

Groton, NH

Hazard Mitigation Plan Update 2024



This Plan integrates the following:

- **Hazard Mitigation Plan Update (FEMA)**
- **Community Wildfire Protection Plan (DNCR)**

**December 6, 2024
Final Plan**

**Prepared for the Town of Groton and NH Homeland Security & Emergency
Management**

**By
The Groton Hazard Mitigation Planning Team**

With assistance from Mapping and Planning Solutions

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“Plans are worthless, but planning is everything. There is a very great distinction because when you are planning for an emergency you must start with this one thing: The very definition of “emergency” is that it is unexpected, therefore it is not going to happen the way you are planning.”

-Dwight D. Eisenhower

HAZARD MITIGATION PLAN DEFINITIONS

“A **natural hazard** is a source of harm or difficulty created by a meteorological, environmental, or geological event.”

“**Hazard mitigation** is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards (44CFR 201.2). Hazard mitigation activities may be implemented prior to, during, or after an event. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.”

(Source: Local Mitigation Plan Review Guide, FEMA, October 1, 2011)



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Cover Photos:

Groton Windmills - <https://www.wind-watch.org/documents/groton-wind-new-hampshire/>

Town House - <http://www.upstatenh.com/PicturePages/Groton-NH-Town-Offices.html>

Flooding on Sculptured Rocks Road - <https://www.wmur.com/article/its-all-gone-groton-flooding-leaves-devastation-in-its-wake/28390470>

Cockermouth River Flooding - <https://www.usgs.gov/media/images/cockermouth-river-flooding-over-a-road-crossing-near-groton-nh>

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Acknowledgments

This Plan integrates elements to qualify it as a Community Wildfire Protection Plan (CWPP), according to the US Forest Service and the NH Department of Natural & Cultural Resources (DNCR). The Plan was created through a grant from NH Homeland Security & Emergency Management (HSEM). The following organizations have contributed invaluable assistance and support for this project:

- NH Homeland Security & Emergency Management (HSEM)
- Federal Emergency Management Agency (FEMA)
- NH Office of Strategic Initiatives (OSI)
- Mapping and Planning Solutions (MAPS)
- NH Forests & Lands (DNCR)
- White Mountain National Forest (WMNF)

This Plan is an update to the most recent Groton Hazard Mitigation Plan, approved on February 28, 2020.

This Plan was funded under the Building Resilient Infrastructure & Communities Grant Program (BRIC2021)

Approval Notification Dates for 2024 Update

Approved Pending Adoption (APA)November 22, 2024
Jurisdiction Adoption:December 3, 2024
CWPP Approval:December 10, 2024
***Plan Approval Date (FEMA):December 6, 2024**
Receipt of FEMA LetterDecember 9, 2024
Plan Distribution (MAPS):.....December 12, 2024

**The start of the next five-year clock*

TOWN OF GROTON HAZARD MITIGATION PLANNING TEAM (HMPT)

The Town of Groton would like to thank the following people for the time and effort spent to complete this Plan. The following people have attended meetings or been instrumental in completing this Plan:

- Sara Smith Groton Town Administrator
- Jamie Moulton..... Hebron Fire Chief
- Ron Madden Groton Select Board Member
- Michael Bagan Groton Police Chief
- Tony Albert..... Groton Select Board Member
- Patti Oakley..... Groton Deputy Emergency Management Director
- Deb Johnson..... Groton Planning Board Member
- John Rescigno Groton Select Board Chair
- Bill Oakley Groton Emergency Management Director
- Ruth Millett..... Groton Town Clerk
- Robert Ellis..... Groton Road Agent
- Fred Brooks Groton Highway Department Crewman
- Hillary Coles..... Groton Deputy Town Clerk
- Dave Switaj..... Groton IT Director
- Angel Ekstrom..... Central NH Regional Public Health Network
- Jennifer Gilbert..... NH OSI State Floodplain Management Program Coordinator
- Lynne Doyle NH HSEM State Hazard Mitigation Planner
- June Garneau MAPS Owner/Planner
- Olin Garneau..... MAPS Senior Planner

Many thanks for all the hard work and effort you provided. This Plan would not exist without your knowledge and experience. Groton would also like to thank FEMA and NH HSEM as the primary funding sources for this Plan.

Executive Summary



The Groton Hazard Mitigation Plan Update 2024 was compiled to assist the Town in reducing and mitigating future losses from natural and other hazardous events. The Plan was developed by the Groton Hazard Mitigation Planning Team (HMPT), interested stakeholders, the public, and Mapping and Planning Solutions (MAPS). The Plan contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts.

This Plan is an **update** to the 2020 Groton Hazard Mitigation Plan. To produce an accurate and current planning document, the HMPT used the 2020 plan as a foundation, building upon that plan to provide more timely information.

Mitigation action items for natural hazards are the focus of this Plan; NH Homeland Security & Emergency Management (HSEM) determined the natural hazard when writing the 2023 NH Hazard Mitigation Plan. However, this Plan addresses technological and human-caused hazards in addition to natural hazards, as shown below.

NATURAL HAZARDS – AS DETERMINED BY NH HSEM AND THE TOWN

- | | |
|--------------------------|-------------------------------------|
| 1) Inland Flooding | 7) Dam Failure |
| 2) Severe Winter Weather | 8) Drought |
| 3) High Wind Events | 9) Infectious Disease |
| 4) Extreme Temperatures | 10) Tropical/Post Tropical Cyclones |
| 5) Lightning | 11) Earthquake |
| 6) Wildfire | |

TECHNOLOGICAL & HUMAN-CAUSED HAZARDS

- | | |
|-----------------------------|-------------------------|
| 1) Aging Infrastructure | 5) Transport Accidents |
| 2) Long Term Utility Outage | 6) Cyber Events |
| 3) Hazardous Materials | 7) Terrorism & Violence |
| 4) Mass Casualty Incidents | |

Some hazards listed in the 2023 NH Hazard Mitigation Plan were not included in this Plan as the Team felt they were unlikely to occur in Groton or were not applicable. An explanation of why these hazards are excluded from this Plan can be seen in Chapter 3, Section A.

This Plan also provides a list of Critical Infrastructure & Key Resources (CIKR) categorized as follows: Emergency Response Facilities (ERF), Non-Emergency Response Facilities (NERF), Facilities & Populations to Protect (FPP), and Potential Resources (PR). Also, this Plan addresses the Town's involvement in the National Flood Insurance Program (NFIP).

Communities can sometimes cope with the impact of particular natural hazards. For example, although severe winter weather is often a common hazard in the State, most New Hampshire communities handle two to three-foot snowstorms with little or no disruption of services. On the other hand, an unexpected ice storm can have disastrous effects on a community. Mitigation for sudden storms, such as ice storms, is difficult to achieve. Establishing warming and cooling centers, creating notification systems, providing public outreach, tree trimming, opening shelters, and perhaps burying overhead power lines are just a few actions that may be implemented.

In summary, finding mitigation action items for every hazard that affects a community can be difficult. With economic constraints, cities and towns are less likely to have the financial ability to complete certain mitigation action items, such as burying power lines. In preparing this Plan, the Groton HMPT (the Team) has considered a comprehensive list of mitigation action items that could diminish the impact of hazards. The Team has also decided to maintain a list of preparedness action items for future reference and action.

To simplify the language in the Plan, the following abbreviations and acronyms will be used:

Groton Hazard Mitigation Plan Update 2024	the Plan or this Plan
Groton	the Town or the Community
Hazard Mitigation Planning Team.....	The Team or HMPT
Hazard Mitigation Plan.....	HMP
Emergency Operations Plan	EOP
Mapping and Planning Solutions	MAPS
Mapping and Planning Solutions Planner.....	the Planner
NH Homeland Security & Emergency Management	HSEM
Federal Emergency Management Agency	FEMA

For more acronyms, please refer to Appendix E: Acronyms.

Mission Statement:
To make Groton less vulnerable to the effects of hazards through the effective administration of hazard mitigation planning, wildfire hazard assessments, and a coordinated approach to mitigation policy and planning activities.

Vision Statement:
The Town of Groton will reduce the impacts of natural hazards and other potential disasters through implementing mitigation measures, public education, and deliberate capital expenditures within the Community. Homes and businesses will be safer and the Community's International Organization for Standardization (ISO) rating may be improved.

Chapter 1: Hazard Mitigation Planning Process

A. AUTHORITY & FUNDING

The Groton Hazard Mitigation Plan Update 2024 was prepared following the Disaster Mitigation Act of 2000 (DMA), Section 322 Mitigation Planning, signed into law by President Clinton on October 30, 2000. This hazard mitigation plan was prepared by the Groton Hazard Mitigation Planning Team (HMPT) under contract with New Hampshire Homeland Security & Emergency Management (HSEM), operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-97 Edition) and with the assistance and professional services of Mapping and Planning Solutions (MAPS). HSEM funded this Plan through Federal Emergency Management Agency (FEMA) grants. Matching funds for team members' time were also part of the funding formula.

B. PURPOSE & HISTORY OF THE FEMA MITIGATION PLANNING PROCESS

The ultimate purpose of the Disaster Mitigation Act of 2000 (DMA) is to:

"...establish a national disaster hazard mitigation program -

- To reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and*
- To provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster".¹*

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section, "322 – Mitigation Planning", which states:

"As a condition of receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government."²

HSEM aims to have all New Hampshire communities complete a local hazard mitigation plan to reduce future losses from natural hazards before they occur. HSEM outlined a process whereby communities throughout the State may be eligible for grants and other assistance upon completing this hazard mitigation plan.

The Groton Hazard Mitigation Plan Update 2024 is a planning tool to reduce future losses from natural, technological, and human-caused hazards as required by the Disaster Mitigation Act of 2000. This Plan does not constitute a section of the Town's Master Plan. However, mitigation action items from this Plan may be incorporated into future Master Plan updates.

The DMA emphasizes local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition for receiving grants under the Hazard Mitigation Grant Program (HMGP). Local governments must review this Plan yearly and update this Plan every five years to continue program eligibility.

¹ Disaster Mitigation Act (DMA) of 2000, Section 101, b1 & b2

² Disaster Mitigation Act (DMA) of 2000, Section 322a

C. JURISDICTION

This Plan addresses one jurisdiction – the Town of Groton, Grafton County, New Hampshire.

D. SCOPE OF THE PLAN & FEDERAL & STATE PARTICIPATION

A community's hazard mitigation plan often identifies many natural hazards and is somewhat broad in scope and outline. The scope and effects of this Plan were assessed based on the impact of hazards and wildfire on Critical Infrastructure & Key Resources (CIKR), current residential buildings, other structures within the Town, future development, administrative, technical, and physical capacity of emergency response services and response coordination between federal, state and local entities.

In seeking approval as a Hazard Mitigation Plan (HMP) and a Community Wildfire Protection Plan (CWPP), the planning effort included the participation of NH Homeland Security & Emergency Management (HSEM), the United States Department of Agriculture-Forest Service (USDA-FS), the NH Department of Natural & Cultural Resources (DNCR), and the NH Bureau of Economic Affairs (BEA) as well as routine notification of upcoming meetings to other state and federal entities. Designation as a CWPP may allow a community to gain federal funding for hazardous fuel reduction and other mitigation projects supported by the USDA-FS and NH-DNCR. By merging the two federal planning processes (hazard and wildfire), duplication is eliminated, and the Town has access to a larger pool of resources for pre-disaster planning.

The Healthy Forest Restoration Act (HFRA) of 2003 includes statutory incentives for the USDA-Forest Service to consider local communities as they develop and implement forest management and hazardous fuel reduction projects. However, a community must prepare a CWPP to take advantage of this opportunity. This hazard mitigation planning process not only satisfies FEMA's criteria regarding wildfires and all other hazards but also addresses the minimum requirements for a CWPP:

- **Collaboration:** *Local and state government representatives must collaboratively develop a CWPP in consultation with federal agencies and other interested parties.*
- **Prioritized Fuel Reduction:** *A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.*
- **Treatment of Structural Ignitability:** *A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the Plan.³*

Finally, as required under the Code of Federal Regulations (CFR), Title 44, Part 201.6(c) (2) (ii) and 201.6(c) (3) (ii), the Plan must address the Community's participation in the National Flood Insurance Program (NFIP) and its continued compliance with the program. As part of a vulnerability assessment, the Plan must address the NFIP-insured structures that have been repetitively damaged due to floods.

³ Healthy Forest Restoration Act; HR 1904, 2003; Section 101-3-a.b.c; <https://www.govinfo.gov/content/pkg/BILLS-108hr1904enr/pdf/BILLS-108hr1904enr.pdf>

E. PUBLIC & STAKEHOLDER INVOLVEMENT

Public and stakeholder involvement was stressed during the initial meeting, and community officials were given a matrix of potential team members (see below). Community officials were urged to contact as many people as possible to participate in the planning process, including residents, officials, and residents from surrounding communities. The Town of Groton understands that natural hazards do not recognize political boundaries.

The Team provided excellent public and stakeholder notification. Many interested citizens and stakeholders had the opportunity to become aware of the hazard mitigation planning in Groton. A press release (see below) was posted at the Town House and Transfer Station. Meeting notices were also posted on the Town’s website and calendar (see next page). The press release was used to notify academia, businesses, and private and non-profit organizations that work with underserved communities and socially vulnerable populations that meetings were taking place, and they were invited to attend. Groton has no colleges or universities; local school officials were invited to attend meetings.

**HAZARD MITIGATION
POTENTIAL TEAM MEMBERS**

FEDERAL

- USDA Forest Service

STATE

- Department of Transportation (DOT)
- Department of Natural & Cultural Resources (DNCR)
- Bureau of Economic Affairs (BEA)

LOCAL

- Select Board Member(s)
- Town Manager/Administrator
- Planning Board Member(s)
- Town Planner
- Police Chief
- Fire Chief
- Emergency Management Director
- Emergency Medical Services
- Education/School
- Recreation Director
- DPW Director or Road Agent
- Water & Waste Management
- Public Utilities
- Dam Operator(s)
- Major Employer(s)
- Senior Citizen Facilities
- Vulnerable populations
- Academia

OTHER OR SPECIAL INTEREST

- Landowners
- Homeowners Association(s)
- Forest Management
- Developers & Builders
- Major Businesses

*Mapping and Planning Solutions
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91 Cherry Mountain Place
Twin Mountain, NH 03595*

Press Release

FOR IMMEDIATE RELEASE
Updated: September 21, 2023

Contact: June Garneau
603-991-9664

**THE TOWN OF GROTON COMMENCES
HAZARD MITIGATION PLANNING**

The Groton Emergency Management Director (EMD) and other town officials will meet with June Garneau of Mapping and Planning Solutions to work on the required five-year update to the **2020 Groton Hazard Mitigation Plan**. The Town and Mapping and Planning Solutions are conducting a series of Hazard Mitigation meetings to develop the plan over the next few months.

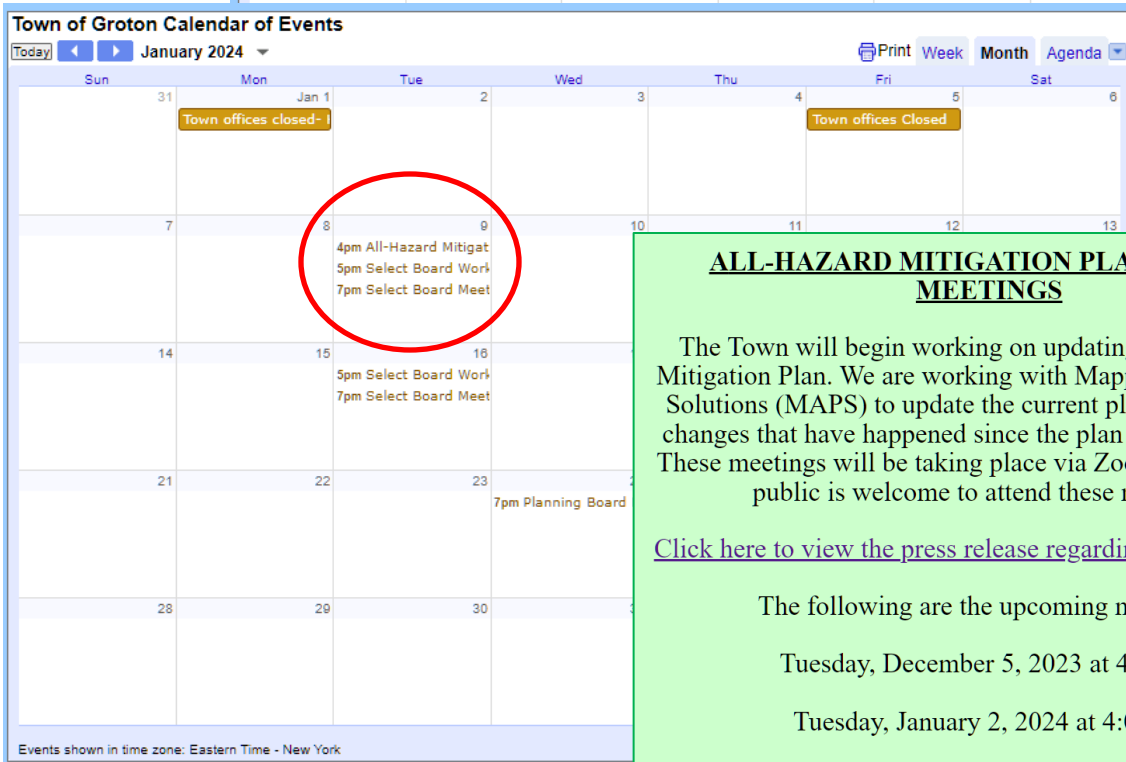
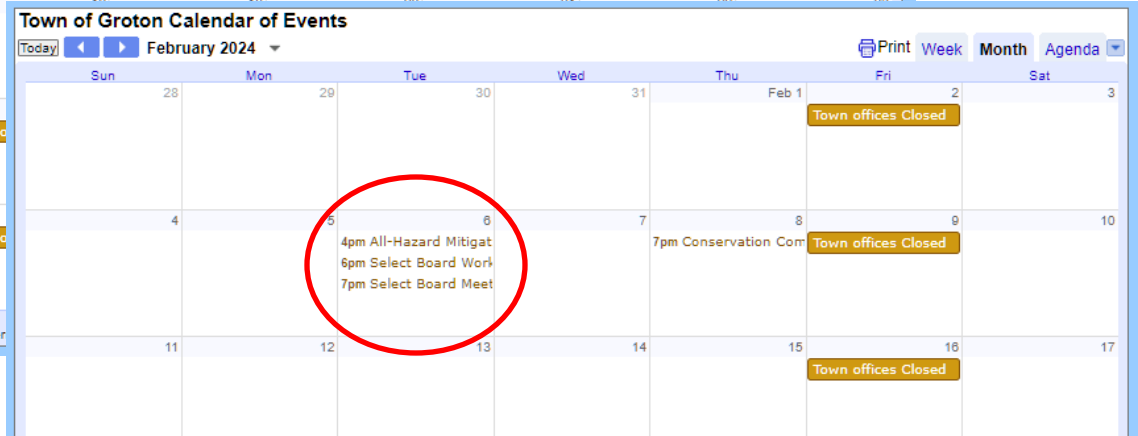
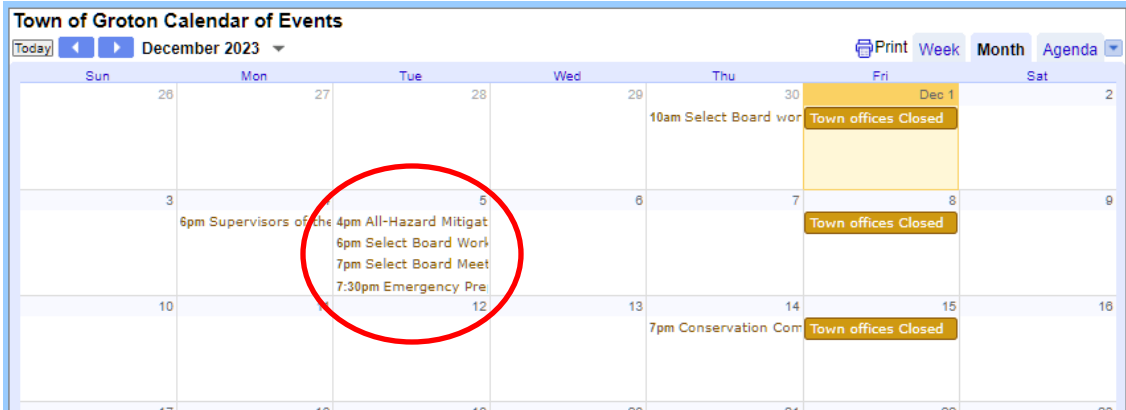
During these public meetings, the Planning Team will address natural, technological, and human-caused hazards such as Inland Flooding, Long-Term Utility Outages, and Transport Accidents. The team will determine "Action Items" to help mitigate the effects of these hazards. The Team will also review shelter sites and the need for generators at those sites.

By examining critical infrastructure and key resources, along with past hazards, the Team will establish priorities for future mitigation projects and steps that can be taken to increase public awareness of hazards in general.

As mandated by the Disaster Mitigation Act of 2000, all municipalities must complete a local Hazard Mitigation Plan to qualify for Federal Emergency Management Administration funding should a natural disaster occur. The planning processes are made possible by grants from FEMA.

The Hazard Mitigation Planning Team (HMPT) is currently being formed. Groton citizens and any interested stakeholders are invited to participate. The next meeting is scheduled for **Tuesday, October 3, 2023, from 4:00 PM to 5:00 PM** via "Zoom". The public is encouraged to attend all meetings. Interested parties should contact Bill Oakley, Groton EMD, by email, w6oaks@live.com, to be included in the process; interested parties will be added to the Zoom meeting invitation list. Future meetings are planned for November 7, December 5, 2023, and January 2, February 6, and March 5, 2024. Future meetings will be held at 4:00 PM and last two hours.

More information on the hazard mitigation planning process is available from June Garneau at [Mapping and Planning Solutions, jgarneau@mappingandplanning.com](mailto:jgarneau@mappingandplanning.com).



ALL-HAZARD MITIGATION PLAN UPDATE MEETINGS


The Town will begin working on updating the All-Hazard Mitigation Plan. We are working with Mapping and Planning Solutions (MAPS) to update the current plan to include any changes that have happened since the plan was last updated. These meetings will be taking place via Zoom Meetings. The public is welcome to attend these meetings.

[Click here to view the press release regarding these meetings.](#)

The following are the upcoming meetings:


- Tuesday, December 5, 2023 at 4:00pm
- Tuesday, January 2, 2024 at 4:00pm
- Tuesday, February 6, 2024 at 4:00pm
- Tuesday, March 5, 2024 at 4:00pm

Lastly, the Planner sent a monthly calendar (see below) and email inviting stakeholders to participate in planning meetings being held by MAPS. EMDs, Police Chiefs, Fire Chiefs, Rangers, and other state, federal, and private officials were included in this email blast. Groton’s neighbors, Rumney, Plymouth, Hebron, Alexandria, Orange, Canaan, and Dorchester, are part of MAPS’ monthly email.



Upcoming Zoom Meetings

Colored by county
December 1, 2023 – January 31, 2024



Day	Date	Time	Town/Location	Plan Type	HSEM Field Rep	County
Tuesday	12/5/23	4:00 PM	Groton Zoom Meeting	HMP	Paul Hatch	Grafton
Wednesday	12/6/23	1:00 PM	Lyme Zoom Meeting	HMP	Paul Hatch	Grafton
Tuesday	12/12/23	6:00 PM	Franconia Zoom Meeting	HMP	Paul Hatch	Grafton
Wednesday	12/13/23	10:00 AM	Portsmouth Zoom Meeting	EOP	Courtney Jordan	Rockingham
Thursday	12/14/23	10:00 AM	Claremont Zoom Meeting	COOP	Liz Gilboy	Sullivan
Thursday	12/14/23	2:00 PM	Bath Zoom Meeting	HMP	Paul Hatch	Grafton
Monday	12/18/23	1:00 PM	Tamworth Zoom Meeting	HMP	Candi Tibbetts	Carroll
Monday	12/18/23	6:30 PM	Randolph Zoom Meeting	HMP	Candi Tibbetts	Coos
Thursday	12/21/23	9:00 AM	Ashland Zoom Meeting	HMP	Paul Hatch	Grafton
Tuesday	1/2/24	4:00 PM	Groton Zoom Meeting	HMP	Paul Hatch	Grafton

Team composition can be impacted in some communities due to lower population and because many people “wear more than one hat”. It is often challenging to attract citizens to participate in town government. In smaller communities, those working in town government generally hold full-time jobs and volunteer in various town positions. Depending on the population, the percentage of interested citizens in a town’s planning processes may be diminished. Due to the availability of jobs, a high elderly population, and other economic factors, smaller communities have a dwindling number of young people interested in town planning.

Groton had excellent participation in developing this Plan. The Emergency Management Director (EMD), Deputy EMD, Police Chief, Road Agent, a Highway Department crewmember, and Hebron Fire Chief participated in the meetings. The Town Administrator, Town Clerk, Deputy Town Clerk, three Select Board members, a Planning Board member, the IT Director, and a North Country Regional Public Health Network (NCRPHN) member also participated in the meetings. Comments made by all team members were integrated into the narrative discussion and incorporated into the document. Although the public was informed about the planning meetings, no one from the public attended.

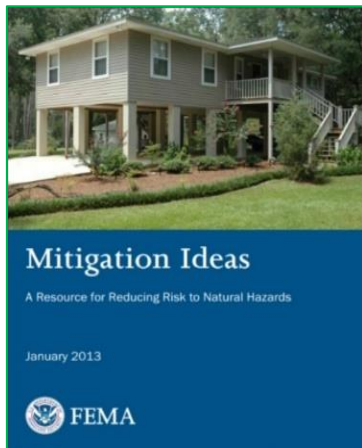
§201.6(b) requires that there be an open public involvement process in the formation of a plan. This process shall provide an opportunity for the public to comment on the Plan during its formation as well as an opportunity for any neighboring communities, businesses, and others to review any existing plans, studies, reports, and technical information and incorporate those into the Plan, to assist in the development of a comprehensive approach to reducing losses from natural disasters.

F. INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS, AND TECHNICAL INFORMATION

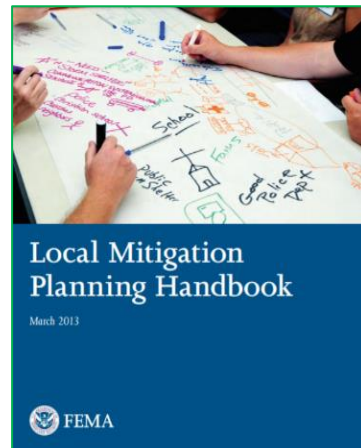
The planning process included a complete review of the Groton Hazard Mitigation Plan 2020 for updates, development changes, and accomplishments. The Team worked with the Planner to identify pertinent information from the reviewed documents; this information was then added to the appropriate place in the Plan. Also, as noted in the bibliography and footnotes throughout the Plan, many other documents were used to create this mitigation plan. Some, but not all, of those plans and documents are listed below:

Groton Hazard Mitigation Plan 2020.....	Compare & Contrast
Groton Master Plan (2017)	Community Information
Groton Annual Reports (2023).....	Fire Report & Development
Other Hazard Mitigation Plans (Hanover, Greenland, Enfield).....	Formats & Mitigation Ideas
The Groton Subdivision Regulations (2023).....	New Development Regulations
The Groton Site Plan Review Regulations (2023).....	Commercial Regulations
The Groton Zoning Ordinance (2023).....	Zoning Regulations
Floodplain Development Ordinance (Part of Zoning)	Floodplain Regulations
Census 2020 Redistricting Data	Population Data
The NH DRA Summary of Inventory of Valuation MS-1 2023 for Groton	Structure Evaluation
The Economic & Labor Market Information Bureau Community Profile.....	Population Trends
The American Community Survey (ACS2021, 201-2021).....	Population Trends
Mitigation Ideas, FEMA, January 2013.....	Mitigation Strategies
The Department of Cultural & Natural Resources (DNCR)	DNCR Fire Report
The NH Bureau of Economic Affairs (BEA)	Flood Losses
Property Tax Valuation (Department of Revenue Administration).....	Property Information

Other technical manuals, federal and state laws, and research data were combined with these elements to produce this integrated hazard mitigation plan. Please refer to *Appendix A: Bibliography* and the Plan’s footnotes.



https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf



https://www.fema.gov/sites/default/files/2020-06/fema-local-mitigation-planning-handbook_03-2013.pdf

G. HAZARD MITIGATION GOALS

Before identifying new mitigation action items, the Team reviewed and agreed to the goals in the State of New Hampshire Multi-Hazard Mitigation Plan Update 2023.⁴ These goals below have been modified for grammatical purposes but are otherwise quoted directly from the State plan.

OVERARCHING GOALS

1. Minimize loss and disruption of human life, property, the environment, and the economy due to natural hazards and high-hazard potential dam failure through a coordinated and collaborative efforts between federal, state, and local authorities to implement appropriate and cost-effective hazard mitigation measures.
2. Enhance the protection of the general population, citizens, and guests of the State before, during, and after a hazard event through public education about disaster preparedness and resilience and expanded awareness of the threats and hazards that face the State.
3. Promote comprehensive hazard mitigation planning at state and local levels to encourage data integration, alignment of plans, and identification of funding and other resources.
4. Identify how climate change impacts natural hazards and mitigation strategies.
5. Strengthen the Continuity of Operations and Continuity of Government across the state and local levels to ensure the continuation of essential services through training, outreach, and education.
6. Promote equity by challenging state agencies and municipalities to incorporate whole community concepts during the planning and execution of mitigation projects, encouraging the identification and inclusion of vulnerable populations in the planning process.

NATURAL HAZARD OBJECTIVES

1. Reduce long-term risks through assessment, identification, and strategic mitigation of at risk/vulnerable infrastructure (high hazard potential and other dams, stream crossings, roadways, coastal levees, etc.)
2. Minimize illnesses and deaths related to events that present a threat to human and animal health
3. Assist communities with plan development, outreach, and public education in order to reduce the impact from natural disasters
4. Ensure mitigation strategies consider the protection and resiliency of natural, historical, and cultural resources.
5. Effectively collaborate between federal, State, and local agencies as well as private partners, NGOs, and VOADs
6. Ensure that grant related funding processes allow for expedient and effective actions to take place at the Community and State-level

TECHNOLOGICAL AN HUMAN-CAUSED HAZARD OBJECTIVES

The State recognizes that technological and human-caused hazards are important to consider at the state and local level. The State and local jurisdictions must prepare to respond to and monitor for these types of hazards. As such, they will remain included in this Plan as an Annex for reference purposes. Strategies and action items for these hazards will not be included in this Plan so that the focus can remain on natural hazards.

⁴ New Hampshire State Hazard Mitigation Plan, 2023 Update; <https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2023/10/2023-NH-State-Hazard-Mitigation-Plan-Signed-10.5.23.pdf>

H. HAZARD MITIGATION PLANNING PROCESS & METHODOLOGY

The planning process consisted of twelve steps; some were accomplished independently, while others were interdependent. Many factors affected the planning process's sequence, such as the number of meetings, community preparation, attendance, and other community needs. The planning process resulted in significant crosstalk regarding natural, technological, and human-cause hazards.



All steps were included but not necessarily in the numerical sequence listed. The steps are as follows:

PLANNING STEPS

Step 01: Team formation, orientation, and goals

Step 02: Identify hazards and their risk and probability

Table 3.1 – Hazard Identification & Risk Assessment (HIRA)

Step 03: Profile and list historic and potential hazards

Table 3.2 – Historic Hazard Identification

Step 04: Profile, list, and establish risk for Critical Infrastructure & Key Resources (CIKR)

Tables 4.1 to 4.4 – Critical Infrastructure & Key Resources

Step 05: Assess the Community's participation in the National Flood Insurance Program (NFIP)

Chapter 3, Section D

Step 06: Prepare an introduction to the Community, discuss emergency service capabilities, and development trends, and review statistical information about the Town

Chapter 2, Sections A, B, and C & Table 2.1, Town Statistics

Step 07: Review current plans, policies, and mutual aid and brainstorm to identify improvements

Table 6.1 – Capabilities Assessment

Step 08: Examine the status of the mitigation action items from the last plan

Table 7.1 – Accomplishments since the last Plan

Step 09: Evaluate and categorize potential mitigation action items

Tables 8.1 - Potential Mitigation Strategies & the STAPLEE

Step 10: Prioritize mitigation action items to determine an action plan

Table 9.1 – The Mitigation Action Plan

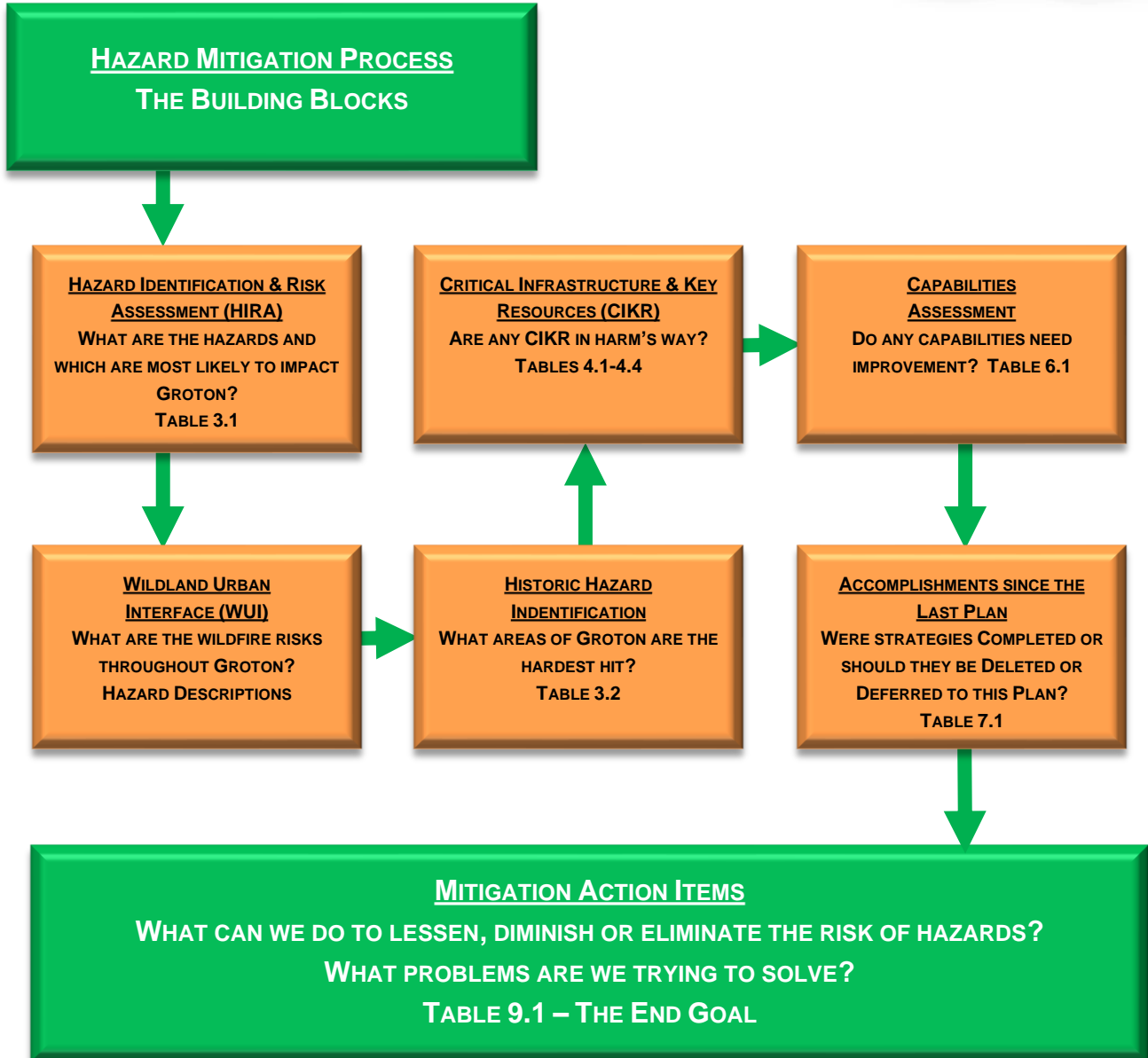
Step 11: Review the Plan before submission to HSEM for APA (Approved Pending Adoption)

Step 12: Adopt and monitor the Plan

I. HAZARD MITIGATION BUILDING BLOCKS & TABLES

The foundation for this mitigation plan was the previous plan; each completed table had its starting point with the last hazard mitigation plan completed by the Community.

Using a building block approach, each table led to the next table. The final goal was to develop prioritized action items that would lessen or diminish the impact of natural hazards on the Town when put into an action plan.



J. NARRATIVE DESCRIPTION OF THE PROCESS

Completion of this new hazard mitigation plan required significant preparation. The Plan was developed with substantial local, state, and federal coordination. All meetings were geared to accommodate brainstorming, open discussion, and increased awareness of potentially hazardous conditions in the Town.

The planning process included a complete 2020 Groton Hazard Mitigation Plan review. Using the 2020 plan as a base, each element of the old plan was examined and revised to reflect changes that had taken place in development and the priorities of the Community. Also, referring to the 2020 plan, strategies from the past were reassessed and improved upon for the future.

The following narrative explains how the 2020 Groton Hazard Mitigation Plan was used during each step of the planning process to make revisions that resulted in this Plan.

MEETING 1, OCTOBER 3, 2023

The first virtual meeting with the Groton Hazard Mitigation Team was held on October 3, 2023. Meeting attendance included Sara Smith (Town Administrator), Jamie Moulton (Hebron Fire Chief), Ron Madden (Select Board), Michael Bagan (Police Chief), Tony Albert (Select Board), Patti Oakley (Deputy Emergency Management Director), Deb Johnson (Planning Board), John Rescigno (Select Board), Bill Oakley (Emergency Management Director), Ruth Millett (Town Clerk), Olin Garneau (Planner, Mapping & Planning Solutions), and June Garneau (Planner, Mapping & Planning Solutions).

To introduce the Team to the planning process, the Planner reviewed the evolution of hazard mitigation plans, the funding, the 12-step process, the collaboration with other agencies, and the goals. The Planner also explained the need to sign in, track time, and provide public notice to encourage community involvement.⁵

Work then began on *Table 2.1, Town Statistics*. Most of the work on this table was completed at this meeting. The Planner agreed to determine the remaining items through GIS or get them later.

Next on the agenda was *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*. The Team assessed which hazards could affect the Community using the Town’s last HMP and the State of New Hampshire Multi-Hazard Mitigation Plan Update 2023.

Meeting 1 – October 3, 2023

- 1) Introduction**
 - a) Evolution of Hazard Mitigation Plans & Community Wildfire Protection Plans
 - b) Reasons for Hazard Mitigation and Update
 - c) Community involvement to solicit input on how to mitigate the effects of hazards
 - d) Devise a plan that lessens, diminishes, or eliminates the threat of Hazards to the town
- 2) The Process**
 - a) Funding
 - b) Review of 12 Step Process & the team
 - c) Collaboration with other agencies (i.e., HSEM, WMNF)
- 3) Meetings**
 - a) Community Involvement - Public Notice & Press Release
 - b) Stakeholders
 - c) Signing In, Tracking Time, Agendas & Narrative
- 4) Today’s Topics**
 - a) Table 2.1, Town Statistics
 - b) Table 3.1, Hazard Identification & Risk Analysis (HIRA)
 - c) Hazard Descriptions
 - d) Tables 4.1-4.4, Critical Infrastructure & Key Resources (CIKR)
- 5) Homework**
 - a) Homework – Critical Infrastructure & Key Resources (CIKR)
 - b) Digital Photos – contributions welcome
- 6) Future Meetings**
 - a) Tuesday, November 7, 2023, @ 4:00 PM
 - b) Tuesday, December 5, 2023, @ 4:00 PM
 - c) Tuesday, January 2, 2023, @ 4:00 PM
 - d) Tuesday, February 6, 2023, @ 4:00 PM
 - e) Tuesday, March 5, 2023, @ 4:00 PM

⁵ Documents emailed to the Team pre-meeting: agenda, process, acronyms & abbreviations, goals, work record, and 2023 state hazards

After the hazards had been identified, the Team then assessed the risk severity and probability by ranking each hazard on a scale of 1-5 (5 being very high or catastrophic) based on the following:

- The Human Impact What is the probability of death or Injury?
- The Property Impact What is the probability of physical losses and damages?
- The Business Impact What is the probability of interruption of service?
- The Probability What is the likelihood of this occurring within 25 years?

The rankings were then calculated to reveal the hazards that pose the Community's most significant risks. Eleven natural hazards and seven technological and human-caused hazards were identified. After analyzing the natural hazards in Table 3.1, Inland Flooding and Severe Winter Weather were designated "Very High" risk natural hazards for the Town.

With time running out, the Planner explained what would occur at the next meeting. The date was set for November 7, 2023, and the meeting was adjourned.

MEETING 2, NOVEMBER 7, 2023

Virtual meeting attendance included Sara Smith, Ron Madden, Michael Bagan, Tony Albert, Patti Oakley, Deb Johnson, John Rescigno, Bill Oakley, Ruth Millett, Robert Ellis (Road Agent), Fred Brooks (Highway Department), Hillary Coles (Deputy Town Clerk), Olin Garneau, and June Garneau.

The meeting began with a review of the work done at the previous meeting. First, the Planner reviewed *Table 2.1, Town Statistics*, to ensure the data was accurate. Next, the Planner reviewed *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*, to ensure the Team felt the Town's hazards were in the correct order. The Team did not make any changes to these tables.

Having completed Table 3.1 at the previous meeting, the Team was ready to work on descriptions of each hazard and how they could impact the Community.

To gain more knowledge of the impact of these hazards, the Planner asked the Team to describe each hazard as it relates to Groton. For example, some of the questions asked were:

- *How often do these hazards occur?*
- *Do the hazards damage either the roads or structures?*
- *Have the hazards resulted in the loss of life?*
- *Are the elderly, functional needs, and other vulnerable populations at risk?*
- *What has been done in the past to cope with the hazards?*
- *Was outside help requested?*
- *Are the hazards further affected by an extended power failure?*
- *What mitigation actions can we take to eliminate the hazard or diminish its impact?*

Meeting 2 – November 7, 2023

1) Last Meeting

- a) Discussed...
 - i) Planning process, purpose, funding & collaboration
 - ii) Community involvement & stakeholders
- b) Worked on...
 - i) Table 2.1, Town Statistics
 - ii) Table 3.1, Hazard Identification & Risk Assessment (HIRA)

2) Today's Topics

- a) Review...
 - i) Table 2.1, Town Statistics
 - ii) Table 3.1, Hazard Identification & Risk Assessment (HIRA)
- b) Work on...
 - i) Hazard Descriptions
 - ii) Table 3.2, Historic Hazard Identification
 - iii) Tables 4.1-4.4, Critical Infrastructure & Key Resources

3) Homework

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

4) Future Meetings

- a) Tuesday, December 5, 2023, @ 4:00 PM
- b) Tuesday, January 2, 2023, @ 4:00 PM
- c) Tuesday, February 6, 2023, @ 4:00 PM
- d) Tuesday, March 5, 2023, @ 4:00 PM

In addition to bringing more awareness to the hazards, these questions provided additional information to analyze the impact of the hazards on the Community. The Planner noted that these descriptions would be used in Chapter 5.

The Team worked on *Table 3.2, Historic Hazard Identification*, which lists past and potentially hazardous locations and events. This table had been prepopulated with information from past hazard mitigation plans, Major Disaster Declarations (DRs), and Emergency Declarations (EMs) reported by FEMA that have occurred statewide, specifically in Grafton County. The Team described the events during each disaster in Groton in each instance.

Next on the agenda were *Tables 4.1–4.4, Critical Infrastructure & Key Resources (CIKR)*. The Emergency Response Facilities (ERFs), the Non-Emergency Response Facilities (NERFs), the Facilities & Populations to Protect (FPPs), and the Potential Resources (PRs) from the 2020 plan were examined. A few minor adjustments were made for this Plan. In addition, the evacuation routes, helicopter landing zones, and bridges on the evacuation routes were discussed. Lastly, each CIKR was analyzed for its “Hazard Risk” (see Chapter 4).

With time running out, the Planner thanked the Team for their work and assigned homework to team members, requesting that the Road Agent prepare a list of road and culvert projects that should be completed within the next five years. The Planner also asked the Team to consider current plans, policies, mutual aid, and projects completed since the prior hazard mitigation plan.

MEETING 3, DECEMBER 5, 2023

Virtual meeting attendance included Sara Smith, Ron Madden, Michael Bagan, Tony Albert, Patti Oakley, John Rescigno, Bill Oakley, Ruth Millett, Robert Ellis, Dave Switaj (IT Director), Olin Garneau, and June Garneau.

First on the agenda was a review of the last meeting, including *Table 3.2, Historic Hazard Identification*. While reviewing Table 3.2, the Planner took the opportunity to explain the Wildland Urban Interface (WUI); this area is determined to be where the urban environment interfaces with the wildland environment and is the most prone area to the risk of wildfires. In Groton, it was noted that the WUI would cover the entire Town due to the abundance of forested land. Mitigation strategies were discussed to protect structures and educate citizens about wildfire risk.

The Planner then brought the Team through a review of Tables 4.1-4.4. The Planner also took some time to discuss development trends in the Town; the Team noted a few development projects, but most were smaller projects not in hazard-prone areas.

Then the Team worked on *Table 6.1, Current Plans, Policies & Mutual Aid*; like other tables, this table was also prepopulated with information from the 2020 plan. Looking closely at the existing policies from the last plan and current mechanisms that are in place, the Team determined if each plan, policy, or mutual aid system should be designated as “No Improvements Needed” or “Improvements Needed” based on the “Key to Effectiveness” found in Chapter 6.

Meeting 3 – December 5, 2023

1) Last Meeting

- a) Reviewed...
 - i) Table 2.1, Town Statistics
 - ii) Table 3.1, Hazard Identification & Risk Assessment (HIRA)
- b) Worked on...
 - i) Hazard Descriptions
 - ii) Table 3.2, Historic Hazard Identification
 - iii) Tables 4.1-4.4, Critical Infrastructure & Key Resources

2) Today's Topics

- a) Review...
 - i) Table 3.2, Historic Hazard Identification
 - ii) Tables 4.1-4.4, Critical Infrastructure & Key Resources
- b) Work on...
 - i) Table 6.1, Capabilities Assessment
 - ii) Tables 7.1, Past Hazard Mitigation Plan Assessment

3) Homework

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

4) Future Meetings

- a) Tuesday, January 2, 2023, @ 4:00 PM
- b) Tuesday, February 6, 2023, @ 4:00 PM
- c) Tuesday, March 5, 2023, @ 4:00 PM

It was explained to the Team that those items that needed improvement would become new action items for this Plan and be discussed again and re-prioritized when we got to the final table, *Table 9.1, The Mitigation Action Plan*.

Table 7.1, Accomplishments since the Last Plan, pre-populated with data from the 2020 plan, was the next agenda item. The Planner discussed each strategy to determine which had been “Completed”, should be “Deleted”, or should be “Deferred” to this Plan as a new mitigation action item. Some of the action items from the 2020 plan had been completed or partially completed by the Town. Some were deleted as they were no longer useful or considered emergency preparedness, not mitigation. Still, others were deferred for consideration as new action items for this Plan. The Planner promised to translate her notes into paragraphs to review at the next meeting.

The Planner provided a virtual handout detailing a comprehensive list of possible mitigation action items (see Chapter 8, Sections A & B, and Appendix F). The Planner also encouraged the Team members to explore the link on their agendas for the FEMA Mitigation Idea booklet to see if any of the strategies in this book would be helpful in Groton (see right).

Link to explore – FEMA Mitigation Ideas:
https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf

With time running out, the Planner adjourned the meeting and promised to write statements to support the concepts and ideas expressed for Tables 6.1 and 7.1. The next meeting was scheduled for January 9, 2024, and the meeting was adjourned.

MEETING 4 – JANUARY 9, 2024

Virtual meeting attendance included Sara Smith, Ron Madden, Michael Bagan, Tony Albert, John Rescigno, Ruth Millett, Robert Ellis, Olin Garneau, and June Garneau.

First, the Team reviewed Table 6.1 to ensure that the comments and ideas expressed by the Team were fully represented. Work on this table resulted in new action items for this Plan, some of which are also in Table 7.1.

Next, the Planner walked the Team through a complete review of Table 7.1. Having translated notes from the last meeting into paragraphs, the Planner reviewed each item in Table 7.1 to see if the concepts and ideas of the Team remained intact and to verify the accuracy of the information. A few changes were made with this review, leaving additional items from Table 7.1 deferred to become new mitigation action items for this Plan. Although several strategies from the last plan were determined to be emergency preparedness and not mitigation, the Team kept them as reminders to complete these important action items.

Meeting 4 – January 9, 2024

- 1) Last Meeting**
 - a) Reviewed...
 - i) Table 3.2, Historic Hazard Identification
 - ii) Tables 4.1-4.4, Critical Infrastructure & Key Resources
 - b) Worked on...
 - i) Table 6.1, Capabilities Assessment
 - ii) Tables 7.1, Past Hazard Mitigation Plan Assessment
- 2) Today's Topics**
 - a) Review...
 - i) Table 6.1, Capabilities Assessment
 - ii) Tables 7.1, Past Hazard Mitigation Plan Assessment
 - b) Work on...
 - i) Table 9.1, Mitigation Action Plan
 - ii) STAPLEE
- 3) Homework**
 - a) Review materials sent by MAPS
 - b) Digital Photos – contributions welcome
- 4) Future Meetings**
 - a) Tuesday, February 6, 2024, @ 4:00 PM
 - b) Tuesday, March 5, 2024, @ 4:00 PM

The Planner also reviewed work done at previous meetings. The recap included a brief look at each of the following completed tables:

- *Table 2.1, Town Statistics*
- *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*
- *Table 3.2, Historic Hazard Identification*
- *Tables 4.1-4.4, Critical Infrastructure & Key Resources*

This review helped the Team understand how these tables served as a building block for the final two tables, *Table 8.1, Potential Mitigation Strategies & the STAPLEE*, and *Table 9.1, The Mitigation Action Plan*. The STAPLEE method analyzes a project's **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental characteristics and helps evaluate the efficacy of the action item.

In addition to the action items identified in Tables 6.1 and 7.1, the Team reviewed additional potential action items, including a comprehensive list of mitigation strategies derived from several sources and the Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards January 2013. (See Chapter 8, Sections A & B, and Appendix F).

The Team then worked on *Table 8.1, Potential Mitigation Action Items & the STAPLEE*, and *Table 9.1, The Mitigation Action Plan*. The Planner explained that these tables were combined for the meeting and would become separate tables in the final plan. Having pre-populated the tables with the action items that had been deferred from Tables 6.1 and 7.1, the Team looked carefully at each action item to assign responsibility, the time frame for completion, the type of funding that would be required, and the estimated cost of the action (see Chapter 9, Section B).

Work on this table included the STAPLEE process, as shown in Chapter 8. Using handouts provided by the Planner, the Team could go through the STAPLEE process for the identified action items. The STAPLEE analysis would then become *Table 8.1, Potential Mitigation Action Items & the STAPLEE*. Most importantly, the STAPLEE process enabled the Team to consider the cost-benefit of each action item.

With Tables 8.1 and 9.1 complete, all that remained for the next meeting was the ranking and prioritizing of each action item. The Planner displayed one last document that explained the ranking and prioritizing methodology (Chapter 9, Section A).

The next meeting was scheduled for March 5, 2024.

MEETING 5 – MARCH 5, 2024

Virtual meeting attendance included Sara Smith, Ron Madden, Michael Bagan, Tony Albert, John Rescigno, Robert Ellis, Hillary Coles, Angel Ekstrom (Central NH Regional Public Health Network), Olin Garneau, and June Garneau.

After considering each strategy forwarded from Tables 6.1 & 7.1, the Team considered additional mitigation items, some the Planner had suggested from other plans and some provided by the Team at an earlier meeting. After much discussion and a careful review, the Team ultimately settled on nineteen “Mitigation Action Items” that they felt were achievable and could help diminish the impact of natural hazards in the future.

Upon determining the mitigation action items and completing the STAPLEE process, the Team was now ready to rank and prioritize the identified action items. Before the meeting, the Planner had pre-ranked the action items based on the time frame, the Town's authority to accomplish the strategy, the type of strategy, and the STAPLEE score. The action items were placed in four categories, as shown in Chapter 9, Section A, and assigned a priority within each category. For example, if seven action items were ranked in the A category, the priority ranks were A-1 to A-7. The pre-ranked action items were shown to the Team using a digital presentation to enable the Team to see the action items, determine any changes needed, and adjust the rank. In this fashion, the Team determined which action items were the most important within their rank and in which order they would be accomplished.

With the completion of Tables 8.1 and 9.1, the Team's work was complete, except for the final review and adoption. No additional meetings were scheduled. The Planner agreed to prepare the draft plan and email a copy for review. The Planner explained the process from this point forward and thanked the Team for their hard work.

Meeting 5 – March 5, 2024

1) Last Meeting

- a) Reviewed...
 - i) Table 6.1, Capabilities Assessment
 - ii) Tables 7.1, Past Hazard Mitigation Plan Assessment
- b) Worked on...
 - i) Table 9.1, Mitigation Action Plan
 - ii) STAPLEE

2) Today's Topics

- a) Review...
 - i) Table 9.1, Mitigation Action Plan
 - ii) STAPLEE
- b) Work on...
 - i) Ranking & Priority

3) Homework

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

4) Future Meetings

- a) _____

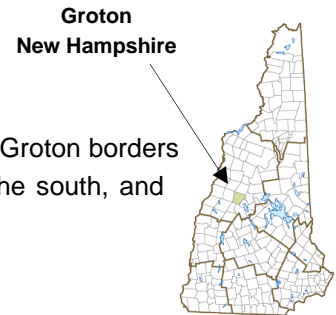
Documentation for the planning process, including public involvement, is required to meet DMA 2000 (44CFR§201 (c) (1) and §201.6 (c) (1)). The Plan must include a description of the planning process used to develop the Plan, including how it was prepared, who was involved in the process, and how other agencies participated. A description of the planning process should include how the planning team or committee was formed, how input was sought from individuals or other agencies who did not participate on a regular basis, what the goals and objectives of the planning process were, and how the Plan was prepared. The description can be in the Plan itself or contained in the cover memo or an appendix.

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Chapter 2: Community Profile

A. INTRODUCTION

Groton is a beautiful community in Grafton County near the center of New Hampshire. Groton borders Rumney to the north, Plymouth and Hebron to the east, Alexandria and Orange to the south, and Dorchester to the west. Groton is in the Dartmouth-Sunapee Tourism Region.



TOWN GOVERNMENT

A three-member Select Board governs the Town of Groton. The Town's departments include but are not limited to Police, Highway, Planning, Zoning, and Conservation. Groton has several businesses, including TLC Tree & Crane Service, Gordon Coursey & Sons LLC, Maxam, and Groton Wind LLC, each with 5-6 employees.

DEMOGRAPHICS & HOUSING

Groton's population has increased from 318 in 1990 to 570 in 2020, showing an increase of 252, according to the US Census 2020.⁶ This data represents a growth rate of approximately 78.93%.

There are an estimated 406 housing units, most of which are occupied (204), while vacant housing units total 202, thus confirming the presence of second homes. The estimated median household income is \$68,611, and the median age is 51.4 years.⁷

EDUCATION & CHILD CARE

Groton students are tuitioned to Newfound Area School District with Alexandria, Bristol, Danbury, Hebron, Bridgewater, and New Hampton. There are no colleges or universities in Groton, nor are there any licensed childcare facilities.

NATURAL FEATURES

The Town of Groton covers approximately 40.7 square miles of land area and 0.1 square miles of inland water. The hills and valleys of central New Hampshire dominate the Community. The highest peak is Tenney Mountain, 2,350' above sea level. The lowest elevation in town is about 636' above sea level at the bottom of Old Groton Road. Vegetation is typical of northern New England, including deciduous and conifer forests, open fields, swamp and riverine areas.

Incorporated: 1761

Origin: This area was named Cockermouth in 1761, after Charles Wyndham, Baron Cockermouth and Earl of Egremont, who succeeded William Pitt as Secretary of State. Few grantees took up their claims, and the land was regranted in 1766. These settlers also did not meet prescribed terms, but in 1772 Governor Wentworth renewed the charter for three years. In 1796, the town voted to change the name to Groton, and successfully petitioned the legislature to legally change the name. The name was suggested by Samuel Blood, for his hometown in Old Groton, which became a Massachusetts town when the boundary between the states was drawn in 1741.

Villages and Place Names: North Groton

Population, Year of the First Census Taken: 373 residents in 1790

Population Trends: Population change for Groton totaled 491 over 57 years, from 99 in 1960 to 590 in 2017. The largest decennial percent change was a 113 percent increase between 1970 and 1980, more than doubling the population over those ten years. The 2017 Census estimate for Groton was 590 residents, which ranked 213th among New Hampshire's incorporated cities and towns.

Population Density and Land Area, 2017 (US Census Bureau): 14.5 persons per square mile of land area. Groton contains 40.7 square miles of land area and 0.1 square miles of inland water area

Source: Economic & Labor Market Information Bureau, NH Employment Security, June 2024; Received 6/05/2023

⁶ US Census 2020

⁷ American Community Survey (ACS 2022) 5-Year Estimate Data

TRANSPORTATION

No major interstates run through Groton; however, minor roadways include North Groton road, Halls Brook Road, Groton Hollow Road, Sculptured Rock Road, River Road, and Stage Coach Road. The Town is accessed by smaller and less traveled roadways that span out through the Town. Groton is very hilly, which could lead to hazardous conditions anywhere in the Town.

B. EMERGENCY SERVICES

EMERGENCY OPERATIONS CENTER & EMERGENCY MANAGEMENT DIRECTOR

The Town of Groton has a designated Emergency Management Director (EMD). The EMD maintains an Emergency Operations Center (EOC) as part of the Town's emergency preparedness program. The EOC is where the EMD, department heads, government officials, and volunteer agencies gather to coordinate their response to a significant emergency or disaster. In Groton, the designated EOC is the Town House.

FIRE DEPARTMENT & EMS

Groton has no fire department; Hebron and Rumney Fire Departments routinely handle all fire and emergency medical services (EMS).

POLICE DEPARTMENT

Groton has a small police department and has recently hired a new Police Chief. The Grafton County Sheriff's Office and the NH State Police supply coverage for the Town when the Groton Police Department is off duty.

PUBLIC WORKS

The Groton Highway Department operates year-round, 24 hours daily, as needed. The department staffs a full-time Road Agent and four part-time employees. The department's mission is to support the citizens of Groton through the safe operation, proper maintenance, and future development of highways, supporting infrastructure and utilities cost-consciously without sacrificing quality. The department belongs to the NH Public Works Mutual Aid Association.

MEDICAL FACILITIES

Groton's closest medical facility is Speare Memorial Hospital in Plymouth (13 miles). If the need arises, an alternative medical facility is Dartmouth-Hitchcock Medical Center in Lebanon (32 miles).

EMERGENCY SHELTER(S)

The primary shelter is where evacuees are directed during an emergency. Groton's designated primary shelter is the Town House, which offers a large sleeping area, restrooms, and kitchen facilities. It has a permanent generator to keep the building operational during power outages. Other potential shelters for the Town include the Hebron Church, Circle Camp, and the Hebron Fire Department.

C. GROTON'S CURRENT & FUTURE DEVELOPMENT TRENDS

Nearly every New Hampshire community experienced a significant drop in new home construction after the Great Recession of 2008. Subsequently, the COVID-19 pandemic, beginning in 2020, caused several changes in New England. One of the most significant changes was occasionally used homes modified as permanent residents for those wishing to flee the cities. Lot line adjustments and minor subdivisions were also quite common. Then, real estate boomed, at least during 2021 and through most of 2022, only to settle to more moderate levels by the fall. 2023 and 2024 have seen a robust real estate market; however, single-family home inventory has dropped while prices continue to rise.

In Groton, development has remained steady and well-regulated since the pandemic's beginning. A few subdivisions are underway, with many lots already sold. Most smaller subdivisions, about 80-90%, are on private roads. Numerous lot line adjustments and small mergers have occurred, especially in 2023. The majority of construction is for single-family homes. The Green Acres lot line adjustment has resulted in six potential lots. Some properties have been converted into seasonal homes. There's very little housing inventory available for sale.

The Team noted that no new subdivisions or public buildings have affected the Town's hazard vulnerability since the last hazard mitigation plan. However, a new Town Garage is planned near the Town House in a safe area, which could also facilitate installing a dry hydrant for water resources. The Planning Board noted in the 2023 Town Report that five building permits were issued, a few lot line adjustments, an extension to the MIT Outing Club, and a subdivision on Route 118 were approved.

The Groton Planning Board's process for all subdivision, site plan, and excavation applications is extensive and, when necessary, involves on-site examinations and the expertise of other departments and commissions as appropriate. Groton's regulations are designed to meet state regulations and maintain the Community's local character. Regulations address wetland areas, stormwater flow, and fire protection and require all large subdivisions and commercial enterprises to address water availability. New development approval requires live hydrants, cisterns, sprinklers, or other fire mitigation provisions as appropriate. All development that has occurred or is proposed in hazard-prone areas has been closely monitored and mitigated to reduce the Town's hazard vulnerability.

The Town recognizes the importance of growth and understands the impact of hazards on new facilities and homes if built within the Community's hazard-prone areas. The Planning Board and the Select Board will monitor and guide growth and development using the Master Plan, Subdivision Regulations, the Site Plan Review process, and the Zoning Ordinance. Building permits are required.

As a very small community, the Planning Board, the Select Board, and other town officials are almost always aware of construction that is taking place. The Planning Board will follow town regulations to ensure that any construction in hazardous areas will be built to minimize vulnerability to the hazards identified in this Plan.

From the 2023 Groton Town Report, Planning Board Report, page 64

"Those of you who regularly travel Halls Brook RD have probably noticed surveyors tape marking new land sales, a subdivision and recent driveway constructions. Of six (6) lots, one has already sold and the others will be placed on the market for sale sometime in the future. Additionally, 100 plus acres remain open for future development, the tract of land created from a Lot adjustment and transfer.

In addition, the recent sale of two of the largest tracts in Groton, the 1139-acre Jewell Hill Forest property and the 1339 acres referred to as the Sculptured Rocks Forest, leave significant undeveloped property open for forestry or housing. In other areas of town, new construction is evident by the building permits the Planning Board must review pursuant to RSA 674:41, the state law controlling erection of buildings on private roads.

Finally, there have been many non-binding inquiries and deliberations on the purchase and use of smaller properties.

Yes, Groton is changing and growing".

TABLE 2.1: TOWN STATISTICS

Table 2.1 - Town Statistics				
Census Population Data	2020	2010	2000	1990
Groton, NH - Census Population Data	569	593	458	318
Grafton County	91,126	89,118	81,826	74,998
30-year Growth Rate	78.93%	Growth Rate = 2020POP-1990POP/1990POP		
Elderly Population-% over 65 (2022 ACS 5-Year)	27.9%			
Median Age (2022 ACS 5-Year)	51.4			
Median Household Income (2022 ACS 5-Year)	\$68,611			
Poverty Rate (2022 ACS 5-Year)	10.2%			
Change in Population-Seasonal & Weekend (%)	30%			
Housing Statistics (2022 ACS 5-Year)				
Total Housing Units	406			
Occupied Housing Units	204			
Vacant Housing Units	202			
Assessed Building Values				
Types buildings	Value	1% Damage	5% Damage	
Residential	\$59,290,300	\$592,903	\$2,964,515	
Manufactured Housing	\$4,857,900	\$48,579	\$242,895	
Commercial	\$721,900	\$7,219	\$36,095	
Discretionary Preservation Easement	\$0	\$0	\$0	
Tax Exempt	\$1,366,100	\$13,661	\$68,305	
Utilities	\$12,182,760	\$121,828	\$609,138	
Totals	\$78,418,960	\$784,190	\$3,920,948	
The above chart shows the 2023-MS1 structure values. These values estimate structure loss due to natural hazards (see Chapter 5) based on a loss of 0-1% or 1-5% of structures in the Community—source: The Town of Groton.				
Regional Coordination				
County	Grafton			
Tourism Region	Dartmouth-Lake Sunapee			
Municipal Services & Government				
Town Hall or Town Office	Town House			
Town Manager or Administrator	No			
Select Board (3-member)	Yes, elected			
Planning Board	Yes, elected			
School Board	Yes, elected			
Zoning Board of Adjustment	Yes, elected			
Conservation Commission	Yes, appointed			
Master Plan	Yes, December 27, 2017			
Emergency Operation Plan (EOP)	Yes, 2010			
Hazard Mitigation Plan (HMP)	Yes, February 28, 2020			

Table 2.1 - Town Statistics	
<i>Zoning Ordinances</i>	Yes, March 14, 2023
<i>Subdivisions Regulations</i>	Yes, July 9, 2014 (updating by 12/31/2023)
<i>Site Plan Review Regulations</i>	Yes, August 30, 2023
<i>Capital Improvement Plan (CIP)</i>	No
<i>Capital Reserve Funds (CRF)</i>	Yes, reviewed annually
<i>Building Permits Required</i>	Yes
<i>Adopted IBC & IRC</i>	No
<i>Town Web Site</i>	Yes, www.grotonnh.org
<i>Floodplain Development Regulation</i>	Yes, stand-alone
<i>National Flood Insurance Program (NFIP) Member</i>	Yes, April 18, 1983
<i>Flood Insurance Rate Maps (DFIRMs)</i>	February 20, 2008
<i>Flood Insurance Rate Study (FIS)</i>	February 20, 2008
Percent of Local Assessed Valuation by Property Type - 2022 (NH Department of Revenue)	
<i>Residential Buildings</i>	85.2%
<i>Commercial Land & Buildings</i>	0.8%
<i>Other (including Utilities)</i>	14.0%
Emergency Services	
<i>Town Emergency Warning Systems</i>	Genasys
<i>School Emergency Warning System</i>	Infinite Campus
<i>Emergency Page</i>	Yes
<i>Facebook Pages</i>	Groton - NH Events & Groton, NH Community Page
<i>Other Social Media</i>	None
<i>ListServ</i>	No
<i>Local Newspapers</i>	Penny Saver, Record Enterprise, Newfound Lake Life & Laconia Citizen
<i>Public Access TV</i>	No
<i>Local TV Stations</i>	WMUR Channel 9
<i>Local Radio Stations</i>	NHPR 97.3 FM (Plymouth) & The Hawk 104.9 FM (Belmont)
<i>Police Department</i>	Yes, part-time Chief
<i>Police Dispatch</i>	Plymouth Dispatch
<i>Police Mutual Aid</i>	NH State Police - Troop F, Grafton County Sheriff's Office & surrounding town's police departments
<i>Animal Control Officer</i>	No, the Police Department handles
<i>Fire Department</i>	No, Hebron & Rumney handles
<i>Fire Dispatch</i>	N/A
<i>Fire Mutual Aid</i>	N/A
<i>Fire Stations</i>	None
<i>Fire Warden</i>	Yes
<i>Emergency Medical Services (EMS)</i>	No, Hebron & Rumney handles
<i>EMS Dispatch</i>	N/A
<i>Emergency Medical Transportation</i>	No, Hebron (primary) & Rumney

Table 2.1 - Town Statistics	
<i>HazMat Team</i>	Central NH HazMat Team through dispatch
<i>Established Emergency Management Director (EMD)</i>	Yes
<i>Established Deputy EMD</i>	Yes
<i>Line of Succession (if EMD is unavailable)</i>	1st...Select Board Chair
	2nd...Highway Department or Select Board
<i>Public Health Network</i>	Central NH Regional Public Health Network
<i>Health Officer</i>	Yes
<i>Deputy Health Officer</i>	Yes
<i>Building Inspector</i>	Select Board
<i>Established Public Information Officer (PIO)</i>	Select Board
<i>Nearest Hospitals</i>	Speare Memorial Hospital, Plymouth (13 miles)
	Dartmouth-Hitchcock, Lebanon (32 miles)
<i>Primary EOC</i>	Town House (generator)
<i>Secondary EOC</i>	EMD's home or vehicle
<i>Primary Shelter</i>	Town House (generator)
<i>Potential Shelters</i>	Hebron Church, Circle Camp (generator) & Hebron Fire Department (generator)
<i>Household Pet Shelter</i>	Old Hebron Fire Station
<i>Large Animal & Livestock Shelter</i>	Not determined
<i>Local Humane Society & Veterinarians</i>	Enfield Humane Society, Laconia Humane Society & veterinarians in Plymouth, Bristol, Ashland & Rumney
Utilities	
<i>Town Sewer</i>	Private septic
<i>Highway Department</i>	Yes, full-time Road Agent, four part-time employees
<i>Miles of Class V Roads</i>	9.07 paved, 4.64 gravel, 13.7 total miles
<i>NH Public Works Mutual Aid</i>	Yes
<i>Water Supply</i>	Private wells
<i>Wastewater Treatment Plant</i>	No
<i>Electric Supplier</i>	NH Electric Coop
<i>Natural Gas Supplier</i>	None
<i>Cellular Telephone Access</i>	Limited
<i>Solar Arrays</i>	No
<i>Pipelines</i>	No
<i>Gas lines</i>	No
<i>High-Speed Internet</i>	Limited
<i>Telephone Company</i>	Consolidated Communications & Spectrum

Table 2.1 - Town Statistics	
Transportation	
<i>Primary Evacuation Routes</i>	North Groton Road, Halls Brook Road, Groton Hollow Road, Sculpture Rock Road, River Road & Stage Coach Road
<i>Secondary Evacuation Routes</i>	None
<i>Nearest Interstate</i>	I-93, Exit 26 (13 miles)
<i>Nearest Airstrip</i>	Plymouth Regional (2,380 ft. turf runway)
<i>Nearest Commercial Airport(s)</i>	Lebanon Municipal Airport, Lebanon (40 miles)
	Manchester-Boston Regional Airport, Manchester (71 miles)
	Portland International Jetport, Portland, ME (98 miles)
	Logan International Airport, Boston, MA (117 miles)
	Burlington International Airport, Burlington, VT (127 miles)
<i>Public Transportation</i>	No
<i>Railroad</i>	No
Education & Childcare	
<i>Elementary/Middle/High Schools</i>	Groton students are tuitioned to the Newfound Area School District with Alexandria, Bristol, Danbury, Hebron, Bridgewater & New Hampton.
<i>School Administrative Unit (SAU)</i>	SAU 4
<i>Private Schools</i>	None
<i>Colleges/Universities</i>	None
<i>Licensed Childcare Facilities</i>	None
<i>Elderly/Senior Facilities</i>	None
Fire Statistics (NH Division of Forests & Lands, Fire Warden Report, and the Town)	
<i>Wildfire Fires (2022 & 2023)</i>	None
<i>Grafton County Fire Statistics (2022)</i>	13 fires, 5.68 acres
<i>State Forest Fires Statistics (2022)</i>	59 fires, 202.95 acres
<p><i>Unless otherwise noted, information in Table 2.1 was derived from the Town, the US Census 2020, and the Economic & Labor Market Information Bureau, NH Employment Security, June 2024. Community Response Received 6/05/2023, https://www.nhes.nh.gov/elmi/products/cp/profiles-pdf/grafon.pdf.</i></p>	

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Chapter 3: Hazard Identification, Risk Assessment & Probability

A. HAZARD IDENTIFICATION

The first step in hazard mitigation is to identify hazards. The Team determined that eleven natural hazards can potentially affect the Community. *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*, estimates the level of impact that each listed hazard could have on humans, property, and business and averages them to establish an index of severity. The probability estimate for each hazard is multiplied by its severity to establish an overall relative threat factor.

Some hazards in Table 3.1 include subcategories of hazards. For instance, Severe Winter Weather includes snowstorms, ice storms, blizzards, and nor'easters. In such instances⁸, the analysis included a discussion of the subcategories. However, ultimately, the final analysis was based on the category in general, as shown in Table 3.1.

The NH State Hazard Mitigation Plan includes many of the same potential hazards identified in Groton. However, several of the State's hazards were excluded from this Plan - these hazards scored a zero during the HIRA process and were excluded from Table 3.1 on page 35. The reasons for exclusion are further explained below.

<u>State Hazard</u>	<u>Reason for exclusion from this Plan</u>
*Coastal Flooding	Distance away from the sea
*Landslides	No known areas subject to landslide or erosion in the Town
*Solar Storms & Space Weather	The Team felt this was not something the Town could manage
*Avalanche	No known areas of avalanches
Radiological	Distance away from radiological sites
Known & Emerging Contaminants	Homeowners would handle mitigation
Conflagration	No known areas for a conflagration event

Specific hazards that have affected the Town, the region, and the State in the past are detailed in *Table 3.2, Historic Hazard Identification*, and Chapter 5. ^{*}=*Natural Hazards as identified in this Plan*.

B. RISK ASSESSMENT

The hazards listed in Table 3.1 were classified based on the "Relative Threat" score as calculated in Column F; these were then separated into three categories using Jenks Optimization, also known as the natural breaks classification⁹. The "Relative Threat" score was then labeled into three categories, *High Risk, Medium Risk, and Low Risk*, as shown in Table 3.1, Column G; these categories are also indicated in Chapter 5, Sections B-D. The Plan demonstrates each hazard's likelihood of occurrence and its potential effect on the Town. This process illustrates a comprehensive hazard statement and helps the Town understand which hazards should receive the most attention.

In addition to the relative threat analysis in Table 3.1, the Team used *Tables 4-1-4.4, Critical Infrastructure & Key Resources (CIKR)*, to identify and analyze the potential hazard risk based on a scale of 1-3 for each CIKR.

⁸ Inland Flooding (Riverine, 100-year, local road flooding, ice jams, dam failure); Extreme Temperatures (hot & cold); High Wind Events (Tornadoes & Downbursts); Infectious Diseases (too many to list)

⁹ The natural breaks classification process is a method of manual data classification partitions data into classes based upon natural groups within the data distribution; ESRI, <https://pro.arcgis.com/en/pro-app/latest/help/mapping/layer-properties/data-classification-methods.htm>

C. PROBABILITY

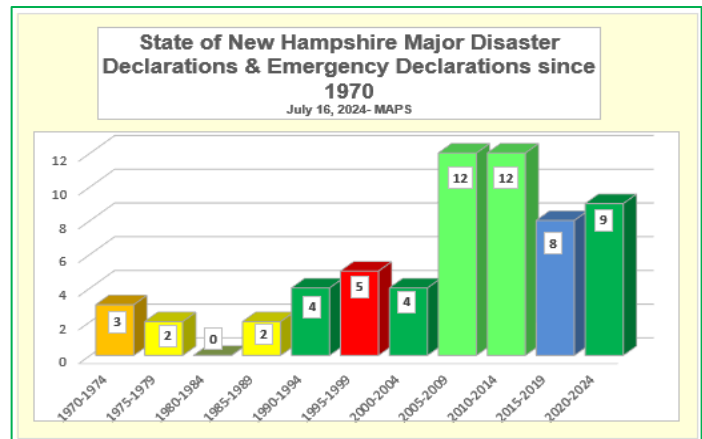
The determination of the probability of occurrence is contained within Column D in Table 3.1, which assesses hazards based on the likelihood that the hazards will occur within 25 years. The probability scores indicate whether the identified hazard has a *Very Low, Low, Moderate, High, or Very High* probability. Probability categories are also indicated in Chapter 5, Sections B-D.

Groton is reasonably safe from natural, technological, and human-caused hazards. However, due to Groton’s geographic location, forested lands, hills, heavy snowpack, and topography, there is always a probability that future hazards will occur.

HAZARD PROBABILITY & CLIMATE CHANGE

Although not identified as a natural hazard in this Plan, no plan can be considered complete without discussing climate change’s impact on weather patterns. *“Climate change increases the frequency, duration and intensity of natural hazards, such as wildfires, extreme heat, drought, storms, heavy precipitation and sea level rise. Communities are feeling the impacts of a changing climate now.”*, FEMA stated in its State Mitigation Plan Mitigation Policy Guide¹⁰. FEMA recognizes climate change by including climate change in this guide for state planners.

The chart to the right shows the increased frequency of Major Disaster Declarations (DR) and Emergency Declarations (EM) in New Hampshire, possibly indicating the impact of climate change.¹¹ The decade beginning in 2020 includes nine disaster declarations: DR-4516 and EM-3445, DR-4622, DR-4624, DR-4693, DR-4740, DR-4761, DR-4771 and DR-4799.



Communities in New Hampshire, such as Groton, should become increasingly aware of climate change’s impact on the hazards already experienced and anticipate an increase in probability in the future.

HAZARD PROBABILITY COMBINED WITH LONG-TERM UTILITY OUTAGE

Any potential disaster in Groton is particularly impactful if combined with a long-term utility outage, as would most likely be true with severe winter storms, blizzards, ice storms, hurricanes, tropical storms, and windstorms. An outage could result in frozen pipes and a lack of water and heat during the winter, a concern for the Town’s elderly and vulnerable citizens. The food supply of individual citizens could become quickly depleted should a power failure last for a week or more. When combined with a long-term utility outage, any hazard’s effects could have a higher probability of damaging impacts on the Community.

¹⁰ State Mitigation Planning Policy Guide, FEMA, Released April 19, 2022, page 6
¹¹ Derived from FEMA’s record of disasters; categorized by decade since 1970 by the Planner

TABLE 3.1: HAZARD IDENTIFICATION & RISK ASSESSMENT (HIRA)

Table 3.1 - Hazard Identification & Risk Assessment (HIRA)							
Scoring for Probability	Column A	Column B	Column C	Column D	Column E	Column F	Risk
1=Very Low (0-20%)	Probability				Severity	Relative Threat	Very High 12.0 & Up
2=Low (21-40%)	Human Impact	Property Impact	Business Impact	Occurrence within 25 years	Average of Human, Property & Business Impact (A+B+C)/3	Risk Severity x Occurrence D x E	High 9.0-11.9
3=Moderate (41-60%)							Medium 6.0-8.9
4=High (61-80%)							Low 3.0-5.9
5=Very High (81-100%)							Very Low 0.0-2.9
Natural Hazards							
1) Inland Flooding	2.00	4.00	3.00	5.00	3.00	15.00	Very High
2) Severe Winter Weather	3.00	3.00	3.00	4.00	3.00	12.00	Very High
3) High Wind Events	2.00	3.00	3.00	4.00	2.67	10.67	High
4) Extreme Temperatures	3.00	3.00	1.00	4.00	2.33	9.33	High
5) Lightning	2.00	2.00	2.00	4.00	2.00	8.00	Medium
6) Wildfire	2.00	2.00	2.00	3.00	2.00	6.00	Medium
7) Dam Failure	3.00	3.00	2.00	2.00	2.67	5.33	Low
8) Drought	1.00	2.00	2.00	3.00	1.67	5.00	Low
9) Infectious Disease	2.00	1.00	2.00	3.00	1.67	5.00	Low
10) Tropical/Post Tropical Cyclones	2.00	2.00	3.00	2.00	2.33	4.67	Low
11) Earthquake	1.00	2.00	2.00	1.00	1.67	1.67	Very Low
Technological & Human-Caused Hazards							
1) Aging Infrastructure	2.00	4.00	2.00	5.00	2.67	13.33	Very High
2) Long-Term Utility Outage	2.00	2.00	3.00	4.00	2.33	9.33	High
3) Hazardous Materials	2.00	3.00	2.00	1.00	2.33	2.33	Very Low
4) Mass Casualty Incidents	3.00	3.00	3.00	4.00	3.00	12.00	Very High
5) Transport Accidents	2.00	2.00	3.00	4.00	2.33	9.33	High
6) Cyber Events	4.00	2.00	3.00	3.00	3.00	9.00	High
7) Terrorism & Violence	4.00	4.00	4.00	2.00	4.00	8.00	Medium

D. NATIONAL FLOOD INSURANCE PROGRAM (NFIP) STATUS

Groton has been a National Flood Insurance Program member since April 18, 1983. Groton has over 26,000 acres of total land, just under 64 acres of surface water, and approximately 159 acres of land in the 100-year floodplain. The floodplain area is primarily in the southeast corner of the Town where the Cockermouth River, Hardy Brook, and waters from Spectacle Pond meet; there is also a small 50-year flood zone within the same area. The latest D-Firm for Groton is dated February 20, 2008; the last Flood Insurance Study (FIS) was completed on February 20, 2008. The Team noted that updated flood maps for the Cockermouth area had been done in 2010. The latest DFIRM and FIS are incorporated by reference when amended in the Floodplain Development Regulation.

According to FEMA, four NFIP policies are in effect in Groton, including three single-family and one other residential policy. There have been zero paid losses for a total of \$0.00. FEMA also reports no repetitive losses in Groton.¹²

FLOODPLAIN DEVELOPMENT REGULATION

The Town of Groton developed and adopted the Groton Flood Plain Development Regulation in February 2007. The Flood Plain Development Regulation is a stand-alone document.¹³

The Town of Groton Flood Plain Development Regulation details the requirements for building in the floodplain and states:

“Purpose...Certain areas of the Town of Groton, New Hampshire are subject to periodic flooding, causing serious damage to properties within these areas. Relief is available in the form of flood insurance as authorized by the National Flood Insurance Act of 1968. Therefore, the Town of Groton, New Hampshire has chosen to become a participating community in the National flood Insurance Program, and agrees to comply with the requirements of the National Flood Insurance Act of 1968 (P.L. 90-488, as amended) as detail in this Floodplain Development Regulation. This Regulation establishes a permit system and review procedure for development activities in the designate flood hazards areas of the Town of Groton, New Hampshire.”

The regulations further state that **“Enforcement...It shall be the duty of the Board of Selectmen (or their designee) to enforce and administer the provisions of this Ordinance in accordance with RSA 676.”**

Other sections of the Groton floodplain regulations are summarized below.

Item I. Definition of Terms: Provides definitions for terms used in the Flood Plain Development Regulation

¹² FEMA Region I, Flood Management & Insurance Branch; received by MAPS on October 16, 2024

¹³<http://www.grotonnh.org/planningboard/2007%20Flood%20Plain%20Regulations.pdf>



In 1968, although well-intentioned government flood initiatives were already in place, Congress established the National Flood Insurance Program (NFIP) to address both the need for flood insurance and the need to lessen the devastating consequences of flooding. The goals of the program are twofold: to protect communities from potential flood damage through floodplain management, and to provide people with flood insurance.

For decades, the NFIP has been offering flood insurance to homeowners, renters and business owners, with the one condition that their communities adopt and enforce measures to help reduce the consequences of flooding.

Source: http://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp

Severe Repetitive Loss (SRL) Properties-- NFIP-insured buildings that, on the basis of paid flood losses since 1978, meet either of the loss criteria described on page SRL 1. SRL properties with policy effective dates of January 1, 2007, and later will be afforded coverage (new business or renewal) only through the NFIP Servicing Agent’s Special Direct Facility so that they can be considered for possible mitigation activities.

Source: <http://www.fema.gov/national-flood-insurance-program/definitions#R>

Item II. Permit Required: States that all proposed development in special flood hazard areas shall require a permit

Item III. Permit Review, Standard: Specifies the design and construction standards for new construction or substantial improvements in special flood hazard areas

Item IV. Water and Sewer Systems: Requires that water and sewer systems in special flood hazard areas be designed to minimize or eliminate infiltration and contamination

Item V. New or Substantially Improved Structures: Requires that new or substantially improved structures in Zones A or AE provide elevation and floodproofing information and certification

Item VI. Certification Required: Requires that the applicant certify that all necessary permits have been obtained from federal or state agencies

Item VII. Alteration/Relocation of Watercourse: Details the regulations for alteration or relocation of watercourses and riverine situations, including flood-carrying capacity, encroachments, and floodway data

Item VIII. Determination of 100-Year Flood Elevation/Standards: Details the regulations for determining the flood zone and the elevation and anchoring standards for structures, manufactured homes, and recreational vehicles

Item IX. Variances and Appeals: Details the process and criteria for appealing or requesting a variance from the regulations, including the notification and reporting requirements

The Town uses the Floodplain Development Regulation to guide development and ensure compliance and enforcement of NFIP standards. The Planning Board (initiator) and the Select Board (enforcer) adhere to the rules, regulations, and requirements outlined in the ordinance. The Groton Flood Plain Development Regulation can be found on the Town's website.¹⁴

Groton's Select Board, the Floodplain Administrator, determines substantial improvement and damage. These determinations are made for all development in a special flood hazard area that proposes to improve an existing structure, including alterations, movement, enlargement, replacement, repair, additions, rehabilitations, renovations, repairs of damage from any origin (such as, but not limited to flood, fire, wind, or snow) and any other improvement of or work on such structure including within its existing footprint.

¹⁴ <http://www.grotonnh.org/planningboard/2007%20Flood%20Plain%20Regulations.pdf>

The Floodplain Administrator, in coordination with any other applicable community official(s), shall be responsible for the following:

- Determine if a substantial damage (SD) determination needs to be made and communicate SD and permit requirements to property owners.
- Verify the cost of repairs to the structure.
- Verify the market value of the structure.
- Make the SD determination and issue it to the property owner.
- Permit development/ensure compliance with community ordinance.
- Inspect development and maintain as-built compliance documentation post-construction.

The Team understands that the benefits of the NFIP also extend to structures not in the 100-year floodplain and felt it worthwhile to have NFIP brochures and information available at the Town House for current homeowners and potential developers. Several flood-related mitigation strategies have been added to this Plan. The Town will continue to work with the Bureau of Economic Affairs and carefully monitor its compliance with the NFIP.

Table 3.1, Table 3.2 and Chapter 5, Section B provide more information on past and potential hazards in Groton.



