New Hampshire Flood Hazards Handbook

A Guide for Municipal Officials

The Flood Hazards Handbook was developed and released in 2019 by the New Hampshire Silver Jackets, a unified team of individuals from federal and state agencies. The Silver Jackets work collaboratively on the state's flood risk management priorities and provide technical expertise to help reduce flood risk in New Hampshire communities. For more information about the NH Silver Jackets team and their work, and to access a digital copy of this handbook, visit the [NH Silver Jackets website](#).

Cover photo: Marlboro Street at Laurel Street in Keene, October 2013
(Source: NH Homeland Security and Emergency Management)

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Introducing the New Hampshire Flood Hazards Handbook

Flooding continues to be the most common and costly type of disaster that happens in New Hampshire, and in the United States as a whole. The ***New Hampshire Flood Hazards Handbook*** has been developed to serve as a reference guide for municipal officials in the state to help them best prepare for, respond to, and recover from floods that affect their communities. This handbook is intended as a companion to a community's existing resources – i.e., staff, plans and preparations, regulations, and equipment which serve as the first line of defense in keeping people, property, and infrastructure safe when a flood happens.

Designed to be used both in "peace time" before a flood threat and also during and after a flood event, this handbook provides guidance, resources, and information about roles and responsibilities organized into situation-specific sections: **Before the Flood**, **During the Flood**, and **After the Flood (Short Term Recovery and Long Term Recovery Considerations)**. Also included as appendices are a customizable **Flood Response and Recovery Checklist** which can be used by community officials to identify and manage priority activities when a flood event does occur and an **Agency Contact List** to identify points of contact for more information about specific topics covered.

Prepare	Respond	Recover	Mitigate
			
Before the Flood	**During the Flood**	**After the Flood: Short Term Recovery Considerations**	**After the Flood: Long Term Recovery Considerations**

Photo/graphic credits: FEMA

Before the Flood

During the Flood

After the Flood: Short Term Recovery Considerations

After the Flood: Long Term Recovery Considerations

Additional Resources and Assistance

Before the Flood

Identifying Flood Risks
Using Data to be Flood Aware
Promoting Public Awareness and Outreach
Community Preparedness

I. Identifying Flood Risks

Knowing the flood hazards that affect your town or city is the first step in understanding how to reduce flood risk and respond to flood events. Some or all of these types of flooding may affect your community:

Riverine flooding happens when water overtops the banks of a river or its tributary streams. Riverine flooding is usually the result of heavy or long periods of rainfall and/or rapid snow melt.

Coastal flooding occurs along the Seacoast and nearby marshes, bays, and tidally-influenced rivers. It can result from storms, and include storm surge and the effects of large waves. Sea level rise is also a factor contributing to more frequent and severe coastal flooding.

Shallow flooding occurs in flat areas where a lack of stream capacity means water cannot drain away easily. Shallow flooding can result in water collecting in floodplains, low-lying urbanized areas, and other places with drainage problems.

King Tide Flooding, Seabrook, October 2016 (Source: Kellie Walsh)

A **flash flood** is a flood that happens within six hours or less of the start of heavy rainfall or another event such as a dam or levee failure, or the rapid release from an ice jam. Flash floods are largely unpredictable and their damage is not always confined to areas along rivers and streams.

Ice jams happen when ice anchors to stream beds and banks, or when ice chunks are carried along a river or stream, blocking the flow of water. This may cause flooding to low-lying areas upstream or, if the ice jam breaks up suddenly after water backs up behind it, flash flooding may happen downstream too.

Dam or levee failures/overtopping can cause a large amount of water to be suddenly released with a great potential to cause human casualties, economic loss, and environmental and property damage. Such failures may be caused by poor maintenance, inadequate design, or structural damage caused by a major flood.

You, as a local official, know best where the flooding 'hot spots' are in your community.
Make sure your community's hazard mitigation plan includes this information too. *(See page 20)*

I. Identifying Flood Risks

FEMA Floodplain Mapping

Most communities that participate in the National Flood Insurance Program (NFIP) have a Flood Insurance Rate Map (FIRM). These maps are developed by the Federal Emergency Management Agency (FEMA) and are used for different purposes:

- to identify areas vulnerable to flooding.
- to manage new development in Special Flood Hazard Areas (SFHAs) on the maps.
- to determine rates for flood insurance policies.
- to determine if a building is located in an SFHA. If so, flood insurance is required as a condition of a federally-backed loan (i.e., a mortgage) on the property.

The FEMA flood maps and SFHAs are a great starting point for locating flood prone areas within your community. Together with your knowledge of local flooding hot spots and choke points, the maps will help you be ready in the event of a flood.

What is the NFIP?

The NFIP is a federal program that communities can choose to join. The program's goal is to reduce the impact of flooding by 1) making available flood insurance to residents of participating communities and 2) requiring communities to adopt and enforce regulations to manage new development in high risk flood zones (i.e., SFHAs) responsibly.

219 communities in NH participate in the NFIP. Learn more about the program and the state's role through the NH Floodplain Management Program website.

FIRMs are available for certain communities that do not participate in the NFIP too. See page 4 for access information.

I. Identifying Flood Risks

What do the FEMA Flood Maps Show?

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs) show Special Flood Hazard Areas (SFHAs). SFHAs are areas that have a 1% chance of being flooded in any given year. Any flood zone beginning with the letters "A" or "V" is included in the SFHA. FIRMs also sometimes show the 0.2% annual chance flood which is labeled as Zone X or B on the FIRM. Floodways are also shown on the maps for certain rivers and streams. The floodway is the part of the SFHA along a river or stream where the deepest, fastest moving water flows during a flood.

In coastal areas, the effects of storm surge, waves, and erosion during a 1% annual chance storm are mapped. V zones are parts of the SFHA where waves 3 feet or higher can cause severe damage. Smaller waves can also cause significant damage in AE zones. Learn more in FEMA's *Introduction to Coastal Floodplain Mapping tutorial*.

How to View FEMA Flood Maps and Data

The FEMA Flood Map Service Center (MSC) provides free access to all FIRMs and Flood Insurance Study reports. FEMA's flood hazard data from digitally-produced maps are included in the National Flood Hazard Layer (NFHL). NFHL data is available for all NH communities except for those in Belknap County for which older format flood maps are available online through the FEMA MSC. The NFHL can be easily accessed using the NFHL Map Viewer which includes an address search function and allows users to turn on/off different data layers. The NFHL is also available in GIS formats, including shapefiles and web services. Communities having difficulty accessing their maps online may contact the NH Office of Strategic Initiatives for assistance (See Appendix B for contact information).

Understand the Limitations of FEMA Flood Maps:

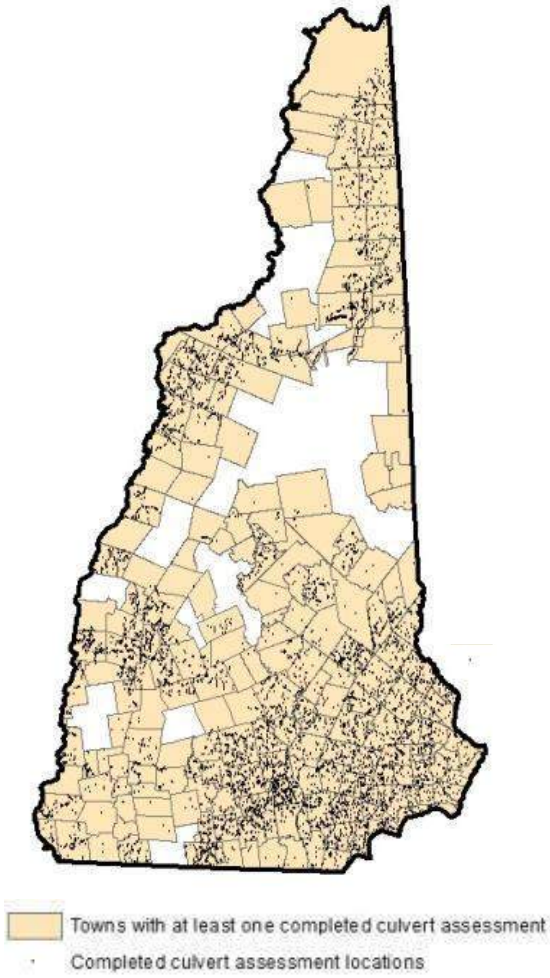
- ✓ *Floods do not follow lines on maps, not even the 1% annual chance (100-year) flood.*
- ✓ *Floods more severe than the 1% annual chance flood can and will happen.*
- ✓ *The maps are a snapshot in time and do not show future conditions. For example, new development can change / worsen flood hazards shown. Plus the future effects of climate change, such as sea level rise and changes in precipitation are not considered.*
- ✓ *Stormwater and local drainage issues are typically not shown on the maps.*

Stream Crossings

Any location where a road intersects a waterway requires a stream crossing (i.e., a culvert or a bridge) to convey the water under the road. The process of flood risk identification should include assessments of stream crossings to determine if any are undersized. Undersized crossings cannot handle large storm flows and can cause flooding during heavy rain or sudden snow melts. They are also prone to becoming blocked, further increasing the chance of flooding. Undersized stream crossings not only pose public safety problems, but also create barriers to fish and other wildlife.

New Hampshire Stream Crossing Assessment Data

Understanding which stream crossings are the most problematic before they fail and cause damage can help you to identify replacement needs and minimize the chances of overtopping (particularly culverts) and failure. Through the NH Stream Crossing Initiative, a multi-agency team is assessing stream crossings in the state. As of 2018, 218 towns have at least one completed culvert assessment within their boundaries (see map at right). This assessment data can be used:



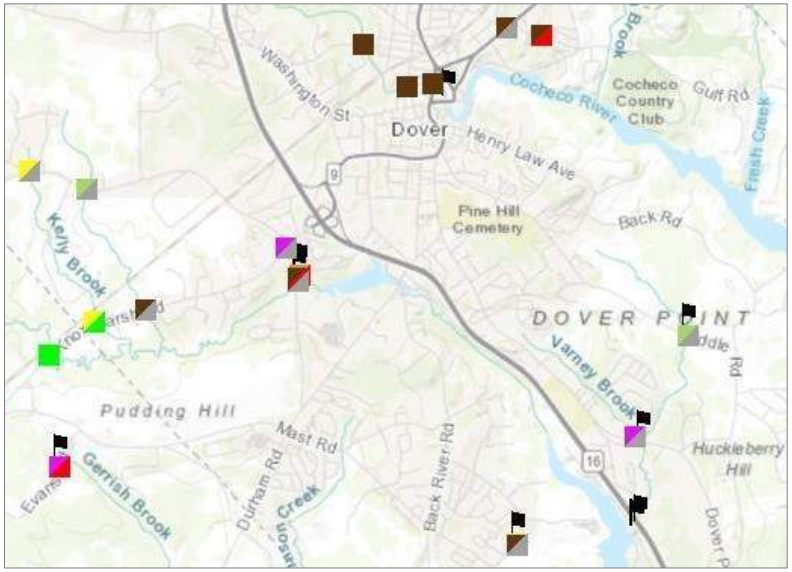
- to identify stream crossings at greatest risk of becoming blocked and which are at an increased risk of flooding and erosion and, as a result, failure.
- to identify stream crossings that cannot support fish passage to points upstream.
- to prioritize which crossings are the best candidates for replacement to improve public safety through flood risk reduction, while addressing crossing condition concerns, and restoring aquatic organism passage capability.
- to assist decision-making by fund and grant managers on which stream crossings to rank for replacement funding.

New Hampshire Stream Crossing Assessment Data, continued

The stream crossing assessment data is available through the Aquatic Restoration Web Mapper with additional information available on the NH Department of Environmental Services' Streams and Stream Crossings webpage.

Culvert stream crossings are scored for their ability to withstand 2-, 10-, 25-, 50- and 100-year (1%-annual chance) storm flows. This information can be used as a "first cut" to identify sites that cannot adequately pass predicted flows based on its watershed area. This information can further support opportunities to design and install new culverts that increase flow capacity permanently during replacement.

Stream crossings are also scored for geomorphic compatibility and for Aquatic Organism Passage (AOP). *Culverts that are incompatible with geomorphology, cannot support AOP, and that cannot pass a range of flow levels are particularly of concern, and in need of closer evaluation to identify replacement options.*



Screen capture from the Aquatic Restoration Web Mapper which includes the stream crossing assessment data.

Locations and Future Assessments

Stream crossing assessments to date have been largely funded through grants. This has influenced where the assessments have been performed across the state. If a town, city, or other organization is interested in having an assessment performed for one or more stream crossings, the designated Regional Planning Commission or the New Hampshire Geological Survey (See Appendix B for contact information) may be contacted to discuss options.

Ice Jams

Winter flood hazards on New Hampshire's rivers and streams include ice jams. Ice forms on rivers statewide during early winter as the water cools. When the ice breaks up and begins to flow with warmer weather, heavy rain, or both, jams can form. This can cause water to back up behind jams, sometimes rapidly, leading to flooding concerns upstream and downstream. Although ice jams can form anywhere, and cannot be easily predicted, data about past events can be used to suggest where they may be more likely to happen. Certain river features can also increase the potential for formation.

Ice jam along the South Branch Piscataquog River in New Boston, January 2018 (Source: Dan MacDonald, New Boston Fire Chief)

Causes of ice jam formation can include one or more of the following:

- Sites where a steeper segment of river or stream enters an area of more level terrain.
- Sites near the confluence of two or more streams or rivers.
- At sharp bends in a river or stream.
- Sites with reduced capacity to pass water and sediment (such as at a sediment deposit or berm).
- Bridge pier or blocked culvert in a river or stream.
- Sharp increases in air temperature, heavy rain, and/or snow melt may lead to ice breakup and flow downstream.

Where to Find Historical Ice Jam Flood Information

The Cold Regions Research and Engineering Laboratory (CRREL) of the U.S. Army Corps of Engineers (USACE) maintains a national ice jam database, including many sites in New Hampshire, with data submitted by state and local officials. A total of 141 reported jams in 101 communities are included from 1835 through 2018.

The New Hampshire Geological Survey (NHGS) at the Department of Environmental Services (NHDES) also maintains a statewide flood hazards geodatabase, which includes sites of past or potential ice jams (See Appendix B for NHGS contact information).

Aerial view of an ice jam on the Gale River in Franconia, February 17, 2016 (Photo courtesy of NH Homeland Security and Emergency Management)

Other Ice Jam Web Resources

- USACE CRREL
- U.S. Geological Survey Daily Streamflow Conditions
- NHDES Dam Bureau
- NHGS Flood Hazards Program, NHDES

See page 23 for information about long-term planning and mitigation options for ice jam-prone areas, and page 33 to learn how to receive technical assistance from the state when an ice jam happens.

