Alexandria, NH

Hazard Mitigation Plan Update 2025




This Plan integrates the following:

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

August 1, 2025
Final for Town Adoption

Prepared for the Town of Alexandria and NH Homeland Security & Emergency Management
By
The Alexandria Hazard Mitigation Planning Team

With assistance from Mapping and Planning Solutions

ALEXANDRIA

"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: Clockwise from top left: Fowler Road near Healy Road, Mt. Cardigan Road, Thomas Road, and Bog Road
Photo Credit: The Town of Alexandria

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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 to 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 Alexandria Hazard Mitigation Plan, approved in January 2018.

This Plan was funded under the Hazard Mitigation Grant Program (HMGP-4516)

Approval Notification Dates for 2025 Update

Approved Pending Adoption (APA).....August 1, 2025
Jurisdiction Adoption: ....._____ __, 2025
CWPP Approval: ....._____ __, 2025
***Plan Approval Date (FEMA): ....._____ __, 2025**
Receipt of FEMA Letter ....._____ __, 2025
Plan Distribution (MAPS):....._____ __, 2025

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

TOWN OF ALEXANDRIA HAZARD MITIGATION PLANNING TEAM (HMPT)

The Town of Alexandria 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:

- Dana Lacasse .....Alexandria Citizen
- Darren Downing .....Alexandria Firefighter
- Dave Suckling, ...Alexandria Police Chief
- George Clayman, ...Alexandria Fire Chief & Emergency Management Director
- George Tuthill,.....Alexandria Select Board Chair
- Heidi Downing, ...Alexandria Fire Department Secretary
- Jennifer Dostie, ...Alexandria Administrative Assistant
- Mike Provost, ...Alexandria Health Officer
- Paul Sirard .....Alexandria Road Agent
- 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. Alexandria would also like to thank FEMA and NH HSEM as the primary funding sources for this Plan.

Executive Summary

The Alexandria Hazard Mitigation Plan Update 2025 was compiled to assist the Town in reducing and mitigating future losses from natural and other hazardous events. The Plan was developed by the Alexandria Hazard Mitigation Planning Team (HMPT), interested stakeholders, the general 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 2018 Alexandria Hazard Mitigation Plan. To produce an accurate and current planning document, the HMPT used the 2018 plan as a foundation, building upon that plan to provide more timely information.

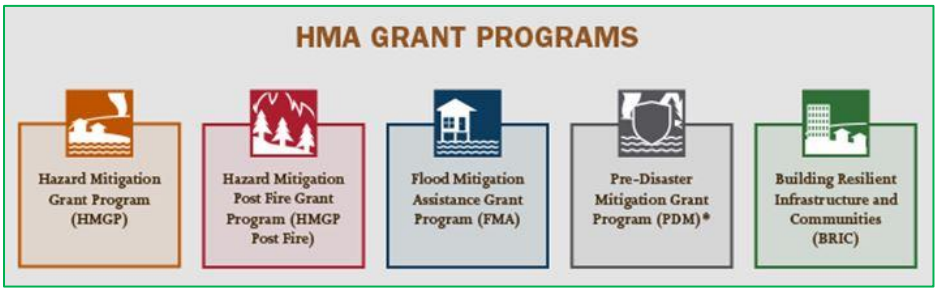
This Plan focuses on mitigation action items for natural hazards; NH Homeland Security & Emergency Management (HSEM) determined the natural hazards when writing the 2023 NH Hazard Mitigation Plan. However, this Plan also addresses technological and human-caused hazards, as shown below.

NATURAL HAZARDS – AS DETERMINED BY NH HSEM AND THE TOWN

1) Inland Flooding
2) Severe Winter Weather
3) High Wind Events
4) Infectious Disease
5) Wildfire
6) Landslides
7) Lightning
8) Drought
9) Dam Failure (Beavers)
10) Extreme Temperatures
11) Solar Storms & Space Weather
12) Earthquake
13) Tropical/Post Tropical Cyclones

TECHNOLOGICAL & HUMAN-CAUSED HAZARDS

1) Long-Term Utility Outage
2) Aging Infrastructure
3) Cyber Events
4) Hazardous Materials
5) Mass Casualty Incidents
6) Transport Accidents
7) Terrorism & Violence
8) Conflagration
9) Known & Emerging Contaminants



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 Alexandria or were not applicable. Chapter 3, Section A, explains why these hazards were excluded from this plan.