Damage to home on Sculptured Rocks Road, July 2019

Photo Credit: Snip from

<https://www.wmur.com/article/groton-homeowners-dealing-with-devastating-flood-damage/28391500>

TABLE 3.2: HISTORIC HAZARD IDENTIFICATION

Key for Table 3.2

2020 HMPT 2020 Hazard Mitigation Planning Team
 2024 HMPT 2024 Hazard Mitigation Planning Team
 DR Major Disaster Declarations (DR) since 1953
 EM Emergency Declarations (EM) since 1953
 FM Fire Management Assistance Declaration (FM) since 1953

Table 3.2 includes the following sections:

A. Inland Flooding	D. Severe Winter Weather	G. Miscellaneous Hazards
B. Wildfire	E. Earthquake	H. Other Hazards
C. High Wind Events	F. Drought	

Type of Event	Date of Event	Location	Description	Source
A. Inland flooding includes flooding caused by 100-year rain events, heavy rainfall, rapid snowmelt, ice jam flooding, and local road flooding: Riverine flooding is the most common disaster event in NH. Significant riverine flooding in some areas of the State occurs in less than ten-year intervals and increases with climate change. The entire State of NH has a high flood risk. Flood events have the potential to impact the Community townwide. Since December 22-25, 2022, no significant flooding has occurred in Groton.				
A summary of flood events, including Major Disaster & Emergency Declarations in the State & regionwide				
Inland Flooding before 1970	1927, 1936, 1938, 1943 (2), 1953, 1955, 1959		Spring and fall flooding events resulting from severe storms and heavy snowmelt	See below
Inland Flooding 1970-1979	1972 (DR-327), 1973 (DR-399), 1974 (DR-411), 1976, 1978 (DR-549), 1979 (EM-3073)			
Inland Flooding 1980-1989	1986 (DR-771), 1987 (DR-789)			
Inland Flooding 1990-1999	1990 (DR-876), 1991 (DR-923), 1991 (DR -917), 1995, 1996 (DR-1077), 1996 (DR-1144), 1998 (DR-1231)			
Inland Flooding 2000-2009	2003 (DR-1489), 2005 (DR-1610), 2006 (DR-1643), 2007 (DR-1695), 2008 (DR-1787), 2008 (DR-1799)			
Inland Flooding 2010 - 2019	2010 (DR-1892), 2010 (DR-1913), 2011 (DR-4006), 2012 (DR-4065), 2013 (DR-4139), 2015 (DR-4206), 2017 (DR-4329), 2017 (DR-4355), 2018 (DR-4370), 2019 (DR-4457)			
Inland Flooding 2020 - Present	2021 (DR-4622), 2021 (DR-4624), 2022 (DR-4693), 2023 (DR-4740), 2003 (DR-4761), 2024 (DR-4771)			
A detailed summary of flood events in the Community				
Inland Flooding (Heavy Rain)	July 11, 1973	All Ten NH Counties	Major Disaster Declaration DR-399: Possibly DR-399: Heavy rain caused road washouts on Halls Brook Road. The flood waters were halfway up the door of the Old Town Hall, and the entire intersection was flooded.	FEMA, 2007 HMPT, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain)	January 21, 1974	Belknap, Carroll, Cheshire & Grafton	Major Disaster Declaration DR-411:	FEMA & 2024 HMPT

Type of Event	Date of Event	Location	Description	Source
Inland Flooding (Heavy Rain)	March 30- April 11, 1987	Carroll, Cheshire, Grafton, Hillsborough, Merrimack Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-789:	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, & Sullivan	Major Disaster Declaration DR-876:	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	October 20- November 15, 1995	Carroll, Cheshire, Coos, Grafton, Merrimack & Sullivan	Major Disaster Declaration DR-1077:	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	October 20-23, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-1144:	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	June 12- July 2, 1998	Belknap, Carroll Grafton, Hillsborough, Merrimack & Rockingham	Major Disaster Declaration DR-1231: Possibly DR-1231 - Heavy rain caused major road washouts on Halls Brook Road. Damage repairs took the State almost two years, leaving one way out of Town, NH Route 118.	FEMA, 2007 HMPT, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain)	October 7-18, 2005	Belknap, Cheshire, Grafton, Hillsborough, Merrimack & Sullivan	Major Disaster Declaration DR-1610: State and federal disaster assistance reached more than \$3 million to help residents and business owners in New Hampshire recover from losses resulting from the severe storms and flooding in October. Groton experienced major road washouts on Sculptured Rocks Road; the Punch Brook remained intact, but the road washed out around it. There was minor road damage on Province Road and at the Groton Highway Garage. The Old Town Hall & Library were flooded. The damaged culvert on Sculptured Rocks Road has been replaced with three box culverts.	FEMA, 2007 HMPT, 2014 HMPT, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain)	May 12-23, 2006	Belknap, Carroll, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	Major Disaster Declaration DR-1643: Flooding occurred in most of southern NH from May 12-23, 2006 (Mother's Day Storm). Groton experienced heavy rain, but there were only minor road washouts.	FEMA, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain)	April 15-23, 2007	All Ten NH Counties	Major Disaster Declaration DR-1695: FEMA & SBA obligated more than \$27.9 million in disaster aid for flood damages following the April nor'easter (Tax Day Storm). Groton experienced flooding and road washouts during this heavy rain storm, with at least one metal culvert washing out on Sculptured Rocks Road.	FEMA, 2014 HMPT, 2020 HMPT & 2024 HMPT

Type of Event	Date of Event	Location	Description	Source
Inland Flooding (Heavy Rain) High Wind Events (Tornado)	July 24- August 14, 2008	Belknap, Carroll & Grafton & Coos	Major Disaster Declaration DR-1787: A period of severe storms and flooding from July 24 to August 14; a tornado occurred on July 24, 2008. In Groton, the road edges washed out on North Groton Road, Sculptured Rocks, and Province Road and there was minor erosion damage to Bailey Hill Road.	FEMA, 2014 HMPT, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain)	February 23- March 3, 2010	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration: DR-1892: See below, Section D	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	May 26-30, 2011	Coos & Grafton County	Major Disaster Declaration DR-4006: Flooding and hail occurred due to a severe storm on May 26-30, 2011, in Coos & Grafton Counties (Memorial Day Weekend Storm). Groton experienced heavy rain, causing minor road washouts in the usual places.	FEMA, 2020 HMPT & 2024 HMPT
Inland Flooding (Tropical Storm Irene)	August 26- September 6, 2011	EM 3333: All Ten NH Counties DR-4026: Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	Major Disaster Declaration DR-4026 & Emergency Declaration EM-3333: See below, Section C	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	July 9-10, 2013	Cheshire, Sullivan & Grafton	Major Disaster Declaration DR-4139: Severe storms, flooding, and landslides occurred from June 26 to July 3, 2013, in Cheshire and Sullivan Counties and southern Grafton County. Groton experienced heavy rain, causing minor road washouts in the usual places.	FEMA, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain)	July 1-2, 2017	Grafton & Coos	Major Disaster Declaration DR-4329: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance was available to supplement state and local recovery efforts in the areas affected by severe storms and flooding from July 1- 2, 2017, in two New Hampshire Counties. Groton experienced road washouts on Province Road, North Groton Road, Blanchette Lane, River Road, and Bailey Hill Road. The Town received \$41,000 in FEMA disaster funding for repairs; the Town's share was \$13,000-\$14,000.	FEMA, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain)	October 29- November 1, 2017	Sullivan, Grafton, Coos, Carroll, Belknap & Merrimack	Major Disaster Declaration, DR-4355: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to NH to supplement state and local recovery efforts in the areas affected by severe storms and flooding from October 29-November 1, 2017, in five counties. Groton experienced road washouts on Sculptured Rocks Road, Province Road, North Groton Road, Edgar Albert Road, Blanchette Lane, and River Road. The Town's Highway Garage and some small highway equipment were also flooded. The estimated total damage was \$493,919. The Town will receive \$370,589 from FEMA and will contribute \$123,529.	FEMA, 2020 HMPT & 2024 HMPT

Type of Event	Date of Event	Location	Description	Source
Inland Flooding (Heavy Rain)	July 11-12, 2019	Grafton	Major Disaster Declaration, DR 4457: The Federal Emergency Management Agency announced a major disaster declaration for several severe storms and flooding from July 11-12, 2019, in one New Hampshire County. Groton experienced road washouts on Sculptured Rocks, North Groton, Edgar Albert, Province Roads, and Blanchette Lane. The Highway Garage sustained major damage, including the heating system. The flood waters also caused the loss of 18 yards of rock salt and damaged the Police Cruiser and other items. The total damages for the July 2019 storm in Groton were \$303,718.12.	FEMA, 2020 HMPT & 2024 HMPT
Inland Flooding (Heavy Rain) Long-Term Utility Outage	December 22-25, 2022	Belknap, Grafton, Coos & Carroll	Major Disaster Declaration, DR-4693: A severe storm occurred December 22-25, 2022. Most communities saw heavy rain and wind, causing culvert damage, road washouts, and power outages. The northern communities saw heavy, wet snow, causing trees and power lines to fall, creating power outages. The declaration was declared in four of the State's ten counties. Groton experienced heavy rain and 3-4 feet of snow. North Groton, River, Edgar Albert, and Providence Roads were affected. The total damages for the December 2022 storm in Groton were \$198,875.07.	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	July 9-17, 2023	Coos, Grafton, Belknap, Sullivan & Cheshire	Major Disaster Declaration, DR-4740: The Federal Emergency Management Agency announced a major disaster declaration and notification of individual and public assistance on September 14, 2023, for five NH Counties. Groton had no significant impact except for a minor area on Sculptured Rocks Road. The Town did not submit for post-disaster funding.	FEMA & 2024 HMPT
Inland Flooding (Heavy Rain)	January 9-14, 2024	Grafton & Rockingham	Major Disaster Declaration, DR-4771: Severe storms brought significant winter rains and flooding to towns in three counties in New Hampshire. There was no significant impact in Groton.	FEMA & 2024 HMPT

B. Wildfires: New Hampshire is heavily forested and is therefore vulnerable to wildfire, particularly during periods of drought. The proximity of many populated areas to the State's forested land exposes these areas to the potential impact of wildfire. Wildfires have the potential to impact the Community townwide. Since the prior hazard mitigation plan, no significant wildfire events have occurred in Groton.

A summary of wildfire events, including Major Disaster & Emergency Declarations in the State and other recent large fires

Wildfire (Fire of 1947)	October 21, 1947	Strafford County	This fire, caused by drought conditions and a spark from the Boston & Maine Railroad, burned a swath 9.5 miles long and 1.5 miles wide starting in Farmington; the fire was widespread enough to cause significant damage in Maine. Spaulding High School was used to serve meals to the hundreds of firefighters and volunteers who assisted. Around a thousand people were evacuated in Rochester; the fire resulted in one death, an 18-year-old UNH student. This fire did not reach Grafton County or Groton.	Local Resources & 2024 HMPT
Wildfire (Shaw Mountain Fire)	July 2, 1953	Carroll County	Major Disaster Declaration DR-11: This wildfire occurred in Carrol County at Shaw Mountain. This fire did not reach Grafton County or Groton.	FEMA & 2024 HMPT
Wildfire (Bayle Mountain Fire)	May 2015	Carroll County	The Bayle Mountain Fire: This Class D fire burned 275 acres and took five days to put out on rocky and steep terrain in Ossipee, NH. Military and private helicopters and fire crews from all over the State assisted in extinguishing this fire. The Bayle Mountain Fire did not damage homes. This fire did not reach Grafton County or Groton.	Local Resources & 2024 HMPT
Wildfire (Stoddard Fire)	April 2016	Cheshire County	Fire Management Assistance Declaration, FM-5123: Stoddard, NH. The Stoddard Fire burned 190 acres in April 2016 and caused the evacuation of 17 homes; Class D fire. This fire did not reach Grafton County or Groton.	FEMA & 2024 HMPT

Type of Event	Date of Event	Location	Description	Source
Wildfire (Covered Bridge Fire)	November 2016	Carroll County	The Covered Bridge Fire: A brush fire near the Albany Covered Bridge grew to 329 acres, primarily on White Mountain National Forest land. No structures were lost; Class E fire. This fire did not reach Grafton County or Groton.	Local Resources & 2024 HMPT
Wildfire (Dilly Cliff Fire)	October 2017	Grafton County	The Dilly Cliff Fire: This fire occurred on the Lost River Gorge Trail in North Woodstock off Route 112 (Lost River Road); Class C: Human-caused; 75 acres. The Dilly Cliff Fire was determined to be extinguished 36 days later. This fire did not reach Groton.	Local Resources & 2024 HMPT
Wildfire (Bemis Fire)	May 14, 2022	Carroll County	The Bemis Fire lasted six days, burning 106 acres on the steep terrain around Bemis Brook in Crawford Notch State Park. Local firefighters, the NH Division of Forest and Lands, and members of the US Forest Service from Maine, Colorado, and Virginia all responded to extinguish the fire. There were no structures damaged or injuries to the public or responders. This fire did not reach Grafton County or Groton.	Local Resources & 2024 HMPT
Wildfire (Centennial Fire)	May 9, 2022	Coos County	The Centennial Fire, caused by an out-of-control campfire, burned 48 acres along the Appalachian Trail (state land) in Shelburne. There was a multi-agency response but no structural damage or injuries. This fire did not reach Grafton County or Groton.	Local Resources & 2024 HMPT

A detailed summary of wildfire events in the Community

Wildfire	1942	The powerline next to Halls Brook Road	Class C (500 acres) - Unknown	2007 HMPT, 2020 HMPT & 2024 HMPT
Wildfire	May 18, 1995	Unknown (Forest & Lands)	Class A - Debris	2007 HMPT, 2020 HMPT & 2024 HMPT
Wildfire	March 12, 1998	Unknown (Forest & Lands)	Class A - Brush	2007 HMPT, 2020 HMPT & 2024 HMPT
Wildfire	2000	Province Road before Coolidge Road	Class A (.5 acre) - Campfire	2007 HMPT, 2020 HMPT & 2024 HMPT
Wildfire	August 17, 2002	Unknown (Forest & Lands)	Class A - Lightning	2007 HMPT, 2020 HMPT & 2024 HMPT
Wildfire	2004	Back Side of Mt. Crosby by Hebron Line	Class B (6 acres) - Lightning	2007 HMPT, 2020 HMPT & 2024 HMPT
Wildfire	March 29, 2004	Unknown (Forest & Lands)	Class A - Brush/debris burning	2007 HMPT, 2020 HMPT & 2024 HMPT

Since the prior hazard mitigation plan, Groton has had no significant wildfires.

Type of Event	Date of Event	Location	Description	Source
<p>C. High Wind Events, including Tropical/Post Tropical Cyclones, Tornadoes, Downbursts, and Windstorms: Tornadoes are spawned by thunderstorms and occasionally hurricanes; tornadoes may occur singularly or in multiples. A downburst is a severe localized wind blasting down from a thunderstorm. Downbursts happen throughout NH and are becoming more prevalent with climate change; most downbursts go unrecognized unless significant damage occurs. Hurricanes develop from tropical depressions, which form off the coast of Africa. New Hampshire's exposure to direct and indirect impacts from hurricanes is prevalent but modest compared to other states in New England. A hurricane downgraded to a Tropical Storm is more likely to impact New Hampshire. Tornadoes and other wind events can impact the Community townwide. Since the prior hazard mitigation plan, no significant high wind events have occurred in Groton.</p>				
<p>A summary of high wind events & tropical & post-tropical cyclone events, including Major Disaster & Emergency Declarations in the State & regionwide</p>				
Tropical/Post Tropical Cyclones	1804, 1869, 1938, 1944, 1954 (2), 1960, 1976, 1978, 1985, 1991 (DR-917), 1999 (DR-1305), 2005 (EM-3258), 2011 (EM-3333 & DR-4026), 2012 (EM-3360)		Number 4 (1938), Number 7 (1944), Carol (1954), Edna (1954), Donna (1960), Belle (1976), Amelia (1978), Gloria (1985), Bob (1991), Floyd (1999), Katrina (2005), Irene (2011), Sandy (2012)	See below
High Wind Events (Tornadoes)	1814, 1890, 1951, 1953, 1957, 1961, 1963, 2008 (DR-1782)		All listed tornadoes were reported as F2, except for the June 1953 tornado, reported as an F3.	See below
<p>A detailed summary of high wind & tropical & post-tropical cyclone events in the Community</p>				
Tropical/Post Tropical Cyclones (Great New England Hurricane)	September 21, 1938	All Ten NH Counties	<p>The Great New England Hurricane: Statewide, multiple deaths occurred, and damages in NH were about \$12.3 million in 1938 (about \$200 million now). This storm damaged 20,000 structures, 26,000 automobiles, 6,000 boats, and 325,000 sugar maples throughout New England. 80% of the people lost power. Although there was no local recollection, it was expected that the damage would have been similar to the rest of the State in Groton.</p> <p>(Source http://nhpr.org/post/75th-anniversary-new-englands-greatest-hurricane)</p>	FEMA, 2020 HMPT & 2024 HMPT
High Wind Events (Macroburst) Long Term Utility Outages	1999	Townwide	A macroburst in Groton downed trees, damaged utility poles and wires, caused widespread power outages, and blew two roofs off structures.	2007 HMPT, 2020 HMPT & 2024 HMPT
Tropical/Post Tropical Cyclones (Tropical Storm Floyd)	September 16-18, 1999	Belknap, Cheshire & Grafton	Major Disaster Declaration DR-1305: The declaration covers damage to public property from the storm that spawned heavy rains, high winds, and flooding throughout September 16-18. Groton experienced heavy rains and wind, but no damage was reported.	FEMA, 2020 HMPT & 2024 HMPT
High Wind Events (Windstorm) Long Term Utility Outages	2003	Townwide	A significant windstorm brought trees and powerlines down, resulting in power outages in parts of Groton.	2007 HMPT, 2020 HMPT & 2024 HMPT
Tropical/Post Tropical Cyclones (Hurricane Katrina evacuation)	August 29-October 1, 2005	All Ten NH Counties	Emergency Declaration EM-3258: Assistance was provided to evacuees from the areas struck by Hurricane Katrina; emergency assistance to those areas began on August 29, 2005. The President's action made federal funding available to all 10 New Hampshire counties. No evacuees or pets came to Groton.	FEMA, 2020 HMPT & 2024 HMPT
High Wind Events (Windstorm) Long Term Utility Outages	2007	Townwide	A significant windstorm brought trees and powerlines down, resulting in power outages for up to five days in parts of Groton.	2007 HMPT, 2020 HMPT & 2024 HMPT

Type of Event	Date of Event	Location	Description	Source
High Wind Events (Microburst)	August 2010	Groton-Dorchester Town Line	A microburst struck Dorchester and a small portion of Groton, including Bailey Hill Road. The most significant impact was the ability of emergency responders to access Groton.	2014 HMPT, 2020 HMPT & 2024 HMPT
Tropical/Post Tropical Cyclones (Tropical Storm Irene)	August 26-September 6, 2011	EM 3333: All Ten NH Counties DR-4026: Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	Major Disaster Declaration DR-4026 & Emergency Declaration EM-3333: Tropical Storm Irene, August 26 to September 6, 2011, occurred in seven New Hampshire counties, causing flood and wind damage. In addition, an Emergency Declaration was declared for all ten New Hampshire counties. Groton experienced flood waters on several roads, including North Groton Road, Sculptured Rocks Road, Province Road, and Baily Hill Road, and in addition, part of NH Route 118 was lost. Rumney and North Dorchester Roads were damaged, leaving the Town cut off from emergency responders.	2014 HMPT, 2020 HMPT & 2024 HMPT
Tropical/Post Tropical Cyclones (Hurricane Sandy)	October 26-November 8, 2012	DR-4095: Belknap, Carroll, Coos, Grafton, Rockingham & Sullivan EM-3360: All Ten NH Counties	Major Disaster Declaration DR-4095 & Emergency Declaration EM-3360: The declaration covers damage to property from the storm that spawned heavy rains, high winds, high tides, and flooding from October 26-November 8, 2012. Hurricane Sandy came ashore in NJ, bringing high winds, power outages, and heavy rain to six New Hampshire counties. Heavy rain and wind occurred in Groton, but no damage occurred.	FEMA, 2014 HMPT, 2020 HMPT & 2024 HMPT
D. Severe Winter Weather, including Nor'easters, Blizzards, and Ice Storms: Severe winter weather in NH may include heavy snowstorms, blizzards, nor'easters, and ice storms, particularly at elevations over 1,000 feet above sea level. Generally speaking, NH will experience at least one of these hazards during any winter season; however, most NH communities are well prepared for such hazards. Severe winter weather and ice storms can impact the Community townwide. Since the prior hazard mitigation plan, Groton has had no significant winter weather events.				
A summary of severe winter weather events, including Major Disaster & Emergency Declarations in the State & nationwide				
Severe Winter Weather (Ice Storms)	1942, 1969, 1970, 1979, 1991, 1998 (DR-1199), 2008 (DR-1812)		The major ice storms that have occurred and caused significant disruptions to power, transportation, and public and private utilities.	FEMA & 2024 HMPT
Severe Winter Weather (Snowstorms)	1920, 1929, 1940, 1950, 1952, 1958 (2), 1960, 1961, 1969, 1978, 1982, 1993 (EM-3101) , 2001 (EM-3166) , 2003 (EM-3177) , 2003 (EM-3193) , 2004, 2005 (EM-3207) , 2005 (EM-3208) , 2005 (EM-3211) , 2008 (EM-3297) , 2009, 2011 (EM-3344 & DR-4049) , 2013 (EM-1405) , 2015 (DR-4209) , 2017 (DR-4316) , 2018 (DR-4371) , 2024 (DR4799)		The major severe winter weather events with snowfalls exceeding 2' in parts of the State. Power and transportation systems were disrupted.	FEMA & 2024 HMPT
A detailed summary of severe winter storm events in the Community				
Severe Winter Weather (Snowstorm)	Winter of 1968-69	All Ten NH Counties	The winter of 1968-69 brought record snow to New Hampshire. Pinkham Notch at the base of Mount Washington recorded more than 75" of snowfall in four days at the end of February 1969 and snow that had already fallen in previous storms. NH experienced difficulty with snow removal because of the great depths that had fallen from December 1968 to April 1969. Groton experienced heavy snow like the rest of the State. The Highway Department handled the heavy snow accumulations in Groton.	2020 HMPT & 2024 HMPT

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather (Snowstorm) High Wind Events Coastal Flooding	February 16, 1978	All Ten NH Counties	Major Disaster Declaration DR-549: The Blizzard of '78, a regionwide storm severely affecting southern New England, resulted in high snow accumulations throughout New Hampshire. This storm also brought hurricane-force winds, making this one of the most intense this century across the northeastern United States. Recorded accumulations show up to 28" in northeast New Hampshire, 25" in west-central New Hampshire, and 33" along the coast of New Hampshire. Groton experienced heavy snow like the rest of the State. The Highway Department handled the heavy snow accumulations in Groton.	FEMA, 2020 HMPT & 2024 HMPT
Severe Winter Weather (Snowstorm) High Wind Events	March 13-17, 1994	All Ten NH Counties	Emergency Declaration EM-3101: The Highway Department handled the heavy snow accumulation in Groton.	FEMA & 2024 HMPT
Severe Winter Weather (Ice Storm)	January 7-25, 1998	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Strafford & Sullivan	Major Disaster Declaration DR-1199: A major ice storm struck nearly every part of the State, impacting northern communities and areas over 1,000 feet above sea level. Many trees were down, and there was a massive loss of timber and a large amount of slash on the forest floor. Groton experienced ice damage in elevations (Town House, 1,700'). This ice storm impacted the logging industry in the Town and State.	FEMA, 2020 HMPT & 2024 HMPT
Severe Winter Weather (Snowstorm)	March 5-7, 2001	Cheshire, Coos, Grafton, Hillsborough, Merrimack, & Strafford	Emergency Declaration EM-3166: The emergency declaration covers jurisdictions with record and near-record snowfall from a late winter storm in March 2001, which affected six New Hampshire counties. The Highway Department handled the heavy snow accumulation in Groton.	FEMA, 2020 HMPT & 2024 HMPT
Severe Winter Weather (Snowstorm)	December 6-7, 2003	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan	Emergency Declaration EM-3193: The emergency declaration covers jurisdictions with record and near-record snowfall that occurred throughout December 6-7, 2003, and affected eight New Hampshire counties. The Highway Department handled the heavy snow accumulation in Groton.	FEMA, 2020 HMPT & 2024 HMPT
Severe Winter Weather (Snowstorms)	January 22-23, 2005 February 10-11, 2005 March 11-12, 2005	EM-3208-002 (Jan, Feb & Mar): All Ten NH Counties EM-3207 (Jan): Nine NH Counties EM-3208 (Feb): Five NH Counties EM-3211 (Mar): Five NH Counties	Emergency Declaration EM 3208-002: The Federal Emergency Management Agency (FEMA) had obligated more than \$6.5 million to reimburse state and local governments for costs incurred in three snowstorms. The total aid for all three storms was \$6,892,023. Emergency Declaration EM-3207: The total aid for the January storm in Grafton was \$137,118. Emergency Declaration EM-3208: The total aid for the January storm in Grafton was \$213,539. Emergency Declaration EM-3211: This storm was not declared in Grafton County. During the 2005 winter season, the Highway Department handled the heavy snow accumulation in Groton.	FEMA, 2020 HMPT & 2024 HMPT
Severe Winter Weather (Snowstorm & Ice Storm)	December 11-23, 2008	All Ten NH Counties	Major Disaster Declaration DR-1812 & Emergency Declaration EM-3297: A damaging ice storm impacted the State, including all 10 New Hampshire counties, resulting in fallen trees and large-scale power outages. Nearly \$15 million in federal aid had been obligated by May 2009. Groton experienced high winds, falling trees on powerlines, and creating power outages for up to two weeks. North Groton Road was closed for several days.	FEMA, 2014 HMPT, 2020 HMPT & 2024 HMPT

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather (Snowstorm)	February 23-March 3, 2010	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration: DR-1892: Flood and wind damage occurred in southern NH, including six counties, resulting in 330,000 homes without power. More than \$2 million was obligated by FEMA by June 2010. Groton experienced some road washouts in the usual places: Sculptured Rocks Road, River Road, Blanchette Lane, Edgar Albert Road, Province Road, and parts of North Groton Road.	FEMA, 2014 HMPT, 2020 HMPT & 2024 HMPT
Severe Winter Weather (Snowstorm)	October 29-30, 2011	DR-4049: Hillsborough & Rockingham EM-3344: All Ten NH Counties	Major Disaster Declaration DR-4049 & Emergency Declaration EM-3344: A severe winter storm occurred in two New Hampshire counties on October 29-30, 2011. EM-3344: The emergency declaration for snow removal and damage repair included all ten NH counties (Snowtober). Leaves were still on trees, contributing to multiple power outages in Groton. The Highway Department handled the heavy snow accumulation in Groton.	FEMA, 2020 HMPT & 2024 HMPT
Severe Winter Weather (Snowstorm)	February 8, 2013	All Ten NH Counties	Major Disaster Declaration DR-4105: A severe winter storm resulted in heavy snow in February 2013 in all ten New Hampshire counties (Nemo). The Highway Department handled the heavy snow accumulation in Groton.	FEMA, 2020 HMPT & 2024 HMPT

E. Earthquakes: According to the NH State Hazard Mitigation Plan, New Hampshire lies in an area of "Moderate" seismic activity compared to other areas of the United States. "Major" activity areas border New Hampshire to the north and southwest. Generally, earthquakes in NH cause little or no damage and have not exceeded a magnitude of 5.5 since 1940. Earthquakes have the potential to impact the Community townwide. Since the prior hazard mitigation plan, no significant earthquakes have been felt in Groton.

A summary of earthquakes with a magnitude of 4.0 or more significant in the State & regionwide

Earthquakes	6/11/1638 (Central NH, 6.5), 10/29/1727 (Off Coastline, 6.0-6.3), 11/18/1755 (Off Coastline, 5.8), 11/10/1810 (Portsmouth, NH, 4.0), 7/23/1823 (Off Hampton, NH, 4.1), 12/19/1882 (Concord, NH, Unknown), 3/5/1905 (Lebanon, NH, Unknown), 8/30/1905 (Rockingham County, Unknown), 11/09/1925 (Ossipee, NH, 4.0), 3/18/1926 (New Ipswich, NH, Unknown), 11/10/1936 (Laconia, NH, Unknown), 12/20/1940 (Tamworth, NH, 5.3), 12/24/40 (Tamworth, NH, 5.6), 1/19/1982 (Sanbornton, NH, 4.5), 10/16/2012 (Hollis Center, ME, 4.7)	Occurrences of earthquakes with a magnitude of 4.0 or greater in recorded New Hampshire History	State of NH Multi-Hazard Mitigation Plan, Update 2018
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A detailed summary of earthquakes that may have been felt in the Community since 1940 with a magnitude of 3.0 or greater

Earthquake	December 20, 1940	Tamworth, NH	Magnitude 5.3	State of NH Multi-Hazard Mitigation Plan, Update 2018, 2020 HMPT & 2024 HMPT
Earthquake	December 24, 1940	Tamworth, NH	Magnitude 5.6	
Earthquake	June 26, 1964	Salisbury, NH	Magnitude 3.2	
Earthquake	June 15, 1973	Quebec/ME border	Magnitude 4.8	
Earthquake	December 25, 1977	Hopkinton, NH	Magnitude 3.2	
Earthquake	June 28, 1981	Sanbornton, NH	Magnitude 3.0	
Earthquake	January 19, 1982	Sanbornton, NH	Magnitude 4.5	
Earthquake	October 25, 1986	Northfield, NH	Magnitude 3.9	
Earthquake	October 20, 1988	Milan, NH	Magnitude 3.9	
Earthquake	November 22, 1988	Milan, NH	Magnitude 3.2	

Type of Event	Date of Event	Location	Description	Source
Earthquake	April 6, 1989	Berlin, NH	Magnitude 3.5	
Earthquake	October 6, 1992	Canterbury, NH	Magnitude 3.4	
Earthquake	August 21, 1996	Livermore, NH	Magnitude 3.8	
Earthquake	June 16, 1995	Lisbon, NH	Magnitude 3.8	
Earthquake	January 10, 1999	Merrimac, MA	Magnitude 3.1 & 3.0	
Earthquake	January 27, 2000	Fremont, N	Magnitude 3.0	
Earthquake	September 26, 2010	Canterbury, NH	Magnitude 3.2	
Earthquake	October 16, 2012	Hollis Center, ME	Magnitude 4.7 - Groton experienced shaking for 10-30 seconds, but no damage was reported.	

F. Drought: Drought is generally not as damaging or disruptive as floods and other hazards and is more challenging to define. A drought is a natural hazard that evolves over months or even years and can last as long as several years to as short as a few months. According to the NH State Hazard Mitigation Plan, New Hampshire has a low probability, severity, and overall risk for drought. Droughts have the potential to impact the Community townwide. Since the drought of 2020-2021, no significant droughts have occurred in Groton.

A summary of drought in the State & regionwide

Drought	1775, 1840, 1882, 1910's, 1929-1936, 1939-1944, 1947-1950, 1960-1969, 1999; 2001-2002, 2016-2017, 2020-2021, 2022	Occurrences of severe droughts in recorded New Hampshire history.	State of NH Multi-Hazard Mitigation Plan, Update 2018
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A summary of drought in the Community since 1929

Drought	1929-1936	Statewide	Regional	State of NH Multi-Hazard Mitigation Plan, Update 2018, 2020 HMPT & 2024 HMPT
Drought	1939-1944	Statewide	Severe in the southeast and moderate elsewhere	
Drought	1947-1950	Statewide	Moderate	
Drought	1960-1969	Statewide	The lengthiest recorded regional continuous spell of less-than-average precipitation	
Drought	2001-2002	Statewide	The third worst drought on record	
Drought	2016-2017	Statewide	A declared drought for the summers of 2016 and 2017, moderating from extreme in southern New Hampshire to dry in the northern communities. Groton experienced the loss of a few dug wells.	
Drought	2020-2021	Statewide	A declared drought for 2020-2021, with NH's north country being impacted more than the southern communities. No significant impact in Groton.	
Drought	2022	Statewide	A declared drought in the summer and fall of 2022 waned as fall and winter approached and after several periods of rain. This drought moderated from south to north. Significant drought conditions had nearly abated by January 2023. No significant impact in Groton.	

Type of Event	Date of Event	Location	Description	Source
G. Miscellaneous Past or Potential Hazards: Natural, technological, and human-caused hazards and other unusual hazardous events have been noted throughout New Hampshire and can impact the Community townwide. One concern is transporting hazardous material through communities by rail and tractor-trailer. Since Covid-19 ended in 2023, Groton has had no significant miscellaneous hazards.				
Cyber Events	September 15, 2015	Townwide	The Groton Police Department was "hacked". The files were locked, and the Town had to pay the hackers around \$2,500 in bitcoin.	2020 HMPT & 2024 HMPT
Infectious Disease	January 2020-May 11, 2023	All Ten NH Counties	Major Disaster Declaration, DR-4516: The Federal Emergency Management Agency ("FEMA") within the US Department of Homeland Security is giving public notice of its intent to assist the State of New Hampshire, local and tribal governments, and specific private nonprofit organizations under the major disaster declaration issued by the President on April 3, 2020, as a result of the Coronavirus Disease 2019 ("COVID-19").	FEMA & 2024 HMPT
Infectious Disease	January 2020-May 11, 2023	All Ten NH Counties	Emergency Declaration EM-3445: Ten county declaration to provide individual assistance and public assistance as a result of the impact of COVID-19	FEMA & 2024 HMPT
H. Other Hazards: Identified hazards with no specific example of occurrence.				
Natural Hazards			<p>Although the Team did not identify specific examples or past occurrences of these hazards, it felt worthwhile to list them as potential hazards to the Town. These hazards can potentially impact the Community either locally or townwide.</p> <p>See <i>Table 3.1, Hazard Threat Analysis</i>, and Chapter 5 for more details on these hazards.</p>	
Lightning				
Dam Failure				
Technological & Human-caused Hazards				
Aging Infrastructure				
Hazardous Materials				
Mass Casualty Incidents				
Transport Accidents				
Terrorism & Violence				

Historic hazard events were derived from the following sources unless noted otherwise:

- Website for NH Disasters: <https://www.nh.gov/safety/divisions/hsem/disaster/documents/NHDisasterInfo.pdf>
- FEMA Disaster Information: <https://www.fema.gov/disaster>
- The Tornado Project: <https://www.tornadoproject.com/alltorns/nhtorn.htm>
- The Disaster Center (NH): <https://www.disastercenter.com/newhamp/tornado.html>
- United State Geological Survey (earthquakes); <https://www.usgs.gov/programs/earthquake-hazards>

For more information on state and county-wide past events, see Major Disaster and Emergency Declarations, Appendix D, NH Major & Emergency Declarations.

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Chapter 4: Critical Infrastructure & Key Resources (CIKR)

Team discussion and brainstorming identified Critical Infrastructure & Key Resources (CIKR) within Groton. The Hazard Risk rating was based on a scale of 1-3, with 1 indicating little or no risk.

TABLE 4.1 - EMERGENCY RESPONSE FACILITIES (ERFs) & EVACUATION

Emergency Response Facilities (ERFs)			
ERFs are primary facilities and resources needed during an emergency response.			
Facility	Type of Facility	Hazard Risk	
Town House (generator)	Town government, records, primary EOC, primary shelter, law enforcement services, communications	All Hazards	1
Highway Department Garage (portable generator)	Heavy equipment & diesel	All Hazards & Inland Flooding	3
Dry hydrant @ Highway Department Garage	Water supply & fire suppression	All Hazards & Inland Flooding	3
Dry Hydrant North Groton Road	Water supply & fire suppression	All Hazards	1
Tenney Mountain Towers (cell, radio & repeater)	Communications	All Hazards & Wildfire	2
Verizon Switching Station	Public Utilities	All Hazards	1
Evacuation Routes			
Hall's Brook Road	Primary evacuation route	All Hazards	1
North Groton Road (From Hall's Brook Road to Dorchester Town line)	Primary evacuation route	All Hazards	1
North Groton Road (From Hall's Brook Road to Sculptured Rocks Road)	Primary evacuation route	All Hazards & Inland Flooding	3
Sculptured Rocks Road (only to pavement end; becomes Province Road and cannot be used to evacuate from that point)	Primary evacuation route	All Hazards & Inland Flooding	2
River Road	Primary evacuation route	All Hazards & Inland Flooding	2
Groton Hollow Road	Primary evacuation route	All Hazards	1
Stagecoach Road	Primary evacuation route	All Hazards	1
Bridges & Culverts on the Evacuation Routes			
Bridge on Hall's Brook Road (near Mary Baker Eddy House)	Bridge on an evacuation route	All Hazards & Inland Flooding	2
Bridge on Hall's Brook Road over Hall's Brook (at "Dead Man's Curve")	Bridge on an evacuation route	All Hazards & Inland Flooding	2
Bridge on North Groton Road over Hall's Brook (at the intersection with Hall's Brook Road)	Bridge on an evacuation route	All Hazards & Inland Flooding	2
Bridge on North Groton Road over Punch Brook	Bridge on an evacuation route	All Hazards & Inland Flooding	2
Bridge on North Groton Road over Cockermouth River (near Town Garage)	Bridge on an evacuation route	All Hazards & Inland Flooding	3
"Atwell/Orange Brook Bridge" on Sculptured Rock Road	Bridge on an evacuation route	All Hazards & Inland Flooding	2

Emergency Response Facilities (ERFs)			
ERFs are primary facilities and resources needed during an emergency response.			
Facility	Type of Facility	Hazard Risk	
Active Dams			
Punch Brook Dam	Non-menace	All Hazards & Inland Flooding	2
Spectacle Pond Dam	High Hazard	All Hazards & Inland Flooding	2
An additional five dams listed by DES are inactive and classified as exempt, not built, or in ruins.			
Helicopter Landing Zones			
Ball Field (South Groton)	Helicopter landing zone	All Hazards	1
Hebron Safety Building	Helicopter landing zone	All Hazards	1
Cersosimo Lumber Company Field (Rumney)	Helicopter landing zone	All Hazards	1
Town House Parking Lot	Helicopter landing zone	All Hazards	1
One landing zone remains at the Groton Wind project. This landing zone is on private land and 2 miles from public access, but it will be useful in emergencies at Groton Wind. For additional landing zones, please refer to the Emergency Operations Plan.			

TABLE 4.2 – NON-EMERGENCY RESPONSE FACILITIES (NERFs)

Non-Emergency Response Facilities (NERFs)			
NERFs are facilities that, although critical, are unnecessary for immediate emergency response efforts. NERFs would include facilities to protect public health and safety and act as backup emergency facilities when needed.			
Facility	Type of Facility	Hazard Risk	
Hebron Church (Hebron)	Secondary shelter	All Hazards	1
Spectacle Pond	Water drafting site	All Hazards	1
Baker Site #8 Reservoir	Water drafting site	All Hazards	1
Circle Camp Summer Camp (Spectacle Pond)	Potential shelter	All Hazards & Wildfires	2
National Grid Power Lines	Utilities	All Hazards & High Wind Events	2
Telephone Lines	Utilities	All Hazards & High Wind Events	2

TABLE 4.3 – FACILITIES & POPULATIONS TO PROTECT (FPPs)

Facilities & People to Protect (FPPs)			
FPPs are facilities that need protection because of their importance to the town and residents who may need help during a hazardous event.			
Facility	Type of Facility	Hazard Risk	
Circle Camp Summer Camp (Ossipee Pond)	Gathering of people	All Hazards & Wildfires	3
MIT Outing Club Wilderness Camp	Gathering of people	All Hazards & Wildfires	3
Diesel Fuel Storage Tank at Town Garage	Hazardous Materials	All Hazards & Inland Flooding	3
Maxam - Explosive Material Storage	Hazardous Materials	All Hazards & Wildfires	3
Palermo Mica Mine	Hazardous Materials	All Hazards & Wildfires	2
Baker Site #8 Flood Control Dam (refurbished in 2023, DES)	Dam	All Hazards & Dam Failure	2
Spectacle Pond Dam (Hebron)	Dam	All Hazards & Dam Failure	2
Spectacle Pond Dam (Boat Ramp)	Dam	All Hazards & Dam Failure	2
School House #4 (Hall's Brook Road)	Historic	All Hazards	1
Mary Baker Eddy House (Hall's Brook Road)	Historic	All Hazards	1
Old Church Marker (Old Rumney Road)	Historic	All Hazards	1
Buck N Horse Campground	Gathering of people	All Hazards	1
Sculptured Rocks State Forest	Gathering of people	All Hazards & Wildfires	3
Cockermouth Forest	Gathering of people	All Hazards & Wildfires	3
Province State Forest	Gathering of people	All Hazards & Wildfires	3

TABLE 4.4 – POTENTIAL RESOURCES (PRs)

Potential Resources (PRs)			
PRs are potential resources that could be helpful for emergency response in the case of a hazardous event.			
TLC Logging	Heavy equipment	All Hazards	1
Dave Leone LLC	Heavy equipment	All Hazards	1
Gordon Coursey (GFC & Son Logging)	Heavy equipment	All Hazards & Wildfires	2
Mike Either Construction	Heavy equipment, sand & gravel	All Hazards & Wildfires	2
Highway Department Garage	Diesel	All Hazards & Inland Flooding	3
Groton Wind Farm (office and location)	Equipment	All Hazards & Wildfires	2
Cersosimo Lumber Company (Rumney)	Heavy equipment	All Hazards	1
NH DNCR	Emergency response trailer	All Hazards	1
Grafton County Sheriff	Emergency response trailer	All Hazards	1
Public Health Network (Old Hebron Fire Station)	Logistics trailer	All Hazards	1
Please refer to the Resource Inventory List in the Groton Emergency Operations Plan for additional resources.			

Chapter 5: Hazard Effects in Groton

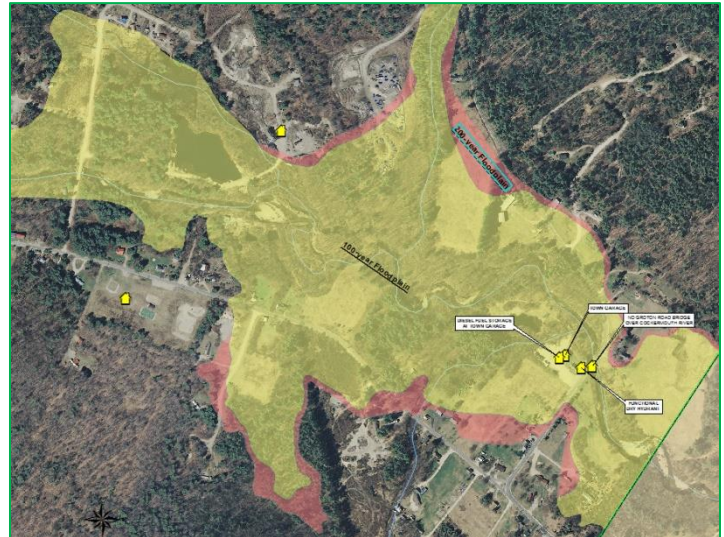
A. IDENTIFYING VULNERABLE CRITICAL INFRASTRUCTURE & KEY RESOURCES (CIKR)

Identifying the Critical Infrastructure & Key Resources (CIKR) that are most likely to be damaged in inland flooding events is important, as inland flooding is the most significant hazard in New Hampshire. Identifying the CIKR with a wildfire risk is also important, as the Town is heavily forested.

Overall Flood Risk

All CIKR in Groton were identified in GIS; this list was then narrowed by those CIKR that were located in the FEMA floodplain. Four CIKR were found in the FEMA flood zone (see map to the right). The Groton Town Garage, the dry hydrant and the diesel fuel storage at the garage, and the bridge on North Groton Road over the Cockermouth River are the four CIKR at risk. As evidenced by the July 2019 rain event (DR-4457), the Town Garage is in a very risky and hazardous location. Action Item #17 in this Plan identifies the project designed to move the garage to higher ground.

No additional CIKR were found in the designated FEMA floodplain, although many non-CIKR structures and residences are expected to be within the flood zone. Town officials should consider all at-risk structures when a flood hazard is likely.