Dams

With over 2,600 dams in New Hampshire, the land area affected by their presence is vast and the impacts associated with flooding caused by their sudden failure can be devastating. Most dams in the state – almost 1,800 - are considered "Non-Menace" and are not likely to cause damage to people, property, or structures should they fail. Over 500 dams are deemed to be "Low hazard" and estimated to cause damage to local roadways and minor damage to property. The remaining 300 dams are evenly split between those designated as "Significant Hazard" and "High Hazard" dams. "Significant Hazard" dams are those that are likely to cause an appreciable degree of economic loss to those impacted, or result in the loss of water supply and wastewater treatment facilities. "High Hazard" dams are those whose failure is likely to result in the loss of one or more lives.

Breach at Meadow Pond Dam in Alton, March 1996
(Source: NH Department of Environmental Services, Dam Bureau)

Though dams can, and do, fail under "sunny day" conditions, most dam failures are the result of natural floods due to inoperable or debris-blocked outlets, or simply because the flood flow is greater than the dam's capacity to pass it safely. Because of these potential impacts, the need for proper planning, monitoring, response, and recovery is critical to protecting the public.

See page 24 for information about planning for dam emergencies, page 34 to learn how to receive technical assistance from the state during an event, and page 50 for post-event considerations.

More Extreme Precipitation and Higher Sea Levels

Flooding in New Hampshire has increased due to intensifying precipitation patterns and rising sea levels caused by climate change, and impacts are expected to worsen over this century. As noted on page 4, Federal Emergency Management Agency flood maps do not account for projected sea-level rise or changes in precipitation, though these changes are expected to increase the extent of flood prone areas. Community decision-makers should prepare now for projected changes to precipitation and sea levels to reduce future risks to local assets.

Flooding in Newmarket (Source: Joanne Gloade)

Precipitation volume estimates based on observed data in the Northeast are presented for different storm frequencies and durations in the Northeast Extreme Precipitation Tool or NOAA Atlas 14. The National Climate Assessment (NCA) and the New Hampshire Coastal Risk and Hazards Commission (NHCRHC) both provide projections and guidance for how to prepare for intensifying precipitation and rising sea levels. The projections below summarize key findings from these two sources. However, since the science is continually improving, ***the most recent editions of the NCA and the NHCRHC Science (both updated every five years) should be used***.

Extreme Precipitation

Past: *The Northeast U.S. has experienced significant increases in the number of extreme precipitation events per year, with the number of 5-year 2 day precipitation events increasing by 74% between 1901 and 2016. The Northeast has also seen a 27% increase in 5-year maximum daily precipitation over the same time period.*

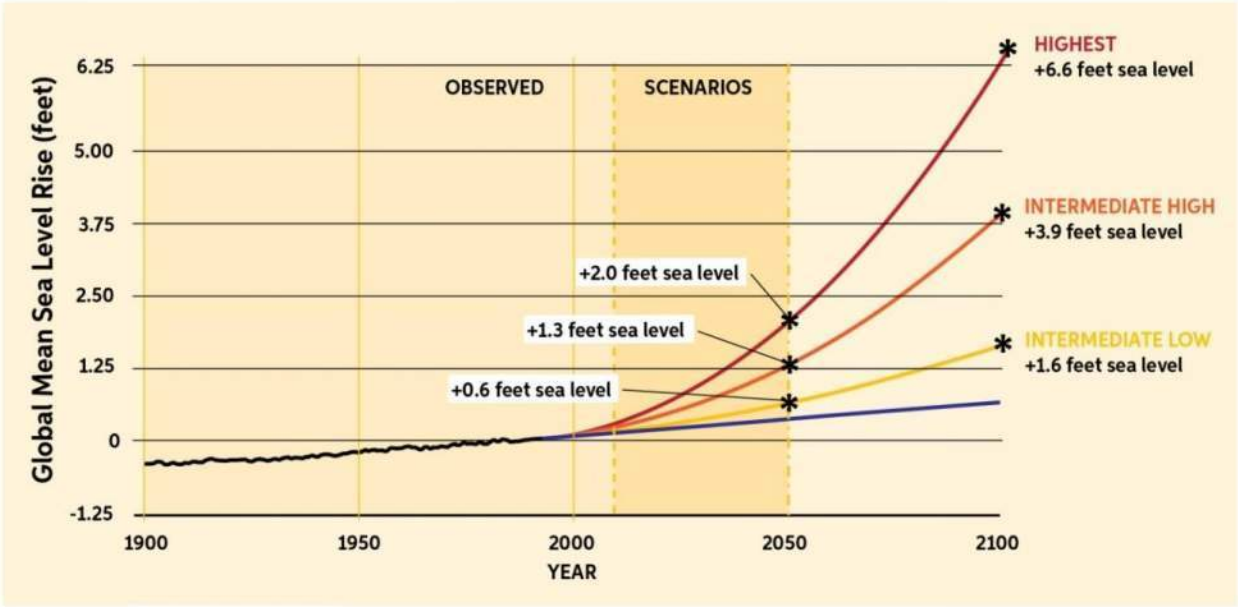
Future: *Extreme precipitation events in the Northeast U.S. are projected to increase even more in frequency and in the amount of precipitation produced, with the biggest increases in precipitation volume occuring in more extreme storms. The Northeast U.S. is expected to experience a 50% to 300% increase in the number of 5-year 2 day precipitation events by 2100 compared to the historical average. The same region expects an increase of between 14% and 22% in the amount of precipitation falling in the 20-year daily extreme precipitation events over the same time period.*

Sea Level Rise

Past: *Mean sea levels have been rising in New Hampshire due primarily to ocean warming (which causes water to expand and take up more space) and melting of land based glaciers and Antarctic and Greenland ice sheets. Almost half of that rise has occurred since 1993.*

Future: *Best available science summarized in 2014 for New Hampshire indicates that sea levels are expected to rise between 0.6 feet and 2 feet by 2050 and between 1.6 feet and 6.6 feet by 2100 compared to a 1992 baseline. The wide range of projected sea levels is primarily due to uncertainty about future global greenhouse gas emissions and the rate of ice sheet melt. Sea levels are expected to continue to rise beyond 2100.* ***Sea level rise projections will be updated in November 2019 as part of the 2019 NHCRHC Science Summary****. Use the New Hampshire Sea-Level Rise Mapper to view maps of possible future sea level rise.*

Sea-level rise scenarios under different emission levels in 2050 and 2100. *Source: Adapted from NHCRHC STAP (2014).*



Current and Future Impacts on NH Coastal Communities

New Hampshire coastal communities have already experienced increases in mean sea level. This upward trend is expected to accelerate. NH coastal communities should plan for more frequent high tide flooding and increased erosion. NH coastal communities should also prepare for more damaging storms that extend further inland and bring deeper flood depths and stronger currents.

Flood Forecasting

The National Weather Service (NWS), which is part of the National Oceanic and Atmospheric Administration, uses the latest science to provide weather forecasts and warnings to the public. The NWS is the sole agency responsible for issuing weather and flood watches and warnings. Flood watches and warnings can be due to tidal and/or river flooding.

The Northeast River Forecast Center (NRFC) uses the latest river models and scientific methods to produce river forecasts for the Northeast U.S. The NRFC uses a combination of real-time precipitation and temperature data as well as Doppler weather radar and real-time streamflow data from the U.S. Geological Survey. During the cold season, snow survey data is also used to model snowmelt.

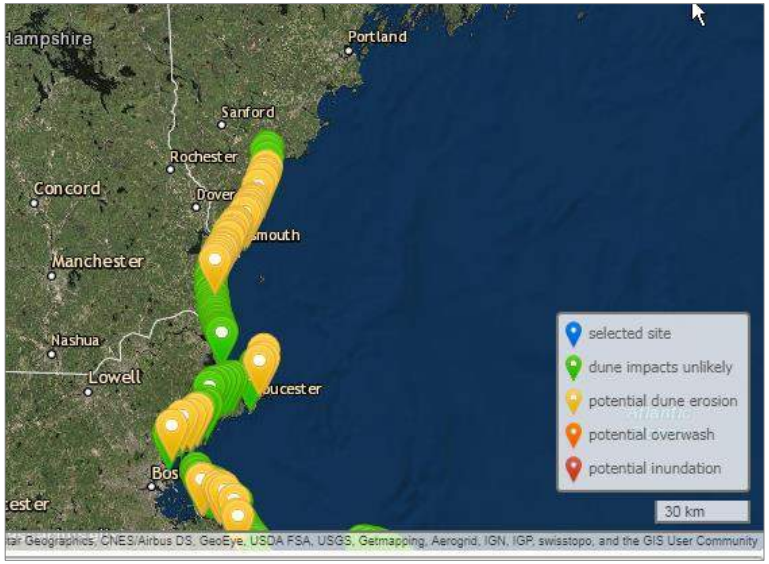
Follow the steps below to use NWS flood forecasting information to identify potential flood threats to your town or city:

- Get situationally aware using the Climate Prediction Center website. Specifically, look at the ***U.S. Hazards for Days 3-7*** and ***Days 8-14***. This will give you an idea of the potential threats coming up over the next 2 weeks.
- Next, go to Meteorological Model Ensemble River Forecasts. These forecasts are based on meteorological models with no human intervention. They will give you a sense of whether river levels will be rising over the next 7 days.
- Once you have determined that an event might be approaching, check the NWS Gray, Maine weather briefing page. This page is updated at least twice daily by 6 AM and 5 PM. It will include information about the weather phenomena that might affect the region over the next 1 to 4 days.
- Once it looks like flooding will be affecting the region, check the Advanced Hydrologic Prediction Service website which shows forecast point locations in New Hampshire based on data from the NRFC. Click a site on the map to get the latest observed data as well as a forecast hydrograph.

NWS Really Simple Syndication (RSS) feeds are another way to access observed or forecast river stages. You will need an RSS reader for your mobile device or computer in order to access the feeds.

Total Water Level and Coastal Change Forecast Viewer

The National Weather Service (NWS) in partnership with the U.S. Geological Survey has developed the Total Water Level and Coastal Change Forecast Viewer. This viewer provides a coastal change forecast that determines the probablility of dune erosion, overwash, and flooding, which can help coastal communities better understand potential flood threats.



Screen capture from the
Total Water Level and Coastal Change Forecast Viewer

Flood Warnings

NWS uses a variety of systems to ensure that flood warnings and other important weather-related information reach the public in a timely fashion. This includes the Emergency Alert System which is triggered when warnings are issued. Ways to receive flood warnings include the following:

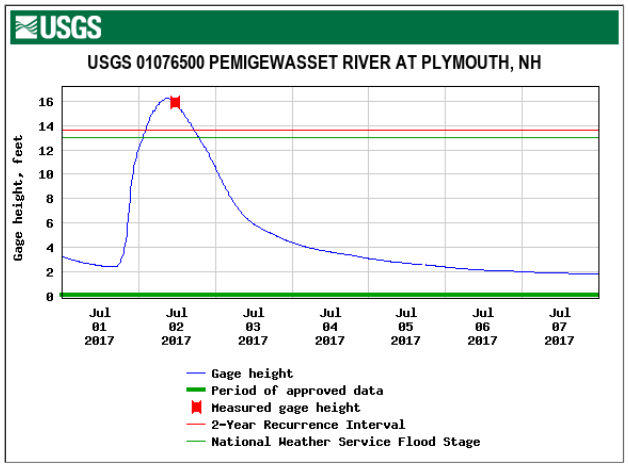
- NOAA Weather Radio (NWR) is the best way to receive warnings from the NWS. NWR is a nationwide network of radio stations broadcasting continuous weather information direct from a nearby NWS office. NOAA broadcasts warnings, watches, and forecasts, and also broadcasts post-event information. NOAA Weather Radio requires a special radio receiver or scanner capable of picking up the signal. Broadcasts are found at (MHz): 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, and 162.550 (also known as channels 1 through 7).

- Wireless Emergency Alerts are another way to get flood warnings. If your phone is capable of receiving WEA you will receive NWS warnings about flash floods, storm surge, and other weather-related hazards via text message.

- The NWS Gray, Maine office (the forecast office for all of New Hampshire) uses social media platforms including Facebook and Twitter (@NWSGray) to provide information, which may include flood warnings. However there is no reqirement to post flood warnings on social media.

Stream Flow Monitoring Network

As of 2018, the U.S. Geological Survey (USGS) operates more than 50 stream gages in New Hampshire. Data from stream gages are typically recorded at 15-minute intervals, transmitted hourly through satellites, and provided in near real-time on the Internet. These data assist federal and state emergency management agencies in monitoring water levels and streamflows and are used in forecasting the timing and magnitude of flood events.



The USGS WaterWatch website provides maps, graphs, and tables describing:

- Current real-time streamflow conditions.
- Past and recent streamflow conditions.
- Locations where floods and droughts are occurring.

You can select a specific USGS stream gage to view more detailed information such as:

- Hydrographs showing real-time data.
- National Weather Service (NWS) forecast estimates.
- Historical flooding data.

A complete list of current stream flow conditions for all USGS stream gages in New Hampshire is available through the USGS National Water Information System.

USGS WaterAlert

The USGS WaterAlert system allows users to select a USGS stream gage, set a stage or streamflow value, and receive text or email messages when the value is equaled or exceeded.

Sign up for WaterAlerts at: water.usgs.gov/wateralert.

Light Detection and Ranging (LiDAR) Data in New Hampshire

During the past decade, the State of New Hampshire, led by the NH Geological Survey (NHGS), in collaboration with the U.S. Geological Survey (USGS) and other partners, has acquired LiDAR data for the entire state. LiDAR provides highly detailed land surface elevation data that can be used to develop Digital Elevation Models (DEMs). DEMs can then be easily manipulated and analyzed with Geographic Information System (GIS) software. Data derived from LiDAR can be used for many purposes related to flood hazards, including:

- Mapping flood hazards for improved safety and long-term hazards reduction.
- Evaluation of coastal flooding from storm surge.
- Modelling area and volume of stormwater runoff.
- Support for ice jam response and mitigation.
- Planning and design of erosion and sediment control measures.

What is LiDAR?

LiDAR is a method that uses light in the form of a pulsed laser to measure variable distances to the Earth. These light pulses, which are often gathered using specially-equipped aircraft, generate precise, 3D information about the shape of the Earth and its surface characteristics. The results are often used to create highly detailed topographic data sets.

High-resolution elevation data from LiDAR is a critical component of efforts by the Federal Emergency Management Agency and its partners to create more accurate flood maps for communities in the National Flood Insurance Program. LiDAR data also represents a key input in modeling flood extents resulting from culvert or other structural failures. The value of LiDAR is also increasingly being recognized in addressing the risks from flooding during actual events.

