Antrim, NH Hazard Mitigation Plan Update 2022

Prepared by the:

Town of Antrim Hazard Mitigation Work Group
&
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FEMA Approval (add date)

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Executive Summary

The Antrim Hazard Mitigation Plan serves as a means to reduce future losses from natural, technological, and human-caused hazard events before they occur. The Plan was developed by the Antrim Hazard Mitigation Work Group.

Hazards considered in the plan:

Flooding, drought, extreme temperatures, high wind events/tornados, infectious disease, solar storms and space weather, tropical storms/hurricanes, severe winter weather, and wildfires.

The Hazard Mitigation Work Group identified "Critical Facilities" as follows:

Critical Facilities

- Town Hall
- Schools
- Fire Stations
- Town Garage/Transfer Station
- Fuel Storage Facilities
- Police Station

The Hazard Mitigation Work Group identified existing hazard mitigation programs as follows:

- Floodplain Development Ordinance
- School Evacuation Plan
- Fire Pond Management Plan
- Town Warning System
- Local Road Design Standards
- Local Bridge Maintenance Program
- Erosion & Sedimentation Control Plans
- Best Management Practices
- Emergency Power Back-up
- Wetlands Protection
- Safety Awareness Program
- Ambulance Service
- Codes and Ordinances
- Septic Systems and Wells
- Emergency Operations Plan (2021)
- Shoreland Protection Program
- Winter Storms Operations Plan
- Spill Prevention Control and Counter Measures Plan
- National Flood Insurance Program (NFIP)
- Town Radio System
- Tree Maintenance Program
- Town Capital Improvements Plan (CIP)
- Mutual Aid
- Town Master Plan

The Antrim Hazard Mitigation Work Group prioritized newly identified hazard mitigation strategies as follows:

- Continue to enforce both the adopted FEMA Digital Flood Insurance Rate Maps/FIS and floodplain ordinance to ensure the NFIP requirements are maintained & implemented.
- Update the Town website to improve public awareness of NFIP. Include preparedness and mitigation methods for residents to reduce the impact of all natural disasters.
- Incorporate this Hazard Mitigation Plan into the Antrim Master Plan as a chapter or appendix.
- Add an emergency management section or page to the town website. Include links to the FEMA and NH HSEM website.
- Establish emergency shelters in case of an emergency.
- Repair the Slaughter House culvert on West Street.
- Upgrade bridge at Liberty Farm Road and access at Stacy Hill Road.
- Stabilize steep slope on Stacy Hill Road with plantings, retaining walls, or rip rap.
- Utilize the CODE RED emergency warning system.
- Continue a strong relationship with the Regional Public Health Representative.
- Provide information to residents about proper use of generators and the importance of maintaining the heating system to prevent carbon monoxide poisoning and fires.
- Install a repeater for fire department.
- Continue to implement the fire ponds/dry hydrant management plan to provide increased access to and upkeep of water sources for fire protection. Work with the Planning Board to encourage installation with new developments.
- Continue Firefighter I program certified through NHFA, and recruiting new members.
- Continue the Fire Prevention Program including carbon monoxide, fire and evacuation information.
- Training/materials needed for Fire Dept. for the Hazardous Materials Plan.
- Update the Hazardous Materials Plan.
- Provide outreach information on proper disposal of hazardous household materials and medicines.
- Upgrade equipment in the fire department for the Spill Prevention Control and Counter Measures Plan.
- Update the EOP in 2026.
- Consider the need and locations for generators.
- Install generator at the school (for a shelter), the Highway Department, and N. Branch Fire Dept.
- Test response times for flood inundation at Highland Lake.
- Add mitigation actions to CIP when appropriate.
- Continue progress of Local Bridge Maintenance Program.
- Continue public awareness & enforcement of erosion & sediment guidelines/BMPs, and codes.
- Update list of residents with special needs.
- Update list of available resources.

Chapter 1
Introduction

Plan Development

Purpose

The Antrim Hazard Mitigation Plan Update 2022 is a planning tool to be used by the Town of Antrim, as well as other local, state and federal governments, in their efforts to reduce the effects from natural and man-made hazards. By maintaining an updated Hazard Mitigation Plan, the Town is eligible to receive grant funding for mitigation projects.

Authority

This Multi-Hazard Mitigation Plan was prepared pursuant to Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act), herein enacted by Section 104 of the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390). This Act provides new and revitalized approaches to mitigation planning. Section 322 of DMA 2000 emphasizes the need for State, local and tribal entities to closely coordinate mitigation planning and implementation efforts. The development and periodic update of this plan satisfies the planning requirements of the Disaster Mitigation Act (DMA) of 2000 which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act).

Funding Source

This Plan was funded by the NH Homeland Security and Emergency Management, with a grant from the Federal Emergency Management Agency (FEMA) Pre-disaster Mitigation Program.

Scope of the Plan

The scope of this Plan includes the identification of past and potential natural and manmade hazards affecting the Town of Antrim, the determination of vulnerability of existing and future structures to the identified potential hazards, and the identification and discussion of new strategies aimed at mitigating the likely effects of potential hazards before they occur.

Methodology

Using the Local Hazard Mitigation Planning Handbook, the Antrim Hazard Mitigation Work Group developed the content of the Antrim Hazard Mitigation Plan by following tasks set forth in the handbook. The Work Group held monthly meetings, open to the public, in order to develop the Plan.

Task 1: Determine the Planning Area & Resources: This task was conducted by Town staff and Southwest Region Planning Commission. The results of this research were shared with the Work Group and can be found in Chapter 2, "Community Profile".

Task 2: Building the Planning Team: The Emergency Management Director contacted Town officials, department heads, and residents who might wish to volunteer their time and serve on a Work Group.

Task 3: Create an Outreach Program: This task was used throughout the Plan and is a vital part of the Plan's success. Many of the proposed actions involve a community outreach component for individuals to use as a means to reduce the risk of loss of life and property from future natural, technical and human-caused hazards.

Task 4: Review Community Capabilities: The Work Group brainstormed on the type of hazards and locations that have sustained or could be susceptible to each hazard within the Town. The Work Group then identified and catalogued all of the critical facilities in Antrim. The result is found in Chapter 5 with a location map at the end of the Plan.

Task 5: Conduct a Risk Assessment: The Work Group conducted several assessments to help determine the gaps in coverage. These include Vulnerability Assessments and Assessing Probability, Severity and Risk. In addition to the assessments, the existing mitigation strategies were reviewed to determine where gaps in coverage exist and areas that need improvement.

Task 6: Develop a Mitigation Strategy: The Work Group identified plans and policies that are already in place to reduce the effects of natural hazards. Then the Work Group evaluated the effectiveness of the existing measures to identify where they can be improved. The Work Group developed the Mitigation Action Plan, which is a clear strategy that outlines who is responsible for implementing each project, as well as when and how the actions will be implemented and the funding source.

Task 7: Keep the Plan Current: It is important to the Town of Antrim that this Plan be monitored and updated annually or after a presidentially declared disaster. Chapter 9 addresses this issue.

Task 8: Review & Adopt the Plan: The Work Group members reviewed and approved each section of the Plan as it was completed. After acceptance by the Work Group, the Plan was submitted to the New Hampshire Homeland Security and Emergency Management (HSEM) for review and Approval Pending Adoption. At a public meeting, the Board of Selectmen formally adopted the Plan on (add adoption date). The Plan was then granted formal approval by HSEM (add approval date by HSEM) and the formal approval letter from FEMA was received on (add date of letter).

Task 9: Create a Safe & Resilient Community: The Work Group discussed the mitigation actions in the Action Plan and the ways in which the implementation of the actions will be beneficial to the community. Annual reviews of the Action Plan by the Work Group are needed to maintain the timeframes identified for completion of activities. Incorporation of the Plan into other land use plans and the help to ensure that the goals of the Plan are met. Implementation of the actions prior to a hazardous event can be funded through a variety of resources found at the end of this plan in Appendix D.

A final draft of this Plan was made available to the Work Group and the public for review and comment. The document was also provided to the NHEM for their review and comment.

Public Work Group Meetings

Work Group meetings were held at the Antrim Town office and by Zoom meetings on December 16, 2021, January 1, February 3, March 3, and April 14, 2022.

An email was sent to each Work Group member, prior to each meeting that contained an agenda (Appendix E) and information to be covered. Agendas were posted at the Town Office to encourage public participation.

Public Participation

An article was printed in the Southwest Region Planning Commission (SWRPC) newsletter to inform the members of the community as well as surrounding communities and other interested stakeholders about participating in this plan update. Copies of the newsletter were sent to the 34 towns within the region, the Cheshire County Office, businesses, and other interested parties. It was also available on the SWRPC website. In addition to the SWRPC newsletter and website, an email of the *SWRPC Happenings* was sent

to more than 450 addresses, including neighboring communities, counties, businesses, and academia. The email newsletter contained notices of public meetings and events.

A copy of the draft Plan was made available for public review and input at the Town Office from (add dates). In addition, the draft Plan was also available for public viewing on the Town website to reach a broad range of interested parties. A copy of the public notice for the public viewing period is in Appendix E. All comments from the public received during the drafting stage of the Plan as well as following the public viewing period were incorporated into the Plan.

Resource List for Hazard Mitigation Team

Antrim's EMD, or designee, reviewed and coordinated with the following agencies in order to determine if any conflicts existed or if there were any potential areas for cooperation. All agencies mentioned below were contacted by Antrim's EMD, or designee. All agencies were given the opportunity to participate in the Work Group meetings or provide valuable input and guidance through telephone conversation or printed data. Training support has been offered by some of those on this resource list.

New Hampshire Homeland Security and Emergency Management:	
33 Hazen Drive, Concord, NH 03305	1-800-852-3792
Field Representative: Elizabeth Gilboy	603-223-3668
New Hampshire Department of Transportation:	
John Kallfelz (District 4), Swanzey, NH 03446	603-352-2302
New Hampshire Department of Environmental Services - Dam Bureau:	
Nancy Baillargeon	603-271-3406
New Hampshire Office of Planning and Development:	
Samara Ebinger	603-271-1755

Plan Updates

During the planning process, the Work Group reviewed relevant portions of the previous hazard mitigation plan and updated those portions accordingly. Unchanged sections were incorporated into the Plan while other sections were amended to reflect changes. Particular attention was given to the previous mitigation strategies that have been completed to give a status update on those that remain on the list. The previous plan was used as a basis to begin the update. Amendments were made in each chapter to reflect changes that have occurred during the five-year period. Included in the changes were:

Chapter 1 - Introduction - updated Methodology, Acknowledgements, etc.;
Chapter 2 - Community Profile - NFIP policies updated, added updated demographics;
Chapter 3 - Assessing Probability, Severity, and Risk - updated risk assessment;
Chapter 4 - Past and Potential Hazards - updated hazards and their location;
Chapter 5 - Critical Facilities - updated locations;
Chapter 6 - Existing Mitigation Strategies and Proposed Improvements - updated chart and other data, updated chart for Status of Previous Mitigation Action Items;
Chapter 7 - Proposed Mitigation Strategies - updated STAPLEE chart;
Chapter 8 - Prioritized Implementation Schedule - updated Action Plan;
Chapter 9 - Adoption, Implementation, Monitoring, and Updates - Adoption certificate, updated information.
Appendices - agendas, resources, public documentation.

This update was prepared with assistance from professional planners at SWRPC trained in hazard mitigation planning. Data and maps used to prepare this Plan are available at their office and should be used in preparing future updates.

Acknowledgements

The Antrim Board of Selectmen extends special thanks to the Antrim Hazard Mitigation Work Group as follows:

Marshall Gale, *Antrim Emergency Management Director and Fire Chief*
Jason Bryer, *Antrim Fire Department*
Diane Chauncy, *Antrim Town Clerk*
Bob Edwards, *Antrim Board of Selectmen*
Donna Hanson, *Antrim Town Administrator (former)*
Brian Lord, *Antrim Police Chief*
Russell McAllister, *Antrim Town Administrator*
Jim Plourde, *Antrim Road Agent*
Mike Tatro, *Antrim Highway Department*
John Robertson, *Antrim Board of Selectmen*

The Antrim Board of Selectmen offers thanks to the New Hampshire Homeland Security and Emergency Management for developing the State of New Hampshire Multi-Hazard Mitigation Plan Update 2018 which served as a model for this plan. In addition, special thanks are extended to the staff of the Southwest Region Planning Commission for professional services, process facilitation and preparation of this document.

Hazard Mitigation Goals

The Antrim Hazard Mitigation Work Group reviewed the goals set forth in the State of New Hampshire Multi-Hazard Mitigation Plan Update 2018. The Work Group generally concurs with those goals and has amended them to better meet the goals of the Town.

Town of Antrim, NH

The overall Goals of the Town of Antrim with respect to Hazard Mitigation are stipulated here:

1. To improve upon the protection of the general population, the citizens of the Town of Antrim and guests, from all natural, technological and human-caused hazards.

2. To reduce the potential impact of natural, technological and human-caused hazards on the Town of Antrim's emergency response services, critical facilities, and infrastructure.

3. To reduce the potential impact of natural, technological and human-caused disasters on the Town of Antrim's economy, natural resources, historic/cultural treasures, and private property.

4. To improve the Town of Antrim's emergency preparedness and disaster response and recovery capability.

5. To reduce the Town of Antrim's risk with respect to natural, technological and human-caused hazards through outreach and education.

6. To identify, introduce and implement cost-effective hazard mitigation measures so as to accomplish the Town's goals and objectives and to raise the awareness of and acceptance of Hazard Mitigation opportunities generally.

7. To address the challenges posed by climate change as they pertain to increasing risks in Antrim's infrastructure and natural environment.

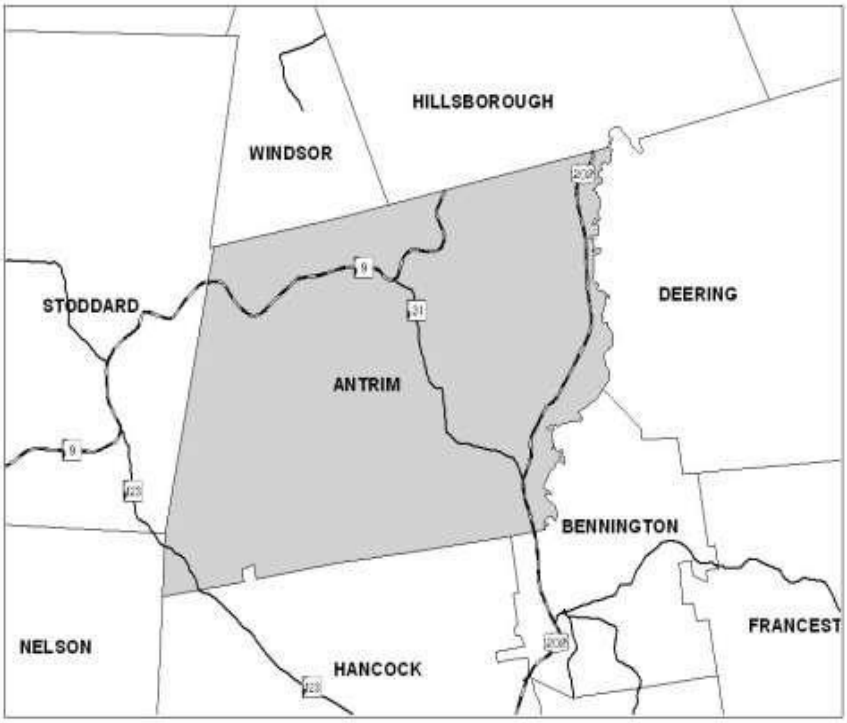
8. To work in conjunction and cooperation with the State of New Hampshire's Hazard Mitigation Goals and with FEMA.

Chapter 2
Community Profile

Town Overview

The Town of Antrim is located in the western portion of Hillsborough County, in Southwest New Hampshire. Antrim is bounded on the north side by Windsor and Hillsborough, easterly by Deering, southerly by Bennington and Hancock, and westerly by Stoddard and Nelson. The Town population is 2,637.

The Town of Antrim consists of 36.5 square miles. Antrim has several significant waterbodies, such as Willard Pond, Gregg Lake, Steeles Pond, and Franklin Pierce Lake. Franklin Pierce Lake is primarily located in the neighboring Town of Hillsborough, but a sizeable portion is located in Antrim. Great Brook and the Contoocook River are the two main streams in Antrim. Additionally, Antrim has large amounts of land that have been publicly and privately protected from development. The largest parcel, known as the De Pierrefeu Wildlife Sanctuary, consists of 675 acres of remote, heavily forested upland area.



The topography of Antrim varies significantly, ranging from a series of steep hills such as Bald Mountain, Robb Mountain, Willard Mountain, and Tuttle Hill that comprise a substantial portion of the western section of Antrim, to the flatter stream valleys of the Contoocook River and its North Branch. These hills combine to form a ridgeline that extends from the Hancock Town Line northward to Route 9 and the North Branch of the Contoocook River.

Antrim's climate is temperate. According to U.S. Climate Data, the average high temperature in July is 83 degrees Fahrenheit and 31 degrees in January. Average annual rainfall is 46.3 inches and the average annual snowfall is 55 inches.

A three-member Board of Selectmen governs the Town of Antrim. The Town has a full-time Town Administrator, Fire Chief with an on-call Fire Department, and a Water/Sewer Manager. There is a full-time Police Chief and four full-time police officers and a Road Agent. The Monadnock Community Hospital is located in Peterborough, 6 miles south of Antrim.

Disaster Risk

Antrim is prone to a variety of man-made and natural hazards. These include: flooding, drought, extreme temperatures, high wind events, infectious disease, lightning, severe winter weather, tropical storms, and wildfire.

Flooding, whether from heavy rains or ice jams, carries the greatest risk for Antrim. Seasonal flooding of the many small streams and the Contoocook River floodplain has occurred.

Severe wind events have occurred Antrim. Over the years unrecorded wind events have caused large losses of timber on the many high points throughout Town.

Wildfire is a concern due to large tracts of forest areas. Bald Mountain, Robb Mountain, Willard Mountain, and Tuttle Hill are potentially a higher risk due to their geographic orientation and abundant forests.

Winter weather has proven to be a regular hazard throughout the Town of Antrim each year. Antrim is susceptible to receiving large volumes of snow from Nor'easters due to its geographical close proximity to the east coast where these storms track. The Town has also received a fair share of damage from ice storms in winter months.

Development Patterns

Examination of the Town's existing land use indicates that most of the Town (about 83%) is undeveloped and consists primarily of wooded and brush-covered areas, many of which have substantial development constraints. Residential uses comprise the most significant amount of developed land in terms of "active" development. Protected lands occupy the largest land area in Town and land devoted to farming occupies the third greatest amount of acreage. The pattern of land use has not changed appreciably over the last twenty-five years; the residential uses have merely extended along the road frontages in all sections of Town.

Most of Antrim's commercial activity is located in the downtown. Outside of the village area, most of the commercial uses are scattered along NH 9 and US 202; these consist, in large part, of small retail businesses, various personal and professional services, and a Christmas tree farm. There are several home occupations and home-based businesses located throughout Town as well.

The downtown area has a much greater density of development than exists in the outlying portions of Town. This density of development is typical of New England villages, where lots are historically smaller, and the later availability of municipal water and sewer supports this type of development. The downtown area is also the location of most of the Town's public and semi-public uses: the Town Hall, Police Department, Library, Town Park, schools, Post Office, several churches and cemeteries, and the wastewater treatment plant.

Consideration for Development

Several factors have played, and will continue to play, an important role in the development of Antrim. These include: the existing development pattern and availability of land for future development; the present road network; physical factors such as steep slopes, poor soil conditions, land set aside for conservation, the Contoocook River, its tributaries and floodplains; and the availability of utilities such as public water

and sanitary sewers. These factors have an impact, both individually and cumulatively, on where and how development occurs.

Population Trends

The following table shows the population in Antrim, Hillsborough County, and the State of New Hampshire between the years of 1970 and 2020 based on US Census data. The trend is an increase in population in each year except between 2010 and 2020 in which there was a decline in population of 14 residents in Antrim. Hillsborough County and New Hampshire also experienced population declines during the same period. The population change from 1970 to 2010 in Antrim was significantly lower than the change in Hillsborough County and the State of New Hampshire.

Population Trends 1970 to 2020

	1970	**1980**	**1990**	**2000**	**2010**	**2020**	**% Change 1970-2020**
Antrim	2,122	2,208	2,360	2,449	2,651	2637	24%
Hillsborough County	223,941	276,608	336,073	380,841	422,937	400,710	79%
New Hampshire	737,681	920,610	1,109,252	1,235,786	1,377,529	1,316,519	78%

Source: US Census 2020; NH OPD tables

Population Projections

Population projections are an important component in planning for the future. Projections are beneficial to help communities begin to plan and budget for Capital Improvement Projects. Since population projections are based on a set of assumptions, changes can be significant if the assumptions used in the calculations are not met. For example, a tropical storm that destroys a large employer or causes infrastructure damages to that facility can cause a significant economic hardship to the business that may ultimately result in its closure and loss of jobs. This can then result in an outward migration of residents from the community. Therefore, population projections should only be used as a basis to begin planning for the future. The New Hampshire Office of Planning and Development (NH OPD) prepares population projections for each community in New Hampshire. The table below indicates that the population of Antrim is expected to see a steady increase in population during the next twenty years.

Population Projections 2010 to 2040

	2015	2020	2025	2030	2035	2040	% Change 2015-2040
Antrim	2633	2668	2715	2767	2800	2811	7%
Hillsborough County	404,322	409,478	416,455	424,492	429,538	431,284	7%
New Hampshire	1,330,501	1,349,908	1,374,702	1,402,878	1,422,530	1,432,730	8%

Source: NH OPD September 2016 (most current projections)

Current Development Trends

Residential development continues to be the primary (active) land use; recreation and protected lands constitute more land area than does residential development, but the actual use of these lands is of a more passive nature.

Commercial and industrial uses occupy only about 90 acres, or just over 2% of the developed land; and most of that is located in the downtown area and along US 202. The primary characteristic of these uses is that of small retail, personal and professional services; in addition, there are over a dozen home occupations and homebased businesses that have been identified in Town.

Given the predominance of residential over non-residential development in Antrim, a conclusion can be reached that Antrim is essentially a bedroom community for economic centers in Peterborough, Hillsborough, Keene and Concord. This should not, however, underestimate the role that Antrim's vital downtown plays, not only in the local economy, but the subregion as well. With Routes 202 and 31 serving as Antrim's Main Street, a great deal of through traffic comes into Antrim, allowing these travelers to take advantage of the goods and services offered by the local businesses.

The data contained in the table below provides a more current perspective of the residential housing trend in Antrim by looking at the number of residential building permits issued since the last census. This does not show, however, whether the homes were built.

Antrim Housing Types

Housing Type	Dwelling Units 2020 Census	2021 New Home Building Permits	Total Estimated Housing Units
Single Family	999	9	1008
Multi-Family	240	0	240
Manufactured Housing	26	0	26
Total Housing Units	1265	9	1274

Source: NH OPD Current Estimates and Trends in New Hampshire's Housing Supply: Update 2021 most current data available.

Development in Hazard Areas

Hazards identified in this plan are regional risks and, as such, all new development falls into the hazard area. The exception to this is flooding. Currently, there are 115 structures located within the Special Flood Hazard Area (SFHA) in Antrim. According to the Community Information System (CIS) of FEMA, there have been no development permits and no variances granted within the SFHA since 1987, the earliest records kept in the CIS for the Town of Antrim.

National Flood Insurance Program (NFIP)

Antrim has been a participating member of the National Flood Insurance Program since April 1, 1981. Flood Insurance Rate Maps, all bearing the effective date of September 25, 2009, are used for flood insurance purposes and are on file with the Antrim Planning Board. The most recent flood insurance study was done on September 25, 2009. There are 10 NFIP Policies in Antrim totaling $2,354,800 and one paid loss of $5,875. There are currently no "Repetitive Loss Properties" insured under the NFIP within the Town of Antrim.

Continued Compliance with NFIP Requirements

The Town of Antrim acknowledges the importance of maintaining requirements set forth in the National Flood Insurance Program. As such, the Town took steps related to continued compliance with the program that will help to reduce or eliminate the potential for loss of life and property due to flooding.

The following actions have been taken since the last Hazard Mitigation Plan:

- Maintained and replaced culverts;
- Posted information to residents about flooding; and NFIP Education and Outreach for Public;
- Participated in NFIP training offered by the State and/or FEMA that addresses flood hazard planning and management;
- Educate Public on Codes (building, zoning, etc.); and
- Continued to enforce the Floodplain Development Ordinance.

While this update continues with structural projects, public outreach and education are also seen as a key to providing information to residents by raising an awareness of measures that they can take. Many of these items will be on-going actions to maintain awareness and continued monitoring.

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Chapter 3
Assessing Probability, Severity and Risk

Risk Assessment

The Hazard Mitigation Work Group met to discuss the Towns' risk assessment and assign rating scores. Consideration was given to climate change, current capabilities, Town assets and critical infrastructure, and previous occurrences when determining the scale of impacts and overall risk. The following terms were used to analyze the hazards:

Impacts: The *Impact* is an estimate generally based on a hazard's effect on humans, property and businesses.

Impact Scoring
1 - Inconvenience, reduced service/productivity, minor damages, non-life-threatening injuries.
3 - Moderate to major damages, temporary closure and reduced service/productivity, moderate number of injuries, and deaths.
6 - Devastation and significant injuries and deaths, permanent closure and/or relocation of services, long-term effects.

Probability of Occurrence: The *Probability of Occurrence* is a numeric value that represents the likelihood that the given hazard will occur within the next 10 years.

Probability Scoring
1 - 33% probability of occurring within 10 years (Low)
3 - 34-66% probability of occurring within 10 years (Medium)
6 - 67-100% probability of occurring within 10 years (High)

Severity**:** Severity is calculated by taking the average of the vulnerability for human, business and property impacts of each hazard type.

Risk: Risk is an adjective description (High, Medium, or Low) of the overall threat posed by a hazard over the next 10 years. It is calculated by multiplying the probability of occurrence and severity.

Overall Risk: The *Overall Risk* is a representation of the combined *potential impact* and *probability of occurrence* ratings. This is calculated by multiplying the probability of occurrence rating score by the impact rating score (the average of human, property and business impacts). The goal of identifying the overall risk of each identified hazard is to assist the Town in determining which hazards pose the largest potential threat. The overall risk ratings are broken down and color coded into the following categories:

White: values 1 - 6, Low Risk
Yellow: values 7 - 12, Medium Risk
Red: values 13 - 18, High Risk

Risk Assessment Matrix

	Threat/Hazard	Classification	Human Impact	Property Impact	Economic/ Business Impact	Average Impact Score	Probability of Occurrence	Overall Risk
Natural Hazards	Flooding	High	1	6	5	4	6	24
	Drought	High	1	3	3	2.3	6	14
	Earthquakes	Low	1	1	1	1	1	1
	Extreme Temperatures	Medium	3	1	1	1.7	6	10
	High Wind Events	High	2	4	4	3.3	6	20
	Infectious Disease	High	6	1	6	4.3	6	26
	Lightning	High	2	5	5	4	6	24
	Severe Winter Weather	High	3	3	3	3	6	18
	Solar Storms & Space Weather	Low	1	1	1	1	6	6
	Tropical Storms and Hurricanes	Medium	1	2	2	1.7	6	10
	Wildfire	High	1	6	3	3.3	6	20
Technological Hazards	Aging Infrastructure	High	1	3	3	2.3	6	14
	Conflagration	Medium	1	6	6	3.7	3	11
	Dam Failure	Low	6	6	5	5.6	1	6
	Known & Emerging Contaminants	Medium	5	1	1	2.3	3	7
	Hazardous Materials	Medium	3	3	3	3	3	9
	Long-term Utility Outage (1 week)	Low	3	3	3	3	2	6
	Radiological	Low	1	1	1	1	1	1
Human-Caused Hazards	Cyber Event	High	1	1	6	2.7	6	16
	Mass Casualty Incident	Low	6	1	1	2.7	1	3
	Terrorism/Violence	Medium	3	2	1	2	4	8
	Transport Accident	Medium	6	1	2	3	3	9

Chapter 4
Hazard Identification and Potential Hazards

Past and Potential Hazards in Antrim

The Antrim Hazard Mitigation Work Group discussed hazard events that have occurred within the last five years. They also looked at the type of hazards that could occur within Town. These hazards were identified by using the New Hampshire Hazard Mitigation Plan (2018), the Federal Emergency Management Agency website, the previous Antrim Hazard Mitigation Plan, and the Antrim Hazard Risk Assessment. From this list, the work group developed a summary for each hazard type to provide information on past and potential events, risk and impact. In some instances, specific locations of hazard events that have occurred within the past five years have been recorded. Estimates of the impact of some of the events is also noted where possible.

Information in this chapter is only given for the medium and high-risk natural hazards identified in the previous chapter. These include: flooding, drought, extreme temperatures, high wind, infectious disease, lightning, severe winter weather, tropical storms/hurricanes, and wildfires. Hazards that ranked as low-risk hazards are not included in the remaining chapters of this plan because the Antrim Hazard Mitigation Work Group felt that the risk was so minimal that resources and efforts would be better utilized on the higher-ranking hazards. The low-risk natural hazards include: earthquake and solar storms and space weather. The Work Group also identified the following medium and high-ranked technological hazards and human-caused hazards that have occurred in Town or have the potential to occur: aging infrastructure, conflagration, known and emerging contaminants, hazardous materials, cyber event, terrorism/violence, and transport accident.

Existing and future structures have the potential of being affected by some of the hazards identified in this Plan. Some hazards identified in this Plan are regional or town-wide risks and, as such, all structures, infrastructure and critical facilities fall into the hazard area. As the population continues to grow, new development has been outside of the flood prone areas which has helped to protect the residents from any increase in vulnerability of hazards. However, as the intensity of storms continues to increase, it is important to review the existing programs and strategies, and improve upon areas that are needed.

Flooding

Risk: High
Impact: Medium
Future Probability: High

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and/or inadequate local drainage. Floods can cause loss of life, property damage, crop damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges. Inland floods are most likely to occur in the spring due to heavy rainfall and melting of snow; however, floods can occur at any time of the year.

Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The 100-year flood does not mean that flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. Instead, it means that there is a 1% chance of a flood of that size happening in any year.

Past Events:
July 1-2, 2017: FEMA Disaster Declaration #4329 for Grafton County. Heavy rains occurred, but no local impact to Town services and no structural damages, injuries, or death were reported due to this event.

October 29 to November 1, 2017: Heavy rains occurred, but no local impact to Town services and no structural damages, injuries, or death were reported due to this event.
March 2, 2018: Heavy rains occurred, but no local impact to Town services and no structural damages, injuries, or death were reported due to this event.
July 17-19, 2021: FEMA Disaster Declaration #4622. Heavy rains occurred, but no local impact to Town services and no structural damages, injuries, or death were reported due to this event. Two farms had significant loss of crops - 1 Main Street, Old Concord Road and US 202, hay, corn, and other vegetables, and some farm equipment.
July 29-30, 2021: FEMA Disaster Declaration #4624. Local impact is the same as the above event.

Potential Occurrences:
Annual events due to heavy rains and snow melt continue to challenge the capacity and integrity of the existing stormwater infrastructure in the following locations: White Birch Road/Gregg Lake Road, Old Concord Road, NH 9/Liberty Farms Road area, NH 31 from Whiton Road to West Street, intersection of Elm Avenue/Cross Road, areas south of Depot Street at the intersection of US 202, Old Hancock Road, Franklin Pierce Lake area, and Willard Pond Road.

Potential Impact:
- There is a potential for injuries and loss of life, structural damage and interruption of services.
- There is potential for damage/repair to the road surface and flooding of roads due to accumulation of heavy rain and runoff which could cause a delay in the response time of emergency services.
- There is a potential for economic loss caused by flooded crops.

Drought
Risk: High
Impact: Low
Future Probability: High

Droughts are a natural hazard that impacts the entire Town. A greater emphasis is placed on responding to these hazards rather than mitigating for them. Outreach and education on methods of dealing with drought are important. The severity of droughts can be found by referring to the Palmer Drought Severity Index and can be viewed at: http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml. Below is the Intensity Scale that is used with the Palmer Drought Severity Index to describe the observed impact with each category.

Palmer Drought Severity Index

Category	Intensity	Impact
D0	Abnormally Dry	Crop growth is stunted; fire danger is elevated; lawns brown and gardens wilt; surface water levels are lower.
D1	Moderate Drought	Wildfires and brush fires increase; increased use of irrigation for crops; hay and grain yields are lower; honey production declines; trees and fish are stressed making them susceptible to disease; water conservation is recommended.
D2	Severe Drought	Water quality and quantity declines; irrigation ponds are dry and hay crops are impacted causing economic hardship to farms; crop yields and size of fruit are reduced; outdoor burning is limited; air quality is poor; impact on the health of trees and wildlife is observed.
D3	Extreme Drought	Crop loss, farms are stressed and are experiencing a financial impact; extremely reduced flow or ceased flow of water; river temperatures are warm; wildlife disease is increased; many well are dry; new and deeper wells are needed.
D4	Exceptional Drought	NH has little or no experience in D4, so no impacts have been recorded at this level.

Source: NOAA

Past Events:

- Summer 2021 - drought conditions had an impact to the agricultural fields causing small and immature crops.
- Summer of 2020 - drought conditions existed throughout New Hampshire. Impact to agriculture fields causing small crops and an increased cost for irrigation. A few wells ran dry.
- Summer of 2018 - drought conditions existed throughout New Hampshire. Impact to agriculture fields causing small crops and an increased cost for irrigation. Many wells ran dry and the Fire Chief delivered water to several residents that had no water.

Potential Occurrences:

- This is a recurring event that impacts the entire Town. Areas of concern are farms, residents with wells and wooded areas.

Potential Impact:

- Drought will increase the risk of wildfire, especially in areas of high recreational use and as more timberland is set aside as non-harvested timberland.
- Some private wells may run dry.
- Minimal impact to Town services.

Extreme Temperatures

Risk: Medium
Impact: Low
Future probability: High

Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures. Although it is an infrequent event, it usually occurs on an annual basis between late July and August and happens town wide. The severity of extreme heat can be dangerous to those residents with medical conditions and the elderly. It is important to have cooling areas and a good supply of water available. Extreme heat can add to the potential for wildfires and depletion of the water supply for firefighting. The Antrim Hazard Mitigation Work Group did not recall any impact to the Town services due to this hazard. They also did not recall any death, injuries or structural damage as a result of extreme heat. The NWS Heat Index is an indicator of the likeliness of heat disorders with prolonged exposure or strenuous activity, especially for those with a history of stroke and heart issues.

NWS Heat Index — Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Source: National Weather Service

Extreme Cold events occur during meteorological cold waves, also known as cold snaps that are caused by the southern transport of arctic airmasses into the Northeast. These events are most common in winter months and increase the likelihood of cold disorders in humans and animals that have prolonged exposure to low ambient temperatures. Cold disorders can include frostbite and hypothermia which can eventually lead to death. Extreme cold can also damage or kill crops and animals (wild, farm, or domesticated), potentially presenting a risk to the economy.

The Wind Chill Chart below shows the impact that wind and cold temperatures can have by indicating the number of minutes until frostbite strikes.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

Source: National Weather Service

Past Events:

- There have been no impactful events of extreme heat or cold that the Work Group recalled since the last plan update.

Potential Occurrences:

- Extreme temperatures are a town-wide event.

Potential Impact:

- Higher elevations are impacted more by extreme temperatures.
- Vulnerable populations are at greater risk.
- High heat causes an increase in EMS calls.

High Wind, Tornado, Downburst

Risk: High
Impact: Medium
Future probability: High

The Enhanced Fujita Scale is used to determine the intensity of tornadoes. Most tornadoes are in the F0 to F2 Class. Building to modern wind standards provides significant property protection from these hazard

events. New Hampshire is located within Zone 2 for Design Wind Speed for Community Shelters, which is 160 mph, and is also noted as being within a hurricane susceptible region.

Past events (regional):

- The southwestern portion of the state is considered a special wind hazard area as demonstrated by the high proportion of tornadoes and severe wind events that are experienced in this Region annually. On July 3, 1997 several tornadoes struck this region of the State. An F1 tornado caused severe tree loss in Swanzey, destroying a building and damaging the stables at the Cheshire Fairgrounds. Although outside the Southwest Region, the 2008 Barnstead tornado caused significant damage and also involved loss of life. Therefore, this is a real hazard and the damage it could inflict should not to be taken lightly.

Local events: There were no high wind events that impacted Antrim since the last update.

Potential Occurrences:

- River corridors and hill tops are more susceptible.
- This is a town wide event; therefore, no specific locations are listed.

Potential Impact:

- There is a potential for structural damage;
- There is a potential for loss of life and property as well as disruption of utility service; and
- Such events cause small blocks of downed timber.

The **Enhance Fajita Scale** is used to rate the intensity of a tornado by examining the damage caused by the tornado once it has passed.

EF-0: Wind speed 65-85 mph.; frequency 53.5%. Minor damage.
EF-1: Wind speed 86-101 mph.; frequency 31.6%. Moderate damage.
EF-2: Wind speed 111-135 mph.; frequency 10.0%. Considerable damage.
EF-3: Wind speed 136-165 mph.; frequency 3.4%. Severe damage.
EF-4: Wind speed 166-200 mph.; frequency 0.7%. Extreme damage.
EF-5: Wind speed >200 mph.; frequency 0.1%. Total destruction.

Infectious Disease

Risk: High
Impact: Medium
Future probability: High

Epidemics may be caused by infectious diseases, which can be transmitted through food, water, the environment or person-to-person or animal-to-person; and noninfectious diseases, such as a chemical exposure, that causes increased rates of illness. Infectious diseases that may cause an epidemic can be broadly categorized into the following groups:

- Foodborne (Salmonellosis, E. Coli)
- Water (Cholera, Giardiasis)
- Vaccine Preventable (Measles, Mumps)
- Sexually Transmitted (HIV, Syphilis)
- Person-to-Person (TB, meningitis)
- Arthropod borne (Lyme, West Nile Virus)
- Zoonotic (Rabies, Psittacosis)
- Opportunistic fungal and fungal infections (Candidiasis)

Extent:
The magnitude and severity of infectious diseases is described by its speed of onset (how quickly people become sick or cases that are reported) and how widespread the infection is. Some infectious diseases are inherently more dangerous and deadly than others, but the best way to describe the extent of infectious diseases relates to the disease occurrence:

- Endemic - Constant presence and/or usual prevalence of a disease or infection agent in a population within a geographic area
- Hyperendemic - The persistent, high levels of disease occurrence
- Cluster - Aggregation of cases grouped in place and time that are suspected to be greater than the number expected even though the expected number may not be known
- Epidemic - An increase, usually sudden, in the number of cases of a disease above what is normally expected
- Outbreak - The same as epidemic, but over a much smaller geographical area
- Pandemic - Epidemic that has spread over several countries or continents, usually affecting many people

Past Events:
January 20, 2020 and continuing; COVID-19 PANDEMIC (DR-4516-NH) Major Disaster Declaration declared on April 3, 2020. The Covid-19 Pandemic that began in 2020 resulted in numerous residents to become ill and also some deaths in Town. In addition, it created economic hardship for many due to loss of work, school closures and business closures. This pandemic is still occurring, so data will be forthcoming in the next update of this Plan.

Potential Occurrences:
- This is a town wide event; therefore, no specific locations are listed.

Potential Impact:
- Those with weakened immune systems are at greater risk during these events.
- There is a potential for injury or death to people, domestic animals and wildlife.
- There is a potential for risk to waterbodies and wildlife habitat.
- There is a potential for loss of crops and vegetation, and economic disparity.