Map derived from GIS analysis. Yellow shading represents the 100-year floodplain and red shading represents the 200-year floodplain.

When working on Table 4.1, it is noted that the Team identified the Town Garage as most subject to inland flooding. Several evacuation routes and the bridge near the Town Garage were also identified as flood-prone. Please refer to Chapter 4, Tables 4.1-4.4 for more information.

Overall Wildfire Risk

CIKR falling within the Wildland Urban Interface (WUI) were reviewed using the same methodology as flooding. Identifying these facilities helped the Team create and prioritize wildfire mitigation action items.

Traditionally, the WUI is determined using GIS analysis to create a 300' buffer from the centerline of all Class V roads and an additional 1,320' buffer from the first buffer. This area is where the urban environment interfaces with the wildland environment and is the most prone to wildfire risk. The traditional WUI was initially developed to identify human-interface areas that may exceed the typical length of fire hoses. In rural communities like Groton, this would virtually cover the entire town. A different method to determine the WUI in suburban communities includes identifying developments, streets, roads with limited egress, a high canopy of old-growth softwoods, or older wooden structures.

Many structures were found in the traditional WUI in Groton; however, only five CIKR were found, as shown in the chart to the right. The rest of the town's Critical Infrastructure & Key Resources were found to be within the 300-foot WUI buffer, therefore accessible by fire apparatus and hoses. As stated elsewhere in this Plan, the entire Town of Groton, including many structures, is thought to be in the WUI because it is so heavily forested. The Town requires a two-acre minimum, and no specific WUI neighborhoods exist.

MAPS_Structures	
ALL_H	NAME
PR	Eithier Gravel Pit
PR	GFC & Son Logging
FPP	MIT Outing Club
FPP	Circle Summer Camp-3
NERF	Spectacle Pond

Several facilities at high risk for wildfires were identified in Tables 4.1-4.4. These include the Tenney Mountain Towers, Circle Camp, MIT Outing Camp, Maxam, Palermo Mine, three State Forests, and three potential resources. Many additional structures in Groton are expected to be prone to wildfires. Because Groton is so forested, it can be assumed that nearly every structure in the Town is within the Wildland Urban Interface. Mitigation strategies were discussed to protect structures and educate the citizens about the wildfire risk.

B. CALCULATING THE POTENTIAL LOSS

It is difficult to ascertain the dollar amount of damage caused by hazards because the damage will depend on the hazard's extent and severity, making each hazard event somewhat unique. Therefore, we have assumed that hazards could damage 0-1% or 1-5% of the Town's structures. Structure damage depends on the nature of the hazard and whether the impact is localized.

MS-1 Assessed Value of All Structures Email from the Town			
2023-MS1	Value	1% Damage	5% Damage
Residential	\$59,290,300	\$592,903	\$2,964,515
Manufactured Housing	\$4,857,900	\$48,579	\$242,895
Commercial	\$721,900	\$7,219	\$36,095
Tax-Exempt	\$1,366,100	\$13,661	\$68,305
Utilities	\$12,182,760	\$121,828	\$609,138
Total	\$78,418,960	\$784,190	\$3,920,948

This Plan assumes that the potential loss from the identified natural hazards would range from **\$0 to \$784,190** or **\$784,190 to \$3,920,948**, based on the 2023 MS1 total structure value of **\$78,418,960**. (See chart above)

Human loss of life was not included in the potential loss estimates but could be expected to occur depending on the hazard's severity and type. Although descriptions are given for technological and human-caused hazards, no potential loss estimates for these hazards are provided in this Plan.

C. NATURAL HAZARDS

The descriptions below represent the **local impact** on the Community for the hazards identified by the Team. The **extent** of these hazards is shown in *Appendix C, The Extent of Hazards*. Charts such as the Saffir-Simpson Hurricane Wind Scale, the Beaufort Wind Scale, the National Weather Service Heat Index, the Sperry-Piltz Ice Accumulation Index, and the Enhanced Fujita Scale for tornadoes are included in Appendix C.

Table 3.1, The Hazard Identification & Risk Assessment (HIRA), is used to evaluate the probability and the potential impact of all hazards.

The "Hazard Identification & Risk Assessment (HIRA)" and the "Probability" noted for each hazard below are taken from the analysis done in *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*. The numbers preceding the hazard name in this section correspond to Table 3.1 and are ordered by "Relative Threat". The estimated loss is determined using the methodology and table, as explained in Section B of this chapter.

1) INLAND FLOODING

Hazard Identification & Risk Assessment (HIRA)	Very High
Probability	Very High
Estimated Structure Loss Value	\$784,190 to \$3,920,948

100-Year Flood Events, Riverine Flooding & Local Road Flooding

Riverine flooding and 100-year flood events can occur due to hurricanes, tropical and post-tropical cyclones, and heavy summer and fall rains. Local road flooding is often the result of rapid snowmelt and heavy spring or autumn rain events. Heavy rain from tropical downpours, hurricanes, severe thunderstorms, and rapid snowmelt often cause culverts to be overwhelmed and roads to wash out. If conducted improperly, timber harvesting, undersized or aging culverts, and inadequate ditching are possible causes of local road flooding.

Based on the Grafton County Floodplain Map and as described in Chapter 3, Section D, Groton has a relatively small 100-year floodplain, primarily in the southeast corner of the Town where the Cockermouth River, Hardy Brook, and waters from Spectacle Pond meet; there is also a small 50-year flood zone within the same area. Despite this small floodplain, 100-year flood events are common in Groton, particularly in the above-mentioned area.

Three declared rain events occurred in Grafton County and Groton in 2017 and 2019; these are detailed in the prior hazard mitigation plan and *Table 3.2, Historic Hazard Identification*. Subsequently, three additional flooding declarations have occurred since the last hazard mitigation plan. These include the following, also detailed in Table 3.2.

- **December 22-25, 2022, DR-4693** brought heavy rain and 3-4 feet of snow. North Groton, Edgar Allen, and Providence Roads were impacted.
- **July 9-17, 2023, DR-4740** brought significant rain to parts of Grafton County, but Groton experienced only minor flooding on Sculptured Rocks Road.
- **January 9-14, 2024, DR-4771** had no significant impact on Groton.

As a result of the six storm events that have occurred in Groton since 2017 and while staying within its budget, the Highway Department has been very proactive in maintaining and repairing culverts, reducing the incidence of local road erosion and washouts. The Department estimates that 90% of the culverts in the Community have been replaced and are in excellent shape.

The Highway Department is responsible for 9.07 miles of paved and 4.64 gravel roads. The State maintains several major arteries. Nonetheless, significant rain, particularly if combined with rapid snow melt, can cause considerable damage to Groton's roads.

The expected loss value from inland flooding would be based on the cost of repairing roadways and the potential cost of damage to structures. Flooding can be severe enough to take out utilities and create areas of town that become inaccessible to emergency responders. The economic impact on the Community, the loss of accessibility, and the time and cost of road repair also factor into the estimated loss value. Therefore, the estimated loss value was determined to be between 1% and 5% of the total structure value.

2) SEVERE WINTER WEATHER

Hazard Identification & Risk Assessment (HIRA)	Very High
Probability	High
Estimated Structure Loss Value	\$784,190 to \$3,920,948

Snowstorms, Blizzards & Nor'easters

Heavy snowstorms typically occur from December through April. New England usually experiences at least one or two heavy snowstorms with varying severity each year. Power outages, extreme cold, and impacts on infrastructure are all effects of past winter storms felt in Groton. These impacts are a risk to the Community, including isolation, especially to older adults (27.9%) and other vulnerable populations.

Damage caused by severe winter snowstorms varies according to wind velocity, snow accumulation, duration, and moisture content. Seasonal accumulation can also be as significant as an individual snowstorm. Heavy overall winter accumulations can impact the roof load of some buildings. Significant snowstorms, nor'easters, and blizzards could diminish food supplies within two days; to worsen the situation, Groton has no major grocers, banks, or pharmacies.

As shown in Table 3.2, snowstorms and nor'easters have struck Groton in the past, but the Highway Department could keep up with the accumulation. The Team noted that more ice than snow had covered Groton's roads in the last five years, increasing roadway dangers.

Although Groton's Highway Department handles usual snow amounts without difficulty, Groton's roads are often impacted by poor weather conditions. Travel can be difficult, and poor road conditions may hinder fire and other emergency responses.

Ice Storms

Ice storms are more concerning than 2-4' snowstorms, though the probability of a significant icestorm is lower than a significant snowstorm. An ice storm can inflict several million dollars of damage on forests and structures. Unlike typical snowstorms, which are generally handled well by the Highway Department, ice storms present significant problems. Downed power lines and fallen trees make it difficult for the highway crew and emergency responders. School buses are also at risk.

There have been significant ice storms in New Hampshire, but in two of the most significant events (1979 and 2010), Groton had no damage. However, ice storms in 1998 and 2008 caused significant damage in Groton, including downed trees and power lines, road closures, limited EMS access, and power outages. The 1998 storm left some residents without power and was especially severe in higher elevations (e.g., Town House at 1,700 feet; Tenney Mountain at 2,350 feet). While the 2008 storm wasn't as severe, it still toppled trees and power lines, causing minor property damage and power outages for up to two weeks.

Since the last hazard mitigation plan, Groton has had no damaging or debilitating winter storm events. However, due to the widespread nature of severe winter weather, particularly from ice storms, the potential loss value is estimated to be between 1% and 5% of the total assessed value of all structures in town.

3) HIGH WIND EVENTS

Hazard Identification & Risk Assessment (HIRA)	High
Probability	High
Estimated Structure Loss Value	\$784,190 to \$3,920,948

Isolated High Wind Events

Isolated high winds and downdrafts are likely to occur in Groton. These unpredictable wind events could fall timber, block roadways, down power lines, and impair emergency response. These unexpected windstorms affect old-growth softwood, especially when the water table is high in the spring. A great deal of the land cover in Groton is forested.

Groton frequently faces occasional strong winds because of its mountain elevation. The Team hasn't reported any damages since the previous plan, but they mentioned the Groton Wind Project; the turbines were installed because of Groton's high wind levels. Although the risk remains, NH Electric Coop has been proactive in trimming trees, especially those close to power lines, that could pose a hazard to the community.

Tornadoes & Downbursts (microbursts & macrobursts)

The most significant difference between tornadoes and downbursts, also known as microbursts and macrobursts, is the direction, size, and direction from which the wind comes; all winds of these types can cause significant damage.

A tornado generally covers a large area, perhaps even several miles. It has winds that blow in a circular fashion, leaving behind downed trees lying in a swirling pattern. Straight-line winds and winds that burst downward indicate a microburst; the fallen trees left behind lay in roughly the same direction. A microburst must be 2.5 miles in width or less, whereas a macroburst is a similar wind event more than 2.5 miles wide and lasting longer than a microburst.

Microbursts are becoming more frequent and often result in damage. Like high winds, the effects would be primarily power outages and blowdowns; however, if a tornado, microburst, or macroburst were severe enough, property damage could also occur. In Groton, a microburst would be more likely than a tornado. Since the previous hazard mitigation plan, Groton has had no reports of downbursts or tornadoes.

Although downbursts are becoming more common, damaging high wind events are rare natural hazards in New Hampshire. Damage from high wind events largely depends on where the hazard strikes. If a high wind event strikes a densely populated or commercial area, the impact could be significant, resulting in personal injury, property damage, and economic hardship. Based on the potential devastation from tornadoes, macrobursts, or microbursts, the potential loss value was estimated to be between 1% and 5% of the total structure value.

4) EXTREME TEMPERATURES

Hazard Identification & Risk Assessment (HIRA)	High
Probability	High
Estimated Structure Loss Value	Not estimated

Extreme Cold & Heat

Winter temperatures in Groton can fall below -30°F, and summer temperatures, laden with high humidity, can soar to nearly 100°F. There was more concern about cold temperatures in the past, but with improved heating systems and local communications, most New Hampshire residents can cope with extreme cold. Many New Hampshire residents have also equipped their homes with generators and woodstoves. Many cities and towns offer warming centers or have established a functional needs list to check vulnerable citizens.

More concerning today is extreme heat conditions, which seem to be more likely with climate change; temperatures above 95° for a week or more can impact the elderly and other vulnerable populations. Few residents, particularly vulnerable populations, have air conditioners and are less able to cope with extreme heat. The estimated older adult population in Groton is 27.9%, and the poverty rate is 10.2% of the total population¹⁵. No deaths or illnesses due to cold or heat have been reported in Groton since the prior hazard mitigation plan.

Extreme Temperatures combined with Long Term Utility Outage

Town officials are concerned during extreme temperatures; they look after their citizens to ensure that extreme temperatures do not create a life or property-threatening disaster. When combined with power failure, extreme temperatures are of the most concern; power failure could result in no water, heat, or air conditioning for the Town’s most vulnerable populations. The Town provides warnings and recommendations regarding extreme temperatures on the emergency webpage and other social media. It has designated the Town House as the cooling or warming center.

The cost of extreme temperatures is difficult to calculate as it is not based on the loss of structures. The expected loss value would be primarily on the economic impact on the Community and the time and cost of emergency response. The structure loss value due to extreme temperatures was not estimated based on the assumption that damage would not occur to structures.

5) LIGHTNING

Hazard Identification & Risk Assessment (HIRA)	Medium
Probability	High
Estimated Structure Loss Value	\$0 to \$784,190

Lightning

Lightning strikes have occurred in Groton because of severe summer storms. Some of the Town’s structures are older and historic buildings, as detailed in Table 4.3. Forests surround other vulnerable structures. Dry timber on the forest floor, some of which remains from past ice or windstorms, along with the age of many buildings and outbuildings combined with lightning strikes, can pose a significant disaster threat. Lightning could damage specific structures, but the direct damage would not be widespread.

¹⁵ American Community Survey, 2022 ACS 5-Year Estimate

Although lightning is a potential problem, the Town reports few occurrences, none of which were significant.

It was noted that severe thunder and lightning storms have been happening more often in recent years, perhaps due to climate change. Also concerning are the heavy rains that thunderstorms can produce and the subsequent erosion of ditches and roadways.

Based on the localized nature of lightning strikes, the potential loss value was determined to be between 0% and 1% of the total assessed structure value.

6) WILDFIRE

Hazard Identification & Risk Assessment (HIRA) Medium
Probability Moderate
Estimated Structure Loss Value \$784,190 to \$3,920,948



There are two potential losses with a wildfire: the loss of forest land and the threat to the built-up human environment and structures within the Wildland Urban Interface (WUI). In many cases, the only time it is feasible for a community to control a forest fire is when the built-up human environment is threatened.

Any wildfire discussion must include a Wildland Urban Interface (WUI) discussion. The WUI can be determined in various ways; however, it represents the area where the forest and human habitation intersect. At times, the WUI is defined as the area out of reach of available fire hoses and water resources, while other times, it is determined to be areas with substantial tree cover and limited egress. For many New Hampshire communities, entire towns are thought to be in the WUI because of the abundance of hardwood and softwood trees. In more populated areas, the WUI is often determined to be in densely populated neighborhoods where a towering canopy of old-growth trees and limited access make people and structures more vulnerable. All structures within the WUI are assumed to be at some level of risk and, therefore, vulnerable to wildfire. See Section A in this chapter for more discussion on the WUI in Groton.

The Team described the forests of Groton as consisting primarily of mixed forests. Some fires are “duff” fires, the burning of *“the layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.”*¹⁶ However, with climate change, drought no longer has a low probability in New Hampshire, and more fires are likely to be surface fires. Burn permits are required in Groton, as they are throughout the State, but often, burning occurs without the proper permits. Sometimes, it’s difficult for the fire department to monitor all conditions, and the occasional unauthorized burn will occur.

The current documentation regarding fires in Groton and New Hampshire shows that humans cause most fires; however, there haven't been any significant wildfires in Groton for many years. In 2017, a small wildfire occurred on Province Road in the nearby town of Dorchester but did not affect Groton. Fires in Groton have generally been minor brush fires with little impact. The Team observed that the increasing number of buildings in the Wildland Urban Interface (WUI) could raise the risk of a significant, damaging wildfire.

¹⁶ https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fswdev3_009827.pdf

Due to the abundance of slash on the forest floor left by past ice storms and blowdowns, and the mixture of hardwood and softwood trees throughout the Community, there is potential for fast-burning fuels, and a wildfire could potentially occur. Also, outdoor enthusiasts' recreational use of woods trails creates additional risks. To help mitigate the effects of wildfire, the Hebron and Rumney Fire Departments, which provide fire service to Groton, strive to improve and maintain firefighting equipment, maintain water resources, and manage a Capital Reserve Fund to help pay costs for new equipment. Groton has had no significant wildfires since the last hazard mitigation plan.

Significant wildfires in New Hampshire are uncommon; six large fires have occurred in the State recently. These include the Bemis Fire in Crawford Notch, the Dilly Cliff Fire in Woodstock, the Covered Bridge Fire in Albany, the Bayle Mountain Fire in Ossipee, the Centennial Fire in Shelburne, and the Stoddard Fire in Stoddard.

Given the right conditions - drought, lightning, human interface - the potential for a significant wildfire is high. The impact of climate change on drought could also play a role in predicting wildfires. Therefore, the potential loss value was estimated to be between 1% and 5% of the total assessed structure value.

7) DAM FAILURE

Hazard Identification & Risk Assessment (HIRA)	Low
Probability	Low
Estimated Structure Loss Value	\$0 to \$784,190

The Department of Environmental Services (DES) lists two active dams in Groton: the high-hazard Spectacle Pond Dam and the low-hazard Punch Brook Dam. The other five dams are inactive, classified as exempt, not built, or in ruins. Nearby, Hebron's Spectacle Pond Dam and Dorchester's Baker River Site #8 flood control dam raise minor concerns.

The Spectacle Pond Association has upgraded the Spectacle Pond Dam in Groton, created an emergency action plan, and regularly monitors the dam. Though it has not been breached, its failure could impact several homes and damage North Groton Road.



Although the failure of the Spectacle Pond Dam in Hebron would likely have minimal impact on Groton, it remains a concern due to the increasingly severe rainstorms caused by climate change. The Baker River Site #8 flood control dam on the Baker River Reservoir in Dorchester poses a potential risk; its failure could result in flooding damage to homes and wash away the lower section of River Road in Groton downstream from the dam.

While the failure of dams in or near Groton could result in road and structural damage, the overall risk associated with a dam failure is minimal, primarily leading to minor road washouts. Consequently, the estimated loss value for structures was between 0-1% of the total estimated structure value.

8) DROUGHT

Hazard Identification & Risk Assessment (HIRA)	Low
Probability	Moderate
Estimated Structure Loss Value	\$0 to \$784,190

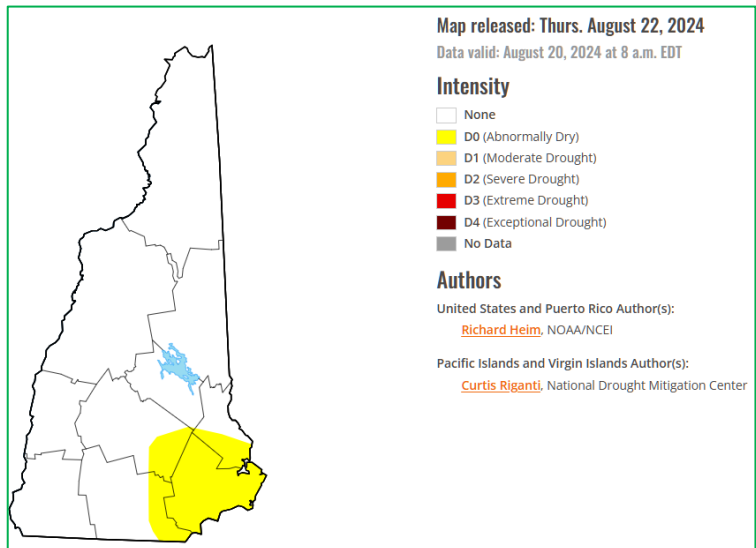
A drought, an extended period without precipitation, could elevate the risk of wildfire and blow-downs in the Community's forested areas. With an extreme drought, the water supply and aquifer levels could be threatened. According to the NH Department of Environmental Services (DES), drought is not rare in New Hampshire. DES states, *"In actuality, New Hampshire experiences drought quite frequently. For example, between the years 2000 and 2020, drought conditions occurred within 11 of those 20 years."*¹⁷

A major concern is that climate change could result in more frequent and extended droughts. These drought conditions negatively impact local forests and farms and increase the likelihood of wildfires. Although Groton is not primarily an agricultural community, it does have extensive woodlands and several open fields.

Only four significant droughts occurred before 2000, while three have occurred in just the past eight years (2016, 2020, and 2022). During the 2016 drought, the Team reported the loss of a few dug wells; the Town supplied bottled water to those who did not have water in their homes. The 2020-21 and 2022 droughts had little or no effect on Groton. Water for fire suppression was not impacted, and no water bans were enacted in these droughts.

The 2016-2017 drought resulted in severe drought conditions in the southern regions, while the north experienced mild to no drought. The 2020-2021 drought had a lesser impact on southern New Hampshire than 2016, but it was more pronounced in the northern part of the state. In the summer of 2022, New Hampshire faced another drought that primarily affected the southern areas and concluded by January 2023. As of August 22, 2024, New Hampshire is experiencing Abnormally Dry conditions, particularly in and around Rockingham County.¹⁸

The cost of future droughts is challenging to calculate as any cost would likely result from associated fire risk, crop loss, and diminished water supply. Based on these assumptions, the structure loss value was not estimated.



¹⁷ <https://www.des.nh.gov/climate-and-sustainability/>

¹⁸ <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH>

9) INFECTIOUS DISEASE

Hazard Identification & Risk Assessment (HIRA) Low
Probability Moderate
Estimated Structure Loss Value Not estimated

“Infectious diseases are disorders 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.”19

Infectious diseases and epidemics or pandemics present a possible threat to Groton. Groton is susceptible to an epidemic and subsequent quarantine with worldwide pandemics such as COVID-19, Lyme Disease, SARS, the Zika Virus, H1N1, the Avian Flu, Eastern Equine Encephalitis (Triple E), the West Nile Virus, and even the common seasonal flu virus. The United States and the world have been coping with the COVID-19 pandemic for over four years. All non-essential businesses and schools throughout New Hampshire and most of the United States were closed during the pandemic's early months in the spring of 2020.



Groton’s distinctive geography attracts many hikers and outdoor enthusiasts throughout the year, resulting in a slight population increase during the summer and on seasonal weekends. Events and activities held in Groton's facilities may heighten the risk of spreading infectious diseases. Students from Groton attend schools in the Newfound Area School District along with students from Alexandria, Bristol, Danbury, Hebron, Bridgewater, and New Hampton, which facilitates the transmission of infections and viruses from other areas. Gatherings at churches, meeting houses, and social facilities also pose a risk for infectious disease outbreaks. Interactions between local students and out-of-town sports teams and clubs can further contribute to the spread of infectious diseases.

With assistance from public health networks, town officials did their best to mitigate the onset of COVID-19 in Groton. To help mitigate the crisis, the Town House remained open with mitigation measures in place. Initially, the schools in the district went virtual. The Town continues to encourage social distancing and protecting the Town’s most vulnerable citizens. There are no senior group housing facilities in Groton.

The CDC recommends that persons, particularly those who are medically compromised or over 65, receive the newest booster shot, which will likely be available in September 2024. Recommendations for children are similar.

Groton’s EMD and other town officials, in coordination with Hebron and Rumney’s emergency service personnel, plan extensively to prepare for and respond to infectious diseases. The Team felt that an epidemic or pandemic, like COVID-19, would continue to threaten the Community's citizens. However, because there would be no direct impact on town structures, the structure loss value was not estimated.

19 Infectious diseases, Overview, https://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/syc-20351173

10) TROPICAL/POST TROPICAL CYCLONES

Hazard Identification & Risk Assessment (HIRA)	Low
Probability	Low
Estimated Structure Loss Value	\$784,190 to \$3,920,948

Due to its abundant forested land, Groton faces a potential, though low, risk from tropical and post-tropical cyclones. Significant forest damage could occur, similar to the impact of the 1938 hurricane. While tropical and post-tropical cyclones could fall into other categories, such as wind and flooding, the Team has treated them as distinct events. Although rare in New Hampshire, these cyclones should still be considered potential hazards. Typically, tropical cyclones have been downgraded to post-tropical cyclones by the time they reach northern New Hampshire.

The heavy rain and winds from Tropical Storm Irene in 2011 submerged North Groton Road at both ends, closed Punch Brook Bridge due to eroded roadsides, and caused washouts on sections of Sculptured Rocks Road, Province Road, and Bailey Hill Road. Further complications arose as washouts on Route 118 and North Dorchester Road effectively isolated the Town from emergency responders. Tropical Storm Sandy in 2012 mainly brought heavy rain to Groton and had minimal impact. Since the previous hazard mitigation plan, no tropical or post-tropical cyclones have affected Groton.

The probability that a tropical and post-tropical cyclone would remain a Category 1 or higher in this part of the State is low. Therefore, the potential loss value due to tropical and post-tropical cyclones was determined to be between 1% and 5% of the total assessed structure value.

11) EARTHQUAKE

Hazard Identification & Risk Assessment (HIRA)	Very Low
Probability	Very Low
Estimated Structure Loss Value	\$784,190 to \$3,920,948

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric, and phone lines, and are often associated with landslides and flash floods. Since 1940, only two earthquakes with a magnitude greater than 5.0 have occurred in New Hampshire; both earthquakes occurred in Tamworth in December of 1940 (5.5-5.8). Since then, only one earthquake with a magnitude greater than 4.0 has occurred in the State; it occurred in Sanbornton on January 19, 1982.

Many New Hampshire residents felt the most recent earthquake in October 2012, with its epicenter in Hollis Center, ME. The Team noted that the Hollis earthquake was felt in Groton, but no damage occurred. More recent earthquakes, in Hanover in 2020 and Haverhill in 2024, were not felt in Groton. Many small earthquakes, such as these, frequently occur in New Hampshire.²⁰

It is well documented that fault lines run throughout the State, but high-magnitude earthquakes have not been common in New Hampshire's history. Although historically, earthquakes have been rare, the potential exists, and depending on the location, the impact could be significant. Therefore, the potential structure loss value due to earthquakes was determined to be between 1% and 5% of the total assessed structure value.

²⁰ United States Geological Survey (USGS), Earthquake Hazards Program (<https://www.usgs.gov/programs/earthquake-hazards>)

D. TECHNOLOGICAL & HUMAN-CAUSED HAZARDS

The following hazards were also considered while developing this hazard mitigation plan. Though these hazards are not analyzed in more detail as part of this Plan, they are worth mentioning as real and possible hazards that could occur in Groton. The estimated structure loss was not determined for these hazards.

1) AGING INFRASTRUCTURE

Hazard Identification & Risk Assessment (HIRA) Very High
Probability Very High

“Infrastructure is the backbone of our community. While we don’t always acknowledge it, the condition of our infrastructure has a very real impact on our lives. We all depend on roads and bridges to get us where we are going, water infrastructure that delivers clean on-demand water, electricity to light our home and office, and schools that will facilitate a learning environment.”²¹

Aging infrastructure is the continued deterioration of roads, bridges, culverts, ports, railroads, wastewater facilities, airports, dams, utilities, and public water and sewage systems. The State Multi-Hazard Mitigation Plan states that the average lifespan of a bridge is 50 years; the current average age of state-owned bridges in New Hampshire is 52-56 years.²² The American Society of Civil Engineers gave NH an overall C- in its 2017 report card.²³

The Groton Town House, initially built in 1700 with an addition in the 1990s, requires general maintenance, particularly the roof, which is scheduled for work in a few years. The roads in the area are in excellent condition due to proactive measures, and there are no red-listed bridges, with the last one having been replaced four or five years ago. The Highway Department has a new building in the planning stages, and the transfer station is working on the compactor.

Action items in Table 9.1 are included in this Plan to address aging infrastructure. Among them are improvements to the North Groton Road culvert and the completion of a new Town Garage.

2) MASS CASUALTY INCIDENTS

Hazard Identification & Risk Assessment (HIRA) Very High
Probability High

A Mass Casualty Incident (MCI) is defined as *“any number of casualties that exceed the resources normally available (locally).”²⁴* MCIs have been known to occur due to bus, auto, train, and aircraft accidents and incidents involving large crowds. MCIs can also result from natural hazards such as hurricanes, floods, earthquakes, and tornadoes. No MCIs have occurred since the previous hazard mitigation plan.

An MCI could happen anywhere in Groton. Groton's roads are, at times, heavily traveled and are particularly dangerous during winter storms. Animal crossings and poor weather can set up the conditions for an MCI. In addition, with students traveling to schools in other towns, the potential for an MCI is increased. Fortunately, there have been no reported MCIs since the last hazard mitigation plan.

²¹ <https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-NH-Report-Card-hq-with-cover.pdf>
²² <https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2023/11/2023-NH-STATE-HAZARD-MITIGATION-PLAN-APPENDICES-2.pdf>, page 87
²³ Ibid
²⁴ DeValle Institute Learning Center; <https://delvalle.bphc.org/mod/wiki/view.php?pageid=89>

3) LONG-TERM UTILITY OUTAGE

Hazard Identification & Risk Assessment (HIRA) High
Probability High



Although rare, long-term utility outages of five or more days have occurred in Groton due to local line damage from high winds, severe storms, and problems with the power grid. A significant or extended power outage lasting more than a week could result in hardship for individual residents, particularly seniors and other vulnerable populations. The Team reported that long-term power outages have diminished due to utility companies' efforts to trim trees and branches near power lines.

Long-term utility outage is still a concern, particularly when combined with the above natural hazards. An extended power failure's most significant impact would be the inconvenience caused by the inability to pump water for residents who rely on wells. It is also noted that all services, including pharmacies and large grocers, are located out of town; driving during severe weather events to obtain necessities can be difficult due to poor road conditions. The Team felt that many residents are self-sufficient and are now equipped with generators and woodstoves.

As a small, close-knit community, town officials know persons who may need help in emergencies. Nonetheless, a long-term utility outage would have a significant impact.

4) TRANSPORT ACCIDENTS

Hazard Identification & Risk Assessment (HIRA) High
Probability High

Vehicular accidents involving hazardous materials are considered a significant risk in Groton. The Town has two main roads: Sculptured Rocks Road, which transitions to a dirt road, and North Groton Road. These and other local roads are lengthy, winding, steep, and frequently affected by severe weather, often traveled by vehicles transporting hazardous materials. The roads pass through sparsely populated terrains and more densely populated areas.



Groton's roads face severe winter weather, becoming dangerous under hazard conditions such as flooding, snow, and ice. Potential risks include vehicular accidents, wildlife collisions, and truck accidents involving hazardous materials. Major ice storms or other significant events can impede both egress and access for residents and first responders. All roads in Groton are prone to hazards like flooding, high winds causing fallen trees, and potentially hazardous materials spills.

In the event of a hazardous materials incident, property and structural damage could be considerable, depending on the scope and location of the incident. However, losses are anticipated to be localized and unlikely to occur in more populated areas where speed limits are reduced.

5) CYBER EVENTS

Hazard Identification & Risk Assessment (HIRA) High
Probability Moderate

Presidential Policy Directive (PPD-41) describes a cyber incident as “An event occurring on or conducted through a computer network that actually or imminently jeopardizes the integrity, confidentiality, or availability of computers, information or communications systems or networks, physical or virtual infrastructure controlled by computers or information systems, or information resident thereon. For purposes of this directive, a cyber incident may include vulnerability in an information system, system security procedures, internal controls, or implementation that could be exploited by a threat source.”²⁵

With the increased use of computers and the internet, cyber events could include targets such as banks, hospitals, schools, churches, towns, city and state government operations, emergency operations, and critical infrastructure. Cyber events have been known to occur almost anywhere, from very small towns to large facilities in New Hampshire, causing large expenditures, disruption in everyday business practices, and data loss. Several communities in New Hampshire have had their data held for ransom.

The Team documented a cyber event in the previous plan that occurred in September 2015, but there have been no incidents since then. Essential documents are stored on a server at the Town House and also backed up in the cloud. Ensuring robust computer network security, off-site backups, and user education is crucial for safeguarding sensitive municipal information and data.

6) TERRORISM & VIOLENCE

Hazard Identification & Risk Assessment (HIRA) Medium
Probability Low

Terrorism is feared throughout our country and the world; the disruption at soft targets is often the result of terrorist incidents. “Soft Targets and Crowded Places (ST-CPs) are locations that are easily accessible to large numbers of people and that have limited security or protective measures in place making them vulnerable to attack.”²⁶

Groton’s primary soft target is the Town House, where many people may congregate. Other soft targets, such as small businesses, camps, and lodging facilities, could also be targeted.

Highways could also be targets; any closure of Groton’s major roadways would cause local disruptions in the transportation system. Disruption of these routes could affect Groton’s commuters, emergency response, and the local economy.

As with many small towns, the terrorism threat is minimal; if a terrorist incident were to occur, it would most likely be a homegrown terrorist event. There has been no significant terrorist or violent incident since the prior hazard mitigation plan.

²⁵ PPD-41; <https://obamawhitehouse.archives.gov/the-press-office/2016/07/26/presidential-policy-directive-united-states-cyber-incident>
²⁶Homeland Security Soft Targets and Crowded Places, https://www.cisa.gov/sites/default/files/publications/DHS-Soft-Target-Crowded-Place-Security-Plan-Overview-052018-508_0.pdf

7) HAZARDOUS MATERIALS

Hazard Identification & Risk Assessment (HIRA) Very Low
Probability Very Low

Hazardous material in fixed locations is a concern in many New Hampshire communities and Groton. Manufacturers, gas stations, fuel depots, small businesses, and even homes can have hazardous chemicals, explosive materials, or poisons on site. Breaches in the storage, use, production, or disposal can affect the groundwater, aquifers, water supply, soil, and the air we breathe.

Maxam Explosives is the one facility in Groton that causes concern for a hazardous materials accident in a fixed location. Detonators for construction explosives and other materials stored at Maxam could potentially create a hazardous event. The actual explosives are stored in a neighboring town but could still affect Groton in the right conditions. Although a ½ mile buffer around the Maxam facility prevents development, there is always the potential for an explosion and a resulting fire. However, such an event would be localized unless drought conditions are in effect.

With only two Tier II properties (Maxam and the Wind Turbines), Groton is relatively safe from a hazardous materials incident. The Team did not report any hazardous materials leaks, spills, or explosions since the previous hazard mitigation plan.

Residents on private property may also store hazardous materials; to help its residents, the Town participates in collecting household hazardous waste, such as batteries and some paint types.

If hazardous materials ignited, entire buildings could be susceptible to explosion and fire. The resulting losses could be substantial in terms of structure loss and loss of business revenue for local merchants.

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Chapter 6: Current Plans, Policies, and Mutual Aid

A. ANALYSIS OF THE EFFECTIVENESS OF CURRENT PROGRAMS

After researching historic hazards, identifying CIKR, and determining potential hazards, the Team determined what was already being done to protect its citizens and structures. Once identified, the Team addressed each policy or plan to determine its effectiveness and whether improvements were needed. This analysis became one of the tools the Team used to identify mitigation action items for this Plan.

Creating new action items was less challenging, knowing what regulations were already in place. In addition, this process helped identify current plans and policies that are working well and those that should be addressed as a new action item and the responsible departments. The following table, *Table 6.1, Policies, Plans & Mutual Aid*, shows the analysis resulting from the Team's discussion.

Existing policies, plans and mutual aid that were designated as "Improvements Needed" were added to **Table 9.1, Mitigation Action Items** as new strategies and were reprioritized to meet the current needs of the Town.

TABLE 6.1: CAPABILITIES ASSESSMENT

KEY TO EFFECTIVENESS

- Excellent**..... The existing program works as intended and is exceeding its goals.
- Good** The existing program works as intended and meets its goals.
- Inadequate**..... The existing program does not work as intended or does not meet its goals.
- Poor** The existing program does not work as intended, often falls short of its goals, or may present unintended consequences.

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
E- 911 Signage Compliance	E-911 signage compliance includes markers at driveway entrances that identify residence locations in conjunction with the E-911 alerting system.	Fire Department & Police Department	Good	Improvements Needed: Groton is about 55% compliant with E-911 signage. This strategy was deferred to this Plan to consider ways to get this signage more compliant so that emergency responders can better assist the public in need. Use public outreach opportunities such as the Emergency Management webpage or social media to promote better compliance and develop other means of increasing compliance. The Town could purchase and install signage, create an ordinance and "fine", or provide signs for residents to install themselves to promote compliance better. Action Item #3 (also in Table 7.1)
Genasys	Genasys (formerly CodeRED/NH ENS) is a reverse calling warning system that uses landline phone numbers. Genasys does not include cell and unlisted numbers or email addresses. Groton's school district uses "Infinite Campus", a reverse calling system for school activities and emergency notification.	Emergency Management Director	Excellent	Improvements Needed: Genasys (formerly CodeRED/NH ENS) is an excellent warning system, but it only stores residents' landline phone numbers. The Town has provided information to residents about CodeRED, the previous system. This strategy was deferred to continue providing public outreach to encourage all residents to contact Genasys to add cell numbers, emails, and unlisted numbers and verify the information. Use the Town's website, a possible brochure at the Town House, social media platforms, or a sign-up at a Town Meeting. Action Item #7 (also in Table 7.1)

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
Culvert & Stormwater Maintenance Plan	A Culvert & Storm Water Maintenance Plan includes an inventory of all culverts and ditches in the Community and a record of the location, size, etc. The Groton Highway Department and the NH DOT clean the drainage basins once a year, and after significant flooding events, culverts are repaired as needed.	Highway Department	Excellent	Improvements Needed: The Groton Highway Department does an excellent job cleaning and repairing drainage basins and culverts, and approximately 90% of the Town's culvert issues have been repaired within the last five years. A list of culverts is available; however, a written Culvert & Stormwater Maintenance Plan should be developed to ensure continuity of actions and efficient stormwater management. This strategy was deferred for continued maintenance and to develop a written Culvert & Stormwater Maintenance Plan detailing the size, material, installation date, recommended date for improvement, GPS location, and any associated problems (i.e., flooding). Action Item #1 (also in Table 7.1)
Emergency Operation Plan (2010)	An Emergency Operations Plan identifies the response procedures and capabilities of the Town of Groton in the event of a natural, technological, or human-caused hazard.	Emergency Management Director	Good	Improvements Needed: The Groton Emergency Operations Plan (EOP) was last updated in 2010, and it is currently in the process of being updated. It is nearly complete. This strategy was deferred to complete the new EOP and include an EOC Call Alert List, a detailed Resource Inventory List, and Player Packets. This strategy was deferred to this Plan to update the EOP. Action Item #13 (also in Table 7.1)
Emergency Generators	The Town has emergency backup power at the Town House. The Town would benefit from a permanent generator for the Town Garage, although a new Town Garage is being planned.	Emergency Management Director	Excellent	Improvements Needed: The Town is moving the Town Garage from its location in the floodplain to a new, safer location; a generator is included in the plans. Otherwise, the emergency generator capabilities in the Town are good. This strategy was deferred to obtain and install an emergency generator for a new Town Garage to improve the effectiveness of the facility. Action Item #17 (also in Table 7.1)
Groton Hazard Mitigation Plan (2020)	A hazard mitigation plan is designed to address natural, technological, and human-caused hazards and understand the risks these pose to the Community. A hazard mitigation plan aims to create action items that will make the Community safer by lessening or eliminating the effects of hazards.	Emergency Management Director	Excellent	Improvements Needed: The Groton Hazard Mitigation Plan (2020) is being updated to this Plan. This strategy was deferred to review this Plan, the Groton Hazard Mitigation Plan 2024, annually and to update the Plan again in 2029. Action Item #14 (also in Table 7.1)
National Flood Insurance Program (NFIP) & Floodplain Ordinance (part of Zoning Ordinance)	The National Flood Insurance Program (NFIP) addresses both the need for flood insurance and the need to lessen the devastating consequences of flooding. The goals of the NFIP are to protect communities from potential flood damage through floodplain management and provide people with flood insurance. A community's floodplain ordinance regulates all new and substantially improved structures in the 100-year floodplain, as identified on the FEMA Flood Maps dated February 20, 2008, in Groton.	Planning Board & Select Board	Excellent	Improvements Needed: The Town developed a flood ordinance and became a National Flood Insurance Program (NFIP) member on April 18, 1983. The Town's Flood Ordinance works well to prohibit or force compliance to the ordinance for building and substantial improvements to structures within the FEMA flood zone. The Zoning Ordinance, which contains the Floodplain Ordinance, was last amended in 2023. This strategy was deferred to this Plan to continue compliance with the NFIP, obtain NFIP brochures, and provide public outreach regarding the benefits of membership in the NFIP, whether or not properties are in the FEMA floodplain. This strategy was also deferred to provide vital information on flood mitigation techniques that can be taken to protect individual homes and properties using the Town's website or social media pages. Provide links to the NFIP, Ready.gov, and other pertinent websites. Action Item #10 (also in Table 7.1)

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
NIMS & ICS Training	The National Incident Management System (NIMS) and the Incident Command System (ICS) provide training that can help ensure effective command, control, and communications during emergencies.	Emergency Management Director	Good	Improvements Needed: Most first responders have done NIMS and ICS training (Hebron Fire). Although this is preparedness, this strategy was deferred to this Plan to continue providing NIMS (IS-700) and ICS (ICS 100 and ICS 200) training to new first responders (fire volunteers) and town officials as they become elected/appointed. Action Item #5 (also in Table 7.1)
Public Education & Awareness	The Town of Groton is very well situated to provide public information and outreach to its citizens.	Emergency Management Director & Other Departments	Good	Improvements Needed: The Town has a website and an Emergency Management webpage with some emergency-related links, including a link to Genasys (CodeRED). An emergency web page is a great way to provide outreach to residents on emergency preparedness and mitigation techniques property owners can use to reduce or eliminate the impact of natural hazards. This strategy was deferred to this Plan to continue providing vital information and links on the Emergency Management webpage to educate the public on general and seasonal mitigation techniques. The Town can also get information via social media platforms (see Table 2.1). Action Item #6 (also in Table 7.1)
Subdivision Regulations (2023) Zoning Ordinance (2023) Site Plan Review Regulations (2023)	The purpose of subdivision regulations is to provide for the Town's orderly present and future development by promoting public health, safety, convenience, and welfare. Zoning regulations deal with land use, including rural, residential, flood zone, agriculture, and timber management. Zoning regulations often include drainage and infrastructure provisions. The Site Plan Review Regulations allow the Town to regulate commercial development.	Select Board & Planning Board	Excellent	Improvements Needed: Groton's regulations address setbacks, road frontage, and the size of the lot. Regulations also address driveways, structures, roads, erosion and sediment control, and adequate stormwater flow. This strategy was deferred to review the Town's planning mechanisms, including but not limited to the Subdivision, Zoning, Site Plan Review, and Floodplain Regulations, and to discuss changes that may mitigate the occurrence of and damage from the natural hazards identified in this Plan. Action Item #19 (also in Table 7.1)
Tree Removal Program	Tree Removal Program reduces damage from fallen trees and limbs to power lines, stormwater ditches, and structures. It also helps reduce the wildfire risk.	Highway Department	Excellent	Improvements Needed: As trees become damaged and threaten structures and town roads, the Highway Department removes them. The NH DOT and NH Electric Coop do this for state roads as needed; they have been very proactive. This strategy was deferred to continue local tree and brush removal efforts to help mitigate the effects of high wind events, ice storms, wildfires, and other natural hazards. Action Item #2 (also in Table 7.1)
Dry Hydrants and other Water Resources	There are no pressurized hydrants in Groton. However, two dry hydrants are maintained by the Highway Department and the Hebron Fire Department. Other water resources in Groton include other locations for water drafting.	Hebron Fire Department & Groton Highway Department	Excellent	Improvements Needed: Two dry hydrants and three drafting sites (may be seasonal) in Groton provide water resources for firefighting. These are maintained by both the Hebron Fire Department and the Groton Highway Department. This strategy was deferred to maintain the dry hydrants and other water resources to help mitigate the effects of structure fires and wildfires. Action Item #4 (also in Table 7.1)

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
Master Plan (2017)	A Master Plan includes goals, objectives, and expectations for the future development of the Town.	Planning Board	Good	Improvements Needed: The Groton Master Plan was last updated in 2017 and will not be ready for a recommended complete update until 2027. This strategy was deferred to update the Master Plan according to the State's 10-year recommendation and consider including a natural hazards section and a discussion on climate change and action items from this Plan in future updates. Action Item #15 (also in Table 7.1)
Bridge Maintenance Program	There are currently no red-listed bridges in the Community. Inspection and clean-up of bridges occur annually. The State inspects all bridges every other year and maintains them regularly.	Highway Department	Excellent	No Improvements Needed: The Groton Highway Department has established a short and long-term bridge maintenance and replacement schedule. Currently, there are no "red-listed" bridges in the Town. The one red-listed bridge was replaced five or six years ago.
Building Code & Permits	The Town has not adopted International Building Codes (IBC) or International Residential Codes (IRC). The Town does require builders to follow the State-adopted codes for new construction so that national standards for flood, wind, earthquake, fire, and snow load are met.	Select Board & Planning Board	Excellent	No Improvements Needed: The Town of Groton does not have a Building Inspector or Code Enforcement Officer. Building permit guidelines are available, and building permits are required. The permitting process requires builders to abide by the International Building Codes (IBC) and the International Residential Codes (IRC), which the State of New Hampshire has adopted. The building permit process in Groton works well.
NH Forest and Lands & Fire Permits	NH Forest & Lands, a division of the NH Department of Natural & Cultural Resources (DNCR), regulates open burning and permits.	NH Forests & Lands (DNCR) & Local Fire Warden	Excellent	No Improvements Needed: The system with NH Forests & Lands (DNCR) and the local fire warden works well. The public knows fire permitting requirements and can get permits online (\$5.50 fee).
Burning Index	New Hampshire Forests & Lands (DNCR) has a burning index that measures the risk for wildfires and how likely fires are to start on a given day. It also evaluates the potential damages wildfires can create, the number of people needed to fight them, and the type of equipment that might be needed.	NH Hampshire Forests & Lands (DNCR) & Fire Department	Excellent	No Improvements Needed: The Fire Department receives regular notification of the burning index via email from NH Forests & Lands. This notification is made daily during the fire danger season, and Hebron and Rumney have fire danger signs.
Capital Reserve Fund (CRF)	A Capital Reserve fund is a type of account on a town's balance sheet reserved for long-term capital investment projects or any other significant and anticipated expense(s) that will be incurred. Reserve funds are set aside to partially ensure adequate funding to finance future projects, equipment, and other expenditures.	Select Board	Excellent	No Improvements Needed: The Town's Capital Reserve Funds are set aside each year at budget time to assist the Town's departments with planned purchases of equipment and supplies or in emergencies. The Groton Capital Reserve Funds work well and are part of the Town Warrant at the annual Town Meeting.
Emergency Action Plan (Dams)	Dam Emergency Action Plans are designed to notify and outline evacuation procedures should a dam failure occur.	Spectacle Pond Dam	Excellent	No Improvements Needed: The Town has a copy of the EAP (9.9.21) for the one high-hazard dam in the Community, Spectacle Pond Dam. This dam, owned by the Spectacle Pond Association, has recently been repaired to meet the State's requirements. No improvements are needed.

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
Life Safety & Fire Codes	Guides all buildings for life safety and fire codes	Fire Departments	Excellent	No Improvements Needed: The National Fire Protection Association (NFPA) and the NH safety and fire codes guide the Hebron and Rumney Fire Departments to inspect all commercial, public assembly, and rental properties (3 units or more). The fire departments do their best to provide timely inspections based on available staffing.
State Health Department Public Health Plan	The State Health Department wrote the "Influenza, Pandemic, Public Health Preparedness, and Response Plan" to be prepared for any public health emergency; the Town is part of the Central NH Regional Public Health Emergency Annex.	Central NH Regional Public Health Network	Excellent	No Improvements Needed: The State Public Health Plan assists the Community as part of the services provided by the Central NH Regional Public Health Network. The Town attends public health meetings whenever possible.
Radio Communications	Radio communications are vital for emergency response to all types of hazards. Radios should be interoperable and up-to-date with current technology.	Emergency Management Director	Good	No Improvements Needed: The Hebron and Rumney Fire Departments, the Police Department, the Highway Department, and the EMD have radio interoperability. Communications systems and radios are updated with state and federal requirements and work as intended. Some areas of the Town have "dead spots," but this is not easily mitigated; therefore, no improvements were needed.
Local Road Design Standards	Local road design standards are specifications for constructing new roads in a community.	Select Board & Highway Department	Excellent	No Improvements Needed: Local road standards have been established in the Subdivision Regulation to provide specifications for building new roads to ensure that the Town does not assume ownership of substandard roads. The Town will not assume ownership of roads not built to Class V standards. Acceptance of new roads is voted on at a Town Meeting as a warrant article.
Shoreland Water Quality Protection Act (formerly the Comprehensive Shoreland Protection Act)	The Shoreland Water Quality Protection Act (SWQPA) establishes minimum standards for using and developing shorelands adjacent to the State's public water bodies. The SWQPA includes changes to vegetation requirements within the natural woodland and waterfront buffers, the impervious surface limitations, and the shoreland permit by notification process.	State of NH	Good	No Improvements Needed: The Town of Groton follows the Shoreland Water Quality Protection Act regulations. Compliance with the Act is encouraged; however, enforcement may not always be optimal with no Building Inspector.
Social Media Accounts	Social media accounts, such as Facebook, Twitter, Instagram, and local online newsletters, can provide excellent information on emergency preparedness and hazard mitigation strategies that can be taken to protect homes and property.	Department Heads	Good	No Improvements Needed: Groton - NH Events and Groton (town) NH Community Page (private page). These social media accounts work well to keep the citizens of Groton informed about what's happening in their town.

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Chapter 7: Last Mitigation Plan

A. DATE OF LAST PLAN

Based on the Disaster Mitigation Act (DMA) of 2000, Groton has developed hazard mitigation plans in the past. The most recent update was formally approved in 2020. The Groton Hazard Mitigation Plan Update 2024 updates the 2020 plan.

Below are the action items that were identified in the 2020 plan. The Team identified the status of each strategy based on three sets of questions:

- Has the strategy been completed?
 - If so, what was done?
- Should the strategy be deleted?
 - Is the strategy mitigation or preparedness?
 - Is the strategy useful to the Town under the current circumstances?
- Should the strategy be deferred for consideration in this Plan?
 - Should this strategy be reconsidered and included as a new action item for this Plan if the strategy was not completed?

Strategies “deferred” from the prior plan, were added to **Table 9.1, Mitigation Action Plan** as new strategies and were reprioritized to meet the current needs of the Town.

In *Table 7.1: Accomplishments since the Last Plan*, the Team assessed what had been accomplished and determined what additional work may be needed. Columns in red font were extracted word-for-word from the 2020 Hazard Mitigation Plan. Four additional columns not shown here – *Type of Hazard, Managing Department, Funding or Support, and Estimated Cost* – can be found in the 2020 Hazard Mitigation Plan.

TABLE 7.1: ACCOMPLISHMENTS SINCE THE LAST PLAN

Rank	Prior Mitigation Project	Time Frame	Completed, Deleted, or Deferred
0-1	Action Item #1: Routinely inspect the functionality of fire hydrants and repair all hydrants and other water resources in Groton. Consider other areas of the community that have limited water resources and address these issues by installing new hydrants, fire ponds and/or cisterns as needed (WF8).	Short Term Ongoing (For the life of the Plan)	Completed & Deferred: Two dry hydrants and drafting sites in Groton provide water resources for firefighting. These are maintained by both the Hebron Fire Department and the Groton Highway Department. This strategy was deferred to maintain the dry hydrants and other water resources to help mitigate the effects of structure fires and wildfires. Action Item #4 (also in Table 6.1)
0-2	Action Item #2: The Emergency Management Director (EMD) to encourage all town officials who may be required to respond to an emergency and any new emergency responders to take NIMS 700 (S-700) & ICS (ISC100 & ISC200); additional, the EMD and other vital emergency responders to learn about and become adept with WEB-EOC (Tables 6.1 & 7.1).	Short Term Ongoing (For the life of the Plan)	Completed & Deferred: Most first responders have done NIMS and ICS training; however, town officials and new hires should also be trained. Although this is preparedness, this strategy was deferred to this Plan to continue providing NIMS (IS-700) and ICS (ICS 100 and ICS 200) training to new first responders and town officials as they become elected/appointed. Action Item #5 (also in Table 6.1)

Rank	Prior Mitigation Project	Time Frame	Completed, Deleted, or Deferred
0-3	<p>Action Item #3: In addition to work that is done by and with local utility companies, monitor the need for brush cutting, drainage system clearance and tree removal as part of a tree trimming program and create defensible space around power lines, oil and gas lines and other infrastructure; work to reduce wildfire risk by clearing dead vegetation, cutting high grass and other fuel loads in the community (SW4, WF7, WF9 & F14) (Table 6.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deferred: As trees become damaged and threaten structures and town roads, the Highway Department removes them. The NH DOT and NH Electric Coop do this for state roads as needed. This strategy was deferred to continue local tree and brush removal efforts to help mitigate the effects of high wind events, ice storms, wildfires, and other natural hazards. Action Item #2 (also in Table 6.1)</p>
0-4	<p>Action Item #4: Train all fire responders on the many aspects of emergency response, including wildfire and HazMat response, in coordination with the Hebron and Rumney Fire Departments and Lakes Region Fire Mutual Aid (Table 6.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deleted: The Hebron and Rumney Fire Departments regularly train their personnel in all aspects of emergency response, including wildfire, HazMat, and training at Groton Wind. The NH State Police also train their personnel in all aspects of law enforcement. With no emergency departments in Groton, this strategy was deleted.</p>
0-5	<p>Action Item #5: Provide an annual review of the Groton Hazard Mitigation Plan Update 2020, including a review of the status of "Action Items" listed in this Plan to encourage completion; get approval from the local elected body on an annual basis (MU11) (Table 6.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Deferred: The Groton Hazard Mitigation Plan (2020) is being updated to this Plan. This strategy was deferred to review this Plan, the Groton Hazard Mitigation Plan 2024, annually and to update the Plan again in 2029. Action Item #14 (also in Table 6.1)</p>
0-6	<p>Action Item #6: The Hebron & Rumney Fire Departments will update their current databases to track vulnerable populations, such as the elderly, the poor, and the homeless, by developing a new and updated survey of the functional needs population and a method of maintaining the data (ET3 & WW6) (Table 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deleted: The Hebron and Rumney Fire Departments continually update their current databases to track vulnerable populations, such as older people and people experiencing poverty and homelessness. As these departments are outside of the Town, this strategy was deleted.</p>
0-7	<p>Action Item #7: Review this Hazard Mitigation Plan whenever an annual review of the Master Plan is done and consider the incorporation of a Natural Hazards section and mitigation action items from this Plan (MU6) (Tables 6.1 & 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Deferred: The Groton Master Plan was last updated in 2017 and will not be ready for a recommended complete update until 2027. This strategy was deferred to update the Master Plan according to the State's 10-year recommendation and consider including a natural hazards section and a discussion on climate change and action items from this Plan in future updates. Action Item #15 (also in Table 6.1)</p>
0-8	<p>Action Item #8: The Fire Departments to participate in training opportunities at Groton Wind to ensure readiness (Table 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deleted: This strategy from the prior plan is combined with Action Item #4 from the prior plan.</p>

Rank	Prior Mitigation Project	Time Frame	Completed, Deleted, or Deferred
0-9	<p>Action Item #9: Post important information on the Town's Emergency website and notices of red flag burning days; obtain and have available "Firewise" brochures to educate homeowners on methods to reduce fire risk around their homes (WF10) and provide a link to "Firewise" on the Emergency page of the Town's website. Provide "Firewise" brochures to those residents seeking burn permits and advise residents of the importance of maintaining defensible space, the safe disposal of yard and household waste, and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches and yards (WF12) (Table 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deferred: The Town has posted important fire information on the Town's website and notices of red flag burning days and has brochures available at the Town House. This strategy was deferred to obtain and have available Firewise® brochures to educate homeowners on methods to reduce fire risk around their homes and provide a link to Firewise® on the Emergency Management webpage of the Town's website. Provide Firewise® brochures to those residents seeking burn permits (if not obtained online); advise residents of the importance of maintaining defensible space, the safe disposal of household waste, and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches, and yards. Action Item #11</p>
0-10	<p>Action Item #10: Provide robust information on a town emergency webpage and on available social media platforms for educating the public on hazard mitigation and preparedness measures (MU14) by adding to the Town's website a webpage that will include such information as emergency contacts, shelter locations, evacuation routes (SW7, WF11 & T3), methods of emergency alerting, 911 compliance, water saving techniques (D9), earthquake risk and mitigation activities that can be taken in residents' homes (EQ7), steps homeowners can take to protect themselves and their properties when extreme temperatures occur (ET1 & ET4), safety measures that can be taken during hail (HA3) and lightning storms (L2), mitigation techniques for property protection and links to available sources; educate homeowners regarding the risks of building in hazard zones and encourage homeowners to install carbon monoxide monitors and alarms (WW5). Develop ways to provide notification to citizens (Table 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Partially Completed & Deferred: The Town has a website and an Emergency Management webpage with some emergency-related links, including a link to Genasys. An emergency web page is a great way to provide outreach to residents on emergency preparedness and mitigation techniques property owners can use to reduce or eliminate the impact of natural hazards. This strategy was deferred to this Plan to continue providing vital information and links on the Emergency Management webpage to educate the public on general and seasonal mitigation techniques. The Town can also get information via social media platforms (see Table 2.1). Action Item #6 (also in Table 6.1)</p>
0-11	<p>Action Item #11: Provide public education to those residents that live on private roads about the importance of maintaining these roads for emergency responders by adding information to the Town's website via an Emergency Webpage or by using available social media (MU16) (Table 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deferred: The Town has continuously promoted private mitigation efforts on private roads to the residents. This strategy was deferred to continue providing public outreach to the citizens of Groton on the importance of maintaining private roads to allow for safe access for fire apparatus into wildland-urban interface neighborhoods and properties. This education will help ensure accessibility for emergency response and decrease the wildfire risk. Action Item #8</p>

Rank	Prior Mitigation Project	Time Frame	Completed, Deleted, or Deferred
0-12	<p>Action Item #12: Advise the public about the local flood hazard, flood insurance and flood protection measures (F10) by obtaining and keeping on hand a supply of NFIP brochures to have available in the Town Offices; give NFIP materials to homeowners and builders when proposing new development or substantial improvements; encourage property owners to purchase flood insurance (F22), whether or not they are in the flood zone and provide appropriate links to the NFIP and Ready.gov on the Emergency webpage or available Facebook pages; through Public Outreach, educate homeowners regarding the risks of building in the flood zone and measures that can be taken to reduce the chance of flooding, such as securing debris, propane tanks, yard items or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters; add links and info to website and available Facebook pages as well as a Community Newsletter; actively work with residents to ensure they are in compliance with the Town's Floodplain Ordinance (F23) (Tables 6.1 & 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deferred: The Town developed a flood ordinance and became a National Flood Insurance Program (NFIP) member on April 18, 1983. The Town's Flood Ordinance works well to successfully prohibit or force compliance to the ordinance for building and substantial improvements to structures within the FEMA flood zone. The Zoning Ordinance was last amended in late 2023. This strategy was deferred to this Plan to continue compliance with the NFIP, obtain NFIP brochures to have available at the Town House, and provide public outreach regarding the benefits of membership in the NFIP, whether or not properties are in the FEMA floodplain. This strategy was also deferred to provide vital information on flood mitigation techniques that can be taken to protect individual homes and properties using the Town's website or social media pages. Provide links to the NFIP, Ready.gov, and other pertinent websites. Action Item #10 (also in Table 6.1)</p>
0-13	<p>Action Item #13: Provide public outreach to encourage all residents to contact CodeRED to add cell numbers, unlisted numbers, emails and to verify information; use the website, a possible brochure, a Community Newsletter or a sign up at Town Meeting (MU14) (Tables 6.1 & 7.1).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deferred: Genasys (formerly CodeRED/NH ENS) is an excellent warning system, but it only stores residents' landline phone numbers. The Town has continuously provided information to residents about CodeRED, the previous system. This strategy was deferred to continue providing public outreach to encourage all residents to contact Genasys to add cell numbers, emails, and unlisted numbers and verify the information. Use the Town's website, a possible brochure at the Town House, social media platforms, or a sign-up at a Town Meeting. Action Item #7 (also in Table 6.1)</p>
0-14	<p>Action Item #14: Provide public outreach to the citizens of Groton regarding the availability of the Town House as a "cooling or warming center" during times of extended high temperatures and severe winter weather (ET3 & WW6).</p>	<p>Short Term Ongoing (For the life of the Plan)</p>	<p>Completed & Deferred: The Town has continuously provided public outreach to the citizens of Groton regarding the availability of the Town House as a "cooling or warming center" during times of extended high temperatures and severe winter weather. This strategy was deferred to continue providing this information via the Town's Emergency Management webpage. Action Item #9</p>
1-1	<p>Action Item #15: Develop a fire pond, instead of a cistern, near the Town House to address water availability to fight fires at this important critical facility (EOC, Shelter, Police Department, Town Records & Government) (Table 7.1).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Completed & Deleted: The Town has not developed a fire pond at the Town House due to budget, time constraints, and necessity. In addition, there is a dry hydrant less than a mile away, and another dry hydrant may be installed when the new Town Garage is built (near the Town House). The Team felt this strategy was no longer needed; therefore, it was deleted.</p>

Rank	Prior Mitigation Project	Time Frame	Completed, Deleted, or Deferred
1-2	<p>Action Item #16: Improve the flow of stormwater on the Province Road by upgrading the twenty underperforming/aging culverts, eighteen 12" metal culverts, and two 15" plastic, with twenty 18"-24" plastic culverts. FEMA funding was provided after the October 2017 heavy rain and wind storm (PDD #4355; \$370,000 (FEMA)/\$123,000 (local)). The Road Agent will replace with larger ones where possible (F13) (Table 7.1).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Completed & Deleted: The Highway Department has improved all 20 underperforming/aging culverts on Province Road with 18"-24" plastic culverts to improve stormwater flow. FEMA funding was provided after the October 2017 heavy rain and wind storm in addition to other funding streams. This strategy was completed; therefore, it was deleted.</p>
1-3	<p>Action Item #17: Lobby the state to mitigate the flooding problems at the bridge on North Groton Road over the Cockermouth River to improve the flow of stormwater and to eliminate the flood hazard (F13).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Completed & Deleted: Lobbying the State to repair the North Groton Road Bridge over Cockermouth has been unsuccessful; the issues at this location cause flooding of the Town Garage. Rather than wait for the State to repair the bridge, the Town has made efforts to move the Town Garage to a less hazardous location. Therefore, the strategy to lobby the State was deleted.</p>
1-4	<p>Action Item #18: Improve the flow of stormwater on North Fletcher Road by upgrading the 12" plastic culvert with an 18" plastic culvert (F13).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Completed & Deleted: The Highway Department replaced the underperforming/aging 12" plastic culvert on North Fletcher Road with an 18" plastic culvert; therefore, this strategy was deleted.</p>
1-5	<p>Action Item #19: Pursue approval by the citizens of Groton at the next Town Meeting (2020) to first hire an engineer and then to build this important critical facility (Table 7.1).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Partially Completed & Deferred: The Town obtained approval from the citizens of Groton to build a new Town Garage and hire an engineering firm at the March 2023 Town Meeting. This strategy was deferred to complete the project to build a new Town Garage, including a generator, and potentially provide a dry hydrant in the vicinity to help mitigate wildfires here and at the Town House. Action Item #17</p>
1-6	<p>Action Item #20: Update the Groton Emergency Operations Plan to coincide with the new State 15-ESF format. Include an analysis of the impact of natural hazards on Critical Infrastructure and Key Resources that may be needed during an emergency and include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets (MU6) (Tables 6.1 & 7.1).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Partially Completed & Deferred: The Groton Emergency Operations Plan (EOP) was last updated in 2010 but is currently being updated; it is nearly complete. This strategy is being deferred to complete the new EOP and include an EOC Call Alert List, a detailed Resource Inventory List, and Player Packets. This strategy was deferred to this Plan to update the EOP. Action Item #13 (also in Table 6.1)</p>
1-7	<p>Action Item #21: Consider ways to improve 911 signage compliance so that emergency responders can better assist the public at the time of need; perhaps through purchase of signs by the Town and/or through public outreach (MU14) (Tables 6.1 & 7.1).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Completed & Deferred: The Town has continuously encouraged the residents of Groton to comply with E-911 signage. Groton is about 55% compliant with E-911 signage. This strategy was deferred to this Plan to consider ways to get this signage more compliant so that emergency responders can better assist the public in need. Use public outreach opportunities such as the Emergency Management webpage or social media to promote better compliance and develop other means of increasing compliance. The Town could purchase and install signage, create an ordinance and "fine", or provide signs for residents to install themselves to promote compliance better. Action Item #3 (also in Table 6.1)</p>

Rank	Prior Mitigation Project	Time Frame	Completed, Deleted, or Deferred
1-8	<p>Action Item #22: Review the Groton Subdivision Regulations to consider changes to the regulations that could potentially reduce the impact from future hazards, such as addressing water resources in new subdivisions, adequate storm water flow, and the steepness of driveways and roads (WF2, F1 & MU6) (Tables 6.1 & 7.1).</p>	<p>Short Term (1 year or less: 0-12 months)</p>	<p>Completed & Deferred: Improvements Needed: Groton's regulations address setbacks, road frontage, and the size of the lot. Regulations also address driveways, structures, roads, erosion and sediment control, and adequate stormwater flow. This strategy was deferred to review the Town's planning mechanisms, including but not limited to the Subdivision, Zoning, Site Plan Review, and Floodplain Regulations, and to discuss changes that may mitigate the occurrence of and damage from the natural hazards identified in this Plan. Action Item #19 (also in Table 6.1)</p>
2-1	<p>Action Item #23: Maintain culverts and ditches in the community and develop a written storm water maintenance plan in order to ensure more efficient storm water management. Include the location, date of installation, GPS coordinates, material, type, size, age, and expected replacement date of all culverts, catch basins, and drainage ditches in the community (F5) (Tables 6.1 & 7.1).</p>	<p>Medium Term (1-3 years: 13-36 months)</p>	<p>Partially Completed & Deferred: The Groton Highway Department does an excellent job cleaning and repairing drainage basins and culverts, and approximately 90% of the Town's culvert issues have been repaired within the last five years. A list of culverts is available; however, a written Culvert & Stormwater Maintenance Plan should be developed to ensure continuity of actions and efficient stormwater management. This strategy was deferred for continued maintenance and to develop a written Culvert & Stormwater Maintenance Plan detailing the size, material, installation date, recommended date for improvement, GPS location, and any associated problems (i.e., flooding). Action Item #1 (also in Table 6.1)</p>
2-2	<p>Action Item #24: Improve the flow of stormwater on the Sculptured Rocks Road by upgrading the six underperforming/aging culverts, three 24" metal culverts, and three 18" plastic, with 18"-24" plastic culverts. The Road Agent will replace with larger ones where possible (F13).</p>	<p>Medium Term (1-3 years: 13-36 months)</p>	<p>Completed & Deleted: The Highway Department has improved the six underperforming/aging culverts on Sculptured Rocks Road with 18"-24" plastic culverts and open-bottom box culverts. This strategy was deleted as the work on Sculptured Rocks Road has been completed.</p>
2-3	<p>Action Item #25: Improve the flow of stormwater on Bailey Hill Road by upgrading the 18" metal culvert with an 18" plastic culvert. The Road Agent will replace with larger ones where possible (F13).</p>	<p>Medium Term (1-3 years: 13-36 months)</p>	<p>Deleted: The Highway Department did not replace the culvert on Bailey Hill Road as it was later felt unnecessary. Therefore, this strategy was deleted.</p>
2-4	<p>Action Item #26: Review the Zoning Ordinance and discuss any changes that can be made to diminish the impact of hazards (Tables 6.1 & 7.1).</p>	<p>Medium Term (1-3 years: 13-36 months)</p>	<p>Completed & Deferred: This strategy from the prior plan is combined with Action Item #19 from this Plan. (also in Table 6.1)</p>
2-5	<p>Action Item #27: Consider the development of a steep slopes ordinance to prohibit development (Table 7.1).</p>	<p>Medium Term (1-3 years: 13-36 months)</p>	<p>Completed & Deferred: This strategy from the prior plan is combined with Action Item #19 from this Plan. (also in Table 6.1)</p>
2-6	<p>Action Item #28: Work on the driveway standards in the Subdivision Regulations to address the slope, width, and access of new driveways to ensure better emergency response accessibility (Table 7.1).</p>	<p>Medium Term (1-3 years: 13-36 months)</p>	<p>Completed & Deferred: This strategy from the prior plan is combined with Action Item #19 from this Plan. (also in Table 6.1)</p>

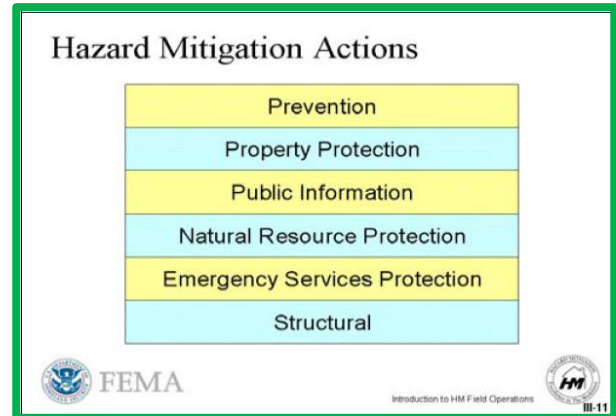
Rank	Prior Mitigation Project	Time Frame	Completed, Deleted, or Deferred
2-7	Action Item #29: Review current subdivision regulations and the Water Resource Plan (WRP) and consider including requirements for builders and developers to install onsite water storage in new subdivisions based on criteria to be determined by the Planning Board and Emergency Responders. Encourage the Planning and other Boards to use of the WRP to assist with the review of future subdivision requests (WF3) (Table 7.1) .	Medium Term (1-3 years: 13-36 months)	Completed & Deferred: The Community developed a Rural Fire Water Resource Plan (WRP) in 2007. The WRP is a useful planning document that can help the Planning Board understand the availability of water resources throughout the Community. This strategy was deferred to use the WRP to assist when examining locations for new proposed subdivisions. Action Item #12
3-1	Action Item #30: Improve the flow of stormwater on Sculptured Rocks Road by upgrading the three 5-foot steel culverts with 10-foot concrete box culverts. The Administrative Assistant and Road Agent have applied for a Hazard Mitigation Grant to try to obtain funding for this project. This project is also affected by the July 2019 storm, when one of these culverts became 100% blocked. HSEM & FEMA are working with the town for FEMA assistance.	Long Term (3-5 years: 37-60 months)	Completed & Deleted: The Highway Department has improved the three underperforming/aging culverts on Sculptured Rocks Road with open bottom box culverts. This strategy was deleted as the work on Sculptured Rocks Road has been completed.
3-2	Action Item #31: Improve the flow of stormwater on River Road by upgrading the ten underperforming/aging 18"-24" metal culverts with 18"-24" plastic culverts. The Road Agent will replace with larger ones where possible (F13) .	Long Term (3-5 years: 37-60 months)	Completed & Deleted: The Highway Department has improved all of the metal culverts on River Road with 18"-24" plastic culverts. This strategy was deleted as the work on River Road has been completed.
3-3	Action Item #32: Improve the flow of stormwater on the North Groton Road by upgrading the four underperforming/aging 18" metal culverts with four 18" plastic culverts. The Road Agent will replace with larger ones where possible (located between Halls Brook and Nedeau Lane) (F13) .	Long Term (3-5 years: 37-60 months)	Completed & Deleted: The Highway Department has improved all the metal culverts on North Groton Road with 18"-24" plastic culverts. This strategy was deleted as the work on North Groton Road has been completed.
3-4	Action Item #33: Improve the flow of stormwater on North Groton Road by upgrading the 7-foot round metal culvert with a 10-foot box culvert (F13) .	Long Term (3-5 years: 37-60 months)	Completed & Deferred: The Highway Department has not replaced the underperforming/aging 7' round concrete culvert on North Groton Road. This project is the only remaining culvert improvement project in Town. This strategy was deferred to obtain grant funding to replace the 7-foot round cement with a 10-foot box open-bottom culvert. Action Item #18
3-5	Action Item #34: Include plans to install a permanent generator for a new Town Garage to ensure functionality at the time of an emergency (MU13) (Tables 6.1 & 7.1) .	Long Term (3-5 years: 37-60 months)	Deferred: The Town is moving the Town Garage from its location in the floodplain to a new, safer location; a generator is included in the plans. Otherwise, the emergency generator capabilities in the Town are good. This strategy was deferred to obtain and install an emergency generator for a new Town Garage to improve the effectiveness of the facility. Action Item #17 (also in Table 6.1)
3-6	Action Item #35: Entice cell companies to come to Groton to provide better cell coverage for the community and to improve the overall communications capabilities of emergency responders (Table 7.1) .	Long Term (3-5 years: 37-60 months)	Deleted: This strategy was not completed. It was deleted because the cost-benefit analysis for this project was not justifiable. The Team determined that it was not likely to be accomplished, primarily due to the population within the service area.

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Chapter 8: New Mitigation Strategies & STAPLEE

A. MITIGATION STRATEGIES BY TYPE

The following list of mitigation categories and possible strategy ideas was compiled from several sources, including the USFS, FEMA, other planners, and past hazard mitigation plans. This list was used during a brainstorming session to discuss the issues in town. Team involvement and the brainstorming sessions proved helpful in bringing new ideas, better relationships, and more in-depth knowledge of the Community.



Prevention

- Forest fire fuel reduction programs
- Special management regulations
- Fire Protection Codes NFPA 1
- Firewise® landscaping
- Culvert and hydrant maintenance
- Planning and zoning regulations
- Building Codes
- Density controls
- Driveway standards
- Slope development regulations
- Master Plan
- Capital Improvement Plan
- Rural Fire Water Resource Plan
- NFIP compliance

Public Education & Awareness

- Hazard information centers
- Public education and outreach programs
- Emergency website creation
- Firewise® training
- National Flood Insurance Program (NFIP)
- Public hazard notification
- Defensible space brochures

Emergency Service Protection

- Critical facilities protection
- Critical infrastructure protection
- Emergency training for town officials
- Ongoing training for first responders

Property Protection

- Current use or other conservation measures
- Transfer of development rights
- Firewise® landscaping
- Water drafting facilities
- High-risk notification for homeowners
- Structure elevation
- Real estate disclosures
- Floodproofing
- Building codes
- Development regulations

Natural Resource Protection

- Best management practices within the forest
- Forest and vegetation management
- Forestry and landscape management
- Development regulations for wetlands
- Watershed management
- Erosion control
- Soil stabilization
- Open space preservation initiatives

Structural Projects

- Structure acquisition and demolition
- Structure acquisition and relocation
- Bridge replacement
- Dam removal
- Culvert up-size or realignment

B. POTENTIAL MITIGATION STRATEGIES BY HAZARD

To further promote the concept of mitigation, the Team was provided with a handout developed by Mapping and Planning Solutions and used to determine what additional mitigation action items might be appropriate for the Town. The mitigation action items from that handout are listed below and on the following page. The Team considered each item from this comprehensive list of possible mitigation action items to determine if any of these action items could be put in place for Groton, emphasizing new and existing buildings and infrastructure.

Strategies that may apply to more than one hazard	Type of Project
• <i>Community Outreach and Education</i>	<i>Public Awareness</i>
• <i>Changes to Zoning Regulations</i>	<i>Prevention</i>
• <i>Changes to Subdivision Regulations</i>	<i>Prevention</i>
• <i>Steep Slopes Ordinance</i>	<i>Prevention</i>
• <i>Density Controls</i>	<i>Prevention</i>
• <i>Driveway Standards</i>	<i>Prevention</i>
• <i>Emergency Website Creation</i>	<i>Public Awareness</i>
• <i>Critical Infrastructure & Key Resources</i>	<i>Emergency Service Protection</i>
• <i>Emergency Training for Town Officials</i>	<i>Emergency Service Protection</i>
• <i>High-risk Notification to Homeowners</i>	<i>Property Protection</i>
• <i>Master Plan Update or Development</i>	<i>Prevention</i>
• <i>Capital Improvement Plan</i>	<i>Prevention</i>
Flood Mitigation Ideas	Type of Project
• <i>Stormwater Management Ordinances</i>	<i>Prevention</i>
• <i>Floodplain Ordinances</i>	<i>Prevention</i>
• <i>Updated Floodplain Mapping</i>	<i>Prevention</i>
• <i>Watershed Management</i>	<i>Natural Resource Protection</i>
• <i>Drainage Easements</i>	<i>Prevention</i>
• <i>Purchase of Easements</i>	<i>Prevention</i>
• <i>Wetland Protection</i>	<i>Natural Resource Protection</i>
• <i>Structural Flood Control Measures</i>	<i>Prevention</i>
• <i>Bridge Replacement</i>	<i>Structural Project</i>
• <i>Dam Removal</i>	<i>Structural Project</i>
• <i>NFIP Compliance</i>	<i>Prevention</i>
• <i>Acquisition, Demolition & Relocation</i>	<i>Structural Project</i>
• <i>Structure Elevation</i>	<i>Structural Project</i>
• <i>Floodproofing</i>	<i>Property Protection</i>
• <i>Erosion Control</i>	<i>Natural Resource Protection</i>
• <i>Floodplain/Coastal Zone Management</i>	<i>Prevention</i>
• <i>Building Codes Adoption or Amendments</i>	<i>Prevention</i>
• <i>Culvert & Hydrant Maintenance</i>	<i>Prevention</i>
• <i>Culvert & Drainage Improvements</i>	<i>Structural Protection</i>
• <i>Transfer of Development Rights</i>	<i>Property Protection</i>

Natural Hazard Mitigation Ideas	Type of Project
Landslide & Erosion	
• Slide-Prone Area Ordinance.....	Prevention
• Drainage Control Regulations.....	Prevention
• Grading Ordinances.....	Prevention
• Hillside Development Ordinances.....	Prevention
• Open Space Initiatives.....	Prevention
• Acquisition, Demolition & Relocation.....	Structural Project
• Vegetation Placement and Management.....	Natural Resource Protection
• Soil Stabilization.....	Natural Resource Protection
Lightning & Hail	
• Building Construction.....	Property Protection
High Wind Events	
• Construction Standards and Techniques.....	Property Protection
• Safe Rooms.....	Prevention
• Manufactured Home Tie Downs.....	Property Protection
• Building Codes.....	Property Protection
Wildfire	
• Building Codes.....	Property Protection
• Defensible Space.....	Prevention
• Forest Fire Fuel Reduction.....	Prevention
• Burning Restriction.....	Property Protection
• Water Resource Plan.....	Prevention
• Firewise® Training & Brochures.....	Public Awareness
• Woods Roads Mapping.....	Prevention
Extreme Temperatures	
• Warming & Cooling Stations.....	Prevention
Severe Winter Weather	
• Snow Load Design Standards.....	Property Protection
Subsidence	
• Open Space.....	Natural Resource Protection
• Acquisition, Demolition & Relocation.....	Structural Project
Earthquake	
• Construction Standards and Techniques.....	Property Protection
• Building Codes.....	Property Protection
• Bridge Strengthening.....	Structural Project
• Infrastructure Hardening.....	Structural Project
Drought	
• Water Use Ordinances.....	Prevention

C. STAPLEE METHODOLOGY

Table 8.1, *Potential Mitigation Items & the STAPLEE*, reflects the newly identified potential hazard mitigation action items and the results of the STAPLEE evaluation, as explained below. Many of these potential mitigation action items overlap. Some areas identified as “All Hazards” would also apply indirectly to wildfire response.

Each proposed mitigation action item aims “to reduce or eliminate the long-term risk to human life and property from hazards”. To determine the effectiveness of each mitigation action item in accomplishing this goal, a set of criteria that was developed by FEMA, the STAPLEE method, was applied to each proposed action item.

The STAPLEE method analyzes a project's social, technical, administrative, political, legal, economic, and environmental characteristics; public administration officials and planners commonly use it to make planning decisions. The following questions were asked about the proposed mitigation action items discussed in Table 8.1.

Social..... Is the proposed action item socially acceptable to the Community? Is there an equity issue that would result in one segment of the Community being treated unfairly?

Technical..... Will the proposed action item work? Will it create more problems than it solves?

Administrative Can the Community implement the action item? Is there someone to coordinate and lead the effort?

Political Is the action item politically acceptable? Is there public support both to implement and maintain the project?

Legal..... Is the Community authorized to implement the proposed action item? Is there a clear legal basis or precedent for this activity?

Economic What are the costs and benefits of this action item? Does the cost seem reasonable for the size of the problem and the potential benefits?

Environmental How will the action item impact the environment? Will it need environmental regulatory approvals?

Each proposed mitigation action item was evaluated and scored based on the above criteria. Each of the STAPLEE categories was discussed and was awarded one of the following scores:

1 - Poor 2 - Average..... 3 - Good

An evaluation chart with total scores for each new action item is shown in Table 8.1.

The “Type” of Action Item was also considered (see section A of this chapter for reference):

- **Prevention**
- **Public Education & Awareness**
- **Emergency Service Protection**
- **Property Protection**
- **Natural Resource Protection**
- **Structural Projects**

D. TEAM’S UNDERSTANDING OF HAZARD MITIGATION ACTION ITEMS

The Team determined that any strategy designed to reduce personal injury or damage to property that could be done before an actual disaster would be listed as a potential mitigation action item. This decision was made even though not all projects listed in Table 8.1 and Table 9.1, *The Mitigation Action Plan*, are fundable under FEMA pre-mitigation guidelines. The Team determined that this Plan was primarily a management document designed to assist the Select Board and other town officials in all aspects of managing and tracking potential emergency planning action items. For instance, the Team knew that some of these action items were more appropriately identified as preparedness or readiness issues. As no other established planning mechanisms recognize some of these issues, the Team did not want to lose the ideas discussed during these planning sessions and thought this method was the best way to achieve that objective.

The Town understands that the action items for a town of 600 may not be the same as those for 30,000. Also, the action items for a town in the middle of predominantly hardwood forests are not the same as those for a town on the Jersey Shore. Therefore, the Town of Groton has accepted the **Mitigation Action Items** in Tables 8.1 and 9.1 as the complete list of action items for this town and only this town. Furthermore, the Town of Groton indicates that having considered a comprehensive list of possible mitigation action items (see sections A & B of this chapter) for this Plan, there are no additional action items to add now.

TABLE 8.1: POTENTIAL MITIGATION ACTION ITEMS & THE STAPLEE

Potential mitigation action items in Table 8.1 are listed in numerical order and indicate if they were derived from prior tables in this Plan, i.e., (Table 7.1). Items in green, such as (MU14) represent mitigation action items taken from Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013; see *Appendix F: Potential Mitigation Ideas*, for more information.

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
<p>Action Item #1: Maintain and improve culverts and ditches in the Community and develop and maintain a written stormwater maintenance plan to ensure more efficient stormwater management. In this plan or "inventory", include the location, installation date, GPS coordinates, material, type, size, age, and expected replacement date of all culverts, catch basins, and drainage ditches in the Community. (F5) (Tables 6.1 & 7.1)</p>	<p>Affected Location -Culverts & Ditches</p> <p>Type of Activity -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection</p>	3	3	2	3	3	3	3	20
		<p><i>Administrative: Time and staff restraints; lower on the priority list than other items</i></p>							
<p>Action Item #2: In addition to work done by and with local utility companies, monitor and maintain brush cutting, drainage system maintenance, and tree removal as part of a tree maintenance program. Create defensible space around power lines, oil and gas lines, and other infrastructure. Work to reduce the effects of invasive species, high wind events, ice storms, wildfires, and other natural hazards by clearing dead vegetation and cutting the Community's high grass and other fuel loads. (SW4, WF7, WF9 & F14) (Table 6.1 & 7.1)</p>	<p>Affected Location -Townwide</p> <p>Type of Activity -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection</p>	3	3	3	3	3	3	3	21
		<p><i>No apparent difficulty with this action item</i></p>							
<p>Action Item #3: Consider ways to get this signage more compliant so that emergency responders can better assist the public in their time of need. Use public outreach opportunities such as the Town's website or available social media to promote better compliance and develop other means of increasing compliance. The Town could purchase and install signage, establish an ordinance and fine, or provide signs for residents to install themselves to promote compliance better. (MU14) (Tables 6.1 & 7.1)</p>	<p>Affected Location -Townwide</p> <p>Type of Activity -Prevention -Public Education & Awareness -Emergency Service Protection -Property Protection -Natural Resource Protection</p>	3	3	3	3	3	3	3	21
		<p><i>Political: Some people will want their own signs; unmotivated residents may not want to be told what to do</i></p>							

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
<p>Action Item #4: Inspect the functionality of all hydrants and maintain and repair all hydrants and other water resources in Groton. Consider other community areas with limited water resources and address these issues by installing new hydrants, fire ponds, and cisterns. Work with local landowners to gain access to available water resources to help mitigate the effects of wildfires. (WF8) (Tables 6.1 & 7.1)</p>	<p><u>Affected Location</u> -Dry Hydrants -Water resources</p> <p><u>Type of Activity</u> -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #5: The Emergency Management Director (EMD) to encourage all town officials who may be required to respond to an emergency and any new emergency responders to take NIMS 700 (S-700) and ICS (ISC100 and ISC200). Additionally, the EMD should encourage key personnel to learn about and become adept with WEB-EOC. (Tables 6.1 & 7.1)</p>	<p><u>Affected Location</u> -Townwide</p> <p><u>Type of Activity</u> -Prevention -Emergency Service Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #6: Provide robust information on the Emergency Information webpage and social media platforms to educate the public on hazard mitigation and preparedness measures. Include preparedness information such as shelter locations, evacuation routes, methods of emergency alerting, and 911 compliance. Also include mitigation strategies such as mitigation techniques for earthquakes, tornadoes, severe winter weather, lightning, and climate change. Provide information on infectious diseases, encourage homeowners to install carbon monoxide monitors and alarms, and monitor radon in their homes. Offer residents and business owners reminders to clear snow from roofs during high accumulation snow years. (MU14, SW7, WF11, D9, T3, EQ7, ET1, ET4, L2, HA3, WW5) (Tables 6.1 & 7.1)</p>	<p><u>Affected Location</u> -Townwide</p> <p><u>Type of Activity</u> -Prevention -Public Education & Awareness -Property Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #7: Provide public outreach to encourage all residents to contact Genasys (formerly CodeRED/NH ENS) to add cell numbers, unlisted numbers, and emails and verify the information. Use the Town's website, a possible brochure, available social media platforms, local newsletters, or a sign-up at a Town Meeting. (MU14) (Tables 6.1 & 7.1)</p>	<p><u>Affected Location</u> -Townwide</p> <p><u>Type of Activity</u> -Prevention -Public Education & Awareness -Emergency Service Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #8: To promote private mitigation efforts, provide public outreach to the citizens of Groton on the importance of maintaining private roads to allow for safe access for fire apparatus into wildland-urban interface neighborhoods and properties. This education will help ensure accessibility for emergency response and decrease the wildfire risk. (MU16) (Table 7.1)</p>	<p><u>Affected Location</u> -Private Roads</p> <p><u>Type of Activity</u> -Prevention -Public Education & Awareness -Emergency Service Protection -Property Protection -Natural Resource Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #9: Provide public outreach to the citizens of Groton regarding the availability of the Town House as a "cooling or warming center" during times of extended high temperatures and severe winter weather. (ET3 & WW6) (Table 7.1)</p>	<p><u>Affected Location</u> -Town House</p> <p><u>Type of Activity</u> -Prevention -Public Education & Awareness</p>	3	3	3	3	3	3	3	21

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
<p>Action Item #10: Advise the public about the local flood hazard, flood insurance, and flood protection measures by obtaining and keeping a supply of NFIP brochures in the Town House. When proposing new development or substantial improvements, give NFIP materials to homeowners and builders. Encourage property owners to purchase flood insurance, whether they are in the flood zone, and provide appropriate links to the NFIP and Ready.gov on the Town's website or available social media platforms. Through Public Outreach, educate homeowners regarding the risks of building in the flood zone and measures to reduce flooding. Actively work with residents and builders to ensure they comply with the Town's Floodplain Ordinance. (F10, F22 & F23) (Tables 6.1 & 7.1)</p>	<p>Affected Location -Areas prone to flooding</p> <p>Type of Activity -Prevention -Public Education & Awareness -Property Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #11: Post important information on the Town's website and notices of red flag burning days. Obtain and have available Firewise® brochures to educate homeowners on methods to reduce fire risk around their homes and provide a link to Firewise® on the emergency page of the Town's website. Provide Firewise® brochures to those residents seeking burn permits (if not obtained online); advise residents of the importance of maintaining defensible space, the safe disposal of household waste, and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches, and yards. (WF10 & WF12) (Table 7.1)</p>	<p>Affected Location -Townwide</p> <p>Type of Activity -Prevention -Public Education & Awareness -Emergency Service Protection -Property Protection -Natural Resource Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #12: Consult the Rural Fire Water Resource Plan (WRP) when considering new subdivisions and developments in Groton. The WRP is a tool to determine water availability for fire suppression. (WF2 & WF3) (Table 7.1)</p>	<p>Affected Location -Townwide</p> <p>Type of Activity -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection -Structural Project</p>	3	3	2	3	3	3	3	20
<p>Action Item #13: Update the Groton Emergency Operations Plan to coincide with the State's 18-ESF format. Include an analysis of the impact of natural hazards on Critical Infrastructure & Key Resources (CIKR) that may be needed during an emergency. Like the current EOP, the new EOP should include an EOC Call Alert List and a detailed Resource Inventory List. (MU6) (Tables 6.1 & 7.1)</p>	<p>Affected Location -Townwide</p> <p>Type of Activity -Prevention -Emergency Service Protection</p>	3	3	3	3	3	3	3	21
<p>Action Item #14: Complete annual reviews of the Groton, NH Hazard Mitigation Plan Update 2024, including a review of the "Action Items" status to encourage completion. Obtain approval from the local elected body annually and provide a complete update of the Plan in five years. (MU11) (Tables 6.1 & 7.1)</p>	<p>Affected Location -Townwide</p> <p>Type of Activity -Prevention</p>	3	3	3	3	3	3	3	21
<p>Action Item #15: Review this Plan, the Groton, NH Hazard Mitigation Plan Update 2024, whenever working on the Master Plan. Consider incorporating a discussion on climate change, natural hazards, and mitigation action items from this Plan. (MU6) (Tables 6.1 & 7.1)</p>	<p>Affected Location -Townwide</p> <p>Type of Activity -Prevention</p>	3	3	3	3	3	3	3	21

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
Action Item #16: Obtain approval of this Plan as a Community Wildfire Protection Plan (CWPP) to enable potential assistance from the State and Federal governments for future wildfire mitigation projects. (WF2) (Other Plans)	<u>Affected Location</u> -Townwide	3	3	3	3	3	3	3	21
	<u>Type of Activity</u> -Prevention -Property Protection -Natural Resource Protection	<i>No apparent difficulty with this action item</i>							
Action Item #17: Complete the project to build a new Town Garage, including a generator, and potentially provide a dry hydrant in the vicinity to help mitigate wildfires here and at the Town House. (MU13) (Table 7.1)	<u>Affected Location</u> -New Town Garage Site	3	3	3	1	3	2	3	18
	<u>Type of Activity</u> -Prevention -Emergency Service Protection -Property Protection -Structural Project	<i>Political: The grant process is slow and stopping the project from going out to bid.</i> <i>Economical: Budget constraints</i>							
Action Item #18: Improve stormwater flow on North Groton Road by upgrading the underperforming and aging 7' round metal culvert with a 10' box culvert. (F13) (Table 7.1)	<u>Affected Location</u> -Culvert on North Groton Road	3	3	3	3	3	1	2	18
	<u>Type of Activity</u> -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection -Structural Project	<i>Economical: Budget constraints</i> <i>Environmental: Will need some DES approvals</i>							
Action Item #19: Review the Groton Subdivision, Zoning, and Site Plan Review Regulations to consider changes that will enhance mitigation efforts across the Community. Update these planning mechanisms and integrate elements from this Plan where possible. (WF2, F1 & MU6) (Tables 6.1 & 7.1)	<u>Affected Location</u> -Townwide	3	3	3	3	3	3	3	21
	<u>Type of Activity</u> -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	<i>Administrative: Time constraints</i>							

Chapter 9: Implementation Schedule for Prioritized Action Items

A. PRIORITY METHODOLOGY

After reviewing the finalized STAPLEE numerical ratings, the Planner and the Team developed *Table 9.1, The Mitigation Action Plan*. To do this, the Planner created four categories in which to place the potential mitigation action items.

CATEGORY A

Category A includes those items that are being done and will continue to be done in the future.

CATEGORY B

Category B includes those items under the direct control of town officials within the financial capability of the Town using only town funding, those already being done or planned, and those that could generally be completed within one year.

CATEGORY C

Category C includes those items that the Town does not have sole authority to act upon, those for which funding might be beyond the Town's capability, and those generally taking 13-36 months to complete.

CATEGORY D

Category D includes those items that would take a significant funding effort, those that the Town has little control over the final decision, and those that would take more than 37 months to complete.

Each potential mitigation action item was placed in one of these four categories. Then, those action items were prioritized within each category according to cost-benefit, time frame, and STAPLEE scores. Actual cost estimates were unavailable during the planning process. However, the Team could agree on the cost-benefit for each proposed action item using the STAPLEE process and a Very Low Cost to High-Cost estimate (see the following page).

The following criteria were considered while ranking and prioritizing each action item:

- *Does the action reduce damage?*
- *Does the action contribute to community objectives?*
- *Does the action meet existing regulations?*
- *Does the action protect historic structures?*
- *Does the action keep in mind future development?*
- *Can the action be implemented quickly?*

The prioritization exercise helped the committee evaluate the new hazard mitigation action items they brainstormed throughout the planning process. While all actions would improve the Town's hazard and wildfire responsiveness capability, funding availability will be a driving factor in determining what and when new mitigation action items are implemented.

B. WHO, WHEN, HOW?

Once this was completed, the Team developed an action plan to outline responsibilities, time frames, and methods for implementing each action item. The following questions were asked to develop a schedule for the identified mitigation action items.

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?

In addition to the prioritized mitigation action items, *Table 9.1, The Mitigation Action Plan*, includes the responsible party (WHO), how the project will be supported (HOW), and what the time frame is for implementation of the project (WHEN).

Once the Plan is approved, the Community will begin working on the action items listed in *Table 9.1, The Mitigation Action Plan* (see below and on the following pages). An estimation of completion for each action item is noted in the “Time Frame” column of Table 9.1. Some projects, including most training and education of residents on emergency and evacuation procedures, could be tied into the emergency operations plan and implemented through that planning effort.

TABLE 9.1: THE MITIGATION ACTION PLAN

Table 9.1, The Mitigation Action Plan, beginning on the following page, includes problem statements expressed by the Team. These action items are listed by priority and indicate if they were derived from other tables in this Plan.

Key to the Estimated Cost	
Very Low Cost	\$0-\$1,000 or staff time only
Low Cost	\$1,000-\$20,000
Medium Cost	\$20,000-\$100,000
High Cost	\$100,000 or more

Key to the Time Frame	
Life of Plan	Starting on Plan adoption 2024-2029 (0-60 months)
Short Term	1 year 2024-2025 (0-12 months)
Medium Term	2 years starting in 2025 – 2027 (12 – 36 months)
Long-term	3 years starting in 2026 – 2029 (36 -60 months)

In the following table, “Final R/P” means final rate and priority. Items in green, such as (MU14), represent mitigation action items taken from *Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards*, FEMA, January 2013; see *Appendix F: Potential Mitigation Ideas* for more information.

Mitigation Action Items are listed in order of priority.

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
A-1	<p>Problem Statement: Although the Groton Highway Department works to clean and repair drainage basins and culverts, a written stormwater maintenance plan should be developed to ensure continuity of actions and efficient stormwater management.</p> <p>Action Item #1: Maintain and improve culverts and ditches in the Community and develop and maintain a written stormwater maintenance plan to ensure more efficient stormwater management. In this plan or "inventory", include the location, installation date, GPS coordinates, material, type, size, age, and expected replacement date of all culverts, catch basins, and drainage ditches in the Community. (F5) (Tables 6.1 & 7.1)</p>	Inland Flooding	Highway Department	Local	Life of the Plan	Low Cost
A-2	<p>Problem Statement: As trees become damaged and threaten structures and town roads, the Highway Department removes them. The NH Department of Transportation (NH DOT) and the NH Electric Coop do this for state roads as needed. There is a need to continue to work to keep this hazard to a minimum.</p> <p>Action Item #2: In addition to work done by and with local utility companies, monitor and maintain brush cutting, drainage system maintenance, and tree removal as part of a tree maintenance program. Create defensible space around power lines, oil and gas lines, and other infrastructure. Work to reduce the effects of invasive species, high wind events, ice storms, wildfires, and other natural hazards by clearing dead vegetation and cutting the Community's high grass and other fuel loads. (SW4, WF7, WF9 & F14) (Table 6.1 & 7.1)</p>	High Wind Events, Wildfire, Severe Winter Weather & Inland Flooding	Highway Department	Local	Life of the Plan	Low Cost
A-3	<p>Problem Statement: The Town has continuously used public outreach to remind residents of the need for proper E911 signage. However, the Town is only about 55% compliant with the proper E911 signage.</p> <p>Action Item #3: Consider ways to get this signage more compliant so that emergency responders can better assist the public in their time of need. Use public outreach opportunities such as the Town's website or available social media to promote better compliance and develop other means of increasing compliance. The Town could purchase and install signage, establish an ordinance and fine, or provide signs for residents to install themselves to promote compliance better. (MU14) (Tables 6.1 & 7.1)</p>	All Hazards	Town Administrator & Bridgewater Fire Department	Local	Life of the Plan	Very Low Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
A-4	<p>Problem Statement: Dry hydrants and drafting sites throughout Groton provide water resources for firefighting. Dry hydrants are tested annually. The maintenance of these hydrants needs to continue. Some areas of the Town could benefit from additional water resources for firefighting tested once a year.</p> <p>Action Item #4: Inspect the functionality of all hydrants and maintain and repair all hydrants and other water resources in Groton. Consider other community areas with limited water resources and address these issues by installing new hydrants, fire ponds, and cisterns. Work with local landowners to gain access to available water resources to help mitigate the effects of wildfires. (WF8) (Tables 6.1 & 7.1)</p>	Wildfire & Conflagration	Hebron Fire Department	Local	Life of the Plan	Very Low Cost
A-5	<p>Problem Statement: Although first responders, including firefighters, have received NIMS and ICS training, not all Groton's town officials have.</p> <p>Action Item #5: The Emergency Management Director (EMD) to encourage all town officials who may be required to respond to an emergency and any new emergency responders to take NIMS 700 (S-700) and ICS (ISC100 and ISC200). Additionally, the EMD should encourage key personnel to learn about and become adept with WEB-EOC. (Tables 6.1 & 7.1)</p>	All Hazards	Emergency Management Director	Local	Life of the Plan	Very Low Cost
A-6	<p>Problem Statement: The Town's website has an Emergency Information webpage with some emergency-related links. The Town has continuously provided the residents with emergency preparedness and mitigation techniques; this practice is ongoing.</p> <p>Action Item #6: Provide robust information on the Emergency Information webpage and social media platforms to educate the public on hazard mitigation and preparedness measures. Include preparedness information such as shelter locations, evacuation routes, methods of emergency alerting, and 911 compliance. Also include mitigation strategies such as mitigation techniques for earthquakes, tornadoes, severe winter weather, lightning, and climate change. Provide information on infectious diseases, encourage homeowners to install carbon monoxide monitors and alarms, and monitor radon in their homes. Offer residents and business owners reminders to clear snow from roofs during high accumulation snow years. (MU14, SW7, WF11, D9, T3, EQ7, ET1, ET4, L2, HA3, WW5) (Tables 6.1 & 7.1)</p>	High Wind Events, Drought, Earthquake, Extreme Temperatures, Lightning, Severe Winter Weather, Wildfire & Infectious Disease	Town Administrator	Local	Life of the Plan	Very Low Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
A-7	<p>Problem Statement: Genasys (formerly CodeRED/NH ENS) is an excellent warning system, but it only stores residents' landline phone numbers. Residents may not be aware that they can add cell numbers, emails, and unlisted numbers.</p> <p>Action Item #7: Provide public outreach to encourage all residents to contact Genasys (formerly CodeRED/NH ENS) to add cell numbers, unlisted numbers, and emails and verify the information. Use the Town's website, a possible brochure, available social media platforms, local newsletters, or a sign-up at a Town Meeting. (MU14) (Tables 6.1 & 7.1)</p>	All Hazards	Emergency Management Director	Local	Life of the Plan	Very Low Cost
A-8	<p>Problem Statement: Residents may not be aware of the importance of maintaining their private roads to allow emergency responders access and prevent wildfires.</p> <p>Action Item #8: To promote private mitigation efforts, provide public outreach to the citizens of Groton on the importance of maintaining private roads to allow for safe access for fire apparatus into wildland-urban interface neighborhoods and properties. This education will help ensure accessibility for emergency response and decrease the wildfire risk. (MU16) (Table 7.1)</p>	Wildfire & Conflagration	Emergency Management Director & Town Administrator	Local	Life of the Plan	Very Low Cost
A-9	<p>Problem Statement: Although public outreach has been done to advise the citizens of Groton of the possibility of using the Town House as a cooling shelter in times of extended high temperatures and as a warming center in times of extended cold temperatures, additional public outreach needs to be done.</p> <p>Action Item #9: Provide public outreach to the citizens of Groton regarding the availability of the Town House as a "cooling or warming center" during times of extended high temperatures and severe winter weather. (ET3 & WW6) (Table 7.1)</p>	Extreme Temperatures & Severe Winter Weather	Emergency Management Director & Town Administrator	Local	Life of the Plan	Very Low Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
A-10	<p>Problem Statement: Residents and builders may not be aware of flood regulations and the availability of flood insurance through the National Flood Insurance Program (NFIP). They may also not be aware of the risk of building in the floodplain and the steps they can take to reduce flooding.</p> <p>Action Item #10: Advise the public about the local flood hazard, flood insurance, and flood protection measures by obtaining and keeping a supply of NFIP brochures in the Town House. When proposing new development or substantial improvements, give NFIP materials to homeowners and builders. Encourage property owners to purchase flood insurance, whether they are in the flood zone, and provide appropriate links to the NFIP and Ready.gov on the Town's website or available social media platforms. Through Public Outreach, educate homeowners regarding the risks of building in the flood zone and measures to reduce flooding. Actively work with residents and builders to ensure they comply with the Town's Floodplain Ordinance. (F10, F22 & F23) (Tables 6.1 & 7.1)</p>	Inland Flooding	Town Administrator & the Planning Board	Local	Life of the Plan	Very Low Cost
A-11	<p>Problem Statement: Although the Town does a great job using its website to promote preparedness, residents may not be aware of the steps they can take to reduce their homes' fire risk.</p> <p>Action Item #11: Post important information on the Town's website and notices of red flag burning days. Obtain and have available Firewise® brochures to educate homeowners on methods to reduce fire risk around their homes and provide a link to Firewise® on the emergency page of the Town's website. Provide Firewise® brochures to those residents seeking burn permits (if not obtained online); advise residents of the importance of maintaining defensible space, the safe disposal of household waste, and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches, and yards. (WF10 & WF12) (Table 7.1)</p>	Wildfire & Conflagration	Administrative & Hebron Fire Department	Local	Life of the Plan	Very Low Cost
A-12	<p>Problem Statement: The Community developed a Rural Fire Water Resource Plan (WRP) in 2007. The WRP has been used as a tool for planning and land development. Its use should be continued.</p> <p>Action Item #12: Consult the Rural Fire Water Resource Plan (WRP) when considering new subdivisions and developments in Groton. The WRP is a tool to determine water availability for fire suppression. (WF2 & WF3) (Table 7.1)</p>	Wildfire & Conflagration	Hebron Fire Department & Planning Board	Local	Life of the Plan	Very Low Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
B-1	<p>Problem Statement: The Groton Emergency Operations Plan (EOP) was last updated in 2010 but is currently being updated and nearing completion.</p> <p>Action Item #13: Update the Groton Emergency Operations Plan to coincide with the State's 18-ESF format. Include an analysis of the impact of natural hazards on Critical Infrastructure & Key Resources (CIKR) that may be needed during an emergency. Like the current EOP, the new EOP should include an EOC Call Alert List and a detailed Resource Inventory List. (MU6) (Tables 6.1 & 7.1)</p>	All Hazards	Emergency Management Director	Local & Grants	Short Term	Very Low Cost
B-2	<p>Problem Statement: This Plan, the Groton, NH Hazard Mitigation Plan Update 2024, will require an annual review and a complete update in five years.</p> <p>Action Item #14: Complete annual reviews of the Groton, NH Hazard Mitigation Plan Update 2024, including a review of the "Action Items" status to encourage completion. Obtain approval from the local elected body annually and provide a complete update of the Plan in five years. (MU11) (Tables 6.1 & 7.1)</p>	All Hazards	Town Administrator & Emergency Management Director	Local	Short Term & Long Term	Very Low Cost
B-3	<p>Problem Statement: The Groton Master Plan was last updated in 2017 and may need an update in 2027 based on the State's 10-year recommendation. It does not have a "Natural Hazards" section or discuss climate change.</p> <p>Action Item #15: Review this Plan, the Groton, NH Hazard Mitigation Plan Update 2024, whenever working on the Master Plan. Consider incorporating a discussion on climate change, natural hazards, and mitigation action items from this Plan. (MU6) (Tables 6.1 & 7.1)</p>	All Hazards	Planning Board	Local	Short Term	Very Low Cost
B-4	<p>Problem Statement: This Plan, the Groton, NH Hazard Mitigation Plan Update 2024, will need to be approved again as a Community Wildfire Protection Plan (CWPP).</p> <p>Action Item #16: Obtain approval of this Plan as a Community Wildfire Protection Plan (CWPP) to enable potential assistance from the State and Federal governments for future wildfire mitigation projects. (WF2) (Other Plans)</p>	Wildfire & Conflagration	Mapping & Planning Solutions	Local	Short Term	Very Low Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
C-1	<p>Problem Statement: The Town Garage is aging and needs repair or replacement. The Town Garage is also in the floodplain and continually has flooding issues. Approval to build a new facility has been received from the citizens, and an engineer has been hired.</p> <p>Action Item #17: Complete the project to build a new Town Garage, including a generator, and potentially provide a dry hydrant in the vicinity to help mitigate wildfires here and at the Town House. (MU13) (Table 7.1)</p>	Inland Flooding, Wildfire & Aging Infrastructure	Select Board	Local & Grants (USDA)	Medium Term	High Cost
C-2	<p>Problem Statement: The 7' round metal culvert on North Groton Road is reaching the end of its lifespan. Flooding has been a problem and could be significant if the culvert fails.</p> <p>Action Item #18: Improve stormwater flow on North Groton Road by upgrading the underperforming and aging 7' round metal culvert with a 10' box culvert. (F13) (Table 7.1)</p>	Inland Flooding & Aging Infrastructure	Highway Department	Local & Grants	Medium Term	High Cost
C-3	<p>Problem Statement: The Groton Subdivision, Zoning, and Site Plan Review Regulations have been recently updated and are in good shape. However, they should be reviewed when this Plan is completed to integrate action items and mitigation ideas into future planning.</p> <p>Action Item #19: Review the Groton Subdivision, Zoning, and Site Plan Review Regulations to consider changes that will enhance mitigation efforts across the Community. Update these planning mechanisms and integrate elements from this Plan where possible. (WF2, F1 & MU6) (Tables 6.1 & 7.1)</p>	Wildfire & Inland Flooding	Select Board & Planning Board	Local	Medium Term	Very Low Cost

Chapter 10: Adopting, Monitoring, Evaluating, and Updating the Plan

A. HAZARD MITIGATION PLAN MONITORING, EVALUATION, AND UPDATES

The Town's Emergency Management Director will call meetings of all responsible town parties to review plan progress annually on the anniversary of plan adoption and, as needed, based on the occurrence of hazard events and report outcomes to the Select Board. The public will be notified of these meetings by posting the agenda at the Town House. Responsible parties identified for mitigation actions will be asked to submit their reports before the meeting. Meetings will entail the following actions:

- Review previous hazard events to discuss and evaluate major issues, the effectiveness of current mitigation, and possible mitigation for future events.
- Assess how the mitigation strategies of the Plan can be integrated with other Town plans and operational procedures.
- Review and evaluate progress toward implementing the current mitigation plan based on reports from responsible parties.
- Amend the current Plan to improve mitigation practices.
- Evaluate and assess the Plan's effectiveness in achieving its goals, stated purpose, and priorities.

The following questions will serve as the criteria that are used to evaluate and update the Plan:

Plan Mission and Goal

- Is the Plan's stated goal and mission still accurate and up to date, reflecting any changes to local hazard mitigation activities?
- Are there any changes or improvements that can be made to the goal and mission?

Hazard Identification and Risk Assessment

- Have there been any new occurrences of hazard events since the Plan was last reviewed? If so, these hazards should be incorporated into the Hazard Identification and Risk Assessment.
- Have any new occurrences of hazards varied from previous occurrences in terms of their extent or impact? If so, the stated impact, extent, probability of future occurrence, or overall risk and vulnerability assessment should be edited to reflect these changes.
- Is there any new data available from local, state, or federal sources about the impact of previous hazard events, or any new data for the probability of future occurrences? If so, this information should be incorporated into the Plan.

Existing Mitigation Strategies

- Are the current strategies effectively mitigating the effect of any recent hazard events?
- Has there been any damage to property since the Plan was last reviewed?
- How could the existing mitigation strategies be improved to reduce the impact of recent occurrences of hazards?

Proposed Mitigation Strategies

- What progress has been accomplished for the previously identified proposed mitigation strategies?
- How have any completed mitigation strategies reduced the Town’s vulnerability and impact from hazards since the strategy was completed? If not, and if they have been tested, what changes are needed to make them more effective?
- Should the criteria for prioritizing the proposed strategies be altered in any way?
- Should the priority given to individual mitigation strategies be changed based on any recent changes to financial and staffing resources or recent hazard events?

Review of the Plan and Integration with Other Planning Documents

- Is the current process for reviewing the Hazard Mitigation Plan effective?
- How could it be improved?
- Are there any town plans in the process of being updated that should have the content of this Hazard Mitigation Plan incorporated into them or integrated with other town planning tools and operational procedures, including the Zoning Regulations, the Subdivision Regulations, the Master Plan, and the Capital Improvement Plan?

Following these discussions, it is anticipated that the Planning Team may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments or revise the goals and objectives contained in the Plan.

Review forms for post-hazard or annual reviews are available in Chapter 11 of this Plan. The Town is encouraged to use these forms to document any changes and accomplishments after this Plan’s development. Forms are available for years 1-4.

B. INTEGRATION WITH OTHER PLANS

This Plan will only enhance mitigation if balanced with all other town plans. Groton completed its last hazard mitigation plan in 2020 and has completed many projects. Examples in Table 7.1 include providing ongoing fire and flood education, replacing culverts on multiple roads, and initializing a new Town Garage project. As a result, the Town was able to integrate these actions into other town activities, budgets, plans, and mechanisms.

The Town of Groton has agreed to incorporate a Community Wildfire Protection Plan (CWPP) into this planning document, the Groton Hazard Mitigation Plan Update 2024. As part of this Plan, the Town will adopt the CWPP, which will be approved by the Department of Natural and Cultural Resources (DNCR).

The Town will incorporate elements from this Plan into the following documents:

GROTON MASTER PLAN

Traditionally, Master Plans are updated every 5 to 10 years. A complete update of Groton's Master Plan was completed in 2017 and is due for a recommended update in 2027. Future reviews and updates of the Master Plan should consider integrating concepts, ideas, and action items from this Hazard Mitigation Plan, a natural hazards section, and a discussion on climate change (**Action Item #15**).

GROTON EMERGENCY OPERATIONS PLAN 2010 (EOP)

The EOP is designed to allow the Town to respond more effectively to disasters and mitigate the risk to people and property. EOPs are generally reviewed after each hazardous event and updated on a five-year basis. The last Groton EOP was completed in 2010 but is nearing completion of an update. The new EOP should incorporate elements from this hazard mitigation plan (**Action Items #13**).

TOWN BUDGET & CAPITAL RESERVE FUNDS

The Town of Groton maintains Capital Reserve Funds (CRFs) for major expenditures. The CRFs are adjusted annually in coordination with the Select Board and other town department heads and committees at budget time. The budget is then voted on at the annual Town Meeting. During the annual budget planning process, specific mitigation actions identified in this Plan that require town fiscal support will be reviewed for incorporation into the budget. **Refer to those Action Items that require local money or match money (multiple Action Items) or address the CIP and CRF.**

THE GROTON ORDINANCES & SUBDIVISION REGULATIONS

As time goes by and the needs of the Town change, the Town's planning mechanisms will be reviewed and updated. In coordination with these actions, the Planning Board will review this Plan and incorporate any changes that help mitigate the Community's susceptibility to the dangers of natural, technical, or human-caused disasters. An example of this integration can be seen in this Plan's mitigation action item (**Action Item #19**).

The local governments will modify other plans and actions to incorporate hazard or wildfire issues. The Select Board ensures this process will be followed in the future.

C. PLAN APPROVAL & ADOPTION

The Emergency Management Director will update the Plan every five years and incorporate the results of the Town's plan monitoring and evaluation procedures. The next anticipated annual update will begin upon the anniversary of the Plan's approval. The next full update of the Plan is scheduled to begin before the fifth anniversary of approval. Plan updates may begin earlier following a significant natural hazard event within the Town and region, such as a federally declared disaster.

The public meetings of the Planning Team shall be publicized through legal notices in local newspapers, posted fliers, and on the town website. Written and email comments shall be directed to the EMD. The updated Plan will incorporate input from the public, other municipalities, and government agencies. The Select Board is responsible for approving the Plan submission to FEMA and for adopting the Plan. The update will follow a similar planning process and outline as the current planning process, making deviations when needed. The update will be expanded to better address natural hazards, development, climate change, vulnerable populations, regional impacts, and other pertinent issues.

This Plan was completed in a series of open meetings beginning October 3, 2023. The Plan was presented to the Town for review, submitted to HSEM/FEMA for Conditional Approval (*APA, Approved Pending Adoption*), formally adopted by the Select Board, and resubmitted to HSEM/FEMA for Final Approval. Once Final Approval from HSEM/FEMA was met, copies of the Plan were distributed to the Town, HESM, FEMA, DNCR, and the USDA-FS; the Plan was then distributed as these entities saw fit. Copies of the Plan remain on file at Mapping and Planning Solutions (MAPS) in digital and paper formats.

Chapter 11: Signed Community Documents and Approval Letters

A. PLANNING SCOPE OF WORK & AGREEMENT

PLANNING SCOPE OF WORK & AGREEMENT

GROTON HAZARD MITIGATION PLAN UPDATE



PARTIES TO THE AGREEMENT

Mapping and Planning Solutions
Town of Groton, NH

Current Plan Expiration: 2/27/25
BRIC FFY 2021 Period of Performance: 8/4/2022-8/3/2025

Agreement

This agreement is between the Town of Groton (the Town) or its official designee and Mapping and Planning Solutions (MAPS). The agreement outlines the Town's desire to engage the services of MAPS to assist in planning and technical services to produce the Groton Hazard Mitigation Plan Update (the Plan) under the Fiscal Year 2021 Building Resilient Infrastructure and Communities (BRIC) grant program.

This agreement outlines the responsibilities to ensure the Plan is developed involving town members, local, federal, and state emergency responders, and organizations. The agreement identifies the work to be done by detailing the specific tasks, schedules, and finished products resulting from the Planning process.

The goal of this agreement is that the Plan and planning process be consistent with town policies and accurately reflect the Town's values and individuality; this is accomplished by forming a working relationship between the Town's citizens, the Planning Team, and MAPS.

The Adopted Plan

The Plan created as a result of this agreement will be presented to the Town for adoption once conditional approval (also known as Approved Pending Adoption or APA) is received from NH Homeland Security (HSEM) or the Federal Emergency Management Agency (FEMA). The adopted Plan will guide the Town's boards, commissions, and departments; however, the action items or projects described in the Plan are not mandatory. Adopted plans do not include any financial commitments by the Town.

All adopted plans should address mitigation strategies for reducing the risk of natural, technological, and human-caused disasters on life and property; this Plan will include a list of action items to address the community's risk. Also, the planning process will include discussions on climate change, building resilient infrastructure, and integrating elements of this Plan with other town planning initiatives.

Scope of Work

MAPS - Responsibilities include, but are not limited to, the following:

- MAPS will collect data that is necessary to complete the Plan and meet the requirements of the FEMA Plan Review Tool by working with the Planning Team (the Team) and taking public input.
- MAPS will coordinate and facilitate six to eight two-hour online meetings via Zoom or other virtual meeting applications. MAPS will provide digital materials and handouts to enhance team members' understanding of each step in the planning process.

- MAPS will assist the Team in developing goals, objectives, and action items and clearly define the processes needed for plan monitoring, educating the public, and integrating the Plan with other town plans and activities.
- MAPS will coordinate and collaborate with other federal, state, and local agencies.
- MAPS will explain and delineate the Town's Wildland Urban Interface (WUI) and, working with the Team, will establish a list of potential hazards and analyze each risk's severity.
- MAPS will author, edit, and prepare the Plan for review by the Team before submitting the Plan to HSEM/FEMA for conditional approval. Upon conditional approval by HSEM/FEMA, MAPS will provide the Planning team with the necessary documents for plan adoption by the Groton Select Board and continue to work with the Town until final approval and Plan distribution.
- Once final documents are received, MAPS will print and distribute the Plan. The final documents include the HSEM formal approval email (if applicable), the FEMA formal letter of approval, and the approved Community Wildfire Protection Plan (CWPP) documents. MAPS will provide the Town with one hard copy of the Plan containing all signed documents and a thumb drive containing these documents in digital form. MAPS will distribute digital copies of the Plan to collaborating agencies, including HSEM/FEMA, the Department of Natural and Cultural Resources (DNCR), and the US Forest Service.
- MAPS will provide all quarterly reports required by HSEM for this project's duration. These quarterly reports will be done online; a copy of the report will be forwarded to the primary contact for Groton.
- MAPS will provide annual plan maintenance reminders leading up to the next five-year plan update as long as MAPS is in operation.
- Understanding that emergencies can and do happen, MAPS will make every effort to proceed with meetings. However, the Town shall ensure that attendance at any given meeting is adequate to proceed. Mapping and Planning Solutions reserves the right to invoice the Town for the time, travel expenses (if applicable), and staff costs that are incurred when meeting attendance is inadequate to proceed.

The Town - Responsibilities include, but are not limited to, the following:

- The Town shall ensure that the Team includes members who can support the Planning process by identifying available town resources, including people who can access and provide pertinent data. The Planning Team should include, but not be limited to, such town members as the local Emergency Management Director, the Fire, Ambulance, and Police Chiefs, members of the Select Board and the Planning Board, the Public Works Director or Road Agent, representatives from relevant federal and state organizations, other local officials, property owners, and relevant businesses or organizations.
- The Town shall determine a primary contact to work with MAPS, usually the Emergency Management Director (EMD). The primary contact shall assist with recruiting participants for meetings, including developing mailing lists when necessary, distributing handouts, and placing meeting announcements. This contact shall also assist MAPS with organizing public meetings to develop the Plan and offer assistance in developing the work schedule, which will produce the Plan.
- The Town shall gain the support of stakeholders for the recommendations found within the Plan.
- The Town shall provide public notice at the start of the planning process, as required by FEMA and the Code of Federal Regulations (CFRs). In coordination with the principal contact, MAPS will include proof of this notification in the Plan.
- The proposed Plan shall be submitted to the Select Board for consideration and adoption.

- After adoption and final approval, the Town will:
 - *Distribute copies of the Plan as it sees fit throughout the local community.*
 - *Develop a team to monitor and work toward plan implementation.*
 - *Publicize the Plan to the community and ensure citizen awareness.*
 - *Encourage the integration of priority projects into the Town’s Capital Improvement Plan (if available).*
 - *Integrate mitigation strategies and priorities from the Plan into other town planning documents.*

Terms

- **Fees & Payment Schedule:** The contract price is limited to \$7,500; an invoice will be sent to the Town for each payment as outlined below.

▪ 1. Initial payment upon receipt of the first invoice, one week before the first meeting.....	\$3,500.00
▪ 2. Second payment upon plan submittal to HSEM for APA (Approve Pending Adoption).....	\$3,300.00
▪ 3. Final payment upon project completion and receipt of the final hard copy of the Plan	<u>\$199.75</u>
Total Fees.....	\$6,999.75

- **Payment Procedures:** The payment procedure is as follows:
 - MAPS will invoice the Town according to the schedule above
 - The Town will pay MAPS
 - The Town will forward the MAPS invoice along with an invoice from the Town on letterhead to HSEM
 - HSEM will reimburse the Town for the monies paid to MAPS

All payments to MAPS are fully reimbursable to the Town by Homeland Security & Emergency Management, provided the required match amounts have been met.

- **Required Matching Funds:** This project’s total cost under BRIC2021 is \$9,333, with a federal share of \$6999.75 and a matching amount of \$2,333.25 (75%/25% split). Matching funds are the responsibility of the Town of Groton, not MAPS. The Town will be responsible for providing and documenting all resources used to meet the FEMA-required match. However, Mapping and Planning Solutions will assist the Town with attendance tracking by asking meeting attendees to sign in at all meetings and to log any time spent outside of the meetings working on this project. MAPS will provide the Town with final attendance records in spreadsheet form at the project’s end to use in its match fulfillment.
- **Project Period:** The grant provided for this project is funded through BRIC2021. Per the grant agreement between the Town and HSEM, all work must be completed by August 3, 2025.

This project shall begin upon grant approval from HSEM and signing this agreement with MAPS and continue through August 3, 2025, or whenever the project is complete. The project period may be extended if required by mutual written agreement between the Town, MAPS, and Homeland Security. The actual project end date depends on timely adoptions and approvals, which may be outside the control of MAPS and the Town. This project is expected to be completed before the grant expiration date.

- **Ownership of Material:** The Town shall own all reports, documents, and other materials produced during the project period; each party may keep file copies of any generated work. MAPS shall have the right to use work products collected during the Planning process; however, MAPS shall not use any data in such a way as to reveal personal or public information about individuals or groups that could reasonably be considered confidential. MAPS provides work products as Portable Document Format (pdf) documents. MAPS’ work tools are Microsoft Word, Excel, and Publisher. MAPS will not share its work tools.
- **Termination:** This agreement may be terminated if both parties agree in writing. In the event of termination, MAPS shall forward all information prepared to date to the Town. MAPS shall be entitled to recover its costs for any work completed.

- **Limit of Liability:** MAPS agrees to perform all work diligently and efficiently according to the terms of this agreement. MAPS' responsibilities under this agreement depend upon the cooperation of the Town of Groton. MAPS and its employees, if any, shall not be liable for opinions rendered, advice, or errors resulting from the quality of data supplied. Adoption of the Plan by the Town and final approval of the Plan by HSEM FEMA relieve Mapping and Planning Solutions of content liability. MAPS carries general liability insurance.
- **Amendments:** Changes, alterations, or additions to this agreement may be made if agreed to in writing between the Town of Groton and Mapping and Planning Solutions.
- **About Mapping and Planning Solutions:** Mapping and Planning Solutions provides hazard mitigation and emergency operations planning throughout New Hampshire. Mapping and Planning Solutions has developed more than 80 Hazard Mitigation Plans and more than 80 Emergency Operations Plans and has completed the following FEMA courses in emergency planning and operations:
 - Introduction to Incident Command System, IS-100.a
 - ICS Single Resources and Initial Action Incidents, IS-200.a
 - National Incident Management System (NIMS) An Introduction, IS-700.a
 - National Response Framework, An Introduction, IS 800.b
 - Emergency Planning, IS-235
 - Homeland Security Exercise & Evaluation Program (HSEEP)
 - IS-547.a – Introduction to Continuity Operations
 - IS-546.a – Continuity of Operations (COOP) Awareness Course
 - G-318; Preparing & Review Hazard Mitigation Plans
 - Climate Change Adaptation Planning, AWR-347
 - ALICE; School Shooting Workshop, Littleton High School
 - L0550 Continuity Planners Workshop (2320EM1216)

➤ **Contacts:**

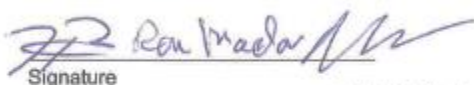
For Mapping & Planning Solutions

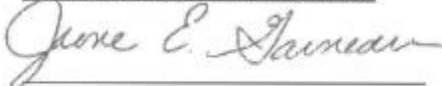
June Garneau
Mapping and Planning Solutions
PO Box 283
Twin Mountain, NH 03595
jgarneau@mappingandplanning.com
(603) 991-9664 (cell)

For the Town

Bill Oakley, Emergency Management Director
Groton Town House
754 North Groton Road
Groton, NH 03241
(603) 744-9190 (Town House)
W6oaks@live.com

Signatures below indicate acceptance of and agreement to the details outlined in this agreement.


FOR THE TOWN OF GROTON, NH

Signature
John Roscigno Ron Maden
Printed Name/Title
Groton Select Board
9-26-23
Date

FOR MAPPING AND PLANNING SOLUTIONS

Signature
June Garneau, Owner
September 20, 2023

Signatures are scanned facsimiles; original signatures are on file.


B. APPROVED PENDING ADOPTION (APA) FROM FEMA


HMP Approvable Pending Adoption (APA) Notice: Groton, NH

 Neiderbach, Josiah <josiah.neiderbach@fema.dhs.gov>
 To W6oaks@live.com
 Cc jgarneau@mappingandplanning.com; FEMA-R1-MitigationPlans; Doyle, Lynne; DOS: Hazard Mitigation; Brown, Austin; Norman, Dena; Markesich, Christopher

↩ Reply
↩ Reply All
→ Forward
⋮

Fri 11/22/2024 4:22 PM

 This message was sent with High importance.

 Groton NH APA Review.docx 87 KB

2023), except its adoption by: Town of Groton, NH.

This status is “Approvable Pending Adoption” (APA). Plan adoption is required to receive formal FEMA approval.

Local governments, including special districts, with a plan status of “Approvable Pending Adoption” are not eligible for FEMA mitigation grant programs with a mitigation plan requirement.

The next step in the approval process is to formally adopt the mitigation plan and send a resolution or adoption documentation in accordance with Element F1 of the [Local Mitigation Planning Policy Guide](#), on pages 31-32, to the State for submission to FEMA. A sample adoption resolution can also be found in Appendix B of the Policy Guide.

It is critical for the jurisdiction to adopt the plan as soon as possible. Jurisdictions that adopt the plan more than one year after APA status has been issued must either:

- Validate that their information in the plan remains current with respect to both the risk assessment (no recent hazard events, no changes in development) and their mitigation strategy (no changes necessary); or
- Make the necessary updates before submitting the adoption resolution to FEMA.

An approved local mitigation plan, including adoption by the local government, is one of the conditions for applying for and/or receiving FEMA mitigation grants from the following programs:

- Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)
- HMGP Post-Fire
- If applicable, High Hazard Potential Dams Grant Program (HHPD)

If a plan does not meet the HHPD requirements, then the jurisdiction is not eligible for assistance from the HHPD Grant Program. If any jurisdiction with HHPDs is interested in this assistance, they should contact the FEMA Regional Mitigation Planner listed below to learn more about how to include all dam risks in the plan, or at least their portion of the plan.

We look forward to receiving the adoption resolution/documentation soon and discussing options for implementing this mitigation plan. If we can assist in any way, please contact Jay Neiderbach at 202-285-7769 and josiah.neiderbach@fema.dhs.gov.

Sincerely,

Jay


Josiah (Jay) Neiderbach, Mitigation Planner
 Floodplain Management and Insurance Branch | Mitigation Division | DHS / FEMA, Region I
 M: 202.285.7769 E: josiah.neiderbach@fema.dhs.gov

Attachment: FEMA Local Mitigation Plan Review Tool

Signatures are scanned facsimiles; original signatures are on file.

C. FORMAL APPROVAL LETTER FEMA

U.S. Department of Homeland Security
FEMA Region 1
220 Binney Street
Cambridge, MA 02142

 **FEMA**

December 6, 2024

Robert M. Buxton, Director
New Hampshire Homeland Security and Emergency Management
33 Hazen Dr.
Concord, NH 03305

Director Buxton:

The U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA) Region 1 Mitigation Division has approved the *Groton, NH Hazard Mitigation Plan Update 2024* effective **December 6, 2024** through **December 5, 2029** in accordance with the planning requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended; the National Flood Insurance Act of 1968, as amended; the National Dam Safety Program Act, as amended; and Title 44 Code of Federal Regulations (CFR) Part 201.

With this plan approval, the Town of Groton, NH is eligible to apply to New Hampshire Homeland Security and Emergency Management for mitigation grants administered by FEMA. Requests for funding will be evaluated according to the eligibility requirements identified for each of these programs. A specific mitigation activity or project identified in this community's plan may not meet the eligibility requirements for FEMA funding; even eligible mitigation activities or projects are not automatically approved.

The plan must be updated and resubmitted to the FEMA Region 1 Mitigation Division for approval every five years to remain eligible for FEMA mitigation grant funding.

Thank you for your continued commitment and dedication to risk reduction demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please contact Jay Neiderbach at (202) 285-7769 or josiah.neiderbach@fema.dhs.gov.