NH GRANIT, the state's GIS clearinghouse, is creating a 2-foot contour (10-foot in the highest relief areas) GIS dataset from a statewide DEM generated from LiDAR. Data for much of the state is currently available through the NH GRANIT website.

How to Obtain and Use Light Detecting and Ranging (LiDAR) Data

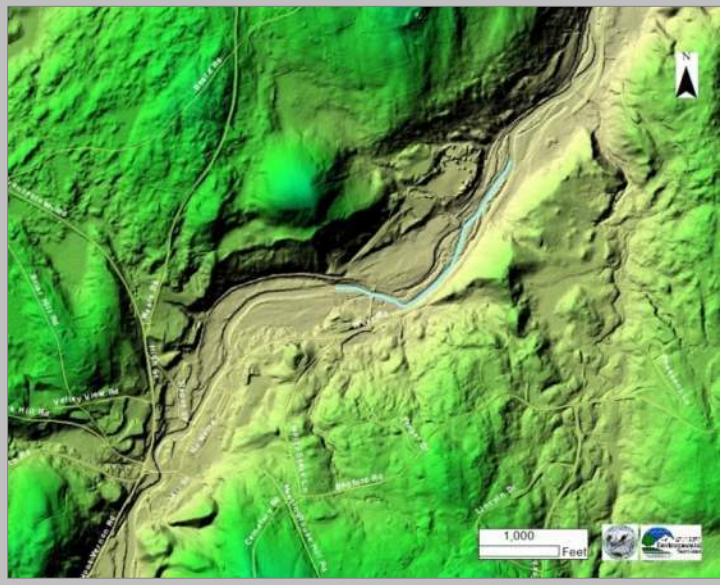
LiDAR data can be obtained through NH GRANIT's LiDAR distribution site. For questions regarding LiDAR data, including collection techniques, uses and applications, and for technical assistance using LiDAR to help mitigate flood hazards, contact the NH Geological Survey (See Appendix B for contact information).

Using LiDAR-Derived Data to Analyze Ice Jam Impacts in New Boston

An example of how communities statewide can benefit from LiDAR comes from the January 2018 ice jam on the South Branch Piscataquog River at New Boston. In New Boston, a segment of the river that parallels Route 13 is historically prone to ice jams. Thus, when a jam occurs, a rapid rise in water levels can result in portions of Route 13 going under water. During the 2018 ice jam, questions arose about flood inundation risks in the New Boston town center, located just upstream of the head of the jam.

An analysis using LiDAR-derived elevation data showed that the natural topography would create an area for water storage immediately upstream of the ice jam if the river's water level rose above flood stage due to the ice blockage. Roughly 20 acres of temporary "storage" capacity below the elevation of Route 13 were identified which would serve to reduce potential flood impacts on the New Boston town center itself.

This type of digital terrain analysis, based on elevation data derived from LiDAR, can provide valuable information about the risks to property and infrastructure in any town or city where there is potential for an ice jam to form.



Imagery showing LiDAR-derived topographic data for the South Branch Piscataquog River at New Boston. The length of the 2018 ice jam is identified by the light blue line, with the head of the jam at the left end of the line, which is heading upstream. The New Boston town center is upstream at the location where the valley constricts. (Source: NH Geological Survey)

III. Promoting Public Awareness and Outreach

ReadyNH

ReadyNH.gov is NH Homeland Security and Emergency Management's portal to help citizens learn what actions to take before, during, and after an emergency. Before a flood, it is important to encourage citizens to take the steps to individual emergency preparedness listed below. All resources listed are available on ReadyNH.gov.

Steps to be Ready

1. Complete the Family Emergency Plan and discuss it as a family. This is a simple way of keeping each member of the family informed on critical information: where to reconnect should you become separated, who to call, and what you will do should a flood occur.
2. Complete the Emergency Contacts Card for each family member.
3. Develop an Emergency Kit. Your Emergency Kit should be easily accessible if you have to leave your home in a hurry, and should account for the needs of each family member. Make sure it is ready to go at all times of the year and contains items suitable for the season.

Public outreach is an important tool to educate your citizenry. ReadyNH is one piece in educating the public about the potential risks of flooding and how they can best protect themselves and their community. Use your community's website, message boards, email groups, and social media accounts to promote emergency preparedness and flood safety awareness messages from the sources listed on this page and the next.

Take Action Before a Flood: *Before an event, information about the risk of floods can be found on local television and radio, and through the National Weather Service. See pages 12-13 for detailed information about flood warnings and forecasts.*

Other Web Resources

- The Federal Emergency Management Agency's (FEMA) Ready.gov preparedness website features a Floods page which provides many online resources about flood preparedness for the general public, including the *Be Prepared for a Flood* fact sheet.
- FloodSmart.gov, the National Flood Insurance Program's official website offers many resources about flood risk and flood insurance.
- FEMA's Flood Map Service Center allows a user to type in an address to find out if their property is located in a high risk flood zone.
- The American Red Cross also provides flood preparedness information on its website.
- The NH Alerts notification system and smartphone app allow state officials to reach residents and visitors with emergency information tailored to the recipient's location.

You can order free copies of most FEMA publications for your community's public outreach efforts directly from the FEMA Publications Warehouse. See also Ready.gov's Free Publications webpage.

Social Media

Social media can be a highly effective tool to communicate with your citizens about emergency preparedness and flood safety. NH Homeland Security and Emergency Management (HSEM) has Facebook, Twitter, and Instagram accounts that all promote safety messaging. Use these feeds to share information on your own social media accounts, or encourage your citizens to follow them.

A Flood Safety Social Media Toolkit from Ready.gov is also available which includes messages you can distribute before, during, and after a flood. The National Weather Service also provides social media messages and graphics about flood safety suitable for sharing.

Flood Safety for Pets and Other Animals

It is important that your residents plan for the safety of their pets and other animals they are responsible for before a flood happens. Consider sharing the information and resources below with your residents periodically and when a flood is imminent.

Pets

The Ready.gov *Pets and Animals* page and brochure include information for pet owners about preparedness and pet care during a disaster. It is recommended that pet owners prepare shelter kits for their pets ahead of time to be ready for a flood or other disaster. The Humane Society of the United States (HSUS) has developed this short video that describes what to include. **If an evacuation order is given, *residents should not leave their pets behind***.

Two disaster survivors return home following a flood (Source: FEMA)

Horses and Farm Animals

The HSUS has also developed disaster preparedness guidance related to horses and farm animals. This includes information about evacuation and what to do if large animals cannot be evacuated.

State Resources

Additional resources related to disaster planning and preparedness for animals are available on the NH Department of Agriculture, Markets and Food's website.

The NH Disaster Animal Response Team

The NH Disaster Animal Response Team (NHDART) is dedicated to increasing the state's capabilities to respond to disasters that affect animals, at the local, regional, and state levels. NHDART helps to develop local response teams, and provides training and other planning and educational support to communities and volunteer groups. If your community is in need of the services of the NHDART, municipal officials may call the NH Homeland Security and Emergency Management Duty Officer at 1-800-852-3792 or 603-271-2231.

Hazard Mitigation Planning

Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. It is most effective when implemented under a comprehensive, long-term mitigation plan. State and local governments engage in hazard mitigation planning to identify risks and vulnerabilities from natural disasters, and develop long-term strategies for protecting people and property from future hazard events. Mitigation plans are key to breaking the cycle of disaster damage, reconstruction, and repeated damage.

Mitigation policies/actions are identified based on an assessment of hazards, vulnerabilities, and risks and participation of a wide range of stakeholders and the public in the planning process. Benefits of mitigation planning include:

- Identifying actions for risk reduction that are agreed upon by stakeholders and the public.
- Focusing resources on the greatest risks and vulnerabilities.
- Building partnerships by involving citizens, organizations, and businesses.
- Increasing education and awareness of threats and hazards, as well as their risks.
- Communicating priorities to state and federal officials.
- Aligning risk reduction with other community objectives. [1]

The State Hazard Mitigation Officer or Hazard Mitigation Planner at NH Homeland Security and Emergency Management (HSEM) can provide further information about hazard mitigation plans, including a copy of your community's latest plan, expiration dates (plans must be updated every 5 years), development guidance, and potential funding to develop plans (See Appendix B for contact information).

For more information, visit www.fema.gov/hazard-mitigation-planning and the NHHSEM Resource Center.

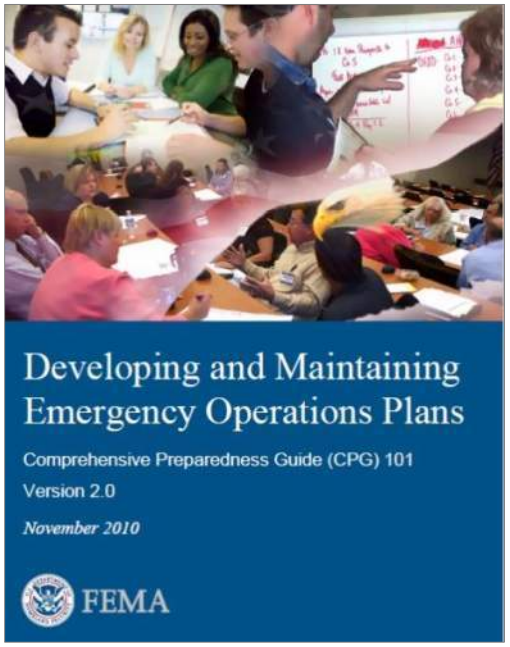
[1] https://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf

Local Emergency Operations Plan

Local Emergency Operations Plans (LEOPs) establish a community's strategy to prevent, protect, prepare for, respond to, recover from, and mitigate the impacts of a wide variety of disasters and other emergencies that could adversely affect the health, safety and/or general welfare of its residents and guests.

A community's LEOP is a document that:

- Assigns responsibility to organizations and individuals for carrying out specific actions that exceed routine responsibility at projected times and places during an emergency.
- Sets forth lines of authority and organizational relationships and shows how all actions will be coordinated.
- Describes how people (including unaccompanied minors, individuals with disabilities, others with access and functional needs, and individuals with limited English proficiency) and property are protected.
- Identifies personnel, equipment, facilities, supplies, and other resources available within the jurisdiction or by agreement with other jurisdictions.
- Reconciles requirements with other communities.[2]



NH Homeland Security and Emergency Management (HSEM) provides a LEOP template via their Resource Center. Please contact your NHHSEM Field Representative for more information about developing a LEOP and exercise/training assistance that can support planning efforts (See Appendix B for contact information). Guidance for developing LEOPs is also available in the Federal Emergency Management Agency's Developing and Maintaining Emergency Operations Plans.

[2] https://www.fema.gov/media-library-data/20130726-1828-25045-0014/cpg_101_comprehensive_preparedness_guide_developing_and_maintaining_emergency_operations_plans_2010.pdf

Pre-Disaster Recovery Planning

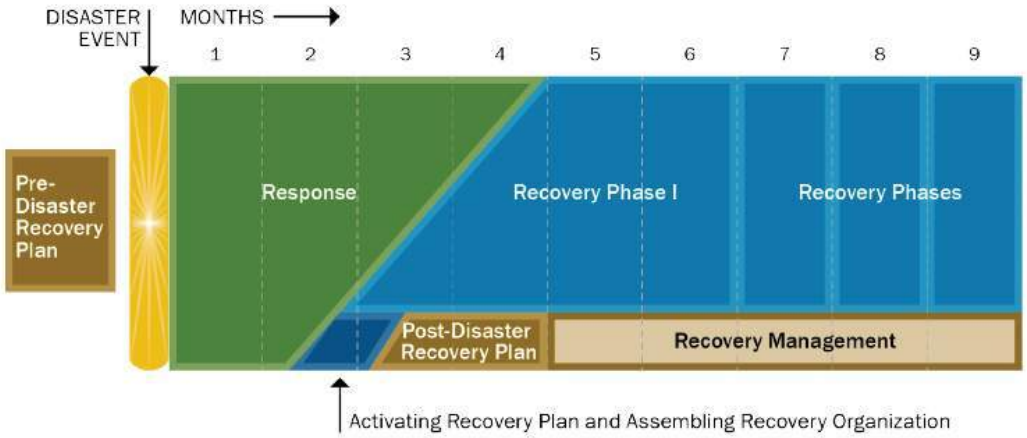


Figure 4 Disaster Response and Recovery Timeline
Source: APA, Planning for Post-Disaster Recovery: Next Generation (PAS Report 576) (2015)

At a fundamental level, disaster recovery requires balancing practical matters with broad policy opportunities. Communities must be ready to invest significant effort to understand and acclimate to the new conditions and growth opportunities post-disaster and to create a desirable future based on these circumstances. Accomplishing these things successfully requires the community to undertake a structured recovery planning process after the disaster, through which the community develops a vision for itself, sets goals, and identifies concrete methods for reaching these goals. Without an organized community planning process that is ready to be implemented post-disaster, recovery may occur but is likely to be uneven, slow, and inefficient.

Pre-disaster planning ensures that an affected community is ready to undertake an organized process and does not miss opportunities to rebuild in a sustainable, resilient way. With a planning framework in place, a community is better situated to address pre-existing local needs, take advantage of available resources, and seize opportunities to increase local resiliency, sustainability, accessibility, and social equity. By working in advance to develop an understanding of needs and vulnerabilities, identify leaders, form partnerships, establish resources, and reach consensus on goals and policies, communities will be prepared to begin recovery immediately rather than struggle through a planning process in the wake of a disaster[3].

More information is available in the Federal Emergency Management Agency's Pre-Disaster Recovery Planning Guide for Local Governments.

[3] https://www.fema.gov/media-library-data/1487096102974-e33c774e3170bebd5846ab8dc9b61504/PreDisasterRecoveryPlanningGuideforLocalGovernmentsFinal50820170203.pdf

Ice Jams: Long-Term Planning and Mitigation Options

Mitigation alternatives to repeated ice jams, while not without costs, are available. These can include monitoring techniques or constructed permanent controls in rivers (e.g., weirs or ice booms), to reduce or alleviate formation. To discuss monitoring options during an ice jam event, including the potential for real-time monitoring of flow conditions in certain ice jam circumstances, contact the NH Department of Environmental Services Dam Bureau, the NH Geological Survey (NHGS), or the U.S. Geological Survey's (USGS) New England Water Science Center (See Appendix B for contact information). For larger jams with public safety risk, it may be possible to deploy rapid development gages, working in partnership with the USGS.

NH Silver Jackets team members assess the Gale River at Route 3, July 2017 (Source: Shane Csiki, NHGS)

If your town or city has locations where ice jams occur repeatedly, consider developing a procedure for observing conditions upstream of a jam to help determine risks based on the degree of ice jam occurrence. This includes monitoring upstream conditions that could worsen a jam that has formed. For example, if a jam has formed, knowing whether blocks of ice are incoming from upstream is important and can increase response effectiveness.

See page 33 to learn how to receive technical assistance from the state when an ice jam happens. Page 16 features a case study about using LiDAR data to analyze potential ice jam impacts.

Dams: Emergency Action Plans and Other Preparedness Measures

The need to prepare for dam-related emergencies cannot be overstated. Dozens of dams have failed over the course of New Hampshire's history and there are typically a handful of events each year that cause dam owners to activate their Emergency Action Plans (EAP) or otherwise reach out to state and local response agencies.

An EAP identifies incidents that can lead to potential emergency conditions at a dam, includes inundation maps showing areas that can be affected by the sudden release of water, and outlines actions to be followed to minimize potential loss of life and property and infrastructure damage due to failure or mis-operation of a dam. All "High hazard" dams and most "Significant hazard" dams are required to have an EAP.

Your community can prepare for a dam-related emergency by:

- Coordinating with the NH Department of Environmental Services (NHDES) Dam Bureau for an up-to-date listing of all jurisdictional dams in your community.
- Ensuring that updated copies of EAPs (if required) are on file with your emergency management director, fire chief or others with a response role. Staff should review the plans annually to ensure they remain up-to-date.
- Developing dam-specific evacuation plans tailored to the EAP inundation maps. Individual dam owners are not required to do this, but communities are strongly encouraged to do so to reduce confusion and speed response.
- Reaching out to dam owners to request a site visit to become familiar with their construction and operation.
- Documenting trouble spots susceptible to flooding due to rising water behind dams or increased stream flows and dam releases.

Visit the NHDES Dam Bureau homepage and its EAP Program page for more dam information.
For recovery considerations after a flood, see page 50.

Reducing Risk through Your Community's Floodplain Management Ordinance

Communities that participate in the National Flood Insurance Program (NFIP) must manage development in Special Flood Hazard Areas (SFHAs) by adopting and enforcing floodplain management regulations that meet NFIP minimum standards. These standards are intended to help protect lives and property in your community from flood risk. The NH Office of Strategic Initiatives (NHOSI) has developed model floodplain management ordinances designed to help NH communities meet minimum NFIP requirements.

Higher Floodplain Development Standards

By adopting floodplain development regulations that go beyond minimum NFIP requirements, your community can further increase its resiliency to future floods. Higher standards can also serve as a way to reduce the risk from future effects of climate change and sea level rise not considered on NFIP flood maps. Examples of higher floodplain development standards include:

- Freeboard (An additional height requirement above the Base Flood Elevation for new construction and/or Substantial Improvements in SFHAs).
- Restricting all development or certain types of development in SFHAs.
- Compensatory storage requirements for development in SFHAs.

NHOSI's Menu of Higher Floodplain Regulation Standards includes detailed descriptions of these and other recommended higher standards, plus sample ordinance language and resources to learn more.

Joining the NFIP

If your community is not currently participating in the NFIP, consider joining. By managing development in high risk floodplains in accordance with NFIP minimum standards, you will be improving your community's resilience to future flooding. Plus flood insurance will be made available for purchase to all of your residents. NFIP participation is also factored into scoring for FEMA Hazard Mitigation Assistance grant applications by the State Interagency Hazard Mitigation Team. Contact the NH Office of Strategic Initiatives to learn more about joining the NFIP (See Appendix B for contact information).

The Community Rating System (CRS)

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) recognizes floodplain management and outreach activities performed by communities that go beyond NFIP minimum standards. This voluntary program rewards these efforts by reducing the cost of flood insurance premiums for eligible policyholders in a participating community. In New Hampshire, flood insurance premium reductions in current CRS communities range from 5 to 10%.

Besides the savings on flood insurance premiums, other benefits can include:

- Reduced damage from future floods in the community
- Improved public safety
- Increased environmental protection
- More flood-savvy residents and greater support for community flood protection measures

There are 19 CRS-creditable activities from which communities can choose, organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Warning and Response. Most communities are already performing activities that will earn them CRS credit.

Join the NH CRS Users Group!

The NH CRS Users Group is a support and educational resource for communities that participate in CRS or who are interested in joining or learning more about the program. During the group's meetings, attendees can share ideas, best practices, and hear from guest speakers about CRS-related topics. If your community is interested in attending a future meeting, contact the Floodplain Management Team at the NH Office of Strategic Initiatives (See Appendix B for contact information).

Contact the Floodplain Management Team at the NH Office of Strategic Initiatives to learn more about how to join CRS (See Appendix B for contact information).

Pre-Disaster Mitigation (PDM) Grant Program

The PDM program, authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, is designed to assist states and local governments in implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis. Eligible applicants include state agencies and local governments.

Eligible activities include, but are not limited to:

- Property Acquisition and Structure Demolition or Relocation
- Structure Elevation
- Mitigation Reconstruction
- Dry Floodproofing of Historic Residential Structures and Non-Residential Structures
- Localized and Non-Localized Flood Risk Reduction Projects
- Structural Retrofitting of Existing Buildings
- Non-Structural Retrofitting of Existing Buildings and Facilities
- Infrastructure Retrofit
- Soil Stabilization
- Hazard Mitigation Planning

Following availability of funding, NH Homeland Security and Emergency Management will send requests for Letters of Intent to community officials.

Contact the State Hazard Mitigation Officer at 603-271-2231 or by email at HazardMitigationPlanning@dos.nh.gov for more information about PDM grants.

Including documentation of prior and current disaster events (e.g., pictures, repair costs, etc.) will help you in preparing a quality PDM grant application.

Flood Mitigation Assistance (FMA) Grant Program

The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to states and local governments for projects and planning that reduce or eliminate long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually. Eligible applicants include state agencies and local governments.

Eligible activities include:

- Property Acquisition and Structure Demolition or Relocation
- Structure Elevation
- Mitigation Reconstruction
- Dry Floodproofing of Historic Residential Structures
- Dry Floodproofing of Non-Residential Structures
- Localized Flood Risk Reduction Projects
- Structural Retrofitting of Existing Buildings
- Non-Structural Retrofitting of Existing Buildings and Facilities
- Infrastructure Retrofit
- Soil Stabilization

Following availability of funding, NH Homeland Security and Emergency Management will send requests for Letters of Intent to community officials.

Contact the State Hazard Mitigation Officer at 603-271-2231 or by email at HazardMitigationPlanning@dos.nh.gov for more information about FMA grants.

Including documentation of prior and current disaster events (e.g., pictures, repair costs, etc.) will help you in preparing a quality FMA grant application.

During the Flood

Keeping Your Community Safe
Evacuation
Keeping Your Community Informed

State and Local Emergency Operations

The State Emergency Operations Center (SEOC) is responsible for coordinating state response and facilitating any federal response to a disaster in New Hampshire. The SEOC maintains a "big picture" view of disasters and assists community Emergency Operations Centers and state agencies with resources and support. The SEOC has 4 levels of activation:

- **Steady State:** Routine monitoring with no event or incident anticipated.
- **Enhanced Monitoring:** A situation has developed with required monitoring and coordination between jurisdictions or agencies. Could develop into a situation or event, but does not require state response at this time.
- **Partial:** A situation has developed that requires coordination extending beyond normal day-to-day operations and/or requires extended shifts or 24-hour operations.
- **Full:** An incident of such magnitude that requires extensive response efforts, recovery efforts, and/or significant resource requirements. Requires 24/7 coordination, monitoring, and support.

By Law (RSA-21-P:39), each community in New Hampshire has an Emergency Management Director (EMD). This person has overall responsibility for day-to-day emergency management and programs. They coordinate all aspects of a jurisdiction's preparedness, response, recovery, and mitigation capabilities. During a disaster, the Local EMD:

- Obtains/maintains situational awareness and contributes to the Common Operating Picture by using WebEOC.
- Helps to coordinate municipal resources and fill resource shortfalls.
- Serves as the principal Point of Contact to request resources from, and provide situational awareness to, NH Homeland Security and Emergency Management (HSEM).

What is Web EOC?

NHHSEM maintains a crisis-disaster management system, WebEOC, which serves as one of the primary means of communications and incident management for the SEOC.

WebEOC provides incident commanders, community leaders, and others with one common operating picture of public safety operations upon which to make informed, effective decisions in response, recovery and mitigation efforts.

Temporary Shelters

Prior to, during, or immediately after a disaster, people and their pets may need safe refuge in temporary, accessible shelters. State and local governments must comply with Title II of the Americans with Disabilities Act and the Pets Evacuation and Transportation Standards Act. Both of these federal laws state that Emergency Operations Plans (see page 21) must provide emergency and disaster-related activities, programs, and services. This would include equal access by all people, pets, and service animals for the benefits that shelters provide, including but not limited to safety, food, a place to sleep, and essential needs until it is safe to return home.

In large disasters local government officials may find it necessary to combine resources and open a regional shelter. According to RSA 21-P:40, local emergency management officials can collaborate with other public and private agencies within the state to develop mutual aid arrangements for reciprocal emergency management aid and assistance.

The Federal Emergency Management Agency (FEMA) and the American Red Cross have developed resources and guidelines for sheltering including the *Shelter Field Guide* and other information available on the National Mass Care Strategy website.

The NH Disaster Animal Response Team is also available to assist local officials with locating facilities to use as temporary, disaster-related pet shelters and can also provide advice for addressing pets and animals in your community's Emergency Operations Plan.

When communicating with residents about available shelters, be sure to indicate which are most accessible to people with disabilities and others with access and functional needs, and which accept pets.

Ensuring Shelters are Accessible to Everyone

The American Red Cross (ARC) can be asked to survey community facilities such as schools, senior centers, office buildings, or other areas to ensure their use as an accessible shelter by the whole community, including people with disabilities and other access/functional needs. If barriers to access are found, the ARC can work with the facility's owner to try to get the barriers modified or removed.

See also FEMA's publication Guidance on Planning for Integration of Functional Needs Support Services in General Population Shelters.

Search and Rescue

Search and rescue operations (i.e., Swift Water Rescue) are coordinated through the local dispatch center. The regional Swift Water Team assigned to your area is a part of your community's available resources. If additional resources are required, the Statewide Mobilization Plan should be activated via Capital Area dispatch which will in turn notify the State Emergency Operations Center (SEOC).

Swift water/flood rescues are conducted by specialized regional response teams comprised of specially trained and certified emergency response personnel throughout the state. All specialized teams will work under the guidance and direction of the local Incident Commander.

Flooding at Brown Avenue, Hampton, March 2018 (Source: Jay Diener)

Ice Jams: Monitoring and Response

If your town or city is concerned about an ice jam formation and technical assistance is desired, your Emergency Management Director may contact your local NH Homeland Security and Emergency Management (HSEM) Field Representative (See Appendix B for contact information), who will relay assistance requests to technical staff at the NH Department of Environmental Services' (NHDES) Geological Survey and Dam Bureau.

Experience has shown that using explosives or performing excavation to destroy an ice jam are typically not effective approaches. Excavation (e.g., using a backhoe) poses safety concerns, both for equipment personnel and the public if a jam were to suddenly release. Communication with NHDES specialists prior to pursuit of such actions is needed, in addition to a NHDES emergency wetland permit (See page 47).

Chunks of snow and ice strewn over land following ice jam flooding (Source: FEMA)

Reporting of the existence of formed ice jams to your NHHSEM field representative is highly encouraged so that:

- Agencies charged with forecasting, such as the National Weather Service in Gray, Maine, are aware.
- The U.S. Army Corps of Engineers' Cold Regions Research and Engineering Laboratory can add the information to its ice jam database.
- State agencies have the knowledge to provide potential future assistance as needed.

When reporting ice jams, be sure to provide photos, the upstream and downstream extent, and the condition of ice.

See page 7 for information about how ice jams form, and page 23 for long-term planning and mitigation options for ice jam-prone areas.

Dams: Monitoring and Response

As rivers and streams rise during a flood, so do the impoundment levels behind dams and the flows released from them. Actions your community should consider performing during an event include:

- Monitoring weather and streamflow conditions. This should include an understanding of the weather up to this point in time, as well as the forecasted conditions. Bookmark websites related to rainfall and streamflows (See pages 12-14) and keep tabs on changing conditions. Remember, rivers and streams are likely to continue to rise and crest even after the rain stops.
- Staging materials, personnel, vehicles, etc. in specific locations that may be needed to assist dam owners with emergency measures such as operating outlets or making critical stopgap measures to prevent (or delay) failures.
- Reaching out to homeowners, businesses, etc. in the vicinity of the dam that have been impacted by flooding in the past. Recommend emergency measures (e.g., elevating belongings) or evacuation, as necessary.
- Contacting dam owners to get updates on conditions. Though many dams cannot control the rate of discharge as waters rise, many have gates that can be operated during an event. Work with owners to strike a balance between protecting the dam and causing higher releases that might cause more damage downstream.
- Keeping the NH Department of Environmental Services (NHDES) Dam Bureau updated on dam-related issues as needed so that it can provide guidance and recommendations. Also, coordinate with NH Homeland Security and Emergency Management to provide information on your response actions and to request related resources. (See Appendix B for contact information).

Responding to Dam-Related Emergencies

Local officials are encouraged to contact the NHDES Dam Bureau with any dam-related issues that affect their communities, whether related to community-owned dams or other dams within or adjacent to the community. ***However, if there is an immediate threat related to a dam the first call should be to 911****.*

See page 50 for information about recovery steps related to dams.

II. Evacuation

Evacuation Routes

Evacuation orders may be voluntary or mandatory. Local fire chiefs are given the authority under RSA 154:7 II(b) to require evacuations in order to carry out emergency duties. Your community should have evacuation protocols in place beforehand that cover all locations within your jurisdiction, including alternate routes.

Major disaster evacuation routes in NH are referenced in two plans:

1. The NH Seacoast Evacuation Study, prepared by consultants for the City of Portsmouth, also indicates evacuation routes for other NH Seacoast communities in the event of a flood (See box at right.) The main routes in the Seacoast region run parallel to the shore - evacuation will need to move inland.

2. The Interstate 95 and Spaulding Turnpike Transportation Incident Management Plan (TIMP), prepared by TransCore in cooperation with the NH Department of Transportation (NHDOT) and regional stakeholders, provides detour plans due to traffic incidents along the subject corridors. The overall vision of the I-95 TIMP is seamless management of traffic and emergency operations across multiple jurisdictional and agency boundaries. Strategies for implementation of the plan are refined over time with innovative technologies and more effective event-centered communication protocols.

   Airports, railroads, buses, and community transportation services will be deployed for major evacuations. The U.S. Coast Guard, Federal Emergency Management Agency, Federal Highway Administration, and many other regional stakeholders have provided input for the I-95 TIMP.

Contact the NHDOT Bureau of Highway Maintenance for more information about the plans listed above.

Communities with Published Evacuation Routes

NH Seacoast Evacuation Study:
Exeter, Greenland, Hampton, Hampton Falls, Kensington, Madbury, New Castle, Newfields, Newington, Newmarket, North Hampton, Portsmouth, Rye, Seabrook, South Hampton, and Stratham

I-95 TIMP:
Barrington, Dover, Exeter, Greenland, Hampton, Hampton Falls, Lee, Madbury, Newcastle, Newington, North Hampton, Portsmouth, Rochester, Rollinsford, Rye, Seabrook, Somersworth, and Stratham

II. Evacuation

NH Department of Transportation Resources and Activities

- The NH Department of Transportation (NHDOT) continues to implement successful Intelligent Transportation Systems (ITS) in highway design and programs. Dynamic mapping feeds and social media platforms including multiple Twitter accounts (see box at right) are in use to communicate transportation information for major NH transportation routes. This information is also reported to www.newengland511.org.
- Emergency management directors and fire chiefs typically receive copies of Traffic Control Plans (TCPs) which are developed as part of the NHDOT project design process. Some of these TCPs or the Traffic Management Plans associated with larger projects could provide information useful to communities interested in adding detail to evacuation routes specific to a given town or city.
- Many bridges susceptible to scour have a Plan of Action (POA) that specifies detour routes.
- NHDOT maintenance crews have extensive experience in deployment of equipment and traffic signs, including digital dynamic messaging signs that will be available as resources allow.

NHDOT Twitter accounts for major New Hampshire routes include:

- *I-93*
- *I-293*
- *I-89*
- *I-95*
- *Spaulding Turnpike*
- *F.E. Everett Turnpike*
- *NH 101*

Live map information is also available at www.waze.com.

Evacuation of People with Disabilities and Others with Access and Functional Needs

Depending upon where and how extensive a flood is, a significant number of people affected may have disabilities or other access and functional needs. People with access and functional needs in the State of New Hampshire include: persons in need of medical assistance; those who use service animals; children; medically fragile or dependent seniors; people whose primary language is not English; those who are incarcerated; and people unable to drive or without transportation. As the number of older people living in the state increases, so will the number of people with access and functional needs.

For information on how and when to evacuate households or residential facilities that need additional assistance, contact NH Homeland Security and Emergency Management (See Appendix B for contact information).

Evacuation of Pets and Other Animals

If it isn't safe for people to stay at home if a flood happens, it isn't safe for pets either. If an evacuation order is given, your residents should not leave their pets behind. See page 19 for resources related to pet and farm animal safety during a disaster, including guidance related to evacuation. The American Veterinary Medical Association also provides information about animals and disaster safety. Its *Saving the Whole Family* brochure includes detailed guidelines for developing evacuation kits for small animals, backyard poultry and birds, horses, and livestock. Consider sharing this information through your community's communication channels, including social media accounts.

Public Safety Messaging

During an actual emergency, communicating with your residents about what they need to do can be critical. Evacuation orders and routes, shelter-in-place instructions, and other safety messaging can be a matter of life or death. Establishing information flow routes prior to an emergency is critical.

As discussed on page 18, NH Homeland Security and Emergency Management (HSEM) has multiple social media outlets that are used to communicate safety messaging to the entire state if needed. In addition, NHHSEM has the ability to focus in on particular neighborhoods or communities as needed. As such, flood warnings can be sent out statewide, by region, or by neighborhood.

NH Route 49, Campton (Source: NHHSEM)

In the event of the State Emergency Operation Center (see page 30) being activated due to a major flood or other emergency, the NH Department of Safety Public Information Officer is available for guidance on messaging and press releases and to assist with the news media (See Appendix B for contact information).

Communicating with Your Residents

When a flood is imminent or ongoing, the public must be provided with timely information about:

Click on the graphic above to access a shareable version.

- Preparedness measures and safety precautions that should be taken (See pages 17-19)
- Short-term and long-term weather forecasts (See pages 12-13)
- Water levels and their implications for flooding (See page 14)
- Road closures – and consider using outreach materials from the National Weather Service's Turn Around Don't Drown® campaign to make sure your residents understand the danger of driving through floodwaters.
- Available shelters (See page 31)
- Evacuation orders (mandatory or voluntary) (See pages 35-37)
- Any other immediate flood-related threat, such as an ice jam (See page 33) or a threatened dam (See page 34)

In addition to using your community's website and social media accounts to distribute information, it may also be helpful to have a notification protocol to distribute information to the media.

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After the Flood

Short Term Recovery Considerations

Safety Considerations for You and Your Residents
Emergency Cleanup, Permitting, and Repairs
Meeting National Flood Insurance Program Requirements
Flood Insurance and Claims
FEMA Disaster Assistance
Other Assistance
Keeping Your Community Informed

I. Safety Considerations for You and Your Residents

Important Post-Flood Information for Your Residents

After a flood, many potential dangers remain that can place people at risk. Below are key messages to share with your residents as the flood begins to recede.

Click on the Federal Emergency Management Agency graphic above to access a shareable version.

- Listen to authorities for information and instructions. If you have evacuated, return home only when authorities say it is safe.
- Avoid driving, except in emergencies, and NEVER drive through floodwaters.
- When you can safely enter your home, photograph flood damage and contact your insurance agent *as soon as possible* to talk through your options.
- Your home may be contaminated with mold or sewage. Wear boots, gloves and a face mask during cleanup (See page 43 for shareable resources about flood cleanup).
- Be aware of the risk of electrocution. Do not touch electrical equipment if it is wet or if you are standing in water. If it is safe to do so, turn off the electricity to prevent electric shock.
- Avoid wading in floodwater, which can contain dangerous debris, contaminants, and animals such as rodents and snakes. Underground or downed power lines can also electrically charge the water.
- Use an emergency generator or other gas-powered machinery ONLY outdoors, away from doors and windows.

The Centers for Disease Control have additional guidance about health and safety risks related to flooding that you may also want to share with your residents.

Cleaning Up After a Flood

Your residents will need information about how they can safely clean up their homes following a flood. Consider sharing the following resources that can provide the information they will need. These documents can also be helpful for community officials to guide larger community cleanup efforts.

Cleaning up a damaged building after a flood (Source: FEMA)

- The Federal Emergency Management Agency's (FEMA) fact sheet *The ABC's of Returning to Flooded Buildings* has helpful information about flood clean up, including a suggested supply list, safety tips when re-entering flooded buildings, and more.
- The American Red Cross/FEMA publication *Repairing Your Flooded Home* has several chapters devoted to home clean up.
- The National Center for Healthy Housing has developed *Creating a Healthy Home: A Field Guide for Clean-Up of Flooded Homes*.
- The NH Department of Environmental Services' fact sheet *Mold in Homes* includes guidance about removing and disposing of mold.

Debris Removal Assistance

The State of New Hampshire publishes a Debris Management Plan (DMP). The purpose of the DMP is to facilitate removal, collection, and disposal of debris generated from a catastrophic disaster. The DMP is a support annex to Emergency Support Function 3 (ESF 3) *Public Works and Engineering* for which the NH Department of Transportation (NHDOT) is the lead agency within the State Emergency Operations Plan. Coordination of people and equipment is managed according to the plan. Adhering to the established roles, responsibilities, and priorities outlined in the DMP is important for everyone involved. Fostering public health and safety as well as adherence to financial resource requirements are paramount for effective implementation of the DMP. The plan includes an explanation about how contracting and procurement of equipment and services will be accomplished.

The State DMP is available by request from the NHDOT (See Appendix B for contact information.)

The state responds with available resources according to the DMP. There are two types of federal funds that might be available depending on the amount and type of debris:

1. Federal Emergency Management Agency funds which are coordinated by NH Homeland Security and Emergency Management (See page 63).
2. Federal Highway Administration funds which are coordinated by NHDOT.

Debris is ranked according to hazard. Debris that is an immediate threat to lives and public health and safety is higher priority. Monitoring of debris removal is necessary and normally performed in accordance with NH Department of Environmental Services (NHDES) rules. There are three key functions/goals associated with debris management and removal assistance:

1. Provide coordination for state-wide implementation of the DMP.
2. Allocate human, technical, and financial resources already available and generate additional support.
3. Provide safe and environmentally responsible coordination on a state and local level including collection, sorting, recycling, and disposal operations.

See also these NHDES fact sheets:

Management of Collected Debris Following Severe Storm Events

Obtaining Authorization for Emergency Wetlands Impacts

Vegetation Management for Water Quality

Road, Culvert, and Bridge Washouts

Communities are responsible for maintaining Class V municipal roads within their jurisdictions. Many of these local roads are gravel and are more easily subjected to washout during floods, particularly those with undersized culverts. The NH Code of Administrative Rules Env-Wt 900 includes requirements for the design and construction of certain stream crossings, including temporary crossings which must be met if applicable.

The UNH Technology Transfer Center (T2), the state's Local Technical Assistance Program, offers training that can help community staff be prepared for and address such road washouts. Training topics include gravel road maintenance, municipal road safety and trees, and ensuring proper drainage near roadways. Your community's highway personnel can also upgrade culverts more quickly and without permits under certain conditions through the T2 Certified Culvert Maintainer Process.

When a washout impacts a state-maintained road, contact your local NH Department of Transportation (NHDOT) Highway Maintenance District office for assistance.

A damaged bridge in Lincoln following Tropical Storm Irene, 2011 (Source: FEMA)

Maps and GIS data showing roads and road classifications are available through NHDOT's GIS Data Catalog webpage.

Be sure to fully document repairs your community makes – take 'before' and 'after' pictures, maintain timesheet records of staff making repairs, and keep records of additional costs such as repair materials. This documentation is important for FEMA damage assessments and public assistance grant funding applications if a Federal Disaster is declared and funding is made available (See pages 62-63 for more information).

Public Water Systems and Wells

During and after floods, water systems can become contaminated from sewage, oil, gasoline, or other chemicals or debris contained in floodwaters. All community water systems are required by the state to have and maintain an emergency plan which should be followed in the event of a flood. When community and non-community public water systems are affected by floods are other emergencies, the NH Department of Environmental Services (NHDES) Drinking Water & Groundwater Bureau must be notified within 24 hours and may be able to provide assistance. Additional information about public water systems and emergency planning is available on the NHDES website.

Residents with private water wells that have been flooded should boil their water and have their well water quality tested after the floodwaters have receded. More information about testing private wells is available online on the NHDES website. Additional safety guidance and resources are available on NHDES' Private Drinking Water Wells Susceptible to Flood Contamination webpage.

NHDES issues drinking water advisories for public water systems in the state which are posted on the NHDES website and include important safety instructions. If an advisory has been issued that affects your community, be sure to communicate this information widely to your residents.

Septic Systems

During floods, septic systems can often become overloaded with floodwaters. Damaged septic tanks, cesspools, pits and leaching systems can be serious health hazards and should be serviced as soon as possible. If sinks and toilets are not draining properly, the property's septic system may be impaired or damaged. The septic tank should be pumped as soon as possible, and a licensed septic system designer consulted to assess the system for damage. NHDES has guidance for replacement of failed subsurface disposal systems. Additional information is available from the NHDES Subsurface Systems Bureau.

Visit NHDES' Disaster Preparedness and Response webpage for flood safety, cleanup, and recovery information on many topics including water systems, waste debris, and more.

Permit Requirements

Depending on the nature of flood cleanup or repair activities, federal and state permits may be required. Examples of state permits that may be needed after a flood include, but are not limited to, the following:

- Alteration of terrain permit: required when a project proposes to disturb more than 100,000 square feet of terrain (50,000 square feet if any disturbance is within the protected shoreline as defined by RSA 483-B) or if the project disturbs any area having a 25% or steeper land slope and is within 50 feet of any surface water.
- Emergency Wetland permit: requested when there is a threat to public safety or public health, or if significant damage to private property is imminent and the event causing the emergency occurred within the previous five days.
- Open burning of storm debris: "Open burning" is the burning of combustible material where the emissions do not vent through a stack, chimney or flue, but is released directly to the air. Open burning is regulated under RSA 125-C and New Hampshire Code of Administrative Rules Env-A 1000 *Prevention Abatement and Control of Open Sources of Air Pollution*. In addition, RSA 125-N prohibits the open burning of household waste.
- Hazardous waste emergency permit: may be issued for a non-permitted facility to treat, store or dispose of hazardous waste; or for a permitted facility to treat, store, or dispose of hazardous waste not covered by an existing permit.
- Solid waste emergency permit: applies to facilities that operate for a limited period of time in response to any emergency for which no other readily available response exists and for which a delayed response to obtain another type of permit will result in an unnecessary risk to public health, safety or the environment.

For communities that participate in the National Flood Insurance Program, any proposed development activity in the Special Flood Hazard Area shown on the FEMA Flood Insurance Rate Map for your community will require a permit from your community and must meet the requirements of your community's floodplain development ordinance. *See page 57 for more information.*

To help applicants navigate the permitting process, the NH Department of Environmental Services (NHDES) can arrange a pre-application meeting to help you understand requirements. Visit NHDES' Permits webpage for more information.

National Historic Preservation Act (NHPA) Section 106 Project Review

All federally funded, licensed, or assisted projects in New Hampshire are subject to the review requirements of Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470), implemented by the procedures of the federal Advisory Council on Historic Preservation (ACHP), Protection of Historic Properties (36 CFR Part 800).

Following a flood, the most likely federal agency providing project funding would be the Federal Emergency Management Agency (FEMA). However, project permitting may also be required from other federal agencies including the U.S. Army Corps of Engineers and the Environmental Protection Agency (EPA).

Once the lead federal agency for a project has been identified, that agency or legal designee is required to take into account the possible impacts of the project on historical resources. The agency must submit the proposed project to the NH Division of Historical Resources (DHR) for a determination of potential effects on properties that are listed, or are eligible for listing, in the National Register of Historic Places. This determination is the result of what is commonly called a Section 106 review. The goal of the Section 106 review is to avoid, minimize, or mitigate the adverse impact of a project on the state's historical resources, which among other things, can provide New Hampshire communities with a sense of place, cohesion and in some cases, economic benefit.

For FEMA-funded projects, the agency itself typically initiates the Section 106 review process. However, for projects that require federal permitting or licensing by other federal agencies, it may be up to your community to start the review process. The first step is to file a Request for Project Review form and supporting materials with NHDHR.

If a post-flood project is not subject to Section 106 review but your community has concerns about its impact on historical resources, NHDHR will, upon request, provide a technical assistance review to assist your community with flood recovery planning.