Lightning
Risk: High
Impact: Medium
Future probability: High

Lightning is a natural hazard that is unpredictable. It could strike anywhere during a storm and potentially start a forest fire, especially in periods of drought. High elevations and areas around waterbodies may be more susceptible to lightning strike incidents. The table below categorizes lightning hazards according to the Lightning Activity Level (LAL) using cloud conditions and precipitation, and an estimate of lightning strikes per every 15 minutes.

LAL	Cloud & Storm Development	Lightning Strikes/15 min.
1	No thunderstorms.	---
2	Cumulus clouds are common but few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. Light rain will occasionally reach the ground. Lightning is very infrequent.	1 - 8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9 - 15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than 3 must occur within the observation area. Moderate rain is common & lightning is frequent.	16 - 25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Similar to LAL 3 but thunderstorms are dry.	16 - 25

Source: NOAA

Past Events:

- There were no specific locations of lightning strikes reported since the previous update.

Potential Occurrences:

- Lightning could occur town wide, therefore, no specific locations are identified; however, river corridors and hill tops are more susceptible.
- Antennas and satellites, church steeples, cupolas, and other upward protruding architectural features are at greater risk for lightning strikes.
- Hikers, fisherman and boaters are at risk during lightning events and should seek safe shelter.

Potential Impact:

- Forested areas with a high fuel load are a high risk for forest fire during lightning storms.
- Telephone and power outages often occur when transformers are hit by lightning or when a tree gets struck and falls onto the lines.
- There is a potential for damage to structures.
- There is a potential for injury or death.

Severe Winter Weather

Risk: High
Impact: Medium
Future probability: High

Three types of winter events that cause concern are heavy snow, ice storms and extreme cold. Antrim's recent history has not recorded any loss of life due to the extreme winter weather. These random events are difficult to set a cost to repair or replace any of the structures or utilities affected.

To help prepare for these events, the Sperry Piltz Ice Accumulation Index was created.

THE SPIA INDEX™

ICE DAMAGE INDEX	DAMAGE AND IMPACT DESCRIPTIONS
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days.
4	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures. Outages lasting 5-10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

Past Events:

- March 14-15, 2017 - Heavy snow and wind occurred throughout the state. There were no injuries or structural damage reported as a result of the storm.
- March 13-14, 2018 - Heavy snow storm but no local impact. FEMA Disaster Declaration # DR-4371 for Carroll, Strafford and Rockingham Counties.

Potential Occurrences:

- This is a town wide event; therefore, no specific locations are listed, however, roads with moderate to steep grades are a concern for driver safety.

Potential Impact:

- There is a potential for interruption of service.
- There is a potential of damage to structures.
- There is a potential for injury or death.
- The freezing and thawing increases repair and maintenance costs on the town budget.

Solar Storm and Space Weather

Risk: Low
Impact: Low
Future probability: High

The term space weather is relatively new and describes the dynamic conditions in the Earth's outer space environment, similar to how the terms "climate" and "weather" refer to the conditions in the Earth's lower atmosphere. Space weather includes any and all conditions and events on the sun, in the solar wind, in near-Earth space, and in our upper atmosphere that can affect space-borne and ground based technological systems.

The chart on the next page shows the level of severity of space weather as it relates to the impact on radio communications. The National Oceanic and Atmospheric Administration (NOAA) uses this chart to alert

those who depend on radio communications such as first responders and airlines on days that could create life threatening situations if their radios are impacted.

Radio Blackout

Scale	Description	Effect	Physical measure	Average Frequency (1 cycle = 11 years)
R 5	Extreme	**HF Radio:** Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and en route aviators in this sector. **Navigation:** Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.	X20 (2×10^{-3})	Less than 1 per cycle
R 4	Severe	**HF Radio:** HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. **Navigation:** Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.	X10 (10^{-3})	8 per cycle (8 days per cycle)
R 3	Strong	**HF Radio:** Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth. **Navigation:** Low-frequency navigation signals degraded for about an hour.	X1 (10^{-4})	175 per cycle (140 days per cycle)
R 2	Moderate	**HF Radio:** Limited blackout of HF radio communication on sunlit side, loss of radio contact for tens of minutes. **Navigation:** Degradation of low-frequency navigation signals for tens of minutes.	M5 (5×10^{-5})	350 per cycle (300 days per cycle)
R 1	Minor	**HF Radio:** Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact. **Navigation:** Low-frequency navigation signals degraded for brief intervals.	M1 (10^{-5})	2000 per cycle (950 days per cycle)

Source: National Oceanic and Atmospheric Administration (NOAA)

This is a new hazard added to this plan. It is anticipated that this will be discussed further in future plans.

Past Events:

- This is a hazard that is difficult to detect and the Work Group was not aware of any specific dates of occurrence. There have been no incidents of damage or interruption of communication services recorded in Antrim.

Potential Occurrences:

- The entire Town is at risk for solar storms and space weather. There is a concern for disruption in emergency services communications and businesses that rely on the internet.

Potential Impact:

- There is a potential for interruption of service.
- Solar storms and space weather can impact the connections for emergency services. It can also impact the wells and tanks which communicate by radio.

Tropical Storm/Hurricane

Risk: Medium
Impact: Low
Future probability: High

There is concern for tropical storms and hurricanes to impact Antrim. Antrim's inland location in southwestern New Hampshire reduces the risk of extreme high winds that are associated with hurricanes. A major hurricane can cause significant damage to a community. Most of the damage is caused by high water and high winds.

Past Events from 2016 to present:

- The Town has experienced small blocks of downed timber and uprooting of trees onto structures in the past, however, there have been no occurrences of tropical storms or hurricanes in the past five years that have impacted Antrim.

Potential Occurrences:

- River corridors and hill tops are more susceptible.
- This is a town wide event; therefore, no specific locations are listed.

Potential Impact:

- There is a potential for injury or death;
- There is a potential for structural damage and disruption of utility service.
- There is a potential for flooding of evacuation routes and other roads.

Saffir-Simpson Hurricane Wind Scale

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating system based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, and require preventative measures.

Category 1

Wind Speed: 74 - 95 mph, 64 - 82 kts

Very dangerous winds will produce some damage. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.

Category 2

Wind Speed: 96 - 110 mph, 83 - 95 kts

Extremely dangerous winds will cause extensive damage. Near-total power loss is expected with outages that could last from several days to weeks.

Category 3

Wind Speed: 111 - 129 mph, 96 - 112 kts

Devastating damage will occur. Electricity and water will be unavailable for several days to weeks after the storm passes.

Category 4

Wind Speed: 130 - 156 mph, 113 - 136 kts

Catastrophic damage will occur. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Category 5

Wind Speed: 157 mph or higher, 137 kts or higher

Catastrophic damage will occur. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: http://www.nhc.noaa.gov/aboutsshws.php

Wildfire

Risk: High
Impact: Medium
Future probability: High

The whole Town is at risk for wildfires. There is a substantial amount of debris on the ground from the ice storms of 1998 and 2008, wind shears, heavy winds, and logging practices. As timber harvesting is reduced, wood roads close and debris builds up on the ground, the potential for wildfire increases town-wide.

Past Events: There have been no reported wildfires in the past five years in Antrim

Potential Occurrences: The potential for a wildfire is higher in the forested areas of Antrim;

- A lack of direct access to many remote areas within Town adds to the danger.

Potential Impact:

- There is a potential for the risk of life and property loss;
- There is a potential for loss of wildlife habitat and timber; and
- There is a potential for disruption of utility service.

Wildfires are classified according to size: Class A - one-fourth acre or less; Class B - greater than one-fourth acre, but less than 10 acres; Class C - 10 acres or more, but less than 100 acres; Class D - 100 acres or more, but less than 300 acres; Class E - 300 acres or more, but less than 1,000 acres; Class F - 1,000 acres or more, but less than 5,000acres; Class G - 5,000 acres or more. The wildfires in Antrim have mostly been small in nature and caused by lightning strikes (Class A or B).

Dam Failure

Risk: Low
Impact: High
Future probability: Low

Dam failure is defined as the sudden, rapid, and uncontrolled release of impounded water. The Gregg Lake Dam is the only high hazard (H) dam in Antrim and the Antrim Sewage Lagoons Dam is the only significant hazard (S) dam.

Past Events from 2016 to present:

- There have been no recent occurrences of dam breach in Town

Potential Occurrences:

- Gregg Lake Dam
- Antrim Sewage Lagoon Dam

Potential Impact:

- There is a potential for the risk of life and property loss;
- There is a potential for disruption of utility service.

Dam Classifications: NM - Non-menace; L - Low hazard; S - Significant hazard; H - High Hazard. Generally, all Class H dams need to have Emergency Action Plans, and most Class S dams also require them. There is one Class H dam and one Class S dam in Antrim according to the Department of Environmental Services Dam Bureau. The Class H dam is the Gregg Lake Dam and the Class S dam is the Antrim Sewage Lagoons Dam. Areas that are downstream from the dams are at greater risk.

Dam	Hazard Class.	Status	Name	Height (ft.)	Impnd. (ac.)	Dam Owner
D009001	NM	Active	Loverin Dam	12	2.5	Private
D009002	L	Active	Steels Pond Dam	20	36	NHDES
D009003	H	Active	Gregg Lake Dam	11.5	201	Town of Antrim
D009004	NM	Active	Great Brook Dam	14	0.5	Private
D009005		Ruins	Holt Mill Dam	12		Private
D009006		Exempt	Great Brook Dam	4	0.78	Town of Antrim
D009007		Ruins	Blacksmith Shop Dam	8		Town of Antrim
D009008		Ruins	Abbot Mill Dam	11		Private
D009009		Ruins	Reel Shop Dam	11		Private
D009010		Ruins	Paige Mill Dam	5		Private
D009011	NM	Active	Silk Mill Dam	6	0.5	Private
D009012	L	Active	Summer Street Dam	10	2.4	Town of Antrim
D009013		Ruins	Poore Dam	10		Private
D009014	L	Active	Great Brook Handle Shop Dam	15	0.13	Private
D009015		Ruins	Saw Mill Dam	24		Private
D009016		Ruins	Thompson Dam	8		Private
D009017	NM	Active	Campbell Pond Dam	5.5	16.6	Town of Antrim
D009018		Ruins	Wilson Dam			Private
D009019	L	Active	Willard Pond Dam	8	108	Private
D009020		Ruins	Willard Pond Brook Dam	6		Unknown
D009021		Ruins	Antrim Rod Gun Fish Pond Dam	4		Private
D009022		Ruins	Great Brook Dam	9		Private
D009023	NM	Active	Andersen Dam	6	2.83	Private
D009024	L	Active	Karsten Wildlife Pond Dam	10	7	Private
D009025		Exempt	Interlocken Dam	5	2.5	Private
D009026	S	Active	Antrim Sewage Lagoons Dam	13	2.63	Town of Antrim

Source: New Hampshire Department of Environmental Services Dam Bureau 2022

Chapter 5
Critical Facilities

Identification and Location of Critical Facilities

A Critical Facility is defined as a building, structure, or location which:

- Is vital to the hazard response effort
- Maintains an existing level of protection from hazards for the community
- Would create a secondary disaster if a hazard were to impact it

Antrim's Hazard Mitigation Planning Work Group has broken up this list of facilities into four categories. The first category contains facilities needed for emergency response in the event of a disaster. The second category contains non-emergency response facilities that have been identified by the Work Group as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Antrim. The third category contains facilities/populations that the Work Group wishes to protect in the event of a disaster. The fourth category contains potential resources, which can provide services or supplies in the event of a disaster. The Critical Facilities Map at the end of this Plan identifies the facilities.

Category 1 - Emergency Response Services

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. Emergency Operations Center

   Antrim Town Hall - 66 Main St.

2. Fire Station

   Antrim Central Fire Station - 82 Clinton Road
   North Branch Fire Station - 137 Keene Road

3. Police Station

   61 Main Street in Antrim Village

4. Emergency Fuel Facilities

   NH DOT Shed - NH 9, 679 West Main Street, Hillsborough

5. Emergency Electrical Power Facility

   Water/sewer facility - 66 Main Street
   Highway Department - 62 Goodell Road
   Fire Departments - 86 Clinton Road; 137 Keene Road
   Town Hall - 66 Main St.
   Police Department - 61 Main Street

Antrim Elementary School - 10 School Street
Great Brook Middle School - 16 Main Street

6. Emergency Shelters

Town Hall - 66 Main Street

7. Evacuation Routes

NH Route 9
NH Route 31
US Route 202

8. Bridges/ Culverts Located on Evacuation Routes

NH Route 9/Loveren Mill Road Bridge, Liberty Farm Road
NH Route 31/Cemetery Road Bridge
NH Route 31/Congreves Road Bridge
NH Route 31/Buttercup Lane Bridge
West Street Bridge (Legion)
NH Route 202/Clinton Road Bridge
NH Route 31/North Branch
West Street near Hilton

9. Town Garage/Transfer Station - 62 Goodell Road

10. Communications

TDS - 5 Summer Street
TDS - 74 Old North Branch Road
TDS - 33 Gregg Lake Road
TDS - 1 Elm Avenue

Category 2 - Non-Emergency Response Facilities

The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Antrim.

1. Water Supply

Water Tower located at intersection of 112 Pleasant Street/Greystone Road
Water Tower located at 90 Stacey Hill Road/NH Route 31
Water Pump Station in Bennington
Public Water Supply Wells - numerous locations, see Critical Facilities Map at the end of the Plan

2. Problem Culverts

Intersection of Buttercup Lane and Clinton Road
West Street - west of NH 31

Category 3 - Facilities/Populations to Protect

The third category contains people and facilities that need to be protected in event of a disaster.

1. Special Needs Population - identified by confidential survey administered by Emergency Medical Services.

    Oxygen-dependent people
    Mentally challenged
    People on a lifeline
    Elderly - on Main Street in Antrim Village
    People assisted by Home Health
    Hearing and sight impaired
    Shut-ins and disabled
    Group Homes

2. Recreation Areas

    Town Beach and Harbor Camp LLC at Gregg Lake
    Hosmer Lot Wildlife Management Area - Near Willard Pond
    Playground facilities/courts at schools - 10 and 16 Main Street
    McCabe Forest off of US Route 202
    Memorial Park - 11 Jameson Avenue

3. Schools/Daycare

    Antrim Elementary School - 10 School Street
    Great Brook Middle School - 16 School Street
    Grapevine - 4 Aiken Street

4. Churches

    Antrim Baptist Church - 85 Main Street in Antrim Village
    Church of Christ - 100 Main Street in Antrim Village
    First Presbyterian Church - 73 Main Street in Antrim Village
    Stone Church - 223 Clinton Road

5. Historic Buildings/Sites

    Maplehurst - 67 Main Street
    Antrim Baptist Church - 85 Main Street
    Church of Christ - 100 Main Street
    First Presbyterian Church - 73 Main Street
    Antrim Mills (Goodell Building) - 42 Main Street
    Flint Mansion on North Branch Road - (National Register of Historic Places) -*5 buildings on the north side of Old Keene Road and intersection with Old Center Road*
    Antrim Town Hall - 66 Main Street
    Tuttle Library - 45 Main Street

6. Other

    Sobriety Center of NH, Antrim House - 55 Main Street

Category 4 - Potential Resources

Contains facilities that provide potential resources for services or supplies.

1. Food/Water

   T-Bird Convenience Store - 1 Concord Street
   Food Pantry at the Antrim Baptist Church - 85 Main Street
   Antrim Market Place - 76 Main Street at the intersection of US 202/NH 31
   Grocery Stores Located in Hillsborough, Keene & Peterborough

2. Hospitals/Medical Supplies

   Medical Facilities Located in Keene, Peterborough, and Concord
   Antrim Medical Group - 12 Elm Street
   Antrim Dentist - 18 Elm Street

3. Gravel Pits

   Gravel Pit at intersection of Old Hancock Road/Boutman Road (abandoned)
   Gravel Pit on N. Branch Road (Town of Antrim Highway Department)
   Gravel Pit on Elm Avenue (Zeke and Mack's) Map Lot: 219-003 and 214-017
   Gravel Pit at 149 Clinton Road
   Gravel Pit in the town of Bennington (Tri-town Pit)
   Gravel Pit at 739 Clinton Road

4. Miscellaneous Resources

   Emergency Broadcast & Television: WMUR

   Transportation: Buses - First Student in Keene and Hillsborough
   STA in Peterborough

   Trucks - Town of Antrim, Local Contractors, National Guard in Keene & Hillsborough

   Beds, Cots, Blankets: National Guard, Red Cross

   Tools, Materials, Heavy Equipment:
   S.R. Jones Excavation - 149 Clinton Road
   Antrim Lumber - 78 Smith Road
   Edmund's Hardware - 56 Main Street
   Robblee Tree Service - 114 Concord Street
   PB & H Equipment - 408 Keene Road
   Landsite Corp. - 739 Clinton Road

Chapter 6
Existing Protection

Description of Existing Programs

- **Floodplain Development Ordinance** - An ordinance has been adopted as part of the Town's Land Use Plan to control development in the 100-year floodplain.

- **School Evacuation Plan** - Designated plan to evacuate the Middle and Elementary schools in the event of an emergency or disaster addressing bussing, transportation routes (primary and alternative), traffic & crowd control, end destination and parental notification. The Antrim Fire, Police, and School Departments are responsible for implementing this plan.

- **Fire Pond Management Plan -** This designates a maintenance schedule to the local ponds and dry hydrants used by the Fire Department for water supply for fire prevention and suppression. Additional fire ponds and dry hydrants are needed for better coverage.

- **Town Warning System** - Town implements a limited warning system utilizing vehicle mounted bullhorns.
- **Local Road Design Standards** - Standards set by the town and the Highway Department to ensure a constant construction benchmark.

- **Local Bridge Maintenance Program** - Guidelines and schedules for Annual upkeep of local town bridges and culverts. The Town has established a capital reserve fund for bridge maintenance and repair since 1997.

- **Erosion and Sedimentation Plan** - E&S plans are established by the state for erosion and sediment control. A Soil Erosion and Sedimentation Control Plan is required by the Town for all major subdivisions and site plans.

- **Best Management Practices** are used as provided by the State to prevent non-point sources from affecting the local waterways.

- **Emergency Back-up Power Program** - The Town has emergency generators at the water and sewer plant (2), Town Hall, Police Department, Fire Department, and the school. There are also 2 portables at the Highway Garage.

- **Wetlands Protection** - The Town has adopted a Wetlands Ordinance that requires a 25-foot setback for all structures.

- **Town-Sponsored Safety Awareness Program** - Town provides safety and liability training for all town personnel.

- **Ambulance Service** - Ambulance service is provided to the neighboring towns of Bennington and Stoddard.

- **Codes and Ordinances -** Antrim maintains a building inspector and has adopted provisions of the NH Life Safety Code and the NH State Building Code. The current program is working. The

Code Enforcement Officer enforces building and zoning ordinances and reviews permit applications.

- **Septic Systems and Wells -** Inspection of failed septic systems, wells, etc.

- **Emergency Operations Plan (2021) -** Actions to follow in the event of a radiological disaster.

- **Shoreland Protection Act -** Designates a protective buffer along all surface waters in town. The local ordinance is stricter than the State's Shoreland Protection Act in that it requires a 100-foot primary structure setback.

- **Winter Storms Operations Plan -** is designed as a set of guidelines for the Highway Department and town personnel to follow during times of extreme winter weather.

- **Spill Prevention Control and Counter Measures Plan -** This plan is maintained at the Fire Department in the event that there is a spill. Personnel in the Fire Department are being trained in how to handle hazardous materials spills. SWNHFMA is called upon in the event of a major spill

- **National Flood Insurance Program -** A federally backed program that encourages communities to enact and enforce floodplain regulations.

- **Town Radio System -** The existing system has a lot of dead spots in town due to antenna placement.

- **Tree Maintenance Program -** The utility company provides tree removal near powerlines to reduce damage to powerlines and potential loss of power during storm events.

- **Town Capital Improvements Plan (CIP) -** The CIP has been in effect since 2006. Each department adds information for future funding of infrastructure, structural improvements, equipment, and other departmental needs.

- **Mutual Aid -** Provides assistance to all aspects of Antrim's Emergency Management Services in town. Southwest New Hampshire Fire Mutual Aid (SWNHFMA) and the Hillsborough Emergency Dispatch provide mutual aid to Antrim. Antrim has an agreement with its neighboring towns to share equipment and services other than Police, Fire, and Highway Department.

- **Town Master Plan (2010) -** A Guidance document to ensure that overall development in town is sustainable, meeting the needs of the citizens by setting forth steps and guidelines for a sound living environment through intelligent growth. The Planning Board is currently updating the plan.

Existing Protection Matrix

The Antrim Hazard Mitigation Work Group has developed the summary matrix of existing hazard mitigation strategies presented on the following pages. This matrix, a summary of the preceding information, includes the type of existing protection (Column 1), area covered (Column 2), the responsible local agent (Column 3), the effectiveness of the strategy (Column 4), the recommended changes (Column 5).

Effectiveness of the existing protection is rated Poor, Average, Good or Unknown: *Poor*- needs improvements; *Average*- meets general expectations; *Good*- meets and sometimes exceeds expectations; *Unknown*- not yet used or unable to quantify effectiveness.

Existing Protection	Area Covered	Responsible Local Agent	Effectiveness (Poor, Avg., Good)	Recommended Changes - Actions
Floodplain Development Ordinance	Floodplain areas	Building Inspector	Good	Maintain good practices/enforcement
School Evacuation Plan	School buildings and campus	Fire, Police, & School Departments	Good	No changes needed at this time.
Fire Pond Management Plan for Antrim Fire Dept.	Areas outside of the water district	Fire Chief	Good	Additional fire ponds & dry hydrants needed. Work with the Planning Board to encourage installation with new developments.
Town Warning System	Townwide	Police Department, EMD	Good	Upgrade as technology becomes available.
Local Road Design Standards	Town roads	Hwy. Dept., Code Enforcement Officer, & Planning Board	Good	Reviewed annually.
Local Bridge Maintenance Program	Townwide	Hwy. Dept. & NH DOT	Good	State inspects all bridges annually
Erosion & Sedimentation Control Plans	Townwide	Planning Board, Conservation Commission and DES	Good	Continue public awareness / enforcement when needed
Best Management Practices	Townwide	DES, Hwy. Dept., Planning Board, & Conservation Commission	Good	Highway Department uses BMPs on all projects
Emergency Power Back-up Program	Townwide	Police Chief, EMD, Fire Chief & Town Administrator	Good	Consider locations needed for additional generators
Wetlands Protection	Wetland areas	Building Inspector, Planning Board, Conservation Commission	Good	Upgrade as BMPs require.

Existing Protection	**Area Covered**	**Responsible Local Agent**	**Effectiveness (Poor, Avg., Good)**	**Recommended Changes - Actions**
Safety Awareness Program	Townwide	Town Administrator	Good	Program works well and should continue as training is needed.
Ambulance Service	Townwide	Fire Department	Good	No changes needed at this time.
Codes and Ordinances	Townwide	Code Enforcement Officer and Fire Department	Good	Increase public awareness of codes.
Septic systems and wells	Townwide	Health Officer, Building Inspector	Good	State established guidelines.
Emergency Operations Plan (2021)	Townwide	Emergency Management Director	Good	Next update needed in 2026.
Shoreland Protection Program	Shoreland areas	Building Inspector, Planning Board, DES, & Conservation Commission	Good	Town has adopted zoning ordinances to coincide with the Shoreland Protection Act.
Winter Storms Operations Plan	Townwide	Road Agent	Good	No changes needed at this time.
Spill Prevention Control and Counter Measures Plan	Townwide	Fire Chief & Highway Department	Average	Upgraded equipment in fire department.
National Flood Insurance Program	Flood areas	EMD, Planning Board, Building Inspector	Poor	Encourage participation in program.
Town Radio System	Townwide	Police, Fire, and Highway	Good	No changes needed at this time.
Tree Maintenance Program	Townwide	Highway Department	Good	No changes needed.
Town Capital Improvements Plan	Townwide	Planning Board	Good	CIP is updated annually. Has been in effect since 2006.
Mutual Aid	Townwide	Fire Chief, Police Chief, EMD, Highway Dept. and Selectmen	Good	No changes needed at this time.
Town Master Plan (2010)	Townwide	Planning Board	Good	Currently updating. Should consider adding this plan to the Master Plan.

Status of Previous Priority Mitigation Actions

The following table provides a status update for the Priority Mitigation Actions identified in the previous Plan. Previously identified mitigation actions are noted as complete, delete, or defer to the updated Plan's new mitigation strategies list.

Mitigation Action	Status	Explanation/Comment
Culverts: Upsize and extend the length of culverts on Mine Ledge Road.	Complete	Culverts were upsized/replaced.
Culverts: some of the culverts on Pond Road should be upsized to allow higher flow rates.	Complete	No action needed at this time.
Continue to enforce both the adopted FEMA Digital Flood Insurance Rate Maps/FIS and floodplain ordinance to ensure the NFIP requirements are maintained & implemented.	Complete and Ongoing	This is being done and is a continuing strategy.
Install generators at the school and Town Hall.	Defer	Continue as a new mitigation action.
Install a repeater for fire department.	Defer	Continue as a new mitigation action.
Update the Town website to improve public awareness of NFIP. Include preparedness and mitigation methods for residents to reduce the impact of all natural disasters.	Complete and Ongoing	Some updates have been made to the website, but additional ones should be done.
Update the Emergency Operations Plan.	Complete	EOP was updated in 2017. Next update should be done in 2022.
Continue Firefighter I program certified through NHFA, and Recruiting New Members.	Complete and Ongoing	Added approximately 10 new members since the last plan
Incorporate this Hazard Mitigation Plan into the Antrim Master Plan as a chapter or appendix.	Defer	Continue as a new mitigation action.
Training/materials needed for Fire Dept. for the Hazardous Materials Plan.	Complete and Ongoing	Continue to provide training and outreach material.
Review the Local Road Design Standards and update as needed.	Complete	No action needed at this time.
Determine the location for an evacuation center in case of an emergency.	Defer	Discussions among town officials and emergency responders is needed.
Bank stabilization is needed on Joslin Road down to Merriam Brook.	Defer	This should be included as a new mitigation action.
Monitor motor vehicle repair shops for proper handling and disposing of hazardous materials that could harm the drinking water.	Complete and Ongoing	This is a continual process and should be included as a new mitigation action.

Chapter 7
Existing & Potential Strategies

Identifying Gaps in Coverage

The following programs and activities are aimed at mitigating the impacts of the identified potential hazards. As more information becomes available for other hazards that may have the potential to impact the Town of Antrim, additional strategies will be added to the Hazard Mitigation Plan Update 2022. The identified strategies are not only meant to address reducing the effects of hazards on existing buildings and infrastructure, but also to address reducing the effects of hazards on new buildings and infrastructure.

In addition to the programs and activities that Antrim is currently undertaking to protect its residents and property from natural, technological and human-caused disasters, a number of additional strategies were identified by the Local Hazard Mitigation Work Group for consideration. The process of compiling a comprehensive list of all mitigation strategies currently in place throughout the Town helped the Work Group identify gaps in the existing coverage and improvements which could be made to the existing strategies. New strategies were identified for each general hazard type using the following categories: Prevention (programs and policies), Property Protection, Emergency Services, Public Information.

Potential Strategies

In addition to the mitigation strategies proposed generally for each hazard type as indicated above, the Work Group brainstormed actions for specific potential hazard areas identified. The section below shows proposed mitigation actions for both general hazard types and specific potential hazard areas. Each strategy was discussed to determine realistic strategies to be included in the STAPLEE chart.

Potential Strategies Matrix

Hazard Type	Prevention	Property Protection	Emergency Services	Public Information
Flooding	Perform a culvert inventory and assessment.	Upsize the Slaughter House culvert on West Street.	Update locations for emergency shelters.	Improve public awareness of the NFIP.
	Identify options for beaver dam eradication.	Upgrade bridge at Liberty Farm Road and access at Stacy Hill Road.		Consider enrolling in Community Rating System (CRS).
Drought	Maintain an updated list of addresses of the older residents and special needs populations.	Add a water conservation regulation & water ban if necessary.	Consider locations for a water distribution center.	Post links to the FEMA and NH HSEM website.

Hazard Type	Prevention	Property Protection	Emergency Services	Public Information
Extreme Temperatures	Maintain an updated list of addresses of the older residents and special needs populations.	Update heating and cooling, insulation, windows, etc.	Update locations for emergency shelters. Consider locations for heating, cooling and charging center.	Post links to the FEMA and NH HSEM website.
High Wind Events	Require tie-downs for structures (such as sheds). Need additional resources for tree removal and trimming.	Trim tree branches near critical facilities, town structures and roadways.	Update locations for emergency shelters.	Add an emergency management section or page to the town website
Infectious Disease	Develop a protocol for determining closures and measures needed to protect the public.	Equip the EOC and shelters with materials to handle a wide-spread infectious disease event.	Continue a strong relationship with the Regional Public Health Representative.	Conduct a public information workshop on emergency preparedness for short-term and long-term quarantine.
Lightning	Consider adding surge protectors to critical infrastructure.	Investigate locations for grounding equipment on public & historic buildings.	Consider the need and locations for generators.	Include a link of the NH HSEM or FEMA website on the Town website.
Severe Winter Weather	Develop a written winter storms operations plan.	Coordinate with Eversource to trim tree branches near power lines. Trim tree branches near critical facilities, town structures, and roadways.	Determine the need for additional portable and fixed generators. Update the vulnerable populations list annually.	Provide information to residents about proper use of generators and the importance of maintaining the heating system to prevent carbon monoxide poisoning and fires.
Solar Storms and Space Weather	Become more aware and monitor high impact days.		Consider alternative means of communication.	
Tropical Storm and Hurricane		Consider requirement for new construction to withstand severe wind speeds.	Determine the need for additional portable and fixed generators.	Utilize the CODE RED emergency warning system.
Wild Fires	Install fire warning signs at trailheads.	Continue to implement the fire ponds/dry hydrant management plan to provide increased access to and upkeep of water sources for fire protection.	Continue the Fire Prevention Program including carbon monoxide, fire and evacuation information.	Provide residents with information on fire safety & prevention. Provide state links to obtain fire permit and fire hazard levels and alerts.

Hazard Type	Prevention	Property Protection	Emergency Services	Public Information
Dams	Identify options for beaver dam eradication	Inspect dams for debris prior to heavy storm events.		Provide information to residents about evacuation routes and emergency procedures.
Hazardous Materials	Training/materials needed for the fire department.	Provide information to residents & businesses about evacuation routes and procedures.	Continue mutual aid SWNHMA & Cheshire County Sheriff's Dept.	Provide outreach information on proper disposal of hazardous household materials and medicines.
Erosion		Establish and implement BMPs and E&S Control Plans for construction and maintenance work throughout the Town.	Stabilize steep slope on Stacy Hill Road with plantings, retaining walls, or rip rap.	
All Hazards	Continue Mutual Aid hazard drills.	Consider a Master Plan update and include this Plan in the appendix.	Update locations for emergency shelters.	Establish an Emergency Public Response System.
	ICS/NIMS Training for Town departments.			Add an emergency management section or page to the town website

Prioritization of Proposed Mitigation Strategies

The goal of each strategy identified in the previous list is reduction or prevention of damage from a hazard event. In order to determine their effectiveness in accomplishing this goal, a set of criteria was applied to each strategy. The STAPLEE method analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies and discussed in the table:

- **Social**: Is the proposed strategy socially acceptable to the community? Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- **Technical**: Will the proposed strategy work? Will it create more problems than it solves?
- **Administrative**: Can the community implement the strategy? Is there someone to coordinate and lead the effort?
- **Political**: Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?
- **Legal**: Is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?
- **Economic**: What are the costs and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?
- **Environmental**: How will the strategy impact the environment? Will the strategy need environmental regulatory approvals?

Each mitigation strategy was evaluated and assigned a score (Good = 3, Average = 2, Poor = 1) based on the above criteria. An evaluation chart with total scores for each strategy can be found in the table below. Each

strategy was evaluated and prioritized according to the final score. The highest scoring strategies were determined to be of most importance, economically, socially, environmentally, and politically.

STAPLEE CHART Mitigation Strategy	Is it Socially acceptable?	Is it Technically feasible &potentially	Is it Administratively workable?	Is it Politically acceptable?	Is there Legal authority to implement?	Is it Economically beneficial?	Is it Environmentally beneficial?	Total Score
Continue to enforce both the adopted FEMA Digital Flood Insurance Rate Maps/FIS and floodplain ordinance to ensure the NFIP requirements are maintained & implemented.	3	3	3	3	3	3	3	21
Update the Town website to improve public awareness of NFIP. Include preparedness and mitigation methods for residents to reduce the impact of all natural disasters.	3	3	3	3	3	3	3	21
Incorporate this Hazard Mitigation Plan into the Antrim Master Plan as a chapter or appendix.	3	3	3	3	3	3	3	21
Add an emergency management section or page to the town website. Include links to the FEMA and NH HSEM website.	3	3	3	3	3	3	3	21
Establish emergency shelters in case of an emergency.	3	3	3	3	3	3	3	21
Repair the Slaughter House culvert on West Street.	3	3	3	3	3	3	3	21
Upgrade bridge at Liberty Farm Road and access at Stacy Hill Road.	3	3	3	3	3	3	3	21
Stabilize steep slope on Stacy Hill Road with plantings, retaining walls, or rip rap.	3	3	3	3	3	3	3	21
Utilize the CODE RED emergency warning system.	3	3	3	3	3	3	3	21
Continue a strong relationship with the Regional Public Health Representative.	3	3	3	3	3	3	3	21
Provide information to residents about proper use of generators and the importance of maintaining the heating system to prevent carbon monoxide poisoning and fires.	3	3	3	3	3	3	3	21
Install a repeater for fire department.	3	3	3	3	3	3	3	21
Continue to implement the fire ponds/dry hydrant management plan to provide increased access to and upkeep of water sources for fire protection. Work with the Planning Board to encourage installation with new developments.	3	3	3	3	3	3	3	21

STAPLEE CHART Mitigation Strategy	Is it Socially acceptable?	Is it Technically feasible & potentially successful?	Is it Administratively workable?	Is it Politically acceptable?	Is there Legal authority to implement?	Is it Economically beneficial?	Is it Environmentally beneficial?	Total Score
Continue Firefighter I program certified through NHFA, and recruiting new members.	3	3	3	3	3	3	3	21
Continue the Fire Prevention Program including carbon monoxide, fire and evacuation information.	3	3	3	3	3	3	3	21
Training/materials needed for Fire Dept. for the Hazardous Materials Plan.	3	3	3	3	3	3	3	21
Update the Hazardous Materials Plan.	3	3	3	3	3	3	3	21
Provide outreach information on proper disposal of hazardous household materials and medicines.	3	3	3	3	3	3	3	21
Upgrade equipment in the fire department for the Spill Prevention Control and Counter Measures Plan.	3	3	3	3	3	3	3	21
Update the EOP in 2026.	3	3	3	3	3	3	3	21
Consider the need and locations for generators.	3	3	3	3	3	3	3	21
Install generator at the school (for a shelter), the Highway Department, and N. Branch Fire Dept.	3	3	3	3	3	3	3	21
Test response times for flood inundation at Highland Lake.	3	3	3	3	3	3	3	21
Add mitigation actions to CIP when appropriate.	3	3	3	3	3	3	3	21
Continue progress of Local Bridge Maintenance Program.	3	3	3	3	3	3	3	21
Continue public awareness & enforcement of erosion & sediment guidelines/BMPs, and codes.	3	3	3	3	3	3	3	21
Update list of residents with special needs.	3	2	2	3	3	3	3	19
Update list of available resources.	3	2	2	3	3	2	3	18

Chapter 8
Implementation Schedule

Action Plan

The Antrim Hazard Mitigation Work Group developed an action plan that outlines who is responsible for implementing each of the prioritized strategies determined in the previous chapters, as well as when and how the actions will be implemented. The following questions were asked to develop an implementation schedule for the identified priority mitigation strategies:

WHO? Who will lead the implementation efforts? Who will put together funding requests and applications?

WHEN? When will these actions be implemented, and in what order?

HOW? How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

A fourth consideration was the cost/benefit of each proposed action. Comments regarding the cost/benefit of each project are included, along with the "who," "when," and "how" in the table below.

Mitigation Actions that were identified in Chapter 7 but did not score as a priority, will remain in the plan. As additional funding and staff becomes available, these strategies should be considered in future plan updates.

Once the plan is formally approved by FEMA, the Town will begin working on the actions listed below with an estimated completion date as noted in the Timeframe (When) column. Also, as additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the plan will be reviewed and amended accordingly

Implementation/Action Plan

Mitigation Action	Leadership (Who)	When	How
Continue to enforce both the adopted FEMA Digital Flood Insurance Rate Maps/FIS and floodplain ordinance to ensure the NFIP requirements are maintained & implemented.	Planning Board and Building Inspector	Short-term and ongoing	Town Budget
Update the Town website to improve public awareness of NFIP. Include preparedness and mitigation methods for residents to reduce the impact of all natural disasters.	Emergency Management Director	Short-term	Town Budget
Incorporate this Hazard Mitigation Plan into the Antrim Master Plan as a chapter or appendix.	Emergency Management Director	Mid-term	Town Budget
Add an emergency management section or page to the town website. Include links to the FEMA and NH HSEM website.	Emergency Management Director	Short-term	Town Budget

Mitigation Action	Leadership (Who)	When	How
Establish emergency shelters in case of an emergency.	Emergency Management Director	Short-term	Town Budget
Repair the Slaughter House culvert on West Street.	Road Agent	Short-term	Town Budget/Grants
Upgrade bridge at Liberty Farm Road and access at Stacy Hill Road.	Road Agent	Mid-term	Town Budget/Grants
Stabilize steep slope on Stacy Hill Road with plantings, retaining walls, or rip rap.	Road Agent	Mid-term	Town Budget/Grants
Utilize the CODE RED emergency warning system.	Fire Chief	Short-term	Town Budget
Continue a strong relationship with the Regional Public Health Representative.	Health Officer	Short-term	Town Budget
Provide information to residents about proper use of generators and the importance of maintaining the heating system to prevent carbon monoxide poisoning and fires.	Fire Chief	Short-term and ongoing	Town Budget
Install a repeater for fire department.	Fire Chief	Mid-term	Town Budget/Grants
Continue to implement the fire ponds/dry hydrant management plan to provide increased access to and upkeep of water sources for fire protection. Work with the Planning Board to encourage installation with new developments.	Fire Chief	Short-term	Town Budget
Continue Firefighter I program certified through NHFA, and recruiting new members.	Fire Chief	Short-term and ongoing	Town Budget/Grants
Continue the Fire Prevention Program including carbon monoxide, fire and evacuation information.	Fire Chief	Short-term	Town Budget
Training/materials needed for Fire Dept. for the Hazardous Materials Plan.	Fire Chief	Short-term and ongoing	Town Budget/Grants
Update the Hazardous Materials Plan.	Fire Chief	Mid-term	Town Budget/Grants
Provide outreach information on proper disposal of hazardous household materials and medicines.	Fire Chief and Health Officer	Short-term	Town Budget
Upgrade equipment in the fire department for the Spill Prevention Control and Counter Measures Plan.	Fire Chief	Short-term	Town Budget
Update the EOP in 2026.	Emergency Management Director	Long-term	Town Budget/Grants
Consider the need and locations for generators.	Select Board	Mid-term	Town Budget
Install generator at the school (for a shelter), the Highway Department, and N. Branch Fire Dept.	Emergency Management Director	Mid-term	Town Budget/Grants

Mitigation Action	Leadership (Who)	When	How
Test response times for flood inundation at Highland Lake.	Emergency Management Director and Fire Chief	Long-term	Town Budget
Add mitigation actions to CIP when appropriate.	Department heads	Short-term	Town Budget
Continue progress of Local Bridge Maintenance Program.	Road Agent and Board of Selectmen	Short-term and ongoing	Town Budget/Grants
Continue public awareness & enforcement of erosion & sediment guidelines/BMPs, and codes.	Planning Board and Board of Selectmen	Short-term and ongoing	Town Budget
Update list of residents with special needs.	Emergency Management Director	Long-term	Town Budget/Grants
Update list of available resources.	Emergency Management Director and department heads	Long-term	Town Budget/Grants

Chapter 9
Adoption, Implementation, Monitoring, and Updates

Plan Management

The Antrim Board of Selectmen adopted the Antrim Hazard Mitigation Plan Update 2022 on *(add BOS adoption date)*. A copy of the resolution can be found at the end of this chapter. Adopted policy addresses the actions for implementation set forth in the chart "Implementation Strategy for Priority Mitigation Actions" in Chapter 8 and in the "Monitoring & Updates" sub-section contained in this chapter. All other sections of this Plan are supporting documentation for information purposes only and are not included as the statement of policy.