Sincerely,

CHRISTOPHER J MARKESICH Digitally signed by CHRISTOPHER J MARKESICH
Date: 2024.12.06 13:41:27 -05'00'

Christopher Markesich
Floodplain Management and Insurance Branch Chief
Mitigation Division | DHS, FEMA Region 1

cc: Austin Brown, Mitigation & Recovery Section Chief, NH HSEM
Lynne Doyle, State Planner, NH HSEM
Dean Savramis, Mitigation Division Director, DHS, FEMA Region 1
Josiah (Jay) Neiderbach, Hazard Mitigation Community Planner, DHS, FEMA Region 1

www.fema.gov

Signatures are scanned facsimiles; original signatures are on file.

D SIGNED CERTIFICATE OF ADOPTION

CERTIFICATE OF ADOPTION

GROTON, NH

SELECT BOARD

A RESOLUTION ADOPTING THE GROTON, NH HAZARD MITIGATION PLAN UPDATE 2024

WHEREAS, the Town of Groton has historically experienced severe damage from natural hazards, and it continues to be vulnerable to the effects of those natural hazards profiled in this Plan, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Groton has received Approved Pending Adoption (APA) status from the Federal Emergency Management Agency (FEMA) for its Hazard Mitigation Plan Update 2024 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held between October 3, 2023, and March 5, 2024, regarding the development and review of the Hazard Mitigation Plan Update 2024 and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and plan maintenance procedures for the Town of Groton; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Groton 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 Groton eligible for funding to alleviate the impacts of future hazards; now, therefore, be it

RESOLVED by the Select Board:

1. The Plan is hereby adopted as an official plan of the Town of Groton;
2. The respective officials identified in the mitigation action items of the Plan are hereby directed to pursue the implementation of the recommended actions assigned to them;

Groton, Hazard Mitigation Plan Update Certificate of Adoption, page two

- 3. Future revisions and plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for five (5) years from the date of this resolution;
- 4. The Emergency Management Director shall present an annual report on the progress of the Plan's action items to the Select Board.

Adopted this day, the 3rd of December, 2024

Select Board Chair

[Signature]
Signature

John Rescigno
Print Name

Member of the Select Board

[Signature]
Signature

RON Madan
Print Name

Member of the Select Board

[Signature]
Signature

TONY ALBERT
Print Name

Emergency Management Director

[Signature]
Signature

William H. Oakley
Print Name

IN WITNESS WHEREOF, the undersigned has affixed their signature and the Notary Seal on this day, Dec, 4, 2024

[Signature]
Notary

March 13, 2029
Expiration

HILARY COLES
NOTARY PUBLIC
State of New Hampshire
My Commission Expires
March 13, 2029



Signatures are scanned facsimiles; original signatures are on file.

E. CWPP APPROVAL LETTER FROM DNCR

**Groton, NH
A Resolution Approving the
Groton, NH Hazard Mitigation Plan Update 2024
As a Community Wildfire Protection Plan**

Several public meetings and committee meetings were held between October 3, 2023, and March 5, 2024, regarding the development and review of the Groton Hazard Mitigation Plan Update 2024. The Groton Hazard Mitigation Plan Update 2024 contains potential future projects to mitigate hazard and wildfire damage in the Town of Groton.

The Hebron Fire Chief, along with the Select Board and the Emergency Management Director, desires that this Plan be accepted by the Department of Natural and Cultural Resources (DNCR) as a Community Wildfire Protection Plan, having adhered to the requirements of said plan.

The Hebron Fire Chief, along with the Select Board and the Emergency Management Director, approve the Groton Hazard Mitigation Plan Update 2024 and understand that with approval by DNCR, this Plan will also serve as a Community Wildfire Protection Plan.

For the Town of Groton


APPROVED and SIGNED this day, December 3, 2024.



Groton Chairman of the Select Board



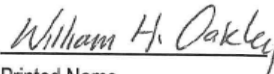
Groton Emergency Management Director



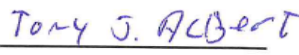
Hebron Fire Chief



Printed Name



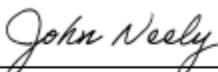
Printed Name



Printed Name


For the Department of Natural & Cultural Resources (DNCR)

APPROVED and SIGNED this day, December 10, 2024.



Forest Ranger – NH Division of Forest and Lands, DNCR

APPROVED and SIGNED this day, December 10, 2024.



Steve Sherman, Chief, Forest Protection Bureau – NH Division of Forests & Lands, DNCR

Signatures are scanned facsimiles; original signatures are on file.

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F. ANNUAL OR POST HAZARD REVIEW FORMS

YEAR ONE - Annual or Post Hazard Review Form

CHECK ALL THAT APPLY

Annual Review - **Year One**: _____ (Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

After inviting the public and stakeholders to hearings, the Town’s governing body and the designated Emergency Management Director shall execute this page annually.

Groton, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2024 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

YEAR TWO - Annual or Post Hazard Review Form

CHECK ALL THAT APPLY

Annual Review - Year Two: _____ (Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

After inviting the public and stakeholders to hearings, the Town’s governing body and the designated Emergency Management Director shall execute this page annually.

Groton, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2024 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

YEAR THREE - Annual or Post Hazard Review Form

CHECK ALL THAT APPLY

Annual Review - Year Three: _____ (Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

After inviting the public and stakeholders to hearings, the Town’s governing body and the designated Emergency Management Director shall execute this page annually.

Groton, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2024 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

YEAR FOUR - Annual or Post Hazard Review Form

CHECK ALL THAT APPLY

Annual Review - Year Four: _____ (Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

Annual Review – Post Hazardous Event: _____ (Event/Date)

After inviting the public and stakeholders to hearings, the Town’s governing body and the designated Emergency Management Director shall execute this page annually.

Groton, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2024 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

Chapter 12: Appendices

- Appendix A: Bibliography
- Appendix B: Technical and Financial Assistance for Hazard Mitigation
 - *Hazard Mitigation Grant Program (HMGP)*
 - *Hazard Mitigation Grant Program Post Fire (HMGMP-Post Fire)*
 - *Flood Mitigation Assistance (FMA)*
 - *Building Resilient Infrastructure and Communities (BRIC)*
 - *Pre-Disaster Mitigation (PDM)*
- Appendix C: The Extent of Hazards
- Appendix D: Major Disaster & Emergency Declarations
- Appendix E: Acronyms
- Appendix F: Potential Mitigation Ideas

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APPENDIX A: BIBLIOGRAPHY

Documents

- **Local Hazard Mitigation Planning Policy Guide**, FEMA, April 19, 2023
- **Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards**, FEMA, January 2013
- **Hazard Mitigation Unified Guidance**, FEMA, July 12, 2013
- **Hazard Mitigation Assistance Guidance**, FEMA, February 27, 2015
- **Hazards Mitigation Plans**
 - Groton Hazard Mitigation Plan, 2020
 - Enfield Hazard Mitigation Plan, 2022
 - Hanover Hazard Mitigation Plan, 2023
 - Greenland Hazard Mitigation Plan, 2023
- **NH State Multi-Hazard Mitigation Plan**, 2023
 - <https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2023/10/2023-NH-State-Hazard-Mitigation-Plan-Signed-10.5.23.pdf>
- **Disaster Mitigation Act (DMA) of 2000**, Section 101, b1 & b2 and Section 322a
 - <https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/regulations-guidance#:~:text=The%20Disaster%20Mitigation%20Act%20of,of%20non%2Demergency%20disaster%20assistance>
- **Economic & Labor Market Information Bureau**, NH Employment Security, June 2024; Community Response for Groton, Received, 6/05/2023, Census 2000 and Revenue Information derived from this site;
 - <http://www.nhes.nh.gov/elmi/products/cp/profiles-htm/Groton.htm>

Photos

- Photos are taken by MAPS unless otherwise noted.

Map Images

- Map images (snips) are created by MAPS using readily available data from NH Granit unless otherwise indicated.

Wildfire Links

- US Forest Service; <https://www.fs.usda.gov/>
- US Fire Administration; <https://www.usfa.fema.gov/>
- Community Wildfire Defense Grant Program: <https://www.fs.usda.gov/managing-land/fire/grants#:~:text=The%20Community%20Wildfire%20Defense%20Program,reduce%20the%20risk%20of%20wildfire>
- Firewise®; <https://www.nfpa.org/Education-and-Research/Wildfire/Firewise-USA>
- Fire Adapted Communities; <https://www.fireadapted.org>
- Ready Set Go; <http://www.wildlandfires.org/>
- Fire education for children; <https://www.smokeybear.com/>

Additional Websites

- NH Homeland Security & Emergency Management; <https://www.nh.gov/safety/divisions/hsem/>
- US Geological Survey; <https://www.usgs.gov/mission-areas/water-resources/science/land-subsidence>
- Department Environmental Services; <https://www.des.nh.gov/>
- The Disaster Center (NH); <https://www.disastercenter.com/newhamp/tornado.html>
- The NFIP; <https://www.floodsmart.gov/>
- NOAA, National Weather Service; <https://w1.weather.gov/glossary/>
- NOAA, Storm Prediction Center; <https://www.spc.noaa.gov/faq/tornado/beaufort.html>
- National Weather Service; <https://www.weather.gov/safety/cold>
- Center for Disease Control; <https://www.cdc.gov/disasters/winter/index.html>
- Slate; <https://slate.com/news-and-politics/2003/12/outbreaks-vs-epidemics.html>
- NH Bureau of Economic Affairs; <https://www.nheconomy.com/office-of-planning-and-development>
- Code of Federal Regulations; Title 14, Aeronautics and Space; Part 1, Definitions and Abbreviations; <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-A/part-1>
- US Legal, Inc.; <https://definitions.uslegal.com/v/violent-crimes/>

APPENDIX B: HAZARD MITIGATION ASSISTANCE (HMA)

The Federal Emergency Management Agency’s (FEMA’s) HMA programs promote funding for mitigation measures that reduce or eliminate long-term risk to people and property from future disasters. These programs allow communities across the nation to enhance mitigation and take steps that will foster greater resilience and reduce disaster suffering²⁷:

HAZARD MITIGATION GRANT PROGRAM (HMGP)

HMGP provides funding to rebuild communities in a way that mitigates future disaster losses in those communities. Funding is made available after the President issues a major disaster declaration. It is based on up to 15% or 20% of the estimated federal assistance provided.

HAZARD MITIGATION GRANT PROGRAM POST FIRE (HMGP POST FIRE)

The HMGP Post Fire program provides funding after a Fire Management Assistance Grant (FMAG) is declared, and helps communities implement hazard mitigation measures after wildfire disasters. State, local, tribal, and territorial governments are eligible to apply for funding. The funding amount is pre-calculated and based on historical FMAG declarations and is reassessed every fiscal year.

FLOOD MITIGATION ASSISTANCE (FMA)

FMA is a competitive grant program that provides funding to states, local communities, tribes, and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP). The program is funded by an annual congressional appropriation and, since 2016, has made \$160 million available for mitigation projects.

HMA Eligible Activities				
MITIGATION PROJECTS	HMGP	HMGP POST FIRE	BRIC	FMA
Property Acquisition	Yes	Yes	Yes	Yes
Structure Elevation	Yes	Yes	Yes	Yes
Mitigation Reconstruction	Yes	Yes	Yes	Yes
Flood Risk Reduction Measures	Yes	Yes	Yes	Yes
Dry Floodproofing Non-Residential Buildings	Yes	Yes	Yes	Yes
Tsunami Vertical Evacuation	Yes	Yes	Yes	–
Safe Rooms Construction	Yes	Yes	Yes	–
Wildfire Mitigation	Yes	Yes	Yes	–
Retrofitting	Yes	Yes	Yes	Yes
Generators	Yes	Yes	Yes	–
Earthquake Early Warning System	Yes	Yes	Yes	–
CAPABILITY AND CAPACITY BUILDING				
New Plan Creation and Updates	Yes	Yes	Yes	Yes
Planning-Related Activities	Yes	Yes	Yes	Yes
Project Scoping/ Advance Assistance	Yes	Yes	Yes	Yes
Financial Technical Assistance	–	–	–	Yes

Note: The table above is not an exhaustive list of eligible activities. Please see program guidance or Notice of Funding Opportunity (NOFO) for more information on eligible activities.

²⁷ https://www.fema.gov/sites/default/files/documents/fema_hma-trifold_2021.pdf; sections of this appendix are taken directly from this Hazard Mitigation Assistance flier, although not all sections are quoted

BUILDING RESILIENT INFRASTRUCTURE AND COMMUNITIES (BRIC)

BRIC is a competitive grant program that provides funding for mitigation projects to reduce the risks from disasters and natural hazards. The amount of funding is based on a 6% set-aside of the assistance FEMA provides following major disaster declarations through the Public Assistance and Individuals and Households Program. The BRIC program was designed to foster innovation and provides a yearly grant cycle, offering applicants a consistent source of funding.

PRE-DISASTER MITIGATION (PDM)

PDM is a grant program that helped state, local, tribal, and territorial governments plan and implement hazard mitigation projects. For 20 years, PDM funded mitigation projects, but in FY 2020 BRIC replaced PDM for any new funding. Any grant awarded in FY 2019 will continue to be managed under PDM for any new funding.

ROLES OF APPLICANTS AND SUBAPPLICANTS

Mitigation project subapplications are developed by local governments (subapplicants) and submitted to their state, territory, or tribal government (applicant). States, territories, and tribes are responsible for selecting the subapplications that align with their mitigation priorities and submitting these in an application to FEMA. FEMA conducts a final eligibility review of all subapplications to ensure compliance with federal regulations. For competitive mitigation grants, FEMA will select projects for funding. All HMA grants have programmatic and administration requirements that are the responsibility of the applicant and subapplicant.

ADDITIONAL RESOURCES

For general questions about the HMA programs, please contact your State Hazard Mitigation Officer or FEMA Region. Other resources are available; see the Hazard Mitigation Assistance flier, FEMA, or go to www.fema.gov/hazard-mitigation-assistance.²⁸

Who is eligible to apply?				
APPLICANTS	HMGP	HMGP POST FIRE	BRIC	FMA
State/territorial agencies	Yes	Yes	Yes	Yes
Federally recognized tribes	Yes	Yes	Yes	Yes

SUBAPPLICANT	HMGP	HMGP POST FIRE	BRIC	FMA
State agencies	Yes	Yes	Yes	Yes
Federally recognized tribes	Yes	Yes	Yes	Yes
Local governments/communities	Yes	Yes	Yes	Yes
Private nonprofit organizations	Yes	Yes	-	-

Cost-share requirements	
PROGRAM	COST SHARE*
HMGP	75 / 25
HMGP Post Fire	75 / 25
BRIC	75 / 25
BRIC (Economically Disadvantaged Rural Communities**)	90 / 10
FMA (Community Flood Mitigation, Project Scoping, Individual Mitigation of Insured Properties, and Planning Grants)	75 / 25
FMA (Repetitive loss properties)	90 / 10
FMA (Severe repetitive loss properties)	100 / 0

* Percent of federal/non-federal cost share
 ** Economically Disadvantaged Rural Communities* is synonymous with small impoverished communities as used in the Stafford Act.

²⁸ https://www.fema.gov/sites/default/files/documents/fema_hma-trifold_2021.pdf

APPENDIX C: THE EXTENT OF NATURAL HAZARDS

Hazards indicated with an asterisk * are included in this Plan.

***SEVERE WINTER WEATHER**

Ice and snow events typically occur during winter and can cause loss of life, property damage, and tree damage.

Snowstorms

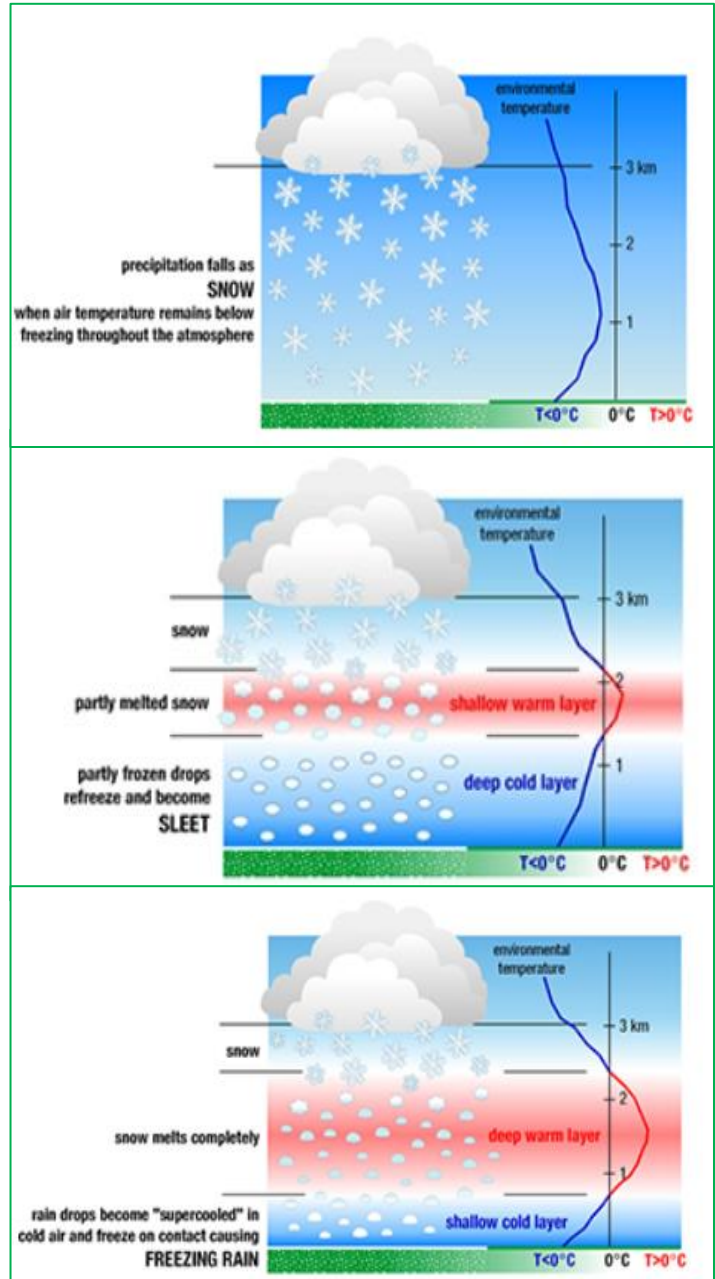
A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow for 12 hours or six inches for 24 hours.

Sleet

Snowflakes melt as they fall through a small band of warm air and refreeze when passing through a wider band of cold air. These frozen raindrops then fall to the ground as “sleet”.

Freezing Rain & Ice Storms

Snowflakes melt as they fall through a warm band of air and then fall through a shallow band of cold air close to the ground to become “supercooled”. These supercooled raindrops instantly freeze upon contact with the ground and anything else below 32 degrees Fahrenheit. This freezing accumulates ice on roads, trees, utility lines, and other objects, resulting in an “ice storm”. “Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires, and similar objects.”²⁹



*Types of Severe Winter Weather
NOAA – National Severe Storms Laboratory*

²⁹ NOAA, National Severe Storms Laboratory, <https://www.nssl.noaa.gov/education/svrwx101/winter/types/>

The Sperry-Piltz Ice Accumulation Index (SPIA) (below) is designed to help utility companies better prepare for predicated ice storms.³⁰

The Sperry-Piltz Ice Accumulation Index, or “SPIA Index” – Copyright, February, 2009

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) <small>*Revised-October, 2011</small>	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
2	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
3	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
	0.75 – 1.00	< 15	
4	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 - 35	
	0.75 – 1.00	15 - 25	
	1.00 – 1.50	< 15	
5	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

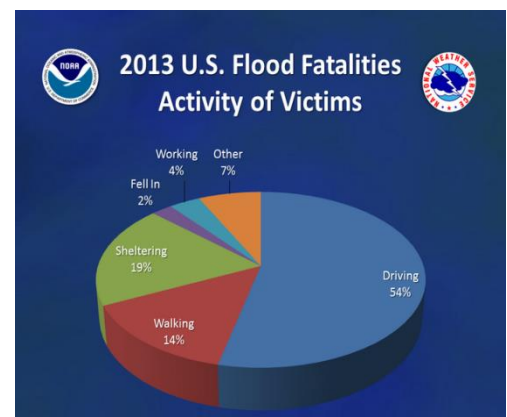
(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

***INLAND FLOODING**

General Flooding Conditions

Floods are defined as a temporary overflow of water onto lands that are not usually covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock 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 increased rainfall and snowmelt; however, floods can occur anytime. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go; warm temperatures and heavy rains cause rapid snowmelt, producing prime flood conditions. Also, rising waters in early spring often break the ice into chunks that float downstream and pile up, causing flooding behind them. Small rivers and streams pose unique flooding risks because jams easily block them. Ice in riverbeds and against structures presents a significant flooding threat to bridges, roads, and the surrounding lands.



³⁰ The Weather Channel, <https://weather.com/news/weather-winter/rating-ice-storms-damage-sperry-piltz-20131202>

Flooding (Dam Failure)

Flooding due to dam failure can be small enough to affect the immediate area of the dam or large enough to cause catastrophic results to cities, towns, and human life below the dam. The amount of flooding depends mainly on the dam's size and the water held by the dam. The size of the breach, the amount of water flowing from the dam, and the amount of human habitation downstream are also factors.

A "Dam" means any artificial barrier, including appurtenant works, which impounds or diverts water, has a height of 4 feet or more, or a storage capacity of two acres or more, or is located at the outlet of a great pond³¹. A dam failure occurs when water overtops the dam or there is a structural failure of the dam, which causes there to be a breach and an unintentional release of water. Dams are classified in the following manner³²:

Classification	Description	Inspection Intervals
Non-Menace	A dam is not a menace because it is in a location and size that failure or misoperation of the dam would not result in probable loss of life or property. The dam must be less than six feet in height if the storage capacity is greater than 50 acre-feet or less than 25 feet if it has a storage capacity of 15-50 acre-feet.	Every six years
Low Hazard	A dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no possible loss of life, low economic loss to structures or property, structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services, the release of liquid industrial, agricultural, or commercial wastes, septage, or contained sediment if the storage capacity is less two-acre-feet and is located more than 250 feet from a water body or watercourse, and/or reversible environmental losses to environmentally-sensitive sites.	Every six years
Significant Hazard	A dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no probable loss of lives; however, there would be a major economic loss to structures or property, structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services, major environmental pro-public health losses including one or more of the following: damages to a public water system (RSA 485:1-a, XV) which will take longer than 48 hours to repair, the release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is two acre-feet or more; or damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.	Every four years
High Hazard	A dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as well as a result of water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure which is occupied under normal conditions; water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to a dam failure is greater than one foot; structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services; the release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 147-A:2 VII; or any other circumstance that would more likely than not cause one or more deaths.	Every two years

³¹ <https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/vol2-appC.pdf>

³² <https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/db-15.pdf>

Flooding (local, road erosion)

Today, the risk of flooding is a serious concern with changes in land use, aging roads, and designs that are no longer effective and undersized culverts. Heavy rain, rapid snowmelt, and stream flooding often cause culverts to be overwhelmed and roads to wash out. In addition, inadequate and aging stormwater drainage systems create local flooding on asphalt and gravel roads.

Flooding (Riverine)

Floodplains are usually located in lowlands near rivers; floodplains experience flooding regularly. The term 100-year flood does not mean that floods 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. Using “1% annual chance of flood” is more accurate. Flooding is often associated with hurricanes, heavy rains, ice jams, and rapid snowmelt in the spring.

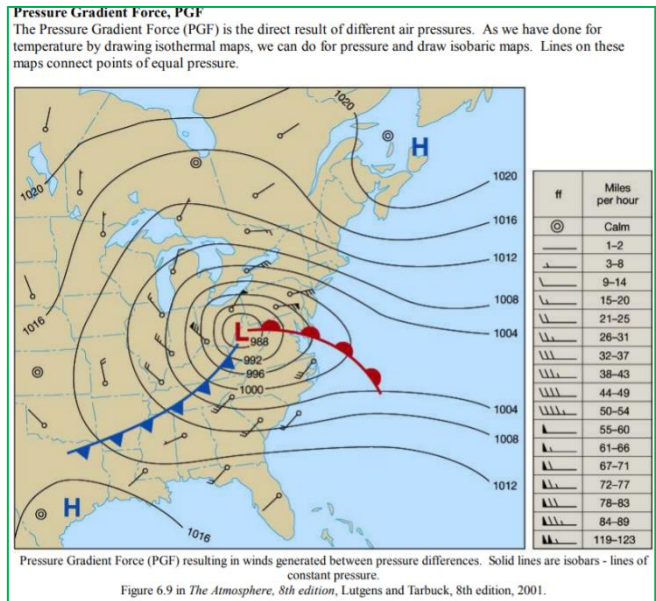
Erosion

Erosion is the wearing away of lands, such as riverbank loss, beach, shoreline, or dune material. It is measured as the rate of change in the position or displacement of a riverbank or shoreline over time. Short-term erosion typically results from periodic natural events, such as flooding, hurricanes, storm surges, and windstorms, but may be intensified by human activities. Long-term erosion results from multi-year impacts such as repetitive flooding, wave action, sea-level rise, sediment loss, subsidence, and climate change. Death and injury are not typically associated with erosion; however, erosion can destroy buildings and infrastructure.³³

***HIGH WIND EVENTS**

Windstorm

NOAA (National Oceanic & Atmospheric Administration) stated that wind is *“The horizontal motion of the air past a given point.”* Winds begin with differences in air pressures. Air pressures higher in one place than another set up a force pushing from the high pressure toward the low pressure. The more significant the difference in pressures, the stronger the force. The distance between high and low pressure also determines how fast the moving air is accelerated. Meteorologists refer to the force that starts the wind flowing as the “pressure gradient force.” High and low pressures are relative. No set number divides high and low pressure. Wind is used to describe the prevailing direction from which the wind is blowing with speed given usually in miles per hour or knots.” Also, NOAA’s issuance of a Wind Advisory occurs when sustained winds reach 25 to 39 mph and gusts to 57 mph.^{34 35}



³³ https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf
³⁴ NOAA; <https://w1.weather.gov/glossary/index.php?letter=w>
³⁵ Pressure Gradient Force Chart “snipped” from [Air Pressure and Wind](https://www.weather.gov/media/zhu/ZHU_Training_Page/winds/pressure_winds/pressure_winds.pdf);
https://www.weather.gov/media/zhu/ZHU_Training_Page/winds/pressure_winds/pressure_winds.pdf

Tornado

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. The atmospheric conditions required to form a tornado include significant thermal instability, high humidity, and the convergence of warm, moist air at low levels with cooler, drier air aloft. Tornadoes develop when cold air overrides a layer of warm air, causing the warm air to rise rapidly. Most tornadoes remain suspended in the atmosphere but become a force of destruction if they touch down.

Tornadoes produce the most violent winds on Earth at 280 mph or more speeds. Also, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be more than one mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage.

The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud “freight train” noise. A tornado covers a much smaller area than a hurricane but can be more violent and destructive.

“Dr. T. Theodore Fujita developed the Fujita Tornado Damage Scale (F-Scale) to provide estimates of tornado strength based on damage surveys. Since it’s practically impossible to make direct measurements of tornado winds, an estimate of the winds based on damage is the best way to classify a tornado. The new Enhanced Fujita Scale (EF-Scale) addresses some of the limitations identified by meteorologists and engineers since introducing the Fujita Scale in 1971. The new scale identifies 28 different free-standing structures most affected by tornadoes considering construction quality and maintenance. The range of tornado intensities remains as before, zero to five, with ‘EF-0’ being the weakest, associated with very little damage and ‘EF-5’ representing complete destruction, which was the case in Greensburg, Kansas on May 4th, 2007, the first tornado classified as ‘EF-5’. The EF scale was adopted on February 1, 2007.”³⁶ The chart (right), adapted from wunderground.com, compares the Fujita Scale to the Enhanced Fujita Scale.

EF SCALE	OLD F-SCALE	TYPICAL DAMAGE
EF-0 (65-85mph)	F0 (65-73 mph)	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF-1 (86-110 mph)	F1 (74-112 mph)	Moderate damage. Roofs are severely stripped; mobile homes are overturned or badly damaged; loss of exterior doors; windows and other glass is broken.
EF-2 (111-135 mph)	F2 (113-157 mph)	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off the ground.
EF-3 (136-165 mph)	F3 (158-206 mph)	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF-4 (166-200 mph)	F4 (207-260 mph)	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF-5 (>200 mph)	F5 (261-318 mph)	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yards); high-rise buildings have significant structural deformation; incredible phenomena will occur.
EF No rating	F6-F12 (319 mph to speed of sound)	Inconceivable damage. Should a tornado with a maximum wind speed in excess of EF5 occur, the extent and types of damage may not be conceivable. A number of missiles, such as iceboxes, water heaters, storage tanks, automobiles, etc., will create secondary damage to structures.

³⁶ Enhance Fujita Scale, <https://www.wunderground.com/prepare/hurricane-typhoon>

Downburst

According to NOAA, a downburst is a strong downdraft that causes damaging winds on or near the ground. Not to be confused with a downburst, the term "microburst" describes the size of the downburst. Comparing a microburst and the larger macroburst shows that both can cause extreme winds.

A microburst is a downburst with winds extending 2 ½ miles or less, lasting 5 to 15 minutes, and causing damaging winds as high as 168 MPH. A macroburst is a downburst with winds extending more than 2 ½ miles and lasting 5 to 30 minutes. Damaging winds, causing widespread, tornado-like damage, could be as high as 134 MPH.³⁷

Below is the Beaufort Wind Scale, showing expected damage based on the wind (knots), developed in 1805 by Sir Francis Beaufort of England and posted on NOAA’s Storm Prediction Center website.³⁸

Force	Wind (Knots)	WMO Classification	The appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction; still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes bring to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted; small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft. taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft., whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft., white foam streaks off breakers	Whole trees moving, resistance felt walking against the wind
8	34-40	Gale	Moderately high (13-20 ft.) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against the wind
9	41-47	Strong Gale	High waves (20 ft.), the sea begins to roll, dense streaks of foam, and the spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft.) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage."
11	56-63	Violent Storm	Exceptionally high (30-45 ft.) waves, foam patches cover the sea, visibility more reduced	
12	64+	Hurricane	Air-filled with foam, waves over 45 ft., sea completely white with driving spray, visibility greatly reduced	

³⁷ NOAA - https://www.noaa.gov/jetstream/wind_damage

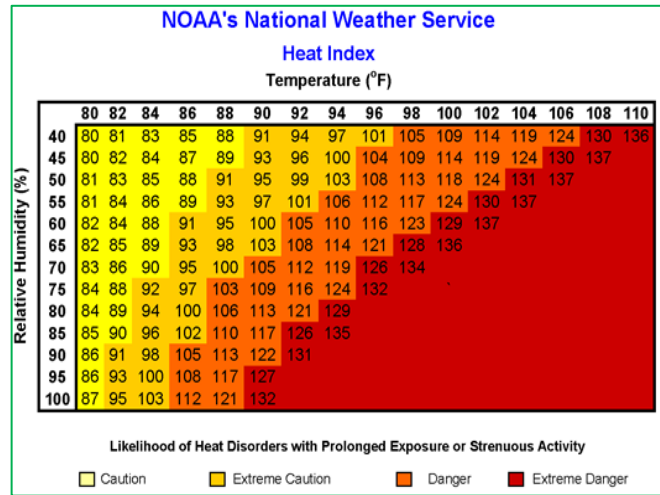
³⁸ NOAA, Storm Prediction Center, <https://www.spc.noaa.gov/faq/tornado/beaufort.html>

***EXTREME TEMPERATURES**

Extreme Heat

A heatwave is a “prolonged period of excessive heat, often combined with excessive humidity.” Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature.

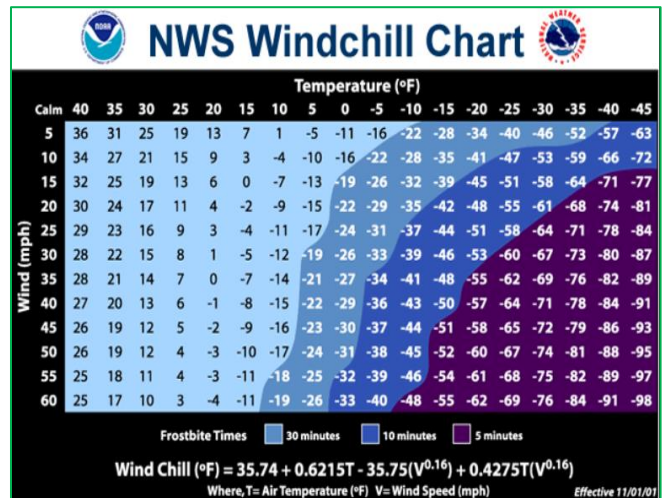
Most heat disorders occur when a victim is overexposed to heat or has over-exercised for their age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.



Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from a prolonged heat wave than those in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, producing higher nighttime temperatures known as the urban heat island effect. The chart above explains the likelihood of heat disorders that may result from high heat.³⁹

Extreme Cold

What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near-freezing temperatures are considered “extreme cold.” Whenever temperatures drop decidedly below average and wind speed increases, heat can leave your body more rapidly; these weather-related conditions may lead to serious health problems. Extreme cold is dangerous; it can bring on health emergencies in susceptible people without shelter, those stranded, or those living in poorly insulated homes or without heat. The National Weather Service Chart (to the right) shows windchill due to wind and temperature.⁴⁰



³⁹ NOAA; <https://www.weather.gov/safety/heat-index>
⁴⁰ National Weather Service; <https://www.weather.gov/safety/cold-wind-chill-chart>

LIGHTNING*Lightning**

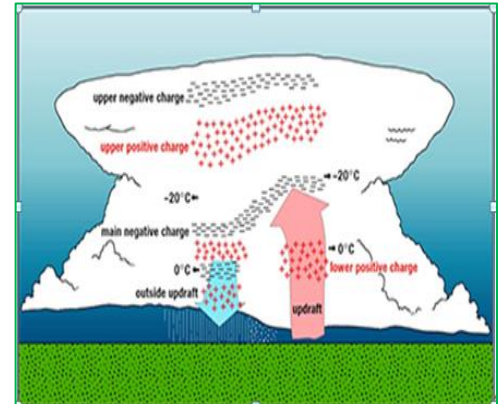
The NOAA National Severe Storms Laboratory (NSSL) stated, "Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up enough, this insulating capacity of the air breaks down, and there is a rapid discharge of electricity that we know as lightning. The flash of lightning temporarily equalizes the charged regions in the atmosphere until the opposite charges build up again."⁴¹

Thunder, a result of lightning, is created when the "lightning channel heats the air to around 18,000 degrees Fahrenheit..."⁴² thus causing the rapid expansion of the air and the sounds we hear as thunder. Although thunder heard during a storm cannot hurt you, the lightning associated with the thunder can strike people and strike homes, outbuildings, grass, and trees, sparking disaster. In addition, wildfires and structure loss are at high risk during severe lightning events.

Although thunderstorms and their associated lightning can occur any time of year, in New England, they are most likely to occur in the summer and late afternoon or early evening; they may even occur during a winter snowstorm. Trees, tall buildings, and mountains are often lightning targets because their tops are closer to the cloud; however, lightning is unpredictable and does not always strike the tallest thing in the area.

Thunderstorms and lightning occur most commonly in moist, warm climates. Data from the National Lightning Detection Network shows an average of 20,000,000 cloud-to-ground flashes occur annually over the continental US. Around the world, lightning strikes the ground about 100 times each second, or 8 million times a day.

In general, lightning decreases across the US mainland toward the northwest. Over the entire year, the highest frequency of cloud-to-ground lightning is in Florida between Tampa and Orlando. This phenomenon is due to the presence, on many days during the year, of significant moisture content in the atmosphere at low levels (below 5,000 feet) and high surface temperatures that produce strong sea breezes along the Florida coasts. The western mountains of the US also produce strong upward motions and contribute to frequent cloud-to-ground lightning. There are also high frequencies along the Gulf of Mexico, the Atlantic coast, and the southeast United States. US regions along the Pacific west coast have the least cloud-to-ground lightning."⁴³



"A conceptual model shows the electrical charge distribution inside deep convection (thunderstorms), developed by NSSL and university scientists. In the main updraft (in and above the red arrow), there are four main charge regions. In the convective region but outside the out draft (in and above the blue arrow), there are more than four charge regions." - NOAA

⁴¹ NOAA National Severe Storms Laboratory, <https://www.nssl.noaa.gov/education/svrwx101/lightning>

⁴² Ibid

⁴³ Ibid

Lightning Activity Level (LAL) Grid		
The lightning activity level is a common parameter in fire weather forecasts nationwide. LAL is a measure of the amount of lightning activity using values 1 to 6 where:		
LAL	Cloud & Storm Development	Lightning Strikes 15 Minutes
1	No thunderstorms	-
2	Cumulus clouds are common, but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but 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 three must occur within the observation area. Moderate rain is common, and 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, except thunderstorms are dry.	

<https://graphical.weather.gov/definitions/defineLAL.html>

***WILDFIRE**

According to the International Wildland-Urban Interface Code (IWUIC), the definition of wildfire is “an uncontrolled fire spreading through vegetative fuels exposing and possibly consuming structures”. In addition, the IWUIC defines the Wildland Urban Interface (WUI) area as “that geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels.”⁴⁴

There are two major potential losses with a wildfire: the forest and the threat to the built-up human environment. In many cases, the only time it is feasible for a community to control a wildfire is when it threatens the built-up human environment.

⁴⁴<https://codes.iccsafe.org/content/IWUIC2021P1/chapter-2-definitions#:~:text=WILDFIRE.,exposing%20and%20possibly%20consuming%20structures>

***TROPICAL/POST TROPICAL CYCLONES**

Cyclones (Hurricanes)

A hurricane is a tropical cyclone with 74 miles per hour or more winds that blow in a large spiral around a relatively calm center. The storm's eye is usually 20-30 miles wide, and the storm may extend over 400 miles. High winds are a primary cause of hurricane-inflicted loss of life and property damage.

“The Saffir-Simpson Hurricane Wind Scale” (on the following page⁴⁵) is a 1 to 5 rating 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. In the western North Pacific, the term "super typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph.”⁴⁶

Flooding is often caused by the coastal storm surge of the ocean and torrential rains, both of which may accompany a hurricane; these floods can result in the loss of lives and property.

Post-Tropical Cyclones

A tropical depression becomes a tropical storm with maximum sustained winds between 39-73 mph. Although tropical storms have less than 74 miles per hour winds, they can do significant damage like hurricanes. The damage most felt by tropical storms is from the torrential rains, which cause rivers and streams to flood and overflow their banks.

Rainfall from tropical storms has been reported at up to 6 inches per hour; 43 inches of rain in 24 hours was reported in Alvin, TX, due to Tropical Storm Claudette.⁴⁷

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt. 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to the roof, shingles, vinyl siding, and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles will likely result in power outages that could last several days.
2	96-110 mph 83-95 kt. 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain significant roof and siding damage. In addition, many shallowly rooted trees will be snapped or uprooted, blocking numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt. 178-208 km/h	Devastating damage will occur: Well-built frame homes may incur significant damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt. 209-251 km/h	Catastrophic damage will occur: Well-built frame homes can sustain severe damage by losing most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles will be downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt. or higher 252 km/h or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

⁴⁵ National Hurricane Center; <https://www.nhc.noaa.gov/aboutsshws.php>

⁴⁶ Ibid

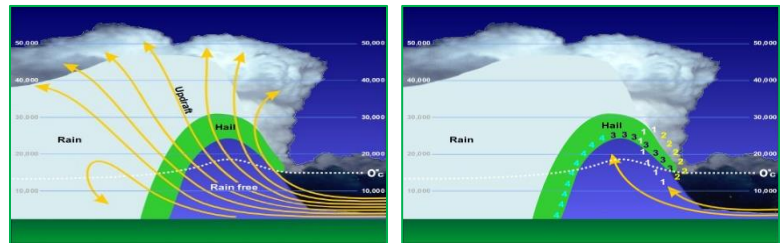
⁴⁷ https://www.wpc.ncep.noaa.gov/research/mcs_web_test_test_files/Page1637.htm

Hail

Hailstones are balls of ice that grow as they are held up by winds, known as updrafts, that blow upwards in thunderstorms. The updrafts carry droplets of supercooled water, water at a below-freezing temperature that is not yet ice. The supercooled water droplets freeze into ice balls and grow to become hailstones. The faster the updraft, the bigger the stones can grow. Most hailstones are smaller in diameter than a dime, but stones weighing more than a pound have been recorded. “The largest hailstone recovered in the US fell in Vivian, SD on June 23, 2010, with a diameter of 8 inches and a circumference of 18.62 inches. It weighed 1 lb. 15 oz.”⁴⁸

Dime/Penny	0.75	
Nickel	0.88	
Quarter	1.00	
Half Dollar	1.25	
Ping Pong	1.50	
Golf Ball	1.75	
Hen Egg	2.00	
Tennis Ball	2.50	
Baseball	2.75	
Tea Cup	3.00	
Grapefruit	4.00	
Softball	4.50	

How hailstones grow is complicated, but the results are irregular balls of ice that can be as large as baseballs. The chart above shows the relative size differences and a common way to “measure” the size of hail based on diameter.⁴⁹ The charts to the right show how hail is formed.⁵⁰



***EARTHQUAKE**

An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth’s surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric, and phone lines, and often cause landslides, flash floods, fires, and avalanches. More significant earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks and end in vibrations of gradually diminishing force called aftershocks. An earthquake’s underground point of origin is called its focus; the point on the surface directly above the focus is the epicenter.

Using the commonly used scales, the Richter scale (which measures strength or magnitude) and the Mercalli Scale (which measures intensity or severity), the magnitude and intensity of an earthquake are determined. The chart to the right shows the two scales relative to one another. The Richter scale measures earthquakes starting at one as the lowest, with each successive unit being about ten times stronger and more severe than the previous one.⁵¹

It is well documented that fault lines run throughout New Hampshire, but high-magnitude earthquakes have not been common in NH history. Four earthquakes occurred in New Hampshire between 1924 and 1989, having a magnitude of 4.2 or more. Two occurred in Ossipee, one west of Laconia and one near the Quebec border.

Modified Mercalli Scale		Richter Magnitude Scale
I	Detected only by sensitive instruments	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibration like passing truck	2.5
IV	Felt indoors by many, outdoors by few, at night some may awaken; dishes, windows, doors disturbed; autos rock noticeably	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos	4.5
VIII	Panel walls thrown out of frames; fall of walls, monuments, chimneys; sand and mud ejected; drivers of autos disturbed	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up in air	7

⁴⁸ NOAA National Severe Storms Laboratory; <https://www.nssl.noaa.gov/education/svrwx101/hail/>

⁴⁹ <https://www.pinterest.com/pin/126171227030590678/>

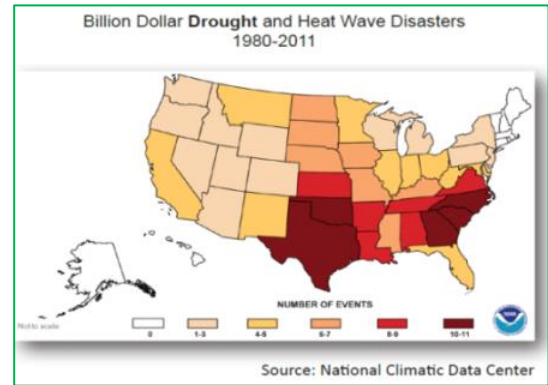
⁵⁰ <https://www.noaa.gov/jetstream/hail>

⁵¹ <https://dnr.mo.gov/land-geology/hazards/earthquakes/science/relationship-between-richter-magnitude-modified-mercalli-intensity>

***DROUGHT**

A drought is a long period of abnormally low precipitation that adversely affects the growing season or living conditions of plants and animals. Droughts are not rare in New Hampshire. They are generally less damaging and disruptive than floods and are more difficult to define. The effect of drought is indicated through measurements of soil moisture, groundwater levels, and streamflow.