Section 106 and technical assistance reviews normally can take up to 30 days. However, an expedited timeline can be requested under extenuating circumstances. If you anticipate that your community's project will require review, it is best to contact NHDHR as soon as possible.

Stream Restoration and Technical Assistance

The main focus of the NH Fish and Game Department's (NHFGD) Fish Habitat Program is to provide technical assistance to individuals, communities, non-governmental organizations, and state and federal agencies on aquatic habitat restoration.

Johnson Brook at Nash Stream Forest Natural Area (Source: John Magee, NHFGD)

Generally, these restoration projects are in response to a documented aquatic habitat problem that has existed for years or decades at a location. However, restoration work done for both short-term and long-term responses to flood damage can also be performed. Long-term solutions can increase the resilience of aquatic habitats to future floods and other stressors, which can have a positive effect on our communities, wildlife, and the environment. Fish Habitat Program staff can work with your community, other state and federal agency staff, and other organizations, both in the immediate aftermath of a flood and on the long-term response to flood damage.

There are several funding sources for aquatic habitat and water quality restoration work that range from state or federal programs managed by state agencies to private foundations managed by a technical committee and/or board. In general, these sources are not for work to be done in an emergency capacity immediately after a flood, but instead are for long-term solutions which require detailed planning and engineering designs. Therefore, these funding sources are typically for restoration projects that are done several months to years after flood damage occurs. Contact NHFGD for more information (See Appendix B for contact information).

Dams: Recovery Considerations

Typically, in the wake of a major flood event, local resources will be focused on repairing washed out roads, damaged bridges, and restoring services and utilities to its population. In the longer term, the condition of local dams in the aftermath of the flood should also be examined. It is recommended that your community:

Breach at Haydens Mill Pond Dam, Hollis (Source: NHDES Dam Bureau)

- Check-in with dam owners who you may have coordinated with during the flood or that you know suffered damage to their structures. Contact the NH Department of Environmental Services (NHDES) Dam Bureau to request an inspection to assess current conditions so that they may provide recommendations for repair/upgrade, if warranted.
- Review, in conjunction with the dam owner and the Dam Bureau, the Emergency Action Plans (EAPs) for impacted dams and how they were (or could have been) implemented. As owners rarely have the benefit of a previous incident to use as a guide in the development of their EAPs, information and protocols in the plan may need adjustment to improve response in the future.
- For any dam that failed and had an EAP, compare the actual areas that were inundated to those shown on the maps included in the EAP. These maps are created using complex computer models that require many inputs to be made, so such after-the-fact comparisons could lead to improvements that make future responses more effective.

See page 24 for more information about EAPs for dams or visit the NHDES Dam Bureau's EAP webpage.

Helping Your Residents Find Reliable Contractors

Following disasters, building contractors can serve as your ally in helping to communicate with property owners about which permits may be needed and building requirements that may apply. However, unqualified or dishonest contractors may offer disaster victims cut rates or "special deals" that are actually scams.

The State of New Hampshire licenses electricians and plumbers who can be looked up through the NH Licensing Verification website. Consider providing your residents with a list of licensed sub-contractors or provide a link to this website. General contractors are not required to be licensed in the state, though individual communities may choose to require licensing.

Consider distributing guidance to your residents about how to avoid unscrupulous contractors who may visit neigborhoods that have experienced damage following a disaster (See box at right and below).

Your residents may have multiple visitors to help them through the recovery process after a flood. Unfortunately, scam artists may also pay a visit. Click on the graphic above to download a shareable FEMA infographic that explains who might be visiting after a flood.

Avoiding Scam Artists

Disasters can attract fraudulent contractors who may offer to begin work immediately with a cash payment. When hiring a contractor, your residents should:

- *only use licensed local contractors who are backed by reliable references.*
- *get written estimates from at least three contractors that include the cost of labor and materials.*
- *insist that contractors carry general liability insurance and workers' compensation.*
- *never pay cash or pay more than half the costs of repairs upfront.*

Contracting scams or price gouging after a disaster can be reported to the Federal Emergency Management Agency's Disaster Fraud Hotline at 1-866-720-5721 or disaster@leo.gov.

III. Meeting National Flood Insurance Program (NFIP) Requirements

Overview

If your community participates in the NFIP, all repair and redevelopment within the Special Flood Hazard Area (SFHA) must be completed according to the requirements in your community's floodplain management ordinance. After a major flood, you will probably take on emergency responsibilities, often at the expense of your normal duties. There may be pressure from the public and elected officials to waive normal procedures and regulations in order to help people return to their homes and businesses as fast as possible. Therefore, it is very important that you have adequate procedures in place to ensure full and fair enforcement of your community's ordinance.

To meet the requirements of your community's floodplain management ordinance after a flood, you must:

1. Determine if buildings located in the SFHA have been Substantially Damaged (See box at right and pages 53-56).
2. Issue floodplain development permits for **any development** proposed in the SFHA. This includes repairs to **any** damaged buildings in the SFHA (See page 57).
3. Ensure compliance of *all* repaired/redeveloped buildings with applicable requirements of your community's ordinance (See page 58).

What is "Substantial Damage"?

Substantial Damage is a formal determination made by a community official that the cost to repair a damaged building to its "before damage" condition would be 50% or more of the market value of the structure before the damage occurred.

Buildings determined to be Substantially Damaged must be brought into full compliance with the same requirements as new construction as indicated in your community's floodplain management ordinance.

Your work to meet the requirements of your community's floodplain management ordinance post-disaster can be reimbursed through the Federal Emergency Management Agency if a Federal Disaster Declaration occurs and Public Assistance is made available (See page 63).

The "Substantial Damage" Requirement

When owners of buildings in the Special Flood Hazard Area (SFHA) must repair damage, it is your community's responsibilty to determine whether the building has been "Substantially Damaged." This is a formal determination made by your community that the cost to repair a damaged building to its "before damage" condition would be 50% or more of the market value of the structure before the damage occurred. Some important things to remember about Substantial Damage:

- Substantially Damaged buildings must comply with the same requirements as new construction in your community's floodplain management ordinance. In addition to other requirements, that will mean elevating to or above the Base Flood Elevation for residential buildings (or higher if your community has an added elevation requirement).
- Damage can be from *any* cause – flood, fire, wind, or other natural or human-caused hazard.
- The rule applies to all buildings in the SFHA, regardless of whether a building is covered by flood insurance.
- People will be eager to begin rebuilding. The sooner your community can issue Substantial Damage determinations after a disaster the better, since the determination will affect how they can rebuild.
- Starting outreach through your website and social media accounts to your residents about Substantial Damage (and permit requirements) as early as possible (even before the floodwaters subside) is recommended to make sure they understand what is required before they can start to rebuild.

Substantially Damaged buildings are eligible for Increased Cost of Compliance (ICC) coverage through a property owner's flood insurance policy. ICC funds can be used to elevate, relocate, demolish, or (for a non-residential property) floodproof the building (See page 60 for more information).

Assessing Flood Damage for Substantial Damage Determinations

In order to make Substantial Damage determinations, your community will need to perform an assessment of each flooded property in the Special Flood Hazard Area (SFHA) to understand the extent of the damage and needed repairs. If your community has the available staff, it is recommended that door-to-door inspections be performed as soon as safely possible after the event.

On-site preliminary damage assessments may be done using a checklist tailored to your community or by using the Federal Emergency Management Agency's (FEMA) Substantial Damage Estimator (SDE) program (see box at right). Here are some tips for performing damage assessments:

- If possible, have a list of all properties located in the SFHA, which includes the assessed value of each building, ready before a flood happens.
- Print work maps that show buildings/parcels, addresses, and SFHA boundaries. You can also use a mobile device to view FEMA flood information online based on your location for all areas of the state except Belknap County.
- Be sure to take plenty of photos documenting damage for each property.
- Any building that is collapsed or appears to be in danger of imminent collapse should be marked with a red placard. Use yellow placards for buildings that are structurally sound but require any type of repair (and be sure to indicate that repairs will still require a permit). Use green placards for unaffected buildings.

FEMA Substantial Damage Estimator (SDE) Tool

The SDE software tool was developed by FEMA to help community officials estimate building value and costs to repair residential and non-residential buildings after natural disasters. SDE damage assessments use predetermined repair values of each element of a structure to estimate total damage to a structure. This repair estimate is then compared to the assessed value to reach the percent damage the structure has sustained. The SDE software and user guide are available for free download through FEMA's online library. Best practices for using the SDE tool are also available.

Staff from other NH communities may be available to assist with damage assessments for your community through the NH Public Works Mutual Aid Program. See page 68 for more information.

Making Substantial Damage Determinations

Summarized below are general guidelines for making Substantial Damage determinations. Specific sections of the Federal Emergency Management Agency's (FEMA) *Substantial Improvement/Substantial Damage (SI/SD) Desk Reference*, a comprehensive resource on the subject, are noted.

A contractor makes repairs to a damaged home. (Source: FEMA)

Determining the Market Value of a Building

You can use your community's current assessed value of the structure (excluding the land) to determine the market value of the structure before the damage occurred. See also Section 4.5 of the SI/SD Desk Reference for other options. If the property owner disagrees with the source used for the market value, they may engage a licensed property appraiser (at their own cost) to submit a comparable property appraisal.

Estimating Repair Costs for a Building

Your community may choose to use FEMA's *Substantial Damage Estimator tool* (See page 54) to estimate repair costs of damaged structures. Section 4.4.3 of the SI/SD Desk Reference includes other acceptable ways to estimate repair costs. Regardless of which approach your community chooses, the repair costs must:

- be calculated for full repair to the building's before damage condition, even if the owner elects to do less.
- also include the cost of any improvements the owner has opted to have performed during the repair project.
- include the fair market value of any donated or discounted materials and volunteer labor (this includes work to be performed by the property owners themselves.)

A detailed list of items that should (and should not) be included in repair cost estimates is included in Section 4.4 of the SI/SD Desk Reference.

Issuing Substantial Damage Determinations to Property Owners

Your community must notify property owners in writing whether or not you have designated their building as Substantially Damaged. It is in the best interest of your community and your residents to issue these letters as soon as possible after the flood, before people begin to make repairs. Consider issuing letters with a preliminary determination first, and request that the property owner meet with you to obtain their permit (See page 57) and receive the final determination. Then, if the property owner provides more accurate information at the follow-up meeting that indicates the preliminary determination should be changed, it can be, as needed. Find sample determination letters in *Appendix E* of the Federal Emergency Management Agency's *Substantial Improvement/Substantial Damage Desk Reference*. Note that a copy of a Substantial Damage determination letter is required for an Increased Cost of Compliance claim (See page 60).

Substantial Damage Determinations: Precautions and Appeals

Disagreements over the list of repairs and costs are not uncommon. Property owners have a incentive to show less damage than actually occurred to avoid the cost of bringing the building into compliance. Some property owners may seek bids for repair from contractors with the condition that the bids come in at less than 50% of the building's pre-flood value. You need to be prepared to deny a permit application if the cost of repair appears suspiciously low.

Property owners may appeal a community's Substantial Damage determination on the basis of insufficient information, errors, repair/improvement costs that should be included/excluded, inappropriate valuations of costs for proposed work, or an inappropriate method to determine the building's market value. Be sure you thoroughly document damage with photographs, and ***be consistent in how you determine market value and estimate repair costs*** to ensure your community's determinations are defensible.

Floodplain Development Permit Requirements

A floodplain development permit must be issued by your community for any development that occurs in the the Special Flood Hazard Area (SFHA), including repairs to buildings such as (but not limited to) removing, altering, or replacing the roof, walls, siding, wallboard, plaster, insulation, paneling, cabinets, flooring, electrical system, and plumbing, heating, or air conditioning systems.

Flood damage in Conway after Irene, 2011 (Source: FEMA)

- A permit is required regardless of whether or not the repairs rise to the level of Substantial Damage.
- The requirement for a permit cannot be waived, but your community may choose to waive permit fees for applicants.
- Property owners will be eager to start making repairs and may not be aware that a permit is required. Make sure you perform outreach as early as possible about when a permit is needed (e.g., even before floodwaters subside).
- You may allow certain cleanup and **temporary emergency repairs** to proceed without a permit including:
    - Removing and disposing of flood-damaged contents.
    - Hosing, scrubbing or cleaning floors, walls, ductwork, etc.
    - Temporary repairs to cover holes in roofs, walls, and windows or to make a building safe to enter (e.g., removing sagging ceilings, shoring up broken foundations, etc.).

If your community participates in the National Flood Insurance Program, you are responsible for issuing a floodplain development permit for any development occurring in the SFHA, regardless of whether or not your community has a building inspector on staff.

Monitoring Rebuilding Efforts

As rebuilding efforts proceed in your community:

- Conduct periodic field inspections during construction to ensure that development complies with issued permits.
- Work with builders and property owners to correct deficiencies and violations as needed.
- Be on the lookout for unpermitted development.
- Ensure you receive "as-built" elevation data (e.g., via a completed *Elevation Certificate form*) for new construction and Substantially Improved or Substantially Damaged buildings, a requirement of your community's floodplain management ordinance. This information is also required documentation to support Increased Cost of Compliance claims (See page 60).

A newly elevated house (Source: FEMA)

***Remember**: it is your community's responsibility to ensure that all repairs are performed in compliance with your floodplain management ordinance. Be familiar with the details of your ordinance before a flood happens to make sure you fully understand the requirements that will apply.*

National Flood Insurance Program (NFIP) Flood Insurance

NFIP flood insurance is available to all homeowners, renters, and business owners in NFIP communities. Coverage is available for any building or permanently anchored mobile home and its contents. Flood insurance is *required* for buildings located in Special Flood Hazard Areas if there is a federally-backed loan (i.e., a mortgage) on the property.

Click on the graphic above to access a shareable version.

Information for your Residents

After a flood, your residents will likely have many questions about flood insurance coverage and filing claims for their insurance agent. The FloodSmart.gov website also provides information about NFIP flood insurance including the following topics that will be important to your residents after a flood:

- How to file a flood insurance claim
- What **is** and **is not** covered under a flood insurance policy
- How to document damage and minimize mold growth
- What to do if they are unsatisfied with their claim payment

The Federal Emergency Management Agency also has detailed step-by-step guidance on their website about filing a claim and a related infographic (See graphic at top right) and fact sheet. You may wish to share some of this information with your residents on your website and social media, or have printed copies available at your office after a flood happens as the floodwaters begin to subside.

You or your residents can also call the NFIP Help Center toll free at 1-800-427-4661 for general questions about flood insurance.