A copy of the public hearing notice for the Board of Selectmen meeting at which the plan was adopted is included in **Appendix E.** The plan was available to the public via a hard copy at the Town offices prior to the Board of Selectmen meeting. Any comments were considered and addressed prior to adoption of the plan.

Monitoring & Updates

Recognizing that many mitigation projects are ongoing, and that while in the implementation stage communities may suffer budget cuts, experience staff turnover, or projects may fail altogether, a good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for updates of the Plan where necessary.

In order to track progress and update the Mitigation Strategies identified in the Action Plan (Chapter 8), the Hazard Mitigation Work Group will revisit the Antrim Hazard Mitigation Plan Update 2022 annually, or after a hazard event. The Emergency Management Director is responsible for initiating this review and should consult with the Board of Selectmen and other key local officials. Changes should be made to the Plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with the timeframe, the community's priorities and funding resources. Priorities that did not make the implementation list, but are identified as potential mitigation strategies, should also be reviewed during the monitoring and update of this Plan to determine feasibility of future implementation. In keeping with the process of adopting the Antrim Hazard Mitigation Plan Update 2022, a public hearing to receive public comment on plan maintenance and updating will be held during the annual review period and the final product adopted by the Board of Selectmen.

Monitoring of the Plan shall include periodic reports, meetings, site visits, and phone calls. The projects identified in this Plan will be evaluated to make sure they are still applicable and practical. When the Plan is evaluated, any changes should be incorporated into the Plan in the annual update.

Appendix F is meant to assist in the monitoring and evaluation of the Plan on an ongoing basis.

The Town of Antrim, NH Hazard Mitigation Plan Update 2022 must be reviewed, revised as appropriate, and resubmitted to FEMA for approval every five years in order to maintain eligibility for Hazard Mitigation & Assistance Grants (HMA Grants).

This plan received NH HSEM/FEMA final approval on (add approval date)

Implementation of the Plan Through Existing Programs

In addition to work by the Hazard Mitigation Work Group and Town departments, several other mechanisms exist which will ensure that the Antrim Hazard Mitigation Plan receives the attention it requires for satisfactory use.

Capital Improvements Program

The Capital Improvements Program (CIP) is reviewed and updated annually by the CIP Committee. Each town department refers to the CIP when developing its annual budget. Strategies or purchases requiring capital improvements from the Antrim Hazard Mitigation Plan Update 2022 will be inserted into the Capital Improvements Program. A capital reserve fund for hazard mitigation projects will be established to set aside funding for the projects identified in the Antrim Hazard Mitigation Plan Update 2022. The Local Hazard Mitigation Work Group will oversee the process to begin working with the CIP Committee to incorporate the various projects into the yearly CIP. Projects that have a substantial cost, such as bridges, culverts and road work will be included in the CIP.

Master Plan

The Local Hazard Mitigation Work Group will oversee the process to begin working with the Planning Board to encourage that the Antrim Hazard Mitigation Plan Update 2022 is adopted as a chapter or appendix in the Master Plan.

Zoning Ordinance and Regulations

Some of the implementation strategies proposed involve revisions to the Subdivision Regulations and/or the Site Plan Review Regulations as well as the Zoning Ordinance. The Local Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to develop appropriate language for the recommended modifications.

Continued Public Involvement

On behalf of the Hazard Mitigation Work Group, the Emergency Management Director (EMD), under direction of the Board of Selectmen, will be responsible for ensuring that town departments and the public have adequate opportunity to participate in the planning process. Administrative staff may be utilized to assist with the public involvement process. For the yearly update process, techniques that will be utilized for public involvement may include:

- Provide personal invitations to Budget Committee members;
- Provide personal invitations to town department heads;
- Post notices of meetings at the Town Office and Library;
- Submit newspaper articles for publication in appropriate newspapers; and
- Information added to the Town website.

A number of Implementation Action items which will be undertaken relate to public education and involvement. Additionally, members of the public including area business owners, schools, communities, and organizations will be invited to participate in the yearly process of updating the Antrim Hazard Mitigation Plan Update 2022. These outreach activities will be undertaken during the Plan's annual review and during any Hazard Mitigation Work Group meetings the Board of Selectmen calls to order. For all meetings regarding the Antrim Hazard Mitigation Plan Update 2022, the public will be noticed and the meetings will be open to the public.

CERTIFICATE OF ADOPTION

ANTRIM, NEW HAMPSHIRE

BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE

ANTRIM HAZARD MITIGATION PLAN UPDATE 2022

WHEREAS, the Town of Antrim has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its Hazard Mitigation Plan Update 2022 under the requirements of 44 CFR 201.6; and

WHEREAS, Work Group meetings were held between December 16, 2021 and April 14, 2022 regarding the development and review of the Antrim Hazard Mitigation Plan Update 2022; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Antrim, and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Antrim, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Antrim eligible for funding to alleviate the impacts of future hazards; now therefore be it RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Antrim;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Antrim this ____ day of _____, **2022**

_____
Antrim Board of Selectmen Chairman

__ _____
Board of Selectmen

_____
Board of Selectmen

ATTEST_____

Appendices

Appendix A: Hazard Descriptions

Natural Hazards

Avalanche: An avalanche is a slope failure consisting of a mass of rapidly moving, fluidized snow that slides down a mountainside. The flow can be composed of snow, ice, water, soil, rocks, and trees. An avalanche can be comparable to a landslide; only with snow instead of earth. Natural and human-caused snow avalanches most often result from structural weaknesses of mountainside and unstable snow and ice formations. Heavy snowfall followed by high winds often create areas of unstable snow accumulations that can be set in motion by human activities, such as hiking, ice climbing, skiing, and snowboarding.

Inland Flooding: Inland flooding is generally defined as a high flow, overflow, or inundation by water, which causes or threatens damage. Flooding results from the overflow of rivers, their tributaries and streams primarily from high precipitation events. Flash flooding is defined as a flow with a rapid rise in water level and extreme velocities in a river or stream, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. Because of New Hampshire's steep terrain in the headwaters of watersheds, particularly outside of the coastal plain, flash floods also lead to river bank and bed erosion. Extreme precipitation events in recent years, such as Tropical Storm Irene, have led to buildings on the edges of streambanks becoming at risk to river erosion, or culvert failures. The National Flood Insurance Program (NFIP) has a more specific definition of flooding, which can also be considered and used when looking at floodplain and floodplain mapping.

A flood is defined by the NFIP as:

- A general and temporary condition of partial or complete inundation of 2 or more acres of normally dry land area or of 2 or more properties (at least 1 of which is the policyholder's property) from:
    - Overflow of inland or tidal waters
    - Unusual and rapid accumulation or runoff of surface waters from any source
    - Mudflow
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term 100-year flood does not mean that flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase "1% annual chance flood". What this means is that there is a 1% chance of a flood of that size happening in any year.

Areas that have been identified as part of the 1% annual chance floodplain in support of the NFIP simply represent those areas for which mapping has been performed. With sufficient rainfall, snowmelt, or through the result of ice jam formation or in the event of dam failure, all areas that are floodplain adjacent to rivers and streams are prone to flood inundation. Developed areas are susceptible to poor drainage flooding during episodes of heavy rain that falls within a short duration. Such flooding is the result of the concentration of impervious surfaces where the amount of concrete, asphalt, rooftops, and other minimally or non-porous materials concentrates flow to stormwater systems that, during heavy rain, cannot always handle the input, causing flooding conditions on streets and parking lots.

Drought: A drought is basically the absence of water in an area that occurs slowly due to below-average precipitation over an extended period, resulting in low stream flows, low surface water, and low groundwater levels. Mitigation for drought is difficult, however, preparedness can help to reduce the impacts that a drought can have. During a drought, water stored in aquifers and surface reservoirs becomes increasingly important to offset the lack of rain, especially in areas of high agricultural production.

Conservation of water usage prior to, and during a drought can help reduce the potential water shortages that often occur during a drought.

Earthquakes: The United States Geological Survey (USGS) defines an earthquake as a sudden slip on a fault. Tectonic plates are always slowly moving, but can get stuck on edges due to friction. When the stress on the plates overcomes the friction, there is an earthquake that releases an energy wave that travels through the earth's crust. The earthquake hazard is anything associated with an earthquake that may affect the normal activities of people; such as, surface faulting, ground shaking, landslides, tsunamis, structural damage, etc. There are two primary ways in which earthquakes are measured, magnitude (the size of the earthquake) and intensity (measure of the shaking and damage, which can vary from location to location). Magnitude is measured in the Moment Magnitude scale (based off the obsolete Richter scale). The Modified Mercalli Intensity (MMI) classifies the perceived feeling of the earthquake.

Extreme Temperatures: Extreme temperatures are a period of prolonged and/or excessive hot or cold that presents a danger to human health and life.

Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures. These event conditions are typically infrequent. When they do occur, however, they are usually in late July and August. The severity of extreme heat can be dangerous to those residents with medical conditions and the older population. It is important to have cooling areas and a good supply of water available. Extreme heat can add to the potential for wildfires and depletion of the water supply for firefighting. Extreme heat can also damage or kill crops and animals (wild, farm, or domesticated), potentially presenting a risk to the economy.

The National Weather Service (NWS) provides the following definitions (northeast ranges):

- Heat Advisory: Two or more consecutive hours of Heat Index values of 95-99 degrees Fahrenheit for two or more days OR any duration of Heat Index values of 100-104 degrees Fahrenheit. A Heat Advisory is issued within 12 hours of the onset of extremely dangerous heat conditions.
- Excessive Heat Warning: Two or more hours with Heat Index values of 105 degrees Fahrenheit or greater. An Excessive Heat Warning is issued within 12 hours of the onset of extremely dangerous heat conditions.
- Excessive Heat Watches: Heat watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
- Excessive Heat Outlooks: Issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to those who need considerable lead-time to prepare for the event.

Extreme Cold events occur during meteorological cold waves, also known as cold snaps that are caused by the southern transport of arctic airmasses into the Northeast. These events are most common in winter months and increase the likelihood of cold disorders in humans and animals that have prolonged exposure to low ambient temperatures. Cold disorders can include frostbite and hypothermia which can eventually lead to death. Extreme cold can also damage or kill crops and animals (wild, farm, or domesticated), potentially presenting a risk to the economy.

The National Weather Service provides the following definitions (northeast ranges):

- Wind Chill Watch: NWS issues a wind chill watch when dangerously cold wind chill values are possible. As with a warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least a half a tank of gas, and update your winter survival kit.
- Wind Chill Advisory: NWS issues a wind chill advisory when seasonably cold wind chill values but not extremely cold values are expected or occurring. Be sure you and your loved ones' dress

appropriately and cover exposed skin when venturing outdoors. A Wind Chill Advisory is issued for New Hampshire if wind chill values are expected to be -20°F to -29°F and winds are greater than 5 mph.

- Wind Chill Warning: NWS issues a wind chill warning when dangerously cold wind chill values are expected or occurring. A Wind Chill Advisory is issued for New Hampshire if wind chill values are expected to be -30°F and winds are greater than 5 mph.
- Freeze Watch: NWS issues a freeze watch when there is a potential for significant, widespread freezing temperatures within the next 24-36 hours. A freeze watch is issued in the autumn until the end of the growing season and in the spring at the start of the growing season.
- Frost Advisory: A frost advisory means areas of frost are expected or occurring, posing a threat to sensitive vegetation.
- Freeze Warning: When temperatures are forecasted to go below 32°F for a long period of time, NWS issues a freeze warning. This temperature threshold kills some types of commercial crops and residential plants.
- Hard Freeze Warning: NWS issues a hard freeze warning when temperatures are expected to drop below 28°F for an extended period of time, killing most types of commercial crops and residential plants.

High Wind Events: The State of New Hampshire experiences two types of high wind events that may result from other severe storms and may occur at any time of the year:

Tornadoes: A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. Because wind is invisible, it is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust and debris. Tornadoes are the most violent of all atmospheric storms.

Straight-line winds: This term describes any thunderstorm wind that is not associated with rotation, and is usually used to differentiate from tornadic winds. There are several sub-types of straight-line winds:

- Downdraft - small-scale column of air that rapidly sinks towards the ground.
- Downburst - result of a downdraft, referred to as a macroburst when the area affected is greater than 2.5 miles and microburst when less than 2.5 miles.
- Gust Front - leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Characterized by wind shift, temperature drop and gusty winds in front of a thunderstorm.
- Derecho - widespread, long-lived wind storm that is associated with a band of rapidly moving showers or thunderstorms. A typical derecho consists of numerous microbursts, downbursts and downburst clusters. By definition, if the wind damage swath extends more than 240 miles and includes wind gusts of at least 58 mph or greater along most of its length, then the event may be classified as a derecho.

Infectious Disease/Pandemic: Infectious diseases are illnesses caused by organisms - such as bacteria, viruses, fungi or parasites. Many organisms live in and on our bodies. They're normally harmless or even helpful, but under certain conditions, some organisms may cause disease. Some infectious diseases can be passed from person to person, some are transmitted by bites from insects or animals and others are acquired by ingesting contaminated food or water or being exposed to organisms in the environment. Signs and symptoms vary depending on the organism causing the infection, but often include fever and fatigue. Mild infections get better on their own without treatment, while some are life-threatening infections and may require hospitalization. Wide-spread infectious diseases may cause mass causality regionally and world-wide.

Landslide: A landslide is the downward or outward movement of earth materials on a slope that is reacting to a combination of the force of gravity and a predisposed weakness in the material that allows the sliding process to initiate. The broad classification of landslides includes mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides, and earth flows. Landslides may be formed when a layer of soil atop a slope becomes saturated by significant precipitation and slides along a more cohesive layer of soil or rock. Although gravity becomes the primary reason for a landslide once a slope has become weak through a process such as the one just described, other causes can include:

- Erosion by rivers or the ocean that creates over-steepened slopes through erosion of the slope's base. In the case of rivers, this can occur as a result of flash flooding.
- Rock and soil slopes are weakened through saturation by snowmelt or heavy rains.
- Wildfires (loss of vegetation).
- Excess weight from accumulation of rain or snow, stockpiling of rock or ore and other material.

Lightning: Lightning is a visible electric discharge produced by a thunderstorm. Thunder always accompanies lightning, but may or may not be heard depending on the position of the observer. As lightning passes through the air, it heats the air to a temperature of 18,000-60,000 degrees Fahrenheit. This causes the air to rapidly expand and contract creating a sound wave known as thunder. Thunder can be heard up to 10 miles away from the strike. At longer distances thunder sounds like a low rumble as the higher frequency sounds are absorbed by the environment.

Severe Winter Weather: The State of New Hampshire experiences four types of severe weather during the winter months, which usually bring snow, high winds and/or rain depending on temperatures.

Heavy snow - Heavy snow is generally defined as:

- Snowfall accumulating to 4" or more in depth in 12 hours or less; or
- Snowfall accumulating to 6" or more in depth in 24 hours or less.

Blizzard - A blizzard is a snowstorm with the following conditions that is expected to prevail for a period of 3 hours or longer:

- Sustained wind or frequent gusts to 35mph or greater and considerable falling and/or blowing snow that frequently reduces visibility to less than ¼ mile.

Nor'easter - A Nor'easter is a large cyclonic storm that tracks north/northeastward along the East Coast of North America. It is so named due to the northeasterly prevailing wind direction that occurs during the storm. While these storms may occur at any time of the year, they are most frequent and severe during the months of September through April. Nor'easters usually develop off the east coast between Georgia and New Jersey, travel northeastward, and intensify in the New England region. Nor'easters nearly always bring precipitation in the form of heavy rain and/or snow, as well as gale force winds, rough seas, and coastal flooding.

Ice Storm - Ice storms typically occur with warm frontal boundaries, where warm air rises up and over a shallow mass of cold air near the earth's surface. When snow falls from clouds near just north of the warm frontal boundary, it will fall through the deep warm layer aloft first and melt completely into a liquid water droplet. As it passes through the shallow cold layer near the surface, the water droplet cools to the point of being supercooled (a liquid raindrop that remains a liquid at the freezing point). When these supercooled water droplets make contact with freezing surfaces on the ground, such as streets and walkways, they freeze on contact forming layers of ice. This process of freezing rain, when persistent over a long period of time, will form layers that may exceed over an inch thick in extreme cases. Any accumulation of ice can present hazards; however, significant accumulations of ice (1/4"

or greater) can pull down trees and utility lines resulting in loss of power and communications. Walking and driving also becomes very dangerous to almost impossible during an ice storm.

Solar Storms and Space Weather: The term space weather is relatively new and describes the dynamic conditions in the Earth's outer space environment, similar to how the terms "climate" and "weather" refer to the conditions in the Earth's lower atmosphere. Space weather includes any and all conditions and events on the sun, in the solar wind, in near-Earth space, and in our upper atmosphere that can affect space-borne and ground based technological systems.

The entire State of New Hampshire is at risk for solar storms and space weather. Space weather affects Earth due to the sun sending energy across the Earth in the form of light and electrically charged particles and magnetic fields. Although space weather has occurred since the beginning of time, little was understood about the causes and impacts of these instances on the planet. As society becomes increasingly reliant on electronics and technology, the hazards presented by space weather are not to be underestimated. The magnetic disturbances that solar storms can bring can disrupt communications, damage or destroy electronic components, corrode gas and oil pipelines, and cause significant damage to spacecraft and satellites. Radio operators have long been aware of the effects of space weather and how it impacts radio communications, especially those in the High Frequency (HF) band (3-30MHz). Depending on atmospheric conditions from space weather, radio signals can be partially or completely blocked.

Hurricane and Tropical Storm: A *hurricane* is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. The eye of the storm is usually 20-30 miles wide and may extend over 400 miles. High winds and flooding are primary causes of hurricane-inflicted loss of life and property damage. *Tropical Storms* are typically storms that have been downgraded from a hurricane as it reaches further inland. These storms often have large amounts of rain and severe wind, but wind speeds do not reach the level to be classified as a hurricane.

Wildfire: A wildfire is any non-structural fire, other than prescribed fire, that occurs in the Wildland. Wildland here is defined as consisting of vegetation or natural fuels. Wildfires can be referred to as brushfires, wildland fires, or grass fires depending on the location and what is burning.

Technological Hazards

Aging Infrastructure: The continued regression of the States'/towns' physical systems including, but not limited to roads and bridges, culverts, utilities, water, and sewage.

Conflagration: A large and destructive fire that threatens human life, animal life, health, and/or property. It may also be described as a blaze or simply a (large) fire. A conflagration can begin accidentally, be naturally caused (wildfire), or intentionally created (arson). Conflagrations have the potential to cause loss of life, property devastation/destruction and potential negative economic impacts.

Dam Failure: Dam failure is defined as the sudden, rapid, and uncontrolled release of impounded water.

Known & Emerging Contaminants: Contaminants in drinking water include naturally occurring contaminants associated with the geology in a given region and known man-made contaminants associated with nearby land use activities. Some contaminants are considered emerging contaminants.