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). It also 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 Alexandria 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:

Alexandria Hazard Mitigation Plan Update 2025	the Plan or this Plan
Alexandria	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 Alexandria 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 Alexandria 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 Alexandria Hazard Mitigation Plan Update 2025 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 Alexandria 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 Alexandria Hazard Mitigation Plan Update 2025 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 Alexandria, 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 treatment methods 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, or its lack of membership. The Plan must address NFIP-insured structures and repetitive loss as part of a vulnerability assessment.

[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 Alexandria 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 Alexandria. A press release (see below) was posted on the Fire Department and Police Department Facebook pages, as a flyer on the Town Office bulletin board, in the Alexandria Today newsletter, and on the Town's website and calendar (see the following 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. Alexandria has no colleges or universities; local school officials were invited to attend meetings.

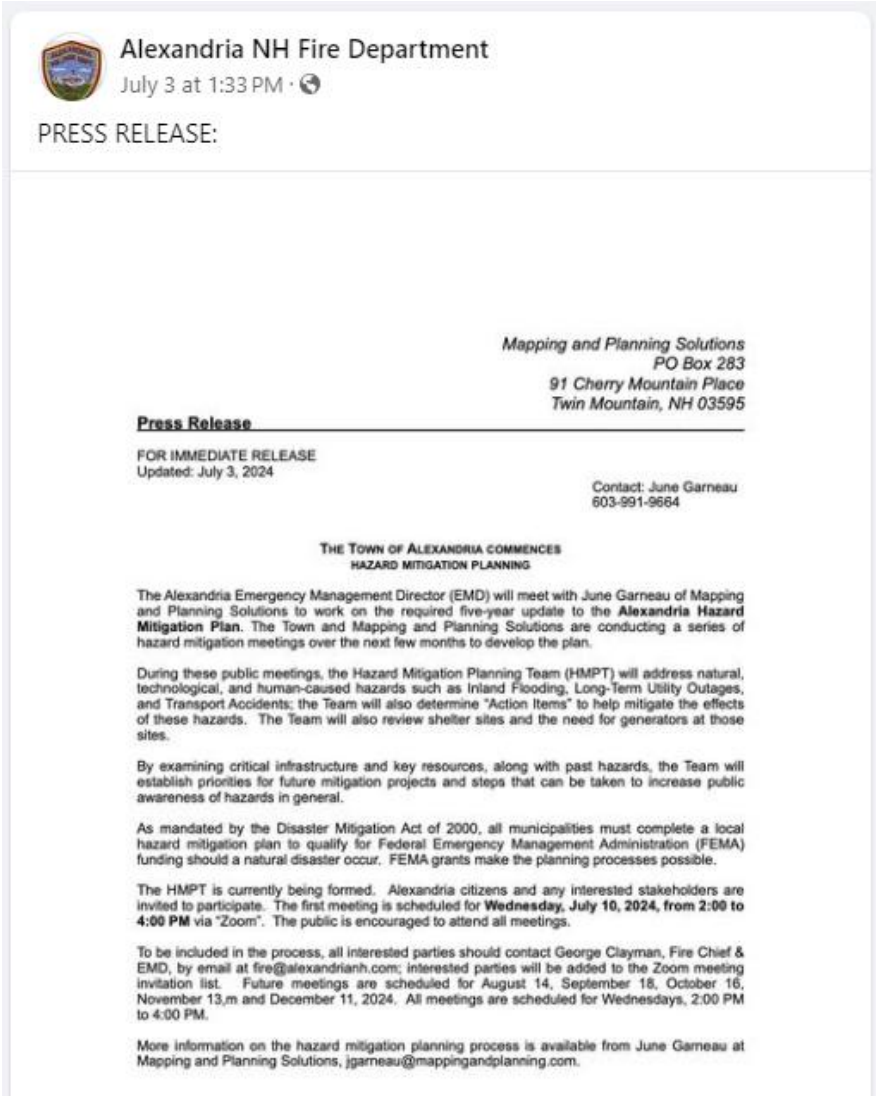
HAZARD MITIGATION
POTENTIAL TEAM MEMBERS

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



Alexandria NH Fire Department
July 3 at 1:33 PM ·

PRESS RELEASE:

Mapping and Planning Solutions
PO Box 283
91 Cherry Mountain Place
Twin Mountain, NH 03595

Press Release

FOR IMMEDIATE RELEASE
Updated: July 3, 2024

Contact: June Garneau
603-991-9664

THE TOWN OