.
- *NHCRHC.* Formed in 2013 by legislation, the NHCRHC has been charged with making recommendations on policies and actions needed to prepare coastal New Hampshire for projected rises in sea level and other natural hazards. The result of their study is now available in a draft report, *Preparing New Hampshire for Projected Storm Surge, Sea-Level Rise, and Extreme Precipitation*. Further information can be found here: <http://nhcrhc.stormsmart.org>.
- *The New Hampshire Coastal Adaptation Workgroup (NHCAW).* NHCAW is a collaboration of 22 organizations that seeks to help communities in New Hampshire's seacoast area prepare for the effects of extreme weather events and other effects

of long-term climate change. They also offer a range of helpful resources such as workshops, an annual NH Climate Summit, and direct technical assistance through collaborative projects. Further information can be found here: www.nhcaw.org.

- *NH Coastal Viewer.* This online mapping tool offers coastal resources, spatial data, hazards-related spatial data, and other spatial data sets within New Hampshire's 42 coastal watershed communities—all together in one place. The mapper is an easy-to-use resource to help visualize community resources for those involved in planning risk assessment or adaptation projects. Further information can be found here: <http://www.granit.unh.edu/nhcoastalviewer/>.
- *Climate Solutions New England (CSNE).* Founded by the University of New Hampshire Sustainability Institute, CSNE promotes energy self-reliance and weather resiliency as keys to a prosperity for New England communities. They host events, including presentations and workshops, to further this mission. Further information can be found here: <http://www.climatesolutionsne.org>.
- *Upper Valley Adaptation Workgroup (UVAW).* This workgroup seeks to help build weather-resilient communities in this region of New Hampshire and Vermont. The UVAW hosts workshops, and their website contains links to helpful resources. Further information can be found here: <http://uvaw.uvlsrpc.org>.

Funding Opportunities

- *National Oceanic and Atmospheric Administration Grants.*

NOAA has a variety of funding opportunities available for local communities, including grants for implementation of climate resiliency projects. Further information can be found at <https://coast.noaa.gov/resilience-grant/> and <http://www.noaa.gov/budget-grants-and-corporate-services>.

- *US Environmental Protection Agency (EPA) Smart Growth Grants.* The EPA's Office of Sustainable Communities occasionally offers grants to support activities that improve the quality of development and protect human health and the environment. Further information can be found here: <https://www.epa.gov/smartgrowth/epa-smart-growth-grants-and-other-funding>.
- *Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance.* FEMA offers a range of grants intended to protect life and property from future natural disasters. Examples include:
 - Hazard Mitigation Grant Program: Assists in implementing long-term hazard mitigation measures following a major disaster;
 - Pre-Disaster Mitigation: Provides funds for hazard mitigation planning and projects on an annual basis;
 - Flood Mitigation Assistance: Provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program on an annual basis

Further information can be found here: <http://www.fema.gov/hazard-mitigation-assistance>.

- *NH Aquatic Resource Mitigation*

Fund. The NHDES administers this program, which can be used to fund land protection and habitat restoration projects throughout the state. Grant funds are available annually and have been used to conduct community-based projects that increase climate resiliency. Further information can be found here: <http://des.nh.gov/organization/divisions/water/wetlands/wmpl/>.

- *NH Coastal Program Coastal Resilience Funding.* Two rounds of funding have been issued through this new grant program, and more funding may become available in the future. Funds from this program are intended to support communication, planning and design, and construction projects that address coastal hazards at the local level—including projects that reduce the risk of future

damage, as well as those that increase public understanding of vulnerabilities and opportunities to reduce risk. Further information can be found here: <http://des.nh.gov/organization/divisions/water/wmb/coastal/index.htm>.

Pete Walker is a principal with the environmental services group at VHB in Bedford, NH. He has also previously

worked at NHDES and has been actively involved in state-level environmental advisory committees for proposed policy and regulatory changes. Pete can be reached at: pwalker@vhb.com. Pete would like to thank the New Hampshire Coastal Program's Kevin Lucey and Kirsten Howard for assistance preparing and reviewing this article.

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