Man-made Contaminants - Man-made chemicals that have been historically recognized to impact some groundwater and surface water sources of drinking water include volatile organic compounds, pesticides, semi-volatile compounds, radionuclides, nitrates/nitrites, metals, and radionuclides.

Emerging Contaminants - *Emerging contaminants* are chemicals that historically have not been monitored in drinking water due to the lack of laboratory capabilities to detect the compounds or a lack of knowledge about the use of certain compounds and their potential to cause human health impacts. Emerging contaminates have been detected in surface and groundwater that are sources of drinking water in the State of New Hampshire. The latest incidents in New Hampshire to garner

widespread media and public attention were related to the discovery of poly and perfluoroalkyl substances, more commonly referred to as PFAS. Historically, other emerging contaminates have spiked public concern, including Methyl Tertiary Butyl Ether (MtBE), which is a manufactured chemical used to increase the octane rating of gasoline. MtBE degrades slowly and is highly soluble in water, allowing it to spread further and last longer in groundwater than many other contaminates.

Hazardous Materials: A hazardous material is any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Hazardous materials spills or releases can cause damage or loss to life and property. Short or long-term evacuation of local residents and businesses may be required, depending on the nature and extent of the incident.

Long-term Utility Outage: A long-term utility outage is defined as a prolonged absence of any type of public utility that is caused by infrastructure failure, cyber-attack, supply depletion, distribution disruption, water source contamination, or a natural, human-caused or technological disaster. This plan considers a long-term utility outage as one lasting two weeks more, or a prolonged outage that causes extreme cascading impacts.

Radiological: Radiological hazards can range from relatively localized incidents involving small amounts of radioactive materials to large-scale catastrophic events. Smaller sources of radiation hazards may be found in medical facilities, industrial and laboratory facilities where radioactive materials and/or radiation producing devices are used. Some radiation is produced naturally from decomposition of radioactive isotopes in soils and underlying strata.

Human-Caused Hazards

Cyber Event: The Department of Homeland Security (DHS) defines a cyber incident as an event occurring on or conducted through a computer network that actually or imminently jeopardizes the confidentiality, integrity, or availability of computers, information or communications systems or networks, physical or virtual infrastructure controlled by computers or information systems.

Mass Casualty Incident: Any large number of casualties (sick, injured, or dead) produced in a relatively short period of time, usually as the result of a single incident such as a military aircraft accident, hurricane, flood, earthquake, or armed attack that exceeds local logistic support capabilities.

Terrorism/Violence: Premeditated, politically motivated violence perpetrated against noncombatant targets by subnational groups or clandestine agents.

Transport Accident: A transport accident is any accident that occurs during transportation that has multiple injuries or deaths, or has significant impact to the roadways and surrounding area. Specifically, for this plan, it refers to an aviation, tractor trailer, or vehicle accident.

Appendix B:
Risk Assessment

Risk Assessment

The Hazard Mitigation Working Group met to discuss the towns' risk assessment and assign rating scores. Consideration was given to climate change, current capabilities, town assets and critical infrastructure, and previous occurrences when determining the scale of impacts and overall risk. The following terms were used to analyze the hazards:

Impacts: The ***Impact*** is an estimate generally based on a hazard's effects on humans, property and businesses. The Working Group determined the impact rating for each of the previously identified hazards. The average impact score was calculated by computing the average of the human, property and business impact scores. The impact ratings were broken down into the following categories:

Impact Scoring

1 - Inconvenience, reduced service/productivity, minor damages, non-life-threatening injuries.

3 - Moderate to major damages, temporary closure and reduced service/productivity, numerous injuries and deaths.

6 - Devastation and significant injuries and deaths, permanent closure and/or relocation of services, long-term effects.

Probability of Occurrence: The *Probability of Occurrence* is a numeric value that represents the likelihood that the given hazard will occur within the next 10 years. This value was chosen based on historical information. The Working Group determined the probability of occurrence rating for each of the previously identified hazards. The probability of occurrence ratings was broken into the following categories:

Low**:** There is little likelihood that this event will occur within the next 10 years (1 event in 10 years).

Medium**:** There is moderate likelihood that this event will occur within the next 10 years (1-2 events each 5-10 years).

High**:** There is great likelihood that this event will occur within the next 10 years (1-2 events each year).

Probability Scoring

1 - 33% probability of occurring within 10 years (Low)

3 - 34-66% probability of occurring within 10 years (Medium)

6 - 67-100% probability of occurring within 10 years (High)

Severity - Severity is calculated by taking the average of the vulnerability for human, business and property impacts of each hazard type.

Risk - Risk is an adjective description (High, Medium, or Low) of the overall threat posed by a hazard over the next 10 years. It is calculated by multiplying the probability of occurrence and severity.

Low**:** There is little potential for a disaster during the next 10 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or mitigate against this hazard. This hazard does not need to be specifically addressed in the town's emergency management training and exercise program except as generally dealt with during hazard awareness training.

Medium: There is moderate potential for a disaster of less than major proportions during the next 10 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and mitigate

against this hazard. This hazard should be included in the town's emergency management training and exercise program.

High**:** Risks that are considered to be high were likely ranked so due to (1) a strong potential for a disaster of major proportions during the next 10 years; or (2) history suggests the occurrence of multiple disasters of moderate proportions during the next 10 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the towns' emergency management training and exercise program.

Overall Risk: The ***Overall Risk*** is a representation of the combined *potential impact* and *probability of occurrence* ratings. This is calculated by multiplying the probability of occurrence rating score by the impact rating score (the average of human, property and business impacts). The goal of identifying the overall risk of each identified hazard is to assist the town in determining which hazards pose the largest potential threat. The overall risk ratings are broken down and color coded into the following categories:

White: values 1 - 6, Low Risk

Yellow: values 7 - 12, Medium Risk

Red: values 13 - 18, High Risk

Appendix C: Resources

Resources Used in the Preparation of this Plan

NH HSEM's State of New Hampshire Natural Hazards Mitigation Plan (2018)
FEMA's Understanding Your Risks: Identifying Hazards and Estimating Losses
Local Mitigation Planning Handbook
Town of Antrim, NH's Hazard Mitigation Plan Update 2016

Agencies

New Hampshire Homeland Security and Emergency Management (NH HSEM)
Field Representative Hillsborough County**:** Liz Gilboy 603-223-3613
Mitigation Officer**:** Brian Eaton.....603-227-8724
Mitigation Planner**:** John Marcel 603-223-3650
Federal Emergency Management Agency (FEMA).....877-336-2734
NH Regional Planning Commissions:
Central NH Regional Planning Commission 603-226-6020
Lakes Region Planning Commission 603-279-8171
Nashua Regional Planning Commission 603-883-0366
North Country Council 603-444-6303
Rockingham Planning Commission 603-778-0885
Southern New Hampshire Planning Commission 603-669-4664
Southwest Region Planning Commission 603-357-0557
Strafford Regional Planning Commission 603-742-2523
Upper Valley Lake Sunapee Regional Planning Commission 603-448-1680
NH Executive Department:
Governor's Office of Energy and Community Services 603-271-2611
NH Department of Cultural Resources: 603-271-2540
Division of Historical Resources 603-271-3483
NH Department of Environmental Services (NHDES):.....603-271-3503
Air Resources 603-271-1370
Air Toxins Control Program.....603-271-0901
Asbestos Program 603-271-1373
Childhood Lead Poisoning Prevention Program.....603-271-5733
Environmental Health Tracking Program.....603-271-4072
Environmental Toxicology Program 603-271-3994
Health Risk Assessment Program.....603-271-6909
Indoor Air Quality Program.....603-271-3911
Occupational Health and Safety Program.....603-271-2024
Radon Program 603-271-4764
Geology Unit 603-271-3503
Pollution Preventive Program.....603-271-6460
Waste Management 603-271-2900
Water Supply and Pollution Control 603-271-3414
Rivers Management and Protection Program 603-271-8801
NH Office of Planning and Development (OPD).....603-271-2155
NH Municipal Association (NHMA) 603-224-7447
NH Fish and Game Department 603-271-3421

Region 1, Lancaster.....603-788-3164
Region 2, New Hampton.....603-744-5470
Region 3, Durham.....603-868-1095
Region 4, Keene.....603-352-9669
NH Department of Business and Economic Affairs (NHDBEA): 603-271-2411
Economic Development.....603-271-2629
Travel and Tourism.....603-271-6870
NH Department of Natural and Cultural Resources (NHDNCR): 603-271-2411
Division of Forests and Lands 603-271-2214
Division of Parks and Recreation 603-271-3556
Design, Development, and Maintenance 603-271-2411
NH Department of Transportation (NHDOT) 603-271-3734
Northeast States Emergency Consortium, Inc. (NESEC) 781 224-9876
US Department of Commerce:.....202-482-2000
NOAA: National Weather Service; Taunton, Massachusetts 508-824-5116
US Department of the Interior:.....202-208-3100
US Fish and Wildlife Service 603-225-1411
US Geological Survey 603-225-4681
US Army Corps of Engineers (USACE) 978-318-8087
US Department of Agriculture:
Natural Resource Conservation Service (NRCS) 603-868-7581
Cheshire County, Walpole.....603-756-2988
Sullivan County, Newport 603-863-4297
Hillsborough County, Milford ..... 603-673-2409 Ext. #4

Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP) ..... NH HSEM
406 Public Assistance and Hazard Mitigation ..... NH HSEM
Community Development Block Grant (CDBG)..... NH HSEM, NH OPD, also refer to RPC
Dam Safety Program.....NHDES
Emergency Generators Program by NESEC‡ ..... NH HSEM
Emergency Watershed Protection (EWP) Program .....USDA, NRCS
Flood Mitigation Assistance Program (FMAP).....NH HSEM, NH OPD
Flood Plain Management Services (FPMS).....USACE
Mitigation Assistance Planning (MAP) ..... NH HSEM
Mutual Aid for Public Works.....NHMA
National Flood Insurance Program (NFIP) †.....NH OPD, NH HSEM
Power of Prevention Grant by NESEC‡..... NH HSEM
Project Impact ..... NH HSEM
Roadway Repair & Maintenance Program(s) ..... NHDOT
Section 14 Emergency Stream Bank Erosion & Shoreline Protection .....USACE
Section 103 Beach Erosion .....USACE
Section 205 Flood Damage Reduction .....USACE
Section 208 Snagging and Clearing.....USACE
Shoreline Protection Program .....NHDES
Various Forest and Lands Program(s) ..... NHDNCR

Wetlands Programs ..... NHDES

NESEC - Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NH HSEM for more information or visit the Consortium's website at http://www.nesec.org/index.cfm.

Note regarding **National Flood Insurance Program** (NFIP) and **Community Rating System** (CRS):

The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community's floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners. The NH Office of Strategic Initiatives can provide additional information regarding participation in the NFIP-CRS Program.

FEMA Region 1 Mitigation Planning Webliography

REGULATORY INFORMATION

Final Rule: 44 CFR 201.6 http://www.fema.gov/pdf/help/fr02-4321.pdf

Disaster Mitigation Act of 2000 (DMA 2K) http://www.fema.gov/library/viewRecord.do?id=1935

DISASTERS AND NATURAL HAZARDS INFORMATION

FEMA-How to deal with specific hazards http://www.ready.gov/natural-disasters

Natural Hazards Center at the University of Colorado http://www.colorado.edu/hazards

National Oceanic and Atmospheric Administration (NOAA): Information on various projects and research on climate and weather. http://www.websites.noaa.gov

National Climatic Data Center active archive of weather data. http://lwf.ncdc.noaa.gov/oa/ncdc.html

Northeast Snowfall Impact Scale http://www.erh.noaa.gov/rnk/Newsletter/Fall%202007/NESIS.htm

Weekend Snowstorm Strikes the Northeast Corridor Classified as a Category 3 "Major" Storm http://www.publicaffairs.noaa.gov/releases2006/feb06/noaa06-023.html

FLOOD RELATED HAZARDS

FEMA Coastal Flood Hazard Analysis & Mapping
http://www.fema.gov/national-flood-insurance-program-0/fema-coastal-flood-hazard-analyses-and-mapping-1
Floodsmart http://www.floodsmart.gov/floodsmart/
National Flood Insurance Program (NFIP) http://www.fema.gov/nfip
Digital quality Level 3 Flood Maps http://msc.fema.gov/MSC/statemap.htm
Flood Map Modernization
http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/map-modernization
Hilliard 2/20/2014 Pg. 2
Reducing Damage from Localized Flooding: A Guide for Communities, 2005 FEMA 511
http://www.fema.gov/library/viewRecord.do?id=1448

FIRE RELATED HAZARDS

Firewise http://www.firewise.org
NOAA Fire Event Satellite Photos http://www.osei.noaa.gov/Events/Fires
U.S. Forest Service, USDA http://www.fs.fed.us/land/wfas/welcome.htm
Wildfire Hazards – A National Threat http://pubs.usgs.gov/fs/2006/3015/2006-3015.pdf

GEOLOGIC RELATED HAZARDS

USGS Topographic Maps http://topomaps.usgs.gov/
Building Seismic Safety Council http://www.nibs.org/?page=bssc

Earthquake hazard history by state http://earthquake.usgs.gov/earthquakes/states/
USGS data on earthquakes http://earthquake.usgs.gov/monitoring/deformation/data/download/
USGS Earthquake homepage http://quake.wr.usgs.gov
National Cooperative Geologic Mapping Program (NCGMP) http://ncgmp.usgs.gov/
Landslide Overview Map of the Conterminous United States
http://landslides.usgs.gov/learning/nationalmap/
Kafka, Alan L. 2008. Why Does the Earth Quake in New England? Boston College, Weston Observatory, Department of Geology and Geophysics
http://www2.bc.edu/~kafka/Why_Quakes/why_quakes.html
Map and Geographic Information Center, 2010, "Connecticut GIS Data", University of Connecticut
http://magic.lib.uconn.edu/connecticut_data.html
2012 Maine earthquake
http://www.huffingtonpost.com/2012/10/17/maine-earthquake-2012-new-england_n_1972555.html
WIND-RELATED HAZARDS
ATC Wind Speed Web Site http://www.atcouncil.org/windspeed/index.php
Hilliard 2/20/2014 Pg. 3
U.S. Wind Zone Maps http://www.fema.gov/safe-rooms/wind-zones-united-states
Tornado Project Online http://www.tornadoproject.com/

National Hurricane Center http://www.nhc.noaa.gov
Community Hurricane Preparedness Tutorial http://meted.ucar.edu/hurrican/chp/hp.htm
National Severe Storms Laboratory, 2009, “Tornado Basics”,
http://www.nssl.noaa.gov/primer/tornado/tor_basics.html

DETERMINING RISK AND VULNERABILITY

HAZUS http://www.hazus.org
FEMA Hazus Average Annualized Loss Viewer
http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cb8228309e9d405ca6b4db6027df36d9&extent=-139.0898,7.6266,-48.2109,62.6754
Vulnerability Assessment Tutorial: On-line tutorial for local risk and vulnerability assessment
http://www.csc.noaa.gov/products/nchaz/htm/mitigate.htm
Case Study: an example of a completed risk and vulnerability assessment
http://www.csc.noaa.gov/products/nchaz/htm/case.htm

GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND MAPPING

The National Spatial Data Infrastructure & Clearinghouse (NSDI) and Federal Geographic Data Committee (FGDC) Source for information on producing and sharing geographic data
http://www.fgdc.gov
The OpenGIS Consortium Industry source for developing standards and specifications for GIS data
http://www.opengis.org
Northeast States Emergency Consortium (NESEC): Provides information on various hazards, funding resources, and other information http://www.nesec.org

US Dept of the Interior Geospatial Emergency Management System (IGEMS) provides the public with both an overview and more specific information on current natural hazard events. It is supported by the Department of the Interior Office of Emergency Management. http://igems.doi.gov/
FEMA GeoPlatform: Geospatial data and analytics in support of emergency management http://fema.maps.arcgis.com/home/index.html Hilliard 2/20/2014 Pg. 4

DATA GATHERING

National Information Sharing Consortium (NISC): brings together data owners, custodians, and users in the fields of homeland security, public safety, and emergency management and response. Members leverage efforts related to the governance, development, and sharing of situational awareness and incident management resources, tools, and best practices http://nisconsortium.org/
The Hydrologic Engineering Center (HEC), an organization within the Institute for Water Resources, is the designated Center of Expertise for the US Army Corps of Engineers http://www.hec.usace.army.mil/
National Water & Climate Centerhttp://www.wcc.nrcs.usda.gov/
WinTR-55 Watershed Hydrology
http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?&cid=stelprdb1042901
USACE Hydrologic Engineering Center (HEC) http://www.hec.usace.army.mil/software/
Stormwater Manager's Resource Center SMRC http://www.stormwatercenter.net
USGS Current Water Data for the Nation http://waterdata.usgs.gov/nwis/rt
USGS Water Data for the Nation http://waterdata.usgs.gov/nwis /

Topography Maps and Aerial photos http://www.terraserver.com/view.asp?tid=142
National Register of Historic Place http://www.nps.gov/nr/about.htm
National Wetlands Inventory http://www.fws.gov/wetlands/
ICLUS Data for Northeast Region http://www.epa.gov/ncea/global/iclus/inclus_nca_northeast.htm

PLANNING

American Planning Association http://www.planning.org
Planners Web - Provides city and regional planning resources http://www.plannersweb.com

FEMA RESOURCES

Federal Emergency Management Agency (FEMA) www.fema.gov Hilliard 2/20/2014 Pg. 5
National Mitigation Framework http://www.fema.gov/national-mitigation-framework
Federal Insurance and Mitigation Administration (FIMA) http://www.fema.gov/fima
Community Rating System (CRS) http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-rating-system
FEMA Building Science http://www.fema.gov/building-science
National Flood Insurance Program (NFIP) http://www.fema.gov/national-flood-insurance-program
Floodplain Management & Community Assistance Program
http://www.fema.gov/floodplain-management
Increased Cost of Compliance (ICC): ICC coverage allows homeowners whose structures have been repeatedly or substantially damaged to cover the cost of elevation and design requirements for rebuilding with their flood insurance claim up to a maximum of $30,000.

http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage
National Disaster Recovery Framework http://www.fema.gov/national-disaster-recovery-framework
Computer Sciences Corporation: contracted by FIMA as the NFIP Statistical Agent, CSC provides information and assistance on flood insurance to lenders, insurance agents and communities www.csc.com
Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan: A Guidebook for Local Governments https://www.fema.gov/ar/media-library/assets/documents/89725
Mitigation Best Practices Portfolio http://www.fema.gov/mitigation-best-practices-portfolio
FEMA Multi-Hazard Mitigation Planning Websitehttp://www.fema.gov/multi-hazard-mitigation-planning
FEMA Resources Page http://www.fema.gov/plan/mitplanning/resources.shtm Hilliard 2/20/2014 Pg. 6
Local Mitigation Plan Review Guide http://www.fema.gov/library/viewRecord.do?id=4859
Local Mitigation Planning Handbook complements and liberally references the Local Mitigation Plan Review Guide above http://www.fema.gov/library/viewRecord.do?id=7209
HAZUS http://www.fema.gov/protecting-our-communities/hazus
Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards
http://www.fema.gov/library/viewRecord.do?id=6938
Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials
http://www.fema.gov/library/viewRecord.do?id=7130
Mitigation Planning for Local and Tribal Communities-Independent Study Course
http://training.fema.gov/EMIWeb/IS/is318.asp

Region 1 Mitigation Contacts

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Email: nan.johnson@fema.dhs.gov
Massachusetts; Rhode Island; Vermont

Brigitte Ndikum-Nyada, Community Planner
Phone: 617-956-7614
Email: brigitte.ndikum-nyada@fema.dhs.gov
Connecticut; Maine; New Hampshire
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OTHER FEDERAL RESOURCES