Increased Cost of Compliance (ICC) Coverage

Most National Flood Insurance Program (NFIP) flood insurance policies include ICC coverage for buildings in Special Flood Hazard Areas. ICC coverage provides up to $30,000 for policyholders to help cover the costs of bringing a building into compliance with their community's floodplain management ordinance. A building is eligible for ICC if it is determined to be Substantially Damaged (See pages 53-56) or if it has been Repetitively Damaged (See box at right). ICC coverage can be used for **elevating**, **moving**, **demolishing, or (for non-residential buildings) floodproofing structures**.

Community officials play a key role in the ICC claims process. The most important points of involvement include:

- Making Substantial Damage determinations and notifying property owners in writing (See pages 53-56).
- Helping property owners and contractors understand the requirements to bring buildings into compliance with the community's floodplain management ordinance.
- Issuing floodplain development permits, ensuring structures are built in compliance with your community's ordinance, and issuing Certificates of Occupancy.

More information about ICC is available for community officials in FEMA's publication *ICC Coverage: Guidance for State and Local Officials*. FEMA's *ICC Coverage* brochure is also a helpful resource that you may wish to share with your residents after a flood.

ICC and "Repetitively Damaged" Buildings

For residents to be eligible for ICC funds for "repetitively damaged" buildings, your community must have a repetitive loss provision in its floodplain management ordinance and determine that the building was damaged by a flood two times in the past ten years, where the cost of repairing the flood damage, on average, equaled or exceeded 25 percent of its market value at the time of each flood. No communities in the state currently have adopted such a provision into their ordinance.

Community officials who take the time to learn about ICC are best positioned to help their residents tap into this additional source of funds.

V. FEMA Disaster Assistance

General Information about FEMA Disaster Assistance

Your community will most likely need outside aid in order to recover from a major flood. You should be familiar with available assistance programs and their requirements *before* a flood happens in order to best respond to the needs of your community and residents.

All requests for a Presidential Disaster Declaration must be made by the Governor of the affected state. State and federal officials conduct a Preliminary Damage Assessment (See page 62) to estimate the extent of the disaster and its impact on individuals and public facilities. This information is included in the Governor's request to show that federal assistance is necessary for the disaster response. Based on the Governor's request, the President may declare that a major disaster or emergency exists, which will make available federal programs to assist in the response and recovery effort (See pages 63-64). Keep in mind that not all programs are activated for every disaster.

If a Presidential Disaster Declaration does **not** occur, assistance may still be available through other sources (See Section VI: Other Assistance on pages 65-69).

Aftermath of March 2018 coastal storm, Rye (Source: Kim Reed)

Disaster Assistance vs. Flood Insurance

If they have flood insurance, your residents will be covered even if a Federal Disaster is not declared.

FEMA disaster grants average about $5,000 per household. By comparison, the average flood insurance claim payment is nearly $30,000 which does not have to be repaid. (Source: FEMA)

Encourage your residents to consider purchasing flood insurance before and after a flood to ensure they have the protection they need.

Preliminary Damage Assessments (PDA) After a Flooding Event

Following a disaster, the Federal Emergency Management Agency (FEMA) and the state will team up with impacted communities to complete a Joint Preliminary Damage Assessment (PDA). The purpose of the Joint PDA is to confirm damages and evaluate the impact to the state in order to determine if the monetary threshold has been met for the state to request a Federally Declared Disaster. Joint PDA teams will evaluate public facilities for the Public Assistance program (See page 63) and private homes for the Individual Assistance program (see page 64).

PDAs are completed as quickly after the conclusion of the disaster as possible. This time is crucial for gathering evidence of the disaster, such as photos, videos, or any other documentation that can later be used should federal aid be granted. It is especially important to document damaged facilities before emergency repairs are made.

Following the completion of the Joint PDA, if it is determined that the state has met the threshold for FEMA disaster assistance, a request will be made by the state through the Governor for a Declared Disaster.

PDA Resources

- *FEMA Independent Study Courses for Individual Assistance and Public Assistance PDAs*
- *FEMA's Damage Assessment Operations Manual*
- *NH Homeland Security and Emergency Management Resource Center*

Completing a PDA following a flooding event poses unique hazards and challenges. Infrastructure will likely be damaged and unstable following the event; therefore safety must be the primary concern while completing these assessments.

FEMA Public Assistance Grants

When a Federally-Declared Disaster occurs, the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) grant program can provide federal financial aid to communities so that they can quickly respond to and recover from major disasters. Through the PA program, FEMA provides federal disaster grant assistance for:

- Emergency work (debris removal and emergency protective measures)
- Repair, replacement, or restoration of disaster-damaged, publicly-owned facilities
- Hazard mitigation measures enacted during recovery that protect against future events
- Building code and floodplain management ordinance administration and enforcement by communities (See pages 52-58)

PA funding becomes available when a federal disaster is declared following an incident. The state will request a declaration on behalf of the impacted communities/other eligible entities. The PA program operates under the Stafford Act and guidance for the program can be found in the Public Assistance Program and Policy Guide.

Additional information about the PA grant program is available through the NH Homeland Security and Emergency Management Resource Center.

Flood damage in Alstead, October, 2005 (Source: NHHSEM)

PA Eligibility

The four basic components of eligibility are listed below.

Categories of Work

Emergency Work:

A. Debris Removal
B. Emergency Protective Measures

Permanent Work:

C. Roads/Bridges
D. Water Control Facilities
E. Buildings/Equipment
F. Utilities
G. Parks, Recreational & Other Facilities

V. FEMA Disaster Assistance

FEMA Individual Assistance Grants

When a Federally-Declared Disaster occurs, the Federal Emergency Management Agency (FEMA) may provide assistance to individuals and households through the Individual Assistance (IA) program. This assistance can include money for rental assistance, essential home repairs, personal property and other needs not covered by insurance. IA program categories include the following:

- Mass Care and Emergency Assistance (MC/EA)
- Crisis Counseling Assistance and Training Program (CCP)
- Disaster Unemployment Assistance (DUA)
- Disaster Legal Services (DLS)
- Disaster Case Management (DCM)
- Individuals and Households Program (IHP)

Information for Your Residents

If IA is made available, flood victims can apply for assistance:

- Online/via mobile device at disasterassistance.gov
- By calling 1-800-621-FEMA or 1-800-462-7585 (TTY)
- By visiting a nearby FEMA Disaster Recovery Center (Locations posted online)

Key Factors for an IA Declaration

- *Amount/type of damage*
- *Impact on infrastructure of affected homes*
- *Imminent threats to public health and safety of individuals*
- *Concentration of damage*
- *Amount of insurance coverage in place*
- *Assistance available from other sources*
- *State and local resource commitments from previous undeclared events*
- *Frequency of disaster events over recent time period*

In the event of an IA declaration, communities will be notified by NH Homeland Security and Emergency Management's Community Outreach Office.

U.S. Small Business Administration Disaster Loans: Not Just For Businesses

If flood insurance claims and grants do not fully cover the recovery costs of your residents, a U.S. Small Business Administration (SBA) low interest disaster loan may be an option for them. In addition to helping businesses (of any size), disaster loans through SBA are also available for homeowners and renters. In order to qualify for an SBA disaster loan, the property must be within a Federally-Declared, SBA-Declared, or U.S. Secretary of Agriculture-Declared disaster area. Eligible disaster areas can be confirmed on the SBA's Current Declared Disasters webpage by state and county.

Homeowners may apply for up to $200,000 to repair or replace their primary residence. If improvements that help prevent the risk of future property damage from a similar disaster are made, the applicant may be eligible for up to a 20 percent loan amount increase above the real estate damage, as verified by the SBA. Renters and homeowners may borrow up to $40,000 to replace or repair personal property — such as clothing, furniture, cars and appliances — damaged or destroyed in a disaster.

Applicants can apply online, in person at a Disaster Recovery Center, or by mailing in a paper application. Details about the application process and required information are available on the SBA's website and through their Customer Service Center at 1-800-659-2955. *Consider sharing information about the SBA disaster loan program with your residents using the SBA's fact sheet series.*

U.S. Department of Agriculture

The U.S. Department of Agriculture (USDA) may have technical and financial assistance available to landowners and agricultural producers for post-flood recovery. USDA agencies that have provided recovery assistance in New Hampshire following disasters in the past include the Natural Resources Conservation Service (NRCS) and the Farm Services Agency (FSA) via the programs listed below.

NRCS Emergency Watershed Protection Program

The NRCS Emergency Watershed Protection (EWP) program may offer assistance in the form of:

1. Recovery Assistance for certain activities including, but not limited to those listed below. Public and private landowners can apply for assistance through a local sponsor such as your community.
    - Debris removal
    - Reshaping and protecting eroded streambanks
    - Establishing vegetative cover on critically eroding lands
    - Repairing levees and other structures
2. Purchase of easements on floodprone land through the Floodplain Easement Option.

Flooded farmland after Irene, 2011 (Source: FEMA)

Contact the NRCS state office at 603-868-9931 for more information about the EWP program.

FSA Emergency Conservation Program

The FSA's Emergency Conservation Program provides emergency funding and technical assistance to farmers to rehabilitate farmland damaged by natural disasters. Contact the FSA state office at 603-224-7941 for more information.

Private Assistance for Your Residents

Some no cost assistance may be available to your residents after a flood from volunteer nonprofit or faith-based organizations. Each organization sets its own qualifications to determine who they can help. Types of assistance that may be available include help with clean-up assessment, exterior and interior debris removal, muck out and gutting, and building repair and rebuild for owned primary residences. It may also include disaster case management, and emotional and spiritual care.

To access these services, which are coordinated in partnership with NH Homeland Security & Emergency Management and Volunteer NH, your residents may call 211 (1-866-444-4211 outside of NH) or visit 211nh.org to register. Any individual who has homeowners, renters, or flood insurance should submit an insurance claim before calling to register.

Discarded flood-damaged contents of a home (Source: FEMA)

New Hampshire 2-1-1™
Get Connected. Get Answers.
An initiative of Granite United Way

Remind your residents! *Permits for repairs are required even if volunteer organizations are performing the work and/or providing materials!*

NH Public Works Mutual Aid (NHPWMA) Program

The NHPWMA program is a network of municipalities that assist one another during emergencies through partnering agreements and a protocol for requesting and receiving aid. NHPWMA allows communities from all over the state to help those most affected by a disaster (See member list).

Assistance includes access to personnel (e.g., road agents, public works directors, building inspectors, water and wastewater operators); equipment such as trucks and graders; and many more resources.

Who Can Participate?

Authorized under RSA 53-A, NHPWMA is currently available to municipalities and other governmental entities including village districts and private water and wastewater utilities.

How Does it Work?

During emergencies, members can either:

1. Contact other members directly
2. Use the toll-free hotline (877-731-9908)
3. Use the pw.net email listserv

Providing aid is optional; the needs of your community always come first. Agreements are reciprocal; all members can help each other.

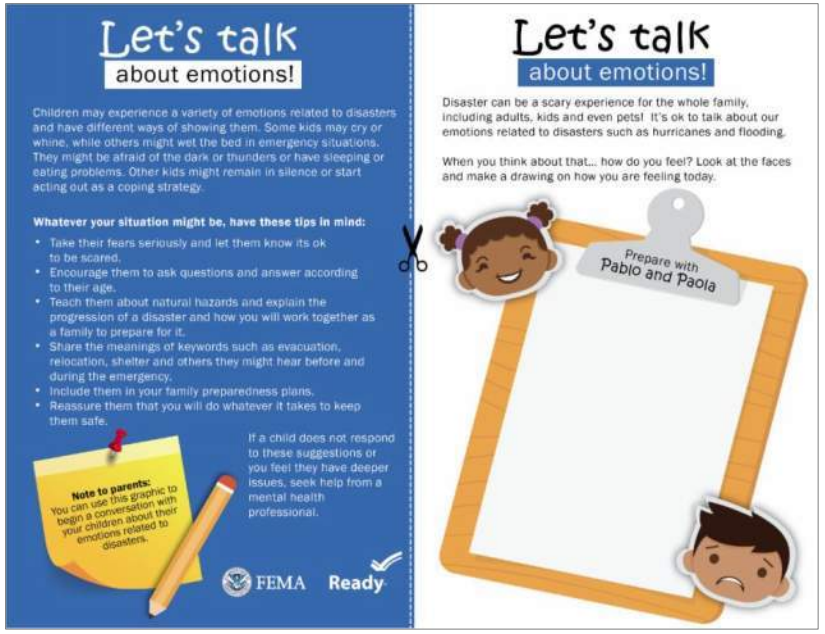
How Can My Community Join the NH Public Works Mutual Aid Program?

Members complete and sign a Mutual Aid and Assistance Agreement and complete the appropriate inventory forms available online. There is also a one-time fee of $25. For more information, visit the NHPWMA website.

For more information, call 1-877-731-9908 (toll-free) or visit the NHPWMA website at www.t2.unh.edu/ma.

Coping with Emotional Stress After a Flood

While people's reactions will vary, it is normal to experience emotional distress when a flood or other disaster happens. Support during this time is especially important for children, older adults, and other vulnerable individuals. Below you will find guidance on recognizing signs of disaster-caused stress and resources for coping which you may wish to share with residents through your community's communications channels.



FEMA's "Let's Talk About Emotions!" graphic provides pointers to help parents and other adults talk with children about their feelings following a disaster. Click on the graphic above to access a shareable version.

- The U.S. Department of Health and Human Services provides information about warning signs and risk factors for emotional stress after a disaster and makes available the Disaster Distress Helpline for those who need support.
- The National Child Traumatic Stress Network provides additional resources for parents and other adults to help children cope when a flood happens.
- FEMA also provides information for disaster survivors about dealing with disaster-caused stress, including guidance about helping children cope.
- Sources of local assistance may also be available through NH 211 (See page 67).

Communicating With Your Residents After a Flood

Be sure to communicate widely with your residents about the following important topics using your community website and social media accounts, and by making available relevant printed handouts at your community office:

- Safety and cleanup after a flood (See page 42-43)
- Drinking water advisories/well safety (See page 46)
- Finding reliable contractors for repairs (See page 51)
- Avoiding scam artists/Understanding who may be visiting their house (See page 51)
- Permitting requirements, including the Substantial Damage rule (See pages 47, 52-57)
- Filing flood insurance claims and Increased Cost of Compliance coverage (See pages 59 - 60)
- How to apply for disaster assistance
    - FEMA assistance (See page 64)
    - Other forms of assistance (See pages 65-67, 69)

Flooding at North and West Shore Roads, Hebron (Source: NHDOT)

After the Flood

Long Term Recovery Considerations

Rebuilding Safer and Stronger

FEMA Hazard Mitigation Grant Program

Flood Documentation and Assessment

Mitigation Options for Communities

The period following a flood is an opportunity for carefully planned efforts to rebuild for the future. The resources on this page can serve as a starting point to help your community build back safer, stronger, and smarter.