However, not all of these indicators will be minimal during a drought. For example, frequent minor rainstorms can replenish the soil moisture without raising groundwater levels or increasing streamflow. Low stream flow also correlates with low groundwater levels because groundwater discharge to streams and rivers maintains streamflow during extended dry periods. Low streamflow and low groundwater levels commonly cause diminished water supply.



The US Drought Monitor provides an intensity scale, as shown to the right, to indicate the “Category” of drought at any given time. During the peak months of the 2016 drought in New Hampshire, the southern part of the state was in Category D3 or Extreme Drought.

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: <ul style="list-style-type: none"> • short-term dryness slowing planting, growth of crops or pastures Coming out of drought: <ul style="list-style-type: none"> • some lingering water deficits • pastures or crops not fully recovered
D1	Moderate Drought	<ul style="list-style-type: none"> • Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested
D2	Severe Drought	<ul style="list-style-type: none"> • Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D3	Extreme Drought	<ul style="list-style-type: none"> • Major crop/pasture losses • Widespread water shortages or restrictions
D4	Exceptional Drought	<ul style="list-style-type: none"> • Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

<https://www.nrcc.cornell.edu/services/blog/2018/06/28/index.html>; photo from US Drought Monitor

LANDSLIDES

While no universally accepted standard or scientific scale has been developed for measuring the severity of all landslides, severity can be measured in several other ways:

- Steepness/grade of the Slope (measured as a percent)
- Geographical Area
 - Measured in square feet, square yards, etc.
 - More accurately measured using LIDAR/GIS systems
- Earthquake, either causing the event or caused by the event (measured using the Moment Magnitude Intensity or Mercalli Scale)

There are also multiple types of landslides:

- Falls: A mass detaches from a steep slope or cliff and descends by free-fall, bounding, or rolling
- Topples: A mass tilts or rotates forward as a unit
- Slides: A mass displaces on one or more recognizable surfaces, which may be curved or planar
- Flows: A mass moves downslope with a fluid motion. A significant amount of water may or may not be part of the mass.

Like flooding, landslides are unique in how they affect different geographic, topographic, and geologic areas. Therefore, consideration of many measurements is required to determine the severity of the landslide event.⁵²

*INFECTIOUS DISEASE

Bacterial & Viral Infections

Many organisms live inside our bodies and on our skin. Although these organisms are generally harmless and sometimes helpful, they can cause illnesses. Infectious diseases can be transmitted from one person to another by bites from animals or insects (zoonotic), from the environment, or by consuming food or water that has been contaminated. In addition, infectious diseases may be caused by bacteria, viruses, fungi, and parasites.⁵³

Some of the more common infectious diseases include Lyme disease, HIV/AIDS, Tuberculosis, Rabies, West Nile Virus, Eastern Equine Encephalitis (EEE), Ebola, Avian Flu, Enterovirus D-68, Influenza, Hepatitis A, Zika Virus, Meningitis, Legionella, Sexually Transmitted Diseases (STD), Hepatitis C, Salmonella, SARS and Staph.⁵⁴

“Throughout history, millions of people have died of diseases such as bubonic plague or the Black Death, which is caused by Yersinia pestis bacteria, and smallpox, which is caused by the variola virus. In recent times, viral infections have been responsible for two major pandemics: the 1918-1919 “Spanish Flu” epidemic that killed 20-40 million people, and the ongoing HIV/AIDS epidemic that killed an estimated 1.5 million people worldwide in 2013 alone.

Bacterial and viral infections can cause similar symptoms such as coughing and sneezing, fever, inflammation, vomiting, diarrhea, fatigue, and cramping – all of which are ways the immune system tries to rid the body of infectious organisms. But bacterial and viral infections are dissimilar in many other important respects, most of them due to the organisms’ structural differences and the way they respond to medications.”⁵⁵

⁵² State of New Hampshire Multi-Hazard Mitigation Plan Update 2023 & <https://oas.org/dsd/publications/Unit/oea66e/ch10.htm>

⁵³ <https://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/syc-20351173>

⁵⁴ <https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control>

⁵⁵ <https://www.webmd.com/a-to-z-guides/bacterial-and-viral-infections#1>

In early 2020, a novel coronavirus emerged in China, spreading worldwide to become the worst pandemic since the 1918 Spanish Flu. Known as COVID-19, this novel coronavirus had infected 676,609,955 people and caused the deaths of 6,881,955 individuals worldwide as of March 20, 2023, the final day that Johns Hopkins collected COVID-19 data, after three years. The Delta and Omnicron variants appeared in the US in December 2021, causing critical concerns about the possibility of overwhelming the country's hospital systems.

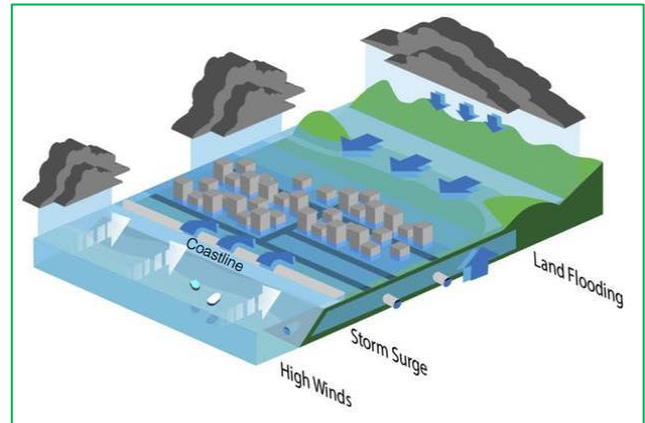
The pandemic remains an evolving worldwide crisis, affecting millions of workers in the United States and presenting significant economic results. Although most people confirmed with COVID-19 eventually recover, and many have been vaccinated, the virus remains a risk for the elderly and compromised individuals.

The extent of infectious diseases is generally described by the level and occurrence of a particular disease as follows:

- Endemic.....Disease with a constant presence or usual prevalence in a population within a geographic area
- Sporadic.....Disease that occurs infrequently and irregularly
- Hyperendemic.....Disease that is persistent and has high levels of occurrence
- EpidemicDisease that shows an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area
- OutbreakDisease that has the same definition as an epidemic but is often used for a more limited geographic area
- Cluster.....Refers to an 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.
- Pandemic.....An epidemic that has spread over several countries or continents, usually affecting a large number of people

COASTAL FLOODING

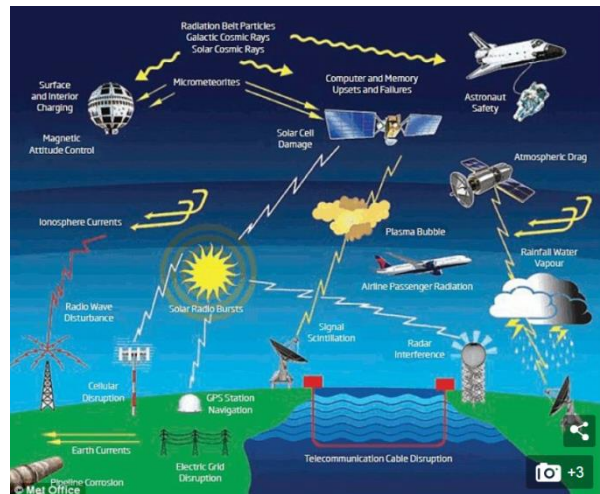
Coastal areas are particularly susceptible to flooding, erosion, storm surge, and sea-level rise due to tropical and post-tropical cyclones, heavy rain events, gale-force winds, and other natural phenomena. The 2023 State Hazard Mitigation Plan states, “Coastal flooding is defined by the National Oceanic and Atmospheric (NOAA) as flooding which occurs when there are significant storms, such as tropical and extratropical cyclones (NWS Internet Services Team, 2009).”⁵⁶



The State Plan goes on to discuss problems associated with coastal flooding, “These problems can include but are not limited to—beach and shoreline erosion; loss or submergence of wetlands, other coastal ecosystems, and developed land; impacts from saltwater intrusion and high groundwater tables; loss of coastal structures (sea walls, piers, bulkheads, bridges, or buildings); overwhelmed public infrastructure; water quality impairments; and hazardous waste exposure. Loss of life and property damage can be more severe in coastal storm events due to velocity of wave action and accompanying winds.”⁵⁷

SOLAR STORMS & SPACE WEATHER

When sudden amounts of stored magnetic energy and ions are discharged from the Sun’s surface, solar flares, high-speed solar wind streams, solar energetic particles, and coronal mass ejections (CMEs) are possible. This magnetic energy sometimes finds its way to Earth by following the Sun’s magnetic field. Then, upon collision with the Earth’s magnetic field, these charged particles enter the Earth’s upper atmosphere, causing Auroras.



Charged magnetic particles can produce their own magnetic field, disrupting navigation, communication systems, and GPS satellites. In addition, they can potentially produce Geomagnetic Induced Currents (GICs), affecting the power grid and pipelines. In addition, an electromagnetic surge from a solar storm can produce an Electromagnetic Pulse (EMP). An EMP could cause significant damage to infrastructures such as nuclear power plants, banking systems, the electrical grid, sewage treatment facilities, cell phones, landlines, and even vehicles. The image above shows the potential impacts of solar storms and space weather.⁵⁸

⁵⁶ New Hampshire State Hazard Mitigation Plan, 2023 Update; <https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2023/10/2023-NH-State-Hazard-Mitigation-Plan-Signed-10.5.23.pdf>; page 127

⁵⁷ Ibid, page 127

⁵⁸ <https://www.dailymail.co.uk/sciencetech/article-3764842/A-solar-storm-destroy-planet-unless-create-massive-magnetic-shield-protect-Earth-warns-expert.html>

Solar Storms & Space Weather Extent⁵⁹

Geomagnetic Storms				
Scale	Description	Effect	Physical Measure	Average Frequency (1 cycle = 11 years)
G 5	Extreme	<p>Power systems: Widespread voltage control problems and protective system problems can occur; some grid systems may experience complete collapse or blackouts. Transformers may experience damage.</p> <p>Spacecraft operations: May experience extensive surface charging, problems with orientation, uplink/downlink, and tracking satellites.</p> <p>Other systems: Pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).</p>	Kp. = 9	4 per cycle (4 days per cycle)
G 4	Severe	<p>Power systems: Possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid.</p> <p>Spacecraft operations: May experience surface charging and tracking problems; corrections may be needed for orientation problems.</p> <p>Other systems: Induced pipeline currents affect preventive measures, HF radio propagation is sporadic, satellite navigation is degraded for hours, low-frequency radio navigation is disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).</p>	Kp. = 8, including a 9-	100 per cycle (60 days per cycle)
G 3	Strong	<p>Power systems: Voltage corrections may be required; false alarms are triggered on some protection devices.</p> <p>Spacecraft operations: Surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems.</p> <p>Other systems: Intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).</p>	Kp. = 7	200 per cycle (130 days per cycle)
G 2	Moderate	<p>Power systems: High-latitude power systems may experience voltage alarms; long-duration storms may cause transformer damage.</p> <p>Spacecraft operations: Corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions.</p> <p>Other systems: HF radio propagation can fade at higher latitudes, and aurora has been seen as low as New York and Idaho (typically 55° geomagnetic lat.).</p>	Kp. = 6	600 per cycle (360 days per cycle)
G 1	Minor	<p>Power systems: Weak power grid fluctuations can occur.</p> <p>Spacecraft operations: Minor impact on satellite operations possible.</p> <p>Other systems: Migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).</p>	Kp. = 5	1700 per cycle (900 days per cycle)

Solar Radiation Storms				
Scale	Description	Effect	Physical Measure (Flux level of >=10 MeV particles)	Average Frequency (1 cycle = 11 years)
S 5	Extreme	<p>Biological: Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.</p> <p>Satellite operations: Satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources, permanent damage to solar panels is possible.</p> <p>Other systems: Complete blackout of HF (high frequency) communications possible through the polar regions and position errors make navigation operations extremely difficult.</p>	10 ⁵	Fewer than 1 per cycle
S 4	Severe	<p>Biological: Unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.</p> <p>Satellite operations: May experience memory device problems and noise on imaging systems; star-tracker problems may cause orientation problems, and solar panel efficiency can be degraded.</p> <p>Other systems: Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.</p>	10 ⁴	3 per cycle

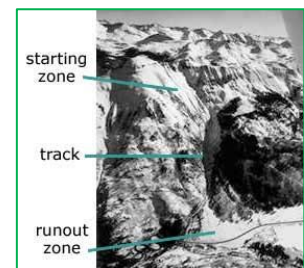
⁵⁹ Extent charts taken from <https://www.weather.gov/akq/SpaceWeather>

Solar Radiation Storms				
S 3	Strong	<p>Biological: Radiation hazard avoidance is recommended for astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.</p> <p>Satellite operations: Single-event upsets, noise in imaging systems, and a slight reduction of efficiency in solar panels are likely.</p> <p>Other systems: Degraded HF radio propagation through the polar regions and navigation position errors likely.</p>	10 ³	10 per cycle
S 2	Moderate	<p>Biological: Passengers and crew in high-flying aircraft at high latitudes may be exposed to elevated radiation risk.</p> <p>Satellite operations: Infrequent single-event upsets are possible.</p> <p>Other systems: minor effects on HF propagation through the polar regions and navigation at polar cap locations possibly affected.</p>	10 ²	25 per cycle
S 1	Minor	<p>Biological: None.</p> <p>Satellite operations: None.</p> <p>Other systems: Minor impacts on HF radio in the polar regions.</p>	10	50 per cycle

Radio Blackout				
Scale	Description	Effect	Physical Measure	Average Frequency (1 cycle = 11 years)
R 5	Extreme	<p>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 on-route aviators in this sector.</p> <p>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.</p>	X20 (2 x 10 ⁻³)	Less than 1 per cycle
R 4	Severe	<p>HF Radio: HF radio communication blackouts on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time.</p> <p>Navigation: Outages of low-frequency navigation signals cause increased errors in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.</p>	X10 (10 ⁻³)	8 per cycle (8 days per cycle)
R 3	Strong	<p>HF Radio: Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth.</p> <p>Navigation: Low-frequency navigation signals degraded for about an hour.</p>	X1 (10 ⁻⁴)	175 per cycle (140 days per cycle)
R 2	Moderate	<p>HF Radio: Limited blackout of HF radio communication on the sunlit side, loss of radio contact for tens of minutes.</p> <p>Navigation: Degradation of low-frequency navigation signals for tens of minutes.</p>	M5 (5 x 10 ⁻⁵)	350 per cycle (300 days per cycle)
R 1	Minor	<p>HF Radio: Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact.</p> <p>Navigation: Low-frequency navigation signals are degraded for brief intervals.</p>	M1 (10 ⁻⁵)	2000 per cycle (950 days per cycle)

AVALANCHE

According to the National Snow & Ice Data Center, an avalanche is a rapid flow of snow down a hill or mountainside. Although avalanches can occur on any slope given the right conditions, certain times of the year and specific locations are naturally more dangerous than others. Most avalanches tend to happen during winter, particularly from December to April. However, avalanche fatalities have been recorded every month of the year.⁶⁰



⁶⁰ Copyright Richard Armstrong, NSIDC, <https://nsidc.org/learn>

“All that is necessary for an avalanche is a mass of snow and a slope for it to slide down...A large avalanche in North America might release 230,000 cubic meters (300,000 cubic yards) of snow. That is the equivalent of 20 football fields filled 3 meters (10 feet) deep with snow. However, such large avalanches are often naturally released, when the snowpack becomes unstable and layers of snow fail. Skiers and recreationists usually trigger smaller, but often more deadly avalanches.”

North American Public Avalanche Danger Scale				
Avalanche danger is determined by the likelihood, size and distribution of avalanches.				
Danger Level		Travel Advice	Likelihood of Avalanches	Avalanche Size and Distribution
5 Extreme		Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Large to very large avalanches in many areas.
4 High		Very dangerous avalanche conditions. Travel in avalanche terrain not recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
3 Considerable		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
2 Moderate		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
1 Low		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.

Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.

An avalanche has three main parts (see the image above). The first and most unstable is the “starting zone”, where the snow can “fracture” and slide. “Typical starting zones are higher up on slopes. However, given the right conditions, snow can fracture at any point on the slope.”⁶¹

The second part is the “avalanche track”, or the downhill path the avalanche follows. The avalanche is evident where large swaths of trees are missing or where there are large pile-ups of rock, snow, trees, and debris at the bottom of an incline.

The third part of an avalanche is the “runout zone”. The avalanche has stopped in the runout zone, leaving the most extensive and highest pile of snow and debris.

“Several factors may affect the likelihood of an avalanche, including weather, temperature, slope steepness, slope orientation (whether the slope is facing north or south), wind direction, terrain, vegetation, and general snowpack conditions. Different combinations of these factors can create low, moderate, or extreme avalanche conditions. In addition, some of these conditions, such as temperature and snowpack, can change on a daily or hourly basis.”⁶²

When an avalanche is possible, an “avalanche advisory” is issued. This preliminary notification warns hikers, skiers, snowmobilers, and responders that conditions may be favorable for the development of avalanches. The chart above shows avalanche danger determined by likelihood, size, and distribution.⁶³

⁶¹ NSIDC, <https://www.sierraavalanchecenter.org/introduction-north-american-avalanche-danger-scale>

⁶² Copyright Richard Armstrong, NSIDC, <http://nsidc.org/cryosphere/snow/science/avalanches.html>

⁶³ NSIDC, <https://www.sierraavalanchecenter.org/introduction-north-american-avalanche-danger-scale>

APPENDIX D: NH MAJOR DISASTER & EMERGENCY DECLARATIONS

Major Disaster (DR) & Emergency Declarations (EM)

This list includes one Fire Management Assistance Declaration (FM)
 Declarations are arranged chronologically; the most recent disaster is listed first

Number	Hazard	Date of Event	Counties	Description
DR-4799	Severe Winter Storm	April 3-5, 2024	Carroll, Belknap, Sullivan & Rockingham	Major Disaster Declaration, DR-4799: A late winter snowstorm on April 4, 2024, brought heavy wet snow with accumulations up to two feet in four NH counties.
DR-4771	Inland Flooding	January 9-14, 2024	Grafton & Rockingham	Major Disaster Declaration DR-4771: A significant winter rain event caused local road and riverine flooding in two counties.
DR-4761	Inland Flooding	December 17-21, 2023	Coos, Grafton & Carroll	Major Disaster Declaration, DR-4761: A significant rain storm, likened to a 100-year flood event, struck multiple areas in New Hampshire, causing widespread damage to rivers, roads, and bridges.
DR-4740	Inland Flooding	July 9-17, 2023	Coos, Grafton, Belknap, Sullivan & Cheshire	Major Disaster Declaration, DR-4740: Severe storms brought significant summer rains and flooding to towns within five counties in New Hampshire.
DR-4693	Inland Flooding	December 22-25, 2022	Belknap, Grafton, Carroll & Coos	Major Disaster Declaration, DR-4693: A severe winter storm occurred December 22-25, 2022. Heavy, wet snow caused trees and power lines to fall; some roadways were closed. Flooding also occurred in several communities. The declaration was declared in four of the State's ten counties.
DR-4624	Inland Flooding	July 29-July 30, 2021	Cheshire & Sullivan	Major Disaster Declaration, DR-4624: The Federal Emergency Management Agency announced a major disaster declaration and notification of individual and public assistance on October 4, 2021, for two NH Counties.
DR-4622	Inland Flooding	July 17-19, 2021	Cheshire	Major Disaster Declaration, DR-4622: The Federal Emergency Management Agency announced a major disaster declaration for one New Hampshire county during a period of severe storms and flooding from July 17-19, 2021.
DR-4516	Infectious Disease	January 20, 2020 ongoing	All Ten NH Counties	Major Disaster Declaration, DR-4516: The Federal Emergency Management Agency ("FEMA") within the US Department of Homeland Security is giving public notice of its intent to assist the State of New Hampshire, local and tribal governments, and certain private nonprofit organizations under the major disaster declaration issued by the President on April 3, 2020, as a result of the Coronavirus Disease 2019 (COVID-19).
EM-3445	Infectious Disease	January 20, 2020 ongoing	All Ten NH Counties	Emergency Declaration EM-3445: A ten-county declaration to provide individual assistance and public assistance as a result of the impact of COVID-19
DR-4457	Severe Storm & Flooding	July 11-12, 2019	Grafton	Major Disaster Declaration, DR-4457: The Federal Emergency Management Agency announced a major disaster declaration for a period of severe storms and flooding from July 11-12, 2019, in one New Hampshire County.
DR-4371	Severe Winter Storms	March 13-14, 2018	Carroll, Strafford & Rockingham	Major Disaster Declaration, DR 4371: The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018, for a period of a severe winter storm from March 13-14, 2018.

Number	Hazard	Date of Event	Counties	Description
DR-4370	Severe Storm & Flooding	March 2-8, 2018	Rockingham	Major Disaster Declaration, DR 4370: The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018, for a period of severe storms and flooding from March 2-8, 2018.
DR-4355	Severe Storms, Flooding	October 29-November 1, 2017	Sullivan, Grafton, Coos, Carroll, Belknap & Merrimack	Major Disaster Declaration, DR-4355: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance was available to supplement state and local recovery efforts in areas affected by severe storms and flooding from October 29-November 1, 2017, in five New Hampshire Counties.
DR-4329	Severe Storms, Flooding	July 1-2, 2017	Grafton & Coos	Major Disaster Declaration DR-4329: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to the State of New Hampshire to supplement state and local recovery efforts in the areas affected by severe storms and flooding from July 1, 2017, to July 2, 2017, in Grafton County
DR-4316	Severe Winter Storms	March 14-15, 2017	Belknap & Carroll	Major Disaster Declaration DR-4316: Severe winter storm and snowstorm in Belknap & Carroll Counties; disaster aid was provided to supplement state and local recovery efforts.
FM-5123	Forest Fire	April 21-23, 2016	Cheshire	Fire Management Assistance Declaration, FM-5123: Stoddard, NH
DR-4209	Severe Winter Storms	January 26-28, 2015	Hillsborough, Rockingham & Stafford	Major Disaster Declaration DR-4209: Severe winter storm and snowstorm in Hillsborough, Rockingham, and Stafford Counties; disaster aid was provided to supplement state and local recovery efforts.
DR-4139	Severe Storms, Flooding	July 9-10, 2013	Cheshire, Sullivan & Grafton	Major Disaster Declaration DR-4139: Severe storms, flooding, and landslides occurred from June 26 to July 3, 2013, in Cheshire, Sullivan, and southern Grafton Counties.
DR-4105	Severe Winter Storm	February 8, 2013	All Ten NH Counties	Major Disaster Declaration DR-4105: Nemo; heavy snow in February 2013.
DR-4095	Hurricane Sandy	October 26-November 8, 2012	Belknap, Carroll, Coos, Grafton, Rockingham & Sullivan	Major Disaster Declaration DR-4095: The declaration covers damage to property from the storm that spawned heavy rains, high winds, high tides, and flooding from October 26-November 8, 2012.
EM-3360	Hurricane Sandy	October 26-31, 2012	All Ten NH Counties	Emergency Declaration EM-3360: Hurricane Sandy came ashore in NJ, bringing NH high winds, power outages, and heavy rain. It was declared in all ten counties in New Hampshire.
DR-4065	Severe Storm & Flooding	May 29-31, 2012	Cheshire	Major Disaster Declaration DR-4065: Severe Storm and Flood Event May 29-31, 2012, in Cheshire County.
DR-4049	Severe Storm & Snowstorm	October 29-30, 2011	Hillsborough & Rockingham	Major Disaster Declaration DR-4049: Severe Storm and Snowstorm Event October 29-30, 2011, in Hillsborough and Rockingham Counties.
EM-3344	Severe Snowstorm	October 29-30, 2011	All Ten NH Counties	Emergency Declaration EM-3344: Severe storm during October 29-30, 2011, in all ten counties in New Hampshire (Snowtober).
DR-4026	Tropical Storm Irene	August 26-September 6, 2011	Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	Major Disaster Declaration DR-4026: Tropical Storm Irene Aug 26th- Sept 6, 2011, in Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan Counties.
EM-3333	Tropical Storm Irene	August 26-September 6, 2011	All Ten NH Counties	Emergency Declaration EM-3333: An emergency Declaration was declared for Tropical Storm Irene in all ten counties.

Number	Hazard	Date of Event	Counties	Description
DR-4006	Severe Storm & Flooding	May 26-30, 2011	Coos & Grafton Counties	Major Disaster Declaration DR-4006: May flooding event occurred May 26th-30th, 2011, in Coos & Grafton Counties (Memorial Day Weekend Storm).
DR-1913	Severe Storms & Flooding	March 14-31, 2010	Hillsborough & Rockingham	Major Disaster Declaration DR-1913: Flooding in two NH counties occurred, including Hillsborough and Rockingham counties.
DR-1892	Severe Winter Storm, Rain & Flooding	February 23 - March 3, 2010	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration: DR-1892: Flood and wind damage to most of southern NH, including six counties; 330,000 homes without power; more than \$2 million obligated by June 2010.
DR-1812	Severe Winter Storm & Ice Storm	December 11-23, 2008	All Ten NH Counties	Major Disaster Declaration DR-1812: Damaging ice storms to the entire state, including all ten NH counties; fallen trees and large-scale power outages; five months after December's ice storm battered the region, nearly \$15 million in federal aid had been obligated.
EM-3297	Severe Winter Storm	December 11, 2008	All Ten NH Counties	Emergency Declaration EM-3297: Severe winter storm beginning on December 11, 2008.
DR-1799	Severe Storms & Flooding	September 6-7, 2008	Hillsborough	Major Disaster Declaration: DR-1799: Severe storms and flooding began on September 6, 2008.
DR-1787	Severe Storms & Flooding	July 24-August 14, 2008	Belknap, Carroll & Grafton & Coos	Major Disaster Declaration DR-1787: Severe storms, a tornado, and flooding occurred on July 24, 2008.
DR-1782	Severe Storms, Tornado, & Flooding	July 24, 2008	Belknap, Carroll, Merrimack, Strafford & Rockingham	Major Disaster Declaration DR-1782: Tornado damage to several NH counties.
DR-1695	Nor'easters, Severe Storms & Flooding	April 15-23, 2007	All Ten NH Counties	Major Disaster Declaration DR-1695: Flood damages; FEMA & SBA obligated more than \$27.9 million in disaster aid following the April nor'easter. (Tax Day Storm)
DR-1643	Severe Storms & Flooding	May 12-23, 2006	Belknap, Carroll, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	Major Disaster Declaration DR-1643: Flooding in most of southern NH; May 12-23, 2006 (aka Mother's Day Storm).
DR-1610	Severe Storms & Flooding	October 7-18, 2005	Belknap, Cheshire, Grafton, Hillsborough, Merrimack & Sullivan	Major Disaster Declaration DR-1610: State and federal disaster assistance reached more than \$3 million to help residents and business owners in New Hampshire recover from losses from severe storms and flooding in October 2005.
EM-3258	Hurricane Katrina Evacuation	August 29-October 1, 2005	All Ten NH Counties	Emergency Declaration EM-3258: Assistance to evacuees from the area struck by Hurricane Katrina and to provide emergency assistance to those areas beginning on August 29, 2005, and continuing. The President's action made federal funding available to the State's ten counties.
EM-3211	Snow	March 11-12, 2005	Carroll, Cheshire, Hillsborough, Rockingham & Sullivan	Emergency Declaration EM-3211: March snowstorm; more than \$2 million has been approved to help pay for costs of the snow removal; Total aid for the March storm is \$2,112,182.01 (Carroll: \$73,964.57; Cheshire: \$118,902.51; Hillsborough: \$710,836; Rockingham: \$445,888.99; Sullivan: \$65,088.53; State of NH: \$697,501.41)

Number	Hazard	Date of Event	Counties	Description
EM-3208	Snow	February 10-11, 2005	Carroll, Cheshire, Coos, Grafton & Sullivan	Emergency Declaration EM-3208: FEMA had obligated more than \$1 million by March 2005 to help pay for costs of the heavy snow and high winds; Total aid for the February storm is \$1,121,727.20 (Carroll: \$91,832.72; Cheshire: \$11,0021.18; Coos: \$11,6508.10; Grafton: \$213,539.52; Sullivan: \$68,288.90; State of NH: \$521,536.78)
EM 3208-002	Snow	January, February, March 2005	Belknap, Carroll, Cheshire, Grafton, Hillsborough, Rockingham, Merrimack, Strafford & Sullivan	Emergency Declaration EM 3208-002: The Federal Emergency Management Agency (FEMA) has obligated more than \$6.5 million to reimburse state and local governments in New Hampshire for costs incurred in three snowstorms that hit the State earlier this year, according to disaster recovery officials. Total aid for all three storms is \$6,892,023.87 (January: \$3,658,114.66; February: \$1,121,727.20; March: \$2,113,182.01)
EM-3207	Snow	January 22-23, 2005	Belknap, Carroll, Cheshire, Grafton, Hillsborough, Rockingham, Merrimack, Strafford & Sullivan	Emergency Declaration EM-3207: More than \$3.5 million has been approved to help pay for the costs of the heavy snow and high winds; Total aid for the January storm is \$3,658,114.66 (Belknap: \$125,668.09; Carroll: \$52,864.23; Cheshire: \$134,830.95; Grafton: \$137,118.71; Hillsborough: \$848,606.68; Merrimack: \$315,936.55; Rockingham: \$679,628.10; Strafford: \$207,198.96; Sullivan: \$48,835.80; State of NH: \$1,107,426.59)
EM-3193	Snow	December 6-7, 2003	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan	Emergency Declaration EM-3193: The declaration covers jurisdictions with record and near-record snowfall that occurred throughout December 6-7, 2003
DR-1489	Severe Storms & Flooding	July 21-August 18, 2003	Cheshire & Sullivan	Major Disaster Declaration DR-1489: Floods stemming from persistent rainfall and severe storms caused damage to public property from July 21 through August 18, 2003.
EM-3177	Snowstorm	February 17-18, 2003	Cheshire, Hillsborough, Merrimack, Rockingham & Strafford	Emergency Declaration EM-3177: Declaration covers jurisdictions with record and near-record snowfall from the snowstorm that occurred February 17-18, 2003
EM-3166	Snowstorm	March 5-7, 2001	Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	Emergency Declaration EM-3166: Declaration covers jurisdictions with record and near-record snowfall from the late winter storm that occurred in March 2001
DR-1305	Tropical Storm Floyd	September 16-18, 1999	Belknap, Cheshire & Grafton	Major Disaster Declaration DR-1305: The declaration covers damage to public property from the storm that spawned heavy rains, high winds, and flooding throughout September 16-18.
DR-1231	Severe Storms & Flooding	June 12-July 2, 1998	Belknap, Carroll Grafton, Hillsborough, Merrimack & Rockingham	Major Disaster Declaration DR-1231:
DR-1199	Ice Storm	January 7-25, 1998	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Strafford & Sullivan	Major Disaster Declaration DR-1199:

Number	Hazard	Date of Event	Counties	Description
DR-1144	Severe Storms/Flooding	October 20-23, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-1144:
DR-1077	Storms/Floods	October 20-November 15, 1995	Carroll, Cheshire, Coos, Grafton, Merrimack & Sullivan	Major Disaster Declaration DR-1077:
EM-3101	High Winds & Record Snowfall	March 13-17, 1994	All Ten NH Counties	Emergency Declaration EM-3101:
DR-923	Severe Coastal Storm	October 30-31, 1991	Rockingham	Major Disaster Declaration DR-923:
DR-917	Hurricane Bob, Severe Storm	August 18-20, 1991	Carroll, Hillsborough, Rockingham & Strafford	Major Disaster Declaration DR-917:
DR-876	Flooding, Severe Storm	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, & Sullivan	Major Disaster Declaration DR-876:
DR-789	Severe Storms & Flooding	March 30-April 11, 1987	Carroll, Cheshire, Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-789
DR-771	Severe Storms & Flooding	July 29-August 10, 1986	Cheshire, Hillsborough & Sullivan	Major Disaster Declaration DR-771:
EM-3073	Flooding	March 15, 1979	Coos	Emergency Declaration EM-3073:
DR-549	High Winds, Tidal Surge, Coastal Flooding & Snow	February 16, 1978	All Ten NH Counties	Major Disaster Declaration DR-549: Blizzard of 1978
DR-411	Heavy Rains, Flooding	January 21, 1974	Belknap, Carroll, Cheshire & Grafton	Major Disaster Declaration DR-411:
DR-399	Severe Storms & Flooding	July 11, 1973	All Ten NH Counties	Major Disaster Declaration DR-399:
DR-327	Coastal Storms	March 18, 1972	Rockingham	Major Disaster Declaration DR-327:
DR-11	Forest Fire	July 2, 1953	Carroll	Major Disaster Declaration DR-11:

Source:
 Disaster Declarations for New Hampshire; <https://www.fema.gov/disaster/declarations>

APPENDIX E: HAZARD MITIGATION PLANNING – LIST OF ACRONYMS

AAR	After Action Report	HSEM.....	Homeland Security Emergency Management
ACS	Acute Care Site	HSPD	Homeland Security Presidential Directive
ARC	American Red Cross	IAP	Incident Action Plan
ARES.....	Amateur Radio Emergency Service	IC.....	Incident Commander
BFE.....	Base Flood Elevation	ICC.....	Incident Command Center
BOCA	Building Officials and Code Administrators	ICS	Incident Command System
CBRNE	Chemical, Biological, Radiological,	JIC.....	Joint Information Center
CDC	Centers for Disease Control and Prevention	LEOP.....	Local Emergency Operations Plan
CDP	Center for Domestic Preparedness	MAPS	Mapping and Planning Solutions
CERT	Community Emergency Response Team	MCI.....	Mass Casualty Incident
CFR	Code of Federal Regulations	MEF.....	Mission Essential Function
CIKR	Critical Infrastructure & Key Resources	MOU	Memorandum of Understanding
CIP.....	Capital Improvements Program	NAWAS	National Warning System
COG	Continuity of Government	NEF	National Essential Function
COGCON.....	Continuity of Government Readiness Conditions	NERF.....	Non-Emergency Response Facility
COOP	Continuity of Operations	NFIP	National Flood Insurance Program
CPCC	Continuity Policy Coordination Committee	NGVD.....	National Geodetic Vertical Datum of 1929
CWPP	Community Wildfire Protection Plan	NIMS	National Incident Management System
DBHRT	Disaster Behavioral Health Response Team	NOAA	National Oceanic and Atmospheric Association
DEMD	Deputy Emergency Management Director	NRP.....	National Response Plan
DES	Department of Environment Services	NSPD	National Security Presidential Directive
DFO	Disaster Field Office	NTAS.....	National Terrorism Advisory System Nuclear and Explosive
DHHS	Department of Health and Human Services	NWS.....	National Weather Service
DHS	Department of Homeland Security	PA	Public Assistance
DMCR	Disaster Management Central Resource	PDA.....	Preliminary Damage Assessment
DBEA.....	Department of Business & Economic Affairs	PDD.....	Presidential Decision Directive
DNCR	Department of Natural & Cultural Resources	PIO	Public Information Officer
DOD.....	Department of Defense	PMEF	Primary Mission Essential Function
DOE.....	Department of Energy	POD	Point of Distribution
DOJ	Department of Justice	PPE	Personal Protective Equipment
DOT	Department of Transportation	PR	Potential Resources
DPW	Department of Public Works	PSA	Public Service Announcement
DRC.....	Disaster Recovery Center	RERP	Radiological Emergency Response Plan
EAS	Emergency Alert System	RNAT.....	Rapid Needs Assessment Team
EMD.....	Emergency Management Director	SERT.....	State Emergency Response Team
EMS.....	Emergency Medical Services	SITREP	Situation Report (Also SitRep)
EO	Executive Order	SNS.....	Strategic National Stockpile
EOC.....	Emergency Operations Center	SOG	Standard Operating Guidelines
EPA	U.S. Environmental Protection Agency	SOP.....	Standard Operating Procedures
EPZ.....	Emergency Planning Zone	SPNHF	Society for the Protection of NH Forests
ERF	Emergency Response Facility	UC	Unified Command
ERG.....	Emergency Relocation Group	USDA-FS	US Department of Agriculture – Forest Service
ESF.....	Emergency Support Functions	USGS	United States Geological Society
FEMA.....	Federal Emergency Management Agency	VOAD	Volunteer Organization Active in Disasters
FIRM.....	Flood Insurance Rate Map	WMD	Weapon(s) of Mass Destruction
FPP.....	Facilities & Populations to Protect	WMNF	White Mountain National Forest
GIS	Geographic Information System	WUI	Wildland Urban Interface
HazMat	Hazardous Material(s)		
HFRA.....	Healthy Forest Restoration Act		
HMGP	Hazard Mitigation Grant Program		
HSAS.....	Homeland Security Advisory System		

APPENDIX F: POTENTIAL MITIGATION IDEAS⁶⁴

Drought

- D1 Assess Vulnerability to Drought Risk
- D2 Monitoring Drought Conditions
- D3 Monitor Water Supply
- D4 Plan for Drought
- D5 Require Water Conservation during Drought Conditions
- D6 Prevent Overgrazing
- D7 Retrofit Water Supply Systems
- D8 Enhance Landscaping & Design Measures
- D9 Educate Residents on Water Saving Techniques
- D10 Educate Farmers on Soil & Water Conservation Practices
- D11 Purchase Crop Insurance

Earthquake

- EQ1.... Adopt & Enforce Building Codes
- EQ2.... Incorporate Earthquake Mitigation into Local Planning
- EQ3.... Map & Assess Community Vulnerability to Seismic Hazards
- EQ4.... Conduct Inspections of Building Safety
- EQ5.... Protect Critical Facilities & Infrastructure
- EQ6.... Implement Structural Mitigation Techniques
- EQ7.... Increase Earthquake Risk Awareness
- EQ8.... Conduct Outreach to Builders, Architects, Engineers, and Inspectors
- EQ9.... Provide Information on Structural & Non-Structural Retrofitting

Erosion

- ER1.... Map & Assess Vulnerability to Erosion
- ER2.... Manage Development in Erosion Hazard Areas
- ER3.... Promote or Require Site & Building Design Standards to Minimize Erosion Risk
- ER4.... Remove Existing Buildings & Infrastructure from Erosion Hazard Areas
- ER5.... Stabilize Erosion Hazard Areas
- ER6.... Increase Awareness of Erosion Hazards

Extreme Temperatures

- ET1 Reduce Urban Heat Island Effect
- ET2 Increase Awareness of Extreme Temperature Risk & Safety
- ET3 Assist Vulnerable Populations
- ET4 Educate Property Owners about Freezing Pipes

Hail

- HA1 Locate Safe Rooms to Minimize Damage
- HA2.... Protect Buildings from Hail Damage
- HA3.... Increase Hail Risk Awareness

Landslides

- LS1.... Map & Assess Vulnerability to Landslides
- LS2.... Manage Development in Landslide Hazard Areas
- LS3.... Prevent Impacts to Roadways
- LS4 Remove Existing Buildings & Infrastructure from Landslide

Lightning

- L1..... Protect Critical Facilities
- L2..... Conduct Lightning Awareness Programs

Inland Flooding

- F1 Incorporate Flood Mitigation in Local Planning
- F2 Form Partnerships to Support Floodplain Management
- F3 Limit or Restrict Development in Floodplain Areas
- F4 Adopt & Enforce Building Codes and Development Standards
- F5 Improve Stormwater Management Planning
- F6 Adopt Policies to Reduce Stormwater Runoff
- F7 Improve Flood Risk Assessment
- F8 Join or Improve Compliance with NFIP
- F9 Manage the Floodplain Beyond Minimum Requirements
- F10 Participate in the CRS
- F11 Establish Local Funding Mechanism for Flood Mitigation
- F12 Remove Existing Structures from Flood Hazard Areas
- F13 Improve Stormwater Drainage System Capacity
- F14 Conduct Regular Maintenance for Drainage Systems & Flood Control Structures
- F15 Elevate or Retrofit Structures & Utilities
- F16 Floodproof Residential & Non-Residential Structures
- F17 Protect Infrastructure
- F18 Protect Critical Facilities
- F19 Construct Flood Control Measures
- F20 Protect & Restore Natural Flood Mitigation Features
- F21 Preserve Floodplains as Open Space
- F22 Increase Awareness of Flood Risk & Safety
- F23 Educate Property Owners about Flood Mitigation Techniques

High Wind Events

- SW1... Adopt & Enforce Building Codes
- SW2... Promote or Require Site & Building Design Standards to Minimize Wind Damage
- SW3... Assess Vulnerability to Severe Wind
- SW4... Protect Power Lines & Infrastructure
- SW5... Retrofit Residential Buildings
- SW6... Retrofit Public Buildings & Critical Facilities
- SW7... Increase Severe Wind Awareness

Severe Winter Weather

- WW1.. Adopt & Enforce Building Codes
- WW2.. Protect Buildings & Infrastructure
- WW3.. Protect Power Lines
- WW4.. Reduce Impacts to Roadways
- WW5.. Conduct Winter Weather Risk Awareness Activities
- WW6.. Assist Vulnerable Populations

Tornado

- T1 Encourage Construction of Safe Rooms
- T2 Require Wind-Resistant Building Techniques
- T2 Conduct Tornado Awareness Activities

⁶⁴ Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013

Wildfire

- WF1 Map & Assess Vulnerability to Wildfire
- WF2 Incorporate Wildfire Mitigation in the Comprehensive Plan
- WF3 Reduce Risk through Land Use Planning
- WF4 Develop a Wildland Urban Interface Code
- WF5 Require or Encourage Fire-Resistant Construction Techniques
- WF6 Retrofit At-Risk Structure with Ignition-Resistant Materials
- WF7 Create Defensible Space around Structures & Infrastructure
- WF8 Conduct Maintenance to Reduce Risk
- WF9 Implement a Fuels Management Program
- WF10 Participate in the Firewise® Program
- WF11 Increase Wildfire Awareness
- WF12 Educate Property Owners about Wildfire Mitigation Techniques

Multi-Hazards

- MU1 Assess Community Risk
- MU2 Map Community Risk
- MU3 Prevent Development in Hazard Areas
- MU4 Adopt Regulations in Hazard Areas
- MU5 Limit Density in Hazard Areas
- MU6 Integrate Mitigation into Local Planning
- MU7 Strengthen Land Use Regulations
- MU8 Adopt & Enforce Building Codes
- MU9 Create Local Mechanisms for Hazard Mitigation
- MU10 Incentivize Hazard Mitigation
- MU11 Monitor Mitigation Plan Implementation
- MU12 Protect Structures
- MU13 Protect Infrastructure & Critical Facilities
- MU14 Increase Hazard Education & Risk Awareness
- MU15 Improve Household Disaster Preparedness
- MU16 Promote Private Mitigation Efforts

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Sculptured Rocks Natural Area

Photo Credit: https://www.youtube.com/watch?v=UcY8B_z9frc

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