U.S. Army Corps of Engineers: Provides funding for floodplain management planning and technical assistance and other water resources issues. www.nae.usace.army.mil
Natural Resources Conservation Service: Technical assistance to individual land owners, groups of landowners, communities, and soil and water conservation districts. www.nrcs.usda.gov
NOAA Coastal Services Center http://www.csc.noaa.gov/

Rural Economic and Community Development: Technical assistance to rural areas and smaller communities in rural areas on financing public works projects. www.rurdev.usda.gov
Farm Service Agency: Manages the Wetlands Reserve Program (useful in open space or acquisition projects by purchasing easements on wetlands properties) and farmland set aside programs www.fsa.usda.gov
National Weather Service: Prepares and issues flood, severe weather and coastal storm warnings. Staff hydrologists can work with communities on flood warning issues; can give technical assistance in preparing flood-warning plans. www.weather.gov
Economic Development Administration (EDA): Assists communities with technical assistance for economic development planning www.osec.doc.gov/eda/default.htm
National Park Service: Technical assistance with open space preservation planning; can help facilitate meetings and identify non-structural options for floodplain redevelopment. www.nps.gov
Fish and Wildlife Services: Can provide technical and financial assistance to restore wetlands and riparian habitats. www.fws.gov
Department of Housing & Urban Development www.hud.gov
Small Business Administration: SBA can provide additional low-interest funds (up to 20% above what an eligible applicant would qualify for) to install mitigation measures. They can also loan the cost of bringing a damaged property up to state or local code requirements. www.sba.gov/disaster
Environmental Protection Agency www.epa.gov
Sustainability/Adaptation/Climate Change
Why the Emergency Management Community Should be Concerned about Climate Change: A discussion of the impact of climate change on selected natural hazards
Hilliard 2/20/2014 Pg. 8
http://www.cna.org/sites/default/files/research/WEB%2007%2029%2010.1%20Climate%20Change%20and%20the%20Emergency%20Management%20Community.pdf
Resilient Sustainable Communities: Integrating Hazard Mitigation& Sustainability into Land Use
http://www.earth.columbia.edu/sitefiles/file/education/documents/2013/Resilient-Sustainable-Communities-Report.pdf
U.S. EPA http://www.epa.gov/climatechange/
NOAA National Ocean Service (NOS) http://oceanservice.noaa.gov/
The Northeast Climate Research Center (NRCC) folks were heavily involved in climate data in the NCA, below. They have a wealth of historic climate data and weather information, trends, etc.
http://www.nrcc.cornell.edu/
NOAA RISA for the Northeast (Regional Integrated Sciences and Assessments) http://ccrun.org/home
Community and Regional Resilience: Perspectives from hazards, disasters, and emergency management
http://www.resilientus.org/library/FINAL_CUTTER_9-25-08_1223482309.pdf
National Fish, Wildlife and Plants Climate Adaptation Strategy www.wildlifeadaptationstrategy.gov
ICLEI Local Governments for Sustainability http://www.icleiusa.org/
Kresge Foundation Survey
http://www.kresge.org/news/survey-finds-communities-northeast-are-trying-plan-for-changes-climate-need-help-0
New England's Sustainable Knowledge Corridor http://www.sustainableknowledgecorridor.org/site/
The Strategic Foresight Initiative (SFI)
http://www.fema.gov/pdf/about/programs/oppa/findings_051111.pdf
Northeast Climate Choices http://www.climatechoices.org/ne/resources_ne/nereport.html

Northeast Climate Impacts Assessment http://www.northeastclimateimpacts.org/
Draft National Climate Assessment Northeast Chapter released early 2013
http://ncadac.globalchange.gov/
Northeast Chapter of the National Climate Assessment of 2009:
http://www.globalchange.gov/images/cir/pdf/northeast.pdf
ClimateNE www.climatenortheast.com
Scenarios for Climate Assessment and Adaptation http://scenarios.globalchange.gov/
Northeast Climate Science Center http://necsc.umass.edu/
FEMA Climate Change Adaptation and Emergency Management
https://www.llis.dhs.gov/content/climate-change-adaptation-and-emergency-management-0
Climate Central http://www.climatecentral.org

OTHER RESOURCES

New England States Emergency Consortium (NESEC): NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Resources are available on earthquake preparedness, mitigation, and hurricane safety.www.nesec.org

Association of State Floodplain Managers (ASFPM): ASFPM has developed a series of technical and topical research papers, and a series of proceedings from their annual conferences.www.floods.org

National Voluntary Organizations Active in Disaster (VOAD) is a non-profit, nonpartisan membership organization that serves as the forum where organizations share knowledge and resources throughout the disaster cycle - preparation, response, recovery and mitigation. http://www.nvoad.org/

ADDITIONAL WEBSITES

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	http://www.colorado.edu/hazards/	Searchable database of references and links to many disaster-related websites.
National Emergency Management Association	http://nemaweb.org	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center "Disaster Finder:	http://disasterfinder.gsfc.nasa.gov/Disaster_	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	http://ltpwww.gsfc.nasa.gov/ndrd/main/html	Searchable database of worldwide natural disasters.

Sponsor	Internet Address	Summary of Contents
U.S. State & Local Gateway	http://www.statelocal.gov/	General information through the federal-state partnership.
National Weather Service	http://nws.noaa.gov/	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	http://waterdata.usgs.gov/nwis/rt	Provisional hydrological data
Dartmouth Flood Observatory	http://www.dartmouth.edu/~floods	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	http://www.fema.gov/about/programs/nfip/index.shtm	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	http://www.met.fsu.edu/explores/tropical.html	Tracking and NWS warnings for Atlantic Hurricanes and other links
National Lightning Safety Institute	http://lightningsafety.com/	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	http://thunder.msfc.nasa.gov/research.html	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	http://www.llnl.gov/hmc/	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	http://www.tornadoproject.com/	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	http://www.nssl.noaa.gov/	Information about and tracking of severe storms.
Earth Satellite Corporation	http://www.earthsat.com/	Flood risk maps searchable by state.
USDA Forest Service Web	http://www.fs.fed.us/land	Information on forest fires and land management.

Appendix D: Hazard Mitigation Resource Profiles

The following are resources that can be used in Hazard Mitigation projects:

U.S. Army Corps of Engineers
Contacts:
John Kennelly, Chief, Special Studies Section (for Flood Plain Management Services activities), Phone: 978-318-8505, Fax: 978-318-8080, E-mail: John.R.Kennelly@usace.army.mil

Mike Keegan, Chief, Project Planning Section (for Section 14, 103, and 205 authorities), Phone: 978-318-8087, Fax: 978-318-8080, E-mail: Michael.F.Keegan@usace.army.mil

Address: US Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

Description and Mission: The Corps of Engineers is a multi-disciplinary engineering and environmental organization that has been identifying and meeting the water resources needs of the nation. These needs have been in the areas of flood damage reduction, flood plain information and management, navigation, shore protection, environmental restoration, water supply, streambank protection, recreation, and fish and wildlife resources conservation, as well as technical assistance in other water resources areas.

The New England District (NAE) of the Corps of Engineers is responsible for managing the Corps' civil responsibilities in a 66,000 square-mile region encompassing the six New England states east of the Lake Champlain drainage basin. The District and its leadership are headquartered in Concord, Massachusetts. The missions of the New England District are many and varied. They include:

- flood damage reduction
- navigation improvements and maintenance
- natural resource management
- streambank and shoreline protection
- disaster assistance
- environmental remediation and engineering
- engineering and construction management support to other agencies

Flood Mitigation Involvement: As a result of the catastrophic floods in 1936, 1938 and 1955, the Corps was called upon to undertake a comprehensive flood damage reduction program. Since then the Corps has built many flood control structures throughout New England. These include 35 dams and reservoirs, five hurricane protection barriers (two are operated by the Corps) and approximately 60 local flood protection projects. The New England District has also completed two nonstructural projects involving the relocation of flood prone property and the acquisition of natural flood storage areas. The Corps also provides technical assistance to states and municipalities in locally constructed flood damage mitigation projects and to promote wise and informed use of floodplain and natural retention areas in order to minimize potential future flood damages.

Mitigation Goals and Objectives: The New England District has two primary mitigation objectives with respect to flood damage reduction. The first objective is the operation and maintenance of the 35 flood control reservoirs and two hurricane barriers that provide protection to the Connecticut, Merrimack, Thames, Naugatuck, and Blackstone River Basins. The second objective is to continue to work with the states and communities in New England to address flooding problems affecting the region.

Projects Desired: The Corps of Engineers has several programs available under its Civil Works authorities to address flooding problems. These programs provide assistance either through the construction of structural and nonstructural projects to mitigate the flooding problem or by providing technical information to assist mitigation performed at the state or local level. Flood damage reduction projects constructed by the Corps of Engineers must demonstrate, based on current Federal guidelines, that the flood damages prevented by the project's construction exceed its total cost. The Corps must also demonstrate that the 10-year frequency flood discharge at the point of concern is equal to or greater than 800 cubic-feet per second (cfs). Technical assistance provided by the Corps does not need to meet the above criteria.

COE Resources with Respect to Hazard Mitigation: The New England Division assists in meeting national, regional and local needs through a variety of means. Congressionally authorized water resources investigations have resulted in the planning, design and implementation of many flood control and flood damage reduction projects. Work conducted under a Congressional authorization can be extensive and there is currently no monetary limit of funding. Typically, there is a 1-2 year minimum delay in the identification of a proposed investigation and the funding of that work. The first phase of study, the Reconnaissance investigation, is 100 percent Federally funded and must be completed within twelve months. The second phase, the Feasibility investigations, must be cost-shared with a local sponsor where the sponsor provides 50 percent of the cost of the feasibility study. Congress in a Water Resources Development Act must specifically authorize construction of any project resulting from a General Investigation study. The cost of implementation for flood damage reduction projects is generally 65 percent Federal and 35 percent non-Federal.

Through the Continuing Authorities Programs of the Corps many structural and non-structural local protection project reducing or eliminating damages from flooding have been constructed. Investigations initiated under the Corps Continuing Authorities do not require specific congressional authorization are initiated simply with a request from the State or community to the New England District. The following is a list of Continuing Authorities applicable to flood mitigation:

Section 14 - Emergency Stream Bank & Shoreline Protection: This work consists of evaluating alternatives to provide emergency protection to public facilities, such as highways and bridges that are threatened due to erosion. The current Federal limit on Section 14 projects is $500,000. The local sponsor is required to provide 25 percent of the cost of developing plans and specifications and of construction.

Section 103 - Beach Erosion: Investigations conducted under this authority are to determine methods of protecting public facilities that have been threatened by beach erosion. Currently there is a Federal limit of $2,000,000 and the local sponsor is required to contribute 35 percent of plans, specifications and construction. The local sponsor is also required to cost-share equally the cost of the feasibility investigation that exceeds $100,000. The first $100,000 is at full Federal expense.

Section 205 - Flood Damage Reduction: Investigations are conducted under this program to assist local communities to identify flooding problems and to formulate and construct alternatives for flood damage reduction. The local sponsor is required to cost-share equally in the cost of the feasibility investigation that exceeds $100,000 and the Federal limit is $5,000,000. The local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

Section 208 - Snagging and Clearing: This emergency program is designed to reduce flood damage potential by identifying and removing obstructions that contribute to flooding by causing higher flood stages in the floodways. The
Federal limit under this program is $500,000 and the local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.
The New England Division also has two Planning Assistance Programs, which provide opportunities for the States to obtain assistance in addressing water resource issues. These programs are the Section 22, Planning Assistance to the States (PAS) program and the Section 206, Flood Plain Management Services (FPMS) program.

Planning Assistance to States Program (PAS): The Planning Assistance to States Program is designed to assist the States in developing comprehensive plans to meet State planning goals. The program is extremely flexible in the type and the methodology of investigations. Studies conducted under the PAS program require a 50/50 cost share with a local sponsor. The existing funding limits are $300,000 per state and a national budget not to exceed $5,000,000.

Flood Plain Management Services (FPMS): The FPMS Program is designed for the Corps to assist States and local communities in improving management of flood plains by performing technical assistance and conducting special investigations. Cost recovery has been implemented in this program effective in FY 1991. Under cost recovery, assistance provided to Federal agencies and private interests must be fully reimbursed by those customers. States and local communities are still provided technical assistance at 100 percent Federal cost. One of the major efforts being conducted under the FPMS program at this time is the preparation of Hurricane Evacuation Studies. These studies are jointly funded with the Federal Emergency Management Agency.

Ice Engineering Research Division
U.S. Army Cold Regions Research and Engineering Laboratory
Contact:
Dr. J-C Tatinclaux, Chief, Ice Engineering Research Division
Phone: 603-646-4187 Fax: 603-646-4477
E-mail: Jean-Claude.Tatinclaux@crl02.usace.army.mil
Website: http://www.crrel.usace.army.mil/ierd/
Address: US Army Cold Regions Research and Engineering Laboratory
Ice Engineering Research Division
72 Lyme Road
Hanover, NH 03755-1290

Description and Mission:
The US Army Cold Regions Research and Engineering Laboratory (CRREL) is a Corps of Engineers' research laboratory that is dedicated to multi-disciplinary engineering and research that addresses the problems and opportunities unique to the world's cold regions. CRREL exists largely to solve the technical problems that develop in cold regions, especially those related to construction, transport, and military operations. Most of these problems are caused by falling and blowing snow, snow on the ground, ice in the air and in the ground, river ice, ice on seas and lakes, and ice effects on manmade materials. CRREL serves the Corps of Engineers and its clients in three main areas:

- Traditional military engineering, which deals with problems that arise during conflict;
- Military construction and operations technology, i.e., the building and maintenance of military bases, airfields, roads, ports, and other facilities; and
- Civil works, which involves the Corps in such things as flood protection, navigation on inland waterways and coastal engineering.

CRREL also deals with cold regions problems for the other defense services, for civilian agencies of the federal government, and to some extent for state agencies, municipalities and private industry.

CRREL's Ice Engineering Research Division (IERD) was created to research, analyze and solve ice problems in and around water bodies, including ice jam flooding and ice accumulation in lock chambers, to ice buildup at water intakes and the destructive forces that moving ice exerts on riverine or coastal structures. In cooperation with the New England District (NAE) of the Corps of Engineers (located in Concord, MA), IERD personnel provide technical assistance before, during and after ice jam flood emergencies. IERD research has resulted in the design and construction of a number of low-cost ice control structures as well as nonstructural mitigation measures. IERD also provides instruction on dealing with river ice problems to local emergency management agencies.

Flood Mitigation Involvement: IERD is frequently called upon by the various Corps Districts to provide technical assistance to states and municipalities in the form of emergency mitigation. IERD is also involved with Corps and local agencies in developing locally constructed flood damage mitigation projects and promoting wise and informed use of floodplain areas in order to minimize potential future flood damages.

Mitigation Goals and Objectives: The IERD has two primary mitigation objectives with respect to flood damage reduction. The first objective is to work with the Corps and other federal, state and local agencies to design and implement ice control methods to reduce ice-related flood potential. The second is to work with the states and communities nationwide as well as in New England to address ice-related emergency flooding problems affecting the region.

Projects Desired

CRREL and IERD are a national resource ready to apply our unique facilities and capabilities to solve problems and conduct innovative, state-of-the-art research and technical support. There are a number of mechanisms that enable IERD and the rest of CRREL to partner with various Federal, non-DoD and private sector entities. The Federal Technology Transfer Act of 1986 (15 USC 3710a) allows CRREL to collaborate with any non-Federal partner on research and technical support

consistent with the mission of the laboratory. The Intergovernmental Cooperation Act (31 USC 6505) lets CRREL work with state and local governments on a broad range of reimbursable projects. Under the "Authority to Sell" (10 USC 2539b), CRREL can provide test and evaluation services to the states and the private sector. This includes the testing and evaluation of materials, equipment, models, computer software, and other items. The laboratory can also provide support to other Federal agencies via the Economy in Government Act (31 USC 1535) through MOUs/MOAs that establish a framework for the partnership and provide a concise description of the planned work. CRREL's 35 active Cooperative Research and Development Agreements (CRADAs) with industry and academia and 17 Intergovernmental Cooperation Agreements with states and local governments in 1998 demonstrate a robust program in this area and the relevance of CRREL's research to many segments of American society beyond DoD.

The Corps of Engineers has several programs available under its Civil Works authorities to address flooding problems. These programs provide assistance either through the construction of structural and nonstructural projects to mitigate the flooding problem or by providing technical information to assist mitigation performed at the state or local level. Flood damage reduction projects constructed by the Corps of Engineers must demonstrate, based on current Federal guidelines, that the flood damages prevented by the project's construction exceed its total cost. The Corps must also demonstrate that the 10-year frequency flood discharge at the point of concern is equal to or greater than 800 cubic-feet per second (cfs). Technical assistance provided by the Corps does not need to meet the above criteria. Through the Corps, IERD has been involved in Section 205 Flood Damage Reduction program, Section 22 Planning Assistance to States Program (PAS)) projects, the Section 206 Flood Plain Management Services (FPMS) program funded jointly with FEMA, and numerous instances of technical assistance.

CRREL IERD Resources with Respect to Hazard Mitigation

Corps: CRREL works jointly with the Corps' New England Division to address regional and local ice-related hazard mitigation needs through a variety of means. Congressionally authorized water resources investigations have resulted in the planning, design and implementation of many flood control and flood damage reduction projects. Work conducted under a Congressional authorization can be extensive and there is currently no monetary limit of funding. Typically there is a 1-2 year minimum delay in the identification of a proposed investigation and the funding of that work. The first phase of study, the Reconnaissance investigation, is 100 percent Federally funded and must be completed within twelve months. The second phase, the Feasibility investigations, must be cost-shared with a local sponsor where the sponsor provides 50 percent of the cost of the feasibility study. Congress in a Water Resources Development Act must specifically authorize construction of any project resulting from a General Investigation study. The cost of implementation for flood damage reduction projects is generally 65 percent Federal and 35 percent non-Federal.

Through the Continuing Authorities Programs of the Corps many structural and non-structural local protection project reducing or eliminating damages from flooding have been constructed. Investigations initiated under the Corps Continuing Authorities do not require specific congressional

authorization are initiated simply with a request from the State or community to the New England District. The following is a list of Continuing Authorities applicable to flood mitigation

Section 205 - Flood Damage Reduction: Investigations are conducted under this program to assist local communities to identify flooding problems and to formulate and construct alternatives for flood damage reduction. The local sponsor is required to cost-share equally in the cost of the feasibility investigation that exceeds $100,000 and the Federal limit is $5,000,000. The local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

Section 22 - Planning Assistance to States Program (PAS): The Planning Assistance to States Program is designed to assist the States in developing comprehensive plans to meet State planning goals. The program is extremely flexible in the type and the methodology of investigations. Studies conducted under the PAS program require a 50/50 cost share with a local sponsor. The existing funding limits are $300,000 per state and a national budget not to exceed $5,000,000.

Section 206 - Flood Plain Management Services (FPMS): The FPMS Program is designed for the Corps to assist States and local communities improve management of flood plains by performing technical assistance and conducting special investigations. Cost recovery has been implemented in this program effective in FY 1991. Under cost recovery, assistance provided to Federal agencies and private interests must be fully reimbursed by those customers. States and local communities are still provided technical assistance at 100 percent Federal cost. One of the major efforts being conducted under the FPMS program at this time is the preparation of Hurricane Evacuation Studies. These studies are jointly funded with the Federal Emergency Management Agency.

Personnel: IERD was created to research, analyze and solve ice problems in and around water bodies. The technical experience of the staff and their in-depth research and field capabilities combine with CRREL's unique Ice Engineering Facility to form one of the premier ice engineering organizations in the world. IERD has a staff of 15 engineers and technicians experienced in technical analyses, methods and engineering solutions to ice problems -- that is, any situation where the effects of ice cause flooding, increase operational and maintenance requirements of water control projects, impede navigation, or adversely impact the environment in cold regions.