- The Federal Emergency Management Agency's (FEMA) publication *Mitigation Ideas: A Resource for Reducing Risk from Natural Hazards* outlines different ways to reduce risk from floods and other disasters in your community.
- Several neighboring states have developed tools to help their communities improve resilience to flooding. Both the Vermont Flood Resilience Checklist and the Maine Flood Resilience Checklist for Coastal Communities are self-assessment tools that can be used to evaluate community vulnerability and resilience to flood hazards. You can use these resources as a starting point for your own community.

Preserved salt marsh buffer, Great Bay (Source: NH Coastal Adaptation Workgroup)

Using Green Infrastructure to Improve Flood Resilience

Green infrastructure is a nature-focused approach to water management that protects, restores, or mimics the natural water cycle[1]. Benefits of green infrastructure practices can include reduced flooding and erosion, and improved air, soil, and water quality. Practices include preserving natural floodplain areas, planting trees, and in coastal areas, creating living shorelines.

Learn more using these resources:

- *Green Infrastructure Options to Reduce Flooding (National Oceanic and Atmospheric Administration, Office for Coastal Management)*
- *Green Infrastructure for Sustainable Coastal Communities (UNH Stormwater Center)*
- *NH Living Shoreline Site Suitability Assessment (NH Department of Environmental Services, Coastal Program)*

[1]*Definition source: American Rivers*

Mitigation Options for Your Residents

While buildings that are Substantially Damaged or Improved must be elevated (or in some cases floodproofed) to at least the Base Flood Elevation (BFE) and meet other applicable local ordinance requirements, it doesn't have to stop there. Seize the moment to encourage property owners to take steps that go further to protect their property from future floods.

Residents can learn about different options available to them to protect their home from flooding in these FEMA publications:

- *Protect Your Property from Flooding: Low-Cost Projects You Can Do Yourself*
- *Protecting Your Home and Property From Flood Damage: Mitigation Ideas for Reducing Flood Loss*
- *The Homeowner's Guide to Retrofitting: Six Ways to Protect Your Home From Flooding*
- *Home Builder's Guide to Coastal Construction*

Additionally, the U.S. Army Corps of Engineers' National Nonstructural Committee has developed a *Flood Damage Reduction Matrix and User Guide* available through the Committee's webpage that can help people make smart choices about protecting their property. The matrix lists types of flood protection measures and the suitability of each depending on type of flooding, building and site characteristics, cost, and other factors. The implications on flood insurance premiums is also provided for each measure.

Residents Can Stay Safer and Save Money by Building Higher

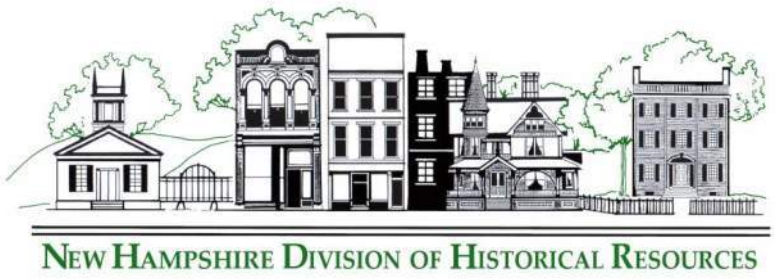
Elevating a building above the BFE for the area is one of the best ways to reduce the risk from flooding. Elevated buildings will have a lower risk of impact from future floods and may have lower flood insurance premiums depending on how high the building is above the BFE. Learn more in The Costs and Benefits of Building Higher.

The Federal Housing Administration's (FHA) 203(k) loan program allows for the purchase (or refinance) of a floodprone house and the cost of rehabilitation (including building elevation) through a single loan. Homeowners can learn more in the Association of State Floodplain Managers' FHA 203(k) fact sheet.

You can order free hard copies of most FEMA publications for your community staff and/or your residents directly from the FEMA Publications Warehouse.

Historic Structures

Historic buildings should be evaluated by a team that includes preservation professionals, architects, and engineers as well as local building officials. General guidance for historic properties affected by a disaster is provided below.



- Take time to properly evaluate damage before making decisions that are irreversible. Demolition is not always necessary. Community and property owner input should be taken into consideration. Can mitigation strategies be implemented that allow the property to be adapted to its location? Is the property so important, but vulnerable to future hazards, that relocation is an option? The emphasis for any action plan should be to explore historic preservation solutions.
- Do not allow any materials to be removed from the site until preservation or building conservation professionals have evaluated what materials should be salvaged. Some decorative elements may not be salvageable for reuse but can provide patterns for reconstruction.
- Make certain that damage to historic structures is evaluated by an architect and engineer who is familiar with historic building methods and materials, and is sensitive to them.
- Document damage to historic buildings with photographs prior to any activity.
- Consult the New Hampshire Division of Historical Resources whenever damage has occurred to historic buildings.
- Use the *Secretary of the Interior's Standards for Rehabilitation* as your guide in rehabilitating historic properties damaged in a disaster.

The Federal Emergency Management Agency's Floodplain Management Bulletin on Historic Structures includes guidance on how to minimize the impacts of flooding and details about National Flood Insurance Program requirements that apply to such structures.

II. FEMA Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) provides grants to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of HMGP is to reduce the loss of life and property due to disasters and enable mitigation to be completed immediately following a disaster. Eligible applicants include state agencies, private nonprofit organizations, and local governments. Eligible activities include but are not limited to:

- Property Acquisition and Structure Demolition or Relocation
- Structure Elevation
- Mitigation Reconstruction
- Dry Floodproofing of Historic Residential Structures
- Dry Floodproofing of Non-Residential Structures
- Localized and Non-Localized Flood Risk Reduction Projects
- Structural Retrofitting of Existing Buildings
- Non-Structural Retrofitting of Existing Buildings / Facilities
- Infrastructure Retrofit
- Soil Stabilization
- Post-Disaster Code Enforcement
- Hazard Mitigation Planning

Including documentation of prior and current disaster events (e.g., pictures, repair costs, etc.) will help you in preparing a quality HMGP application.

Benefits of HMGP include:

- *Supporting risk reduction activities*
- *Improving resiliency*
- *Eliminating the impact of future events*
- *Providing a long-term solution to a problem*
- *Offering a cost-effective solution*
- *Helping avoid repetitive damage from disasters*

Following availability of funding, NH Homeland Security and Emergency Management will send requests for Letters of Intent to community officials.

Contact the State Hazard Mitigation Officer at 603-271-2231 or by email at HazardMitigationPlanning@dos.nh.gov for more information about HMGP.

U.S. Geological Survey: Post-Flood Assessments

The U.S. Geological Survey (USGS) documents flooding and provides assessments that are crucial in reducing flood hazards. This information can provide situational awareness, and support predictive models, floodplain mapping, and ecological assessments. Below are descriptions of some of the data and assessments available for New Hampshire. A complete list of resources and tools is available on the USGS Flood Information webpage.

High Water Marks (HWMs)

Following a flood disaster and Federal Disaster Declaration, USGS flags and surveys HWMs in flooded areas to document the extent of the flooding. HWMs are used for:

- Future flood forecasting.
- Predicting the severity of future floods.
- Delineating or revising FEMA floodplain maps.

Annual Exceedance Probabilities and Modeled Streamflows

USGS computes and publishes Annual Exceedance Probabilities (AEP) for peak streamflows at long-term USGS stream gages and models peak streamflows to create flood recovery maps. These assessments are used to:

- Provide context to floods and their occurrence.
- Allow for an assessment of risk.
- Allow for development of peak-flow regression equations at ungaged locations.
- Document the extent of flooding.

USGS Surge, Wave, and Tide Hydrodynamics (SWaTH) Network

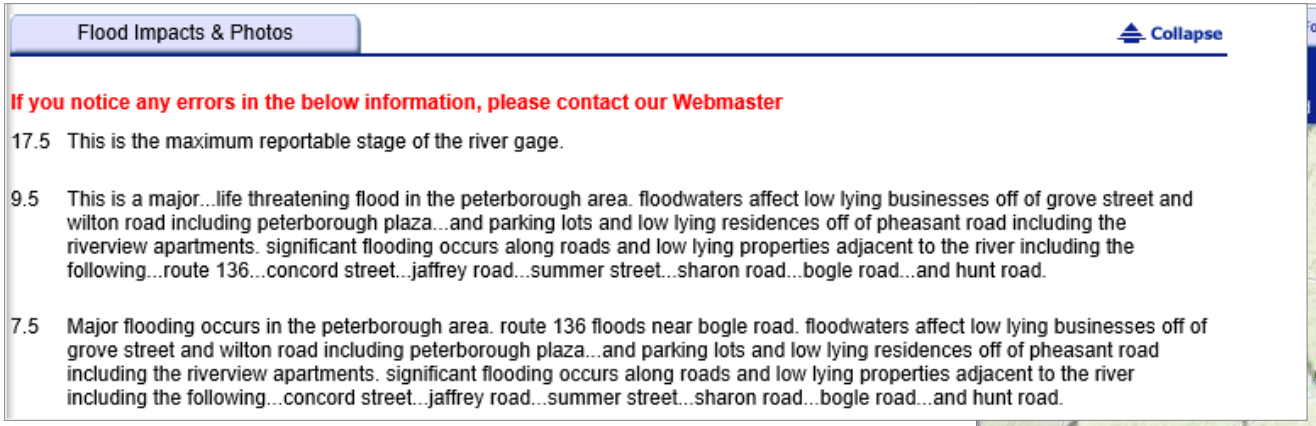
The USGS maintains the SWaTH Network along the New England coast to improve understanding of how overland storm tide and waves evolve and dissipate when they move across natural and man-made landscapes. Information from the network is available through the USGS Flood Event Viewer.

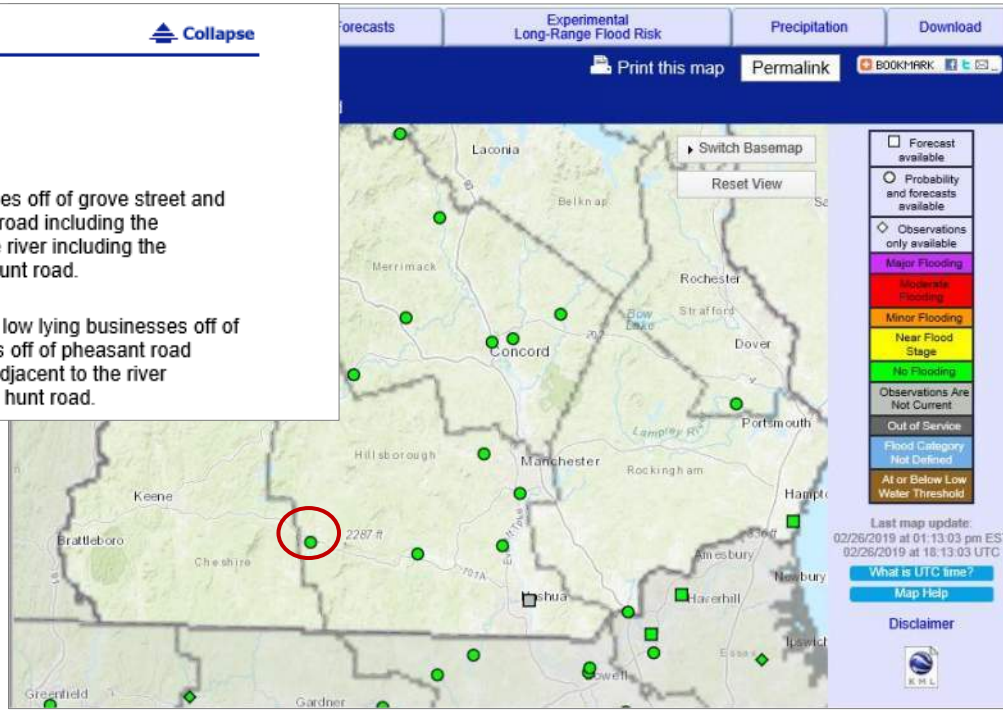
The USGS has a policy for post-flood tasks to perform based on the severity of an event. Federal, state, or local officials may request post-flood assessments not ordinarily included in the scope of tasks, which may be performed, funding permitting.

National Weather Service: River Forecast Points

After a flood, National Weather Service (NWS) personnel will visit forecast point locations to speak with community Emergency Management Directors to discuss flood impacts. Each forecast point has a set of flood impacts based on levels of past flooding (see graphic below). These impacts can change over time due to changes to the watercourse itself, infrastructure improvements, or other modifications that occur in the floodplain. These impact statements can be changed to reflect the impacts from the latest flooding event. If, at any time, your community Emergency Management Director feels the impact statements do not reflect what is actually occurring, contact the NWS (See Appendix B for contact information) to request changes.

To access NWS flood impacts for a particular forecast point, go to the Advanced Hydrologic Prediction Service (AHPS) website. Click on a forecast point on the map to go the webpage for that location, then scroll down to the Flood Impacts & Photos section (See example below).





An example of flood impacts (based on flood height in feet) listed for the forecast point along the Contoocook River at Peterborough (location circled in red on the AHPS map at right).

Additional Resources and Assistance

A community's staff, plans, and preparations serve as the first line of defense when a flood or other type of disaster happens. The information and resources presented in this handbook are intended to help bolster your community's capabilities to prepare for flooding and effectively respond to and recover from future flood events. The following additional resources included as appendices to this handbook can provide further assistance.

- The customizable ***Flood Response and Recovery Checklist*** (*Appendix A*) can help community officials identify priority activities that should be performed when a flood is imminent and at the response and recovery stages as well. Topics covered in the checklist are cross-referenced to specific pages of this handbook that include additional information on the subject.
- To find a subject matter expert for specific topics covered in this handbook, use the ***Agency Contact List*** (*Appendix B*). The handbook topic index starting on page 79 notes the lead agency for most topics covered.

Suncook River Avulsion (River course change due to flooding), Epsom, May 2006
(Source: Central NH Regional Planning Commission)

Topic Index

(Lead agency in the state for topic is listed following page numbers – see list of agency acronyms on page 80)

Agency Acronyms

NHDES: NH Department of Environmental Services

NHDHR: NH Department of Natural and Cultural Resources, Division of Historical Resources

NHDOT: NH Department of Transportation

NHFG: NH Fish and Game Department

NHGS: NH Department of Environmental Services, Geological Survey

NHHSEM: NH Department of Safety, Homeland Security & Emergency Management

NHOSI: NH Office of Strategic Initiatives

NWS: National Oceanic and Atmospheric Administration, National Weather Service

USGS: US Geologic Survey