Equipment and Facilities: The Ice Engineering Facility was built to increase the research capabilities of the U.S. Army Cold Regions Research and Engineering Laboratory. It is a two-story building approximately 160 by 210 feet containing three primary cold spaces: the test Basin, Flume, and Research Area. They have recently designed and built a new Wind Tunnel Facility. In addition, there is a machine room in the basement, an instrumentation corridor separating the flume and test basin spaces, a shop/storage area, and one sample-storage cold room.

The Test Basin was designed primarily for large-scale work on ice forces on structures, such as drill platforms and bridge piers, and for tests using model icebreakers. The Basin is 30 feet wide, 8 feet deep and 120 feet long. The room is designed to operate at any temperatures between +65° and -10°F with very even temperature distribution, which results in uniform ice thickness. Other studies

conducted in the Test Basin concern the formation of ice pressure ridges, ice problems in and around navigation locks and vertical uplift forces.

The Flume is situated in a room where the temperature can be regulated between +65° and -20° F. The Flume is 2 by 4 feet in cross section and 120 feet long. It can tilt from +2° to -1° slope, have a flow capacity of nearly 14 cubic feet per second and have a refrigerated bottom. Some other studies conducted in the Flume are the formation of ice covers and frazil ice, the hydraulics of ice-covered rivers, the formation of ice jams, and the effect of ice covers on sediment transport and scour.

Possibly the most versatile portion of the Ice Engineering Facility is the Research Area. This room is 80 by 160 feet clear span and has a temperature range of +65° to -10°F. Piping capable of providing a flow of 1, 2, 4 or 8 cubic feet per second is located on one side of the room, and a large drain trough is on the other. The floor is designed for loads up to 400 pounds per square foot. Models of reaches can be constructed in this area to test ways to alleviate ice jams through channel modification. Tests of the bearing capacity of large ice sheets and cold-testing of vehicles and structures are a few of the other potential uses of this space. Tests conducted in this room will help to alleviate much of the flooding caused by ice jams.

USDA, Natural Resources Conservation Service
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Description and Mission: The Natural Resources Conservation Service (NRCS) is a Federal agency within the US Department of Agriculture. The mission of the NRCS is to help people conserve, improve and sustain our natural resources and environment. NRCS, formerly the Soil Conservation Service, is the lead federal agency for conservation on private land. NRCS provides conservation technical assistance through local conservation districts and Resource Conservation and Development (RC&D) Councils to individuals, communities, watershed groups, tribal governments, federal, state, and local agencies, and others. NRCS has an interdisciplinary staff of professional engineers, planners, biologists, foresters, agronomists, and soil scientists working together to provide the necessary technical assistance to solve resource or environmental problems. NRCS products typically include conservation plans, study reports, engineering designs, and resource maps.

Authorities and Funding: NRCS state and field offices derive funding from two possible sources, direct Federal appropriations and reimbursable agreements with agencies and units of government. NRCS manages several programs; Environmental Quality Incentive Program (EQIP), Wildlife Habitat Incentives Program (WHIP), Wetland Reserve Program (WRP), Forestry Incentives Program (FIP), and Farmland Protection Program (FPP) which provide cost-share assistance to landowners and users (primarily agricultural or forestry land) to install conservation practices to

restore and protect natural resources. NRCS can also provide technical assistance ranging from preliminary reviews to complete detail designs to landowners/users solving resource problems even if financial assistance is not being provided for the installation of conservation practices. This assistance is dependent on staff availability and priorities.

NRCS also manages the Emergency Watershed Protection (EWP) program, which can provide financial and technical assistance to units of government and groups to repair damages sustained from a natural disaster (flood, fire, hurricane, tornado) creating an imminent hazard to life and property. The restoration efforts must be environmentally and economically cost effective and typically includes clearing debris from clogged stream channels, stabilizing eroded stream banks and restoring vegetation for stabilization purposes. NRCS can also provide technical assistance to watershed associations or groups to develop comprehensive plans for improving or protecting the watershed environment (water quality, flood reduction, wildlife habitat).

Mitigation Involvement: The NRCS can provide technical assistance to conduct inventories, to complete watershed or site-specific plans, or to develop detail engineering and construction designs for conservation applications that will help reduce future damages from natural disasters. Some examples of past mitigation efforts include: floodplain management studies for towns, site assessments of stream flow impairments, stabilization designs to protect structures which could sustain severe damages from another storm event, and small watershed plans addressing flooding problems. Some of these products can be provided through other conservation assistance efforts. However, the major jobs would require a reimbursable agreement with the state or towns to complete the work.

Mitigation Goals and Objectives: With respect to hazard mitigation, the goal of the NRCS in New Hampshire is to meet the needs of the State and local governments by providing timely technical assistance to support recovery and restoration efforts. NRCS can contribute this technical assistance by interacting directly with NH HSEM at the state level and having field staff working directly with Town Emergency Management officials at the local level. Short-term goals are to establish contacts with local officials and the conservation districts at the field office level to facilitate quicker response times. Intermediate and long-term objectives are to improve the cooperative efforts of working with NH HSEM and establish additional contacts for providing timely technical assistance at the local level.

Projects/Planning Desired: NRCS would like to work with local watershed associations to develop comprehensive plans addressing resource and environmental needs and opportunities in the priority watersheds as identified in the Unified Watershed Assessment. These plans can provide the basis for targeting and requesting special funding to meet the needs of the local watershed association. Technical assistance for planning and designing along with public information dissemination are the typical activities the agency can provide in this effort.

NRCS Resources with respect to Hazard Mitigation

Personnel: NRCS in New Hampshire has a workforce of 45 staff members along with 5 multi-state staff members. Approximately 22 staff members consisting of engineers, biologists, foresters, conservation planners, and technicians are available to provide some assistance in mitigation efforts. Support staff of a GIS specialist, computer specialist and public information specialist could assist in providing information for public outreach. This staff is available to provide limited assistance under present program funding authorities. However, larger projects would require reimbursement for planning and design assistance.

Equipment, Physical Facilities and Other Capabilities: All of the field offices and State office have computers and access to the internet. All of the field offices have survey equipment and all engineers have the use of CADD software. All field offices have access to small meeting rooms and access to the Federal Telecommunications System. Government vehicles are located at all field offices for use by government employees and could be made available in emergencies.

Northeast States Emergency Consortium (NESEC)
Contacts:
Edward S. Fratto, Executive Director: Phone: 781-224-9876, Fax: 781-224-4350
E-Mail: www.nesec.org
Kristin M. O'Brien, Assistant Executive Director: Phone: 781-224-9876; e-mail: www.nesec.org

Address: Northeast States Emergency Consortium**,** 419 Main Street, Suite 5
Wakefield, MA 01880

Organization Description: The Northeast States Emergency Consortium, Inc. (NESEC) is a 501(c)(3) not-for-profit natural disaster mitigation and emergency management organization, located in Wakefield, Massachusetts. NESEC is the only multi-hazard consortium of its kind in the country and is supported and funded by the Federal Emergency Management Agency (FEMA). The eight Northeast States of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont form the consortium. NESEC has a full-time Executive Director, and Assistant. It is governed by a Board of Directors. The Board is comprised of the Directors of the State Emergency Management Agencies from each of the six New England States and the States of New York and New Jersey.

Organization Mission: NESEC works in partnership with government and private organizations to reduce losses of life and property from natural disasters in the Northeast United States. The Northeast States are vulnerable to most of the natural hazards, including hurricanes, earthquakes, coastal and inland flooding, tornadoes and micro-bursts, forest fires, drought, lighting, blizzards, and other forms of severe weather. Our developed urban areas and the desire to build and live on waterfront property have increased our degree of risk from natural hazards.

Mitigation Programs

Grants**:** NESEC raises funds from government and private sources to support local mitigation projects. These funds are awarded on a competitive basis in the form of grants in the range of $500-5,000. The name of this program is called the **Power of Prevention**. All grant programs are administered in cooperation with the New Hampshire Homeland Security and Emergency Management (NH HSEM). Communities interested in participating should contact NH HSEM.

HAZUS: NESEC assists FEMA PROJECT IMPACT Communities in the use of HAZUS as a planning platform for incorporating multi-hazard disaster prevention initiatives. NESEC can produce a HAZUS report using default data for each of the initial PROJECT IMPACT Communities. Priority is given to PROJECT IMPACT communities; however, assistance may be provided to other communities as resources allow. This report provides an excellent starting point for communities wishing to utilize HAZUS to identify potential hazards. The NESEC HAZUS Report is multi-hazard and usually contains information on earthquakes, tornadoes, flood and wind.

There is no fee or charge for producing the default HAZUS Report and meeting with the community to discuss the results. All HAZUS support is arranged in cooperation with the New Hampshire Homeland Security and Emergency Management (NH HSEM). Communities interested in participating should contact NH HSEM.

Emergency Generators: NESEC assists communities to establish a partnership with their electric utilities and service companies. The partnership would conduct an energy efficiency audit of the community, recommend cost saving measures, and implement a cost saving plan. Monthly savings could be used to fund emergency generator(s) for local critical facilities. The utility or energy service company could then lease, install, and maintain generator(s) in a community.

The community would pay a monthly charge for the lease agreement. This charge would not exceed the savings derived through energy efficiency measures, so there would be no capital outlay or additional cost to the community. In fact, some communities may be able to reduce their monthly electric bills in an amount that exceeds the cost of the generator(s) lease agreement.

Monthly savings and utility participation will vary from state to state and community-to-community depending on present electric power usage and efficiency measures and deregulation. There is no fee or charge for assisting communities in establishing partnerships with electric utilities. NESEC assistance will be provided as resources allow. All emergency generator support is arranged in cooperation with the New Hampshire Homeland Security and Emergency Management (NH HSEM). Communities interested in participating should contact NH HSEM.

Federal Mitigation Grant Programs

Pre-Disaster Mitigation Grant Program: The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on

funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds. http://www.fema.gov/government/grant/pdm/index.shtm

Hazard Mitigation Grant Program: The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.
http://www.fema.gov/government/grant/hmgp/index.shtm

Flood Mitigation Assistance Program: The Flood Mitigation Assistance (FMA) program was created as part of the National Flood Insurance Reform Act of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program.

FEMA provides FMA funds to assist states and communities in implementing measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other structures insurable under the National Flood Insurance Program.
http://www.fema.gov/government/grant/fma/index.shtm

Appendix E: Documentation of the Planning Process

Antrim Hazard Mitigation Plan Update
Work Group

Meeting #1

AGENDA

December 16, 2021
9:00 a.m.

Join Zoom Meeting

https://bit.ly/Dec16AntHMWG21

Meeting ID: 827 6230 4866
Passcode: 215713
or
Join by Phone: (646) 558-8656

1. Introduction

a. Discuss the process to update the plan and the addition of recently added hazards to the State Hazard Mitigation Plan

2. Status of Previous Hazard Mitigation Actions

a. Review the Action Plan from the existing Hazard Mitigation Plan to determine what has been completed, deleted, or deferred to the updated plan

3. Identify Past and Potential Hazards

a. Review each hazard type and other information on the chart provided in the existing plan
b. Add any new hazards that have occurred since the previous plan was adopted
c. Add any potential hazard concerns

4. Identify Existing Mitigation Protection

a. Complete the Existing Mitigation Matrix

5. Next Meeting

a. Potential date: January 13, 2022 at 9:00 a.m.

Antrim Hazard Mitigation Plan Update
Work Group

Meeting #2

AGENDA

January 13, 2022
9:00 a.m.

Join Zoom Meeting
https://bit.ly/Jan13AnHMWG22

Meeting ID: 833 5960 3519
Passcode: 453110
or
Join by Phone: (646) 558-8656

1. Introduction

2. Critical Facilities

a. Provide address or location information for critical facilities

3. Potential Strategies and Gaps in Coverage

a. Look at the Potential Strategies Matrix and determine gaps in coverage

4. Hazard Mitigation Goals

a. Review the previous goals and determine any changes needed

5. Future Meetings

a. Next Meeting: February 3, 2022 at 9:00 a.m.

Antrim Hazard Mitigation Plan Update
Work Group

Meeting #3

AGENDA

February 3, 2022
9:00 a.m.

Join Zoom Meeting

https://bit.ly/Feb3AnHMWG22

Meeting ID: 871 4777 5921
Passcode: 512586
or
Join by Phone: (646) 558-8656

1. Identify and Prioritize Mitigation Actions for Each Hazard

    a. Identify specific locations to be added to the Action Plan
    b. Use the STAPLEE Chart to identify and rank actions for each hazard

2. Prepare an Action Plan

    a. Determine the *Who*, *When* and *Funding Source* for each action identified in the STAPLEE Chart.

3. Future Meetings

    a. Meeting #4 - March 3, 2022 at 9:00 a.m.

Antrim Hazard Mitigation Plan Update
Work Group

Meeting #4

AGENDA

March 3, 2022
9:00 a.m.

Join Zoom Meeting

https://bit.ly/Mar03AnHMWG2022

Meeting ID: 868 6981 7721
Passcode: 609645
or
Join by Phone: (646) 558-8656

1. Review Draft Plan

   a. Discuss incomplete sections
   b. Review chapters 2, 4, 6, 9

2. Discuss Plan Review and Approval

   a. Public viewing period
   b. HSEM/FEMA Review Process and Timeline
   c. Board of Selectmen adoption of the Plan

Antrim Hazard Mitigation Plan Update
Work Group

Meeting #5

AGENDA

April 14, 2022
9:00 a.m.

Join Zoom Meeting

https://bit.ly/Apr14AnHMWG22

Meeting ID: 819 0146 3161
Passcode: 975882
or
Join by Phone: (646) 558-8656

1. Review Key Chapters of the Draft Plan

    a. Review and edit chapters 3, 4, 7, and 8
    b. Review other parts of the Plan as needed

2. Discuss the final steps to FEMA approval

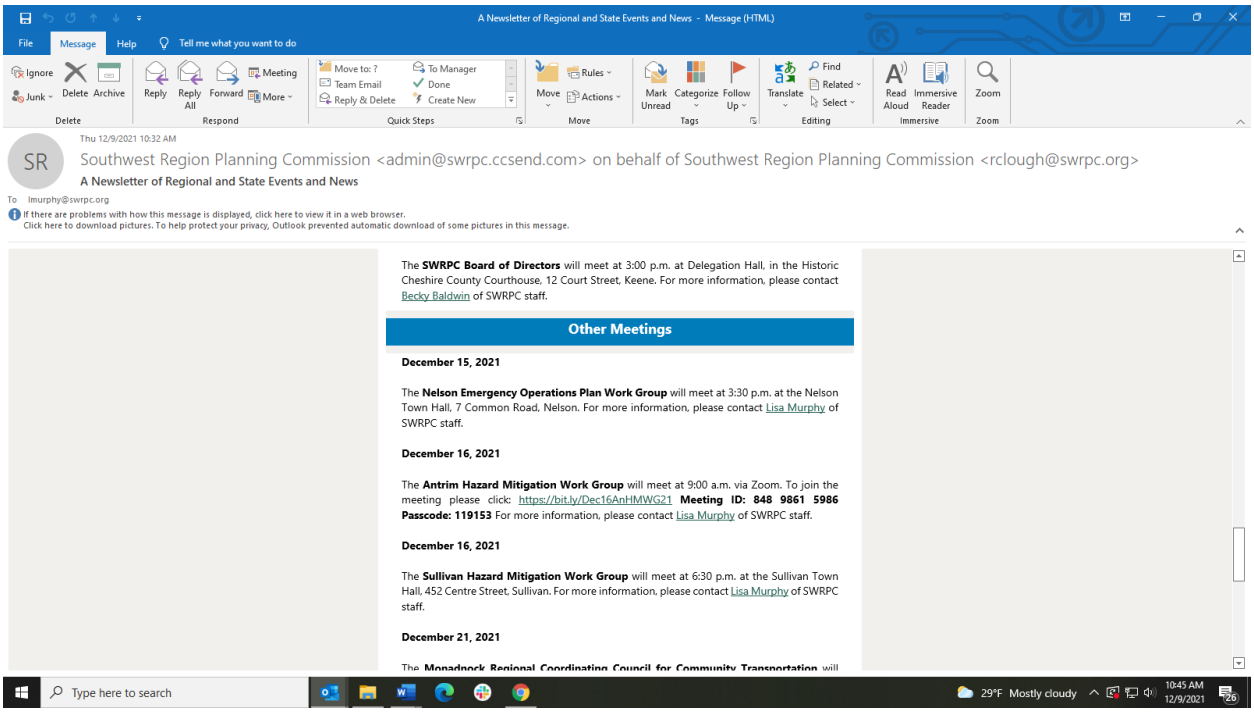
Antrim Hazard Mitigation Work Group Sign-in Sheet for Meeting #1 December 16, 2021	
Name	Title
Marshall Gale	Antrim Emergency Management Director
Diane Chauncy	Antrim Town Clerk
John Robertson	Antrim Board of Selectmen
Jason Bryer	Antrim Fire Department
Donna Hansen	Antrim Town Administrator
Bob Edwards	Antrim Board of Selectmen
Jim Plourde	Antrim Road Agent

Antrim Hazard Mitigation Work Group Sign-in Sheet for Meeting #2 January 13, 2022	
Name	Title
Marshall Gale	Antrim Emergency Management Director
Diane Chauncy	Antrim Town Clerk
John Robertson	Antrim Board of Selectmen
Jim Plourde	Antrim Road Agent
Jason Bryer	Antrim Fire Department
Brian Lord	Antrim Police Chief

Antrim Hazard Mitigation Work Group Sign-in Sheet for Meeting #3 February 3, 2022	
Name	Title
Marshall Gale	Antrim Emergency Management Director
Diane Chauncy	Antrim Town Clerk
John Robertson	Antrim Board of Selectmen
Jim Plourde	Antrim Road Agent

Antrim Hazard Mitigation Work Group Sign-in Sheet for Meeting #4 March 3, 2022	
Marshall Gale	Antrim Emergency Management Director
Diane Chauncy	Antrim Town Clerk
Jim Plourde	Antrim Road Agent
John Robertson	Antrim Board of Selectmen

Antrim Hazard Mitigation Work Group Sign-in Sheet for Meeting #5 April 14, 2022	
Name	Title
Diane Chauncy	Antrim Town Clerk
Jim Plourde	Antrim Road Agent
Russell McAllister	Antrim Town Administrator
Bob Edwards	Antrim Board of Selectmen
Jim Plourde	Antrim Road Agent
John Robertson	Antrim Board of Selectmen
Marshall Gale	Antrim Emergency Management Director



A Newsletter of Regional and State Events and News - Message (HTML)

Thu 12/9/2021 10:32 AM

Southwest Region Planning Commission <admin@swrpc.ccsend.com> on behalf of Southwest Region Planning Commission <rclough@swrpc.org>

A Newsletter of Regional and State Events and News

To lmurphy@swrpc.org

If there are problems with how this message is displayed, click here to view it in a web browser.
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

The **SWRPC Board of Directors** will meet at 3:00 p.m. at Delegation Hall, in the Historic Cheshire County Courthouse, 12 Court Street, Keene. For more information, please contact Becky Baldwin of SWRPC staff.

Other Meetings

December 15, 2021

The **Nelson Emergency Operations Plan Work Group** will meet at 3:30 p.m. at the Nelson Town Hall, 7 Common Road, Nelson. For more information, please contact Lisa Murphy of SWRPC staff.

December 16, 2021

The **Antrim Hazard Mitigation Work Group** will meet at 9:00 a.m. via Zoom. To join the meeting please click: https://bit.ly/Dec16AnHMWG21 **Meeting ID: 848 9861 5986 Passcode: 119153** For more information, please contact Lisa Murphy of SWRPC staff.

December 16, 2021

The **Sullivan Hazard Mitigation Work Group** will meet at 6:30 p.m. at the Sullivan Town Hall, 452 Centre Street, Sullivan. For more information, please contact Lisa Murphy of SWRPC staff.

December 21, 2021

The **Monadnock Regional Coordinating Council for Community Transportation** will

Appendix F:
Project Status Sheet

The following form can be used to keep track of projects identified in the hazard mitigation plan that are in progress or that have been completed.

Project Title	Page # in Plan	Date of Project Completion	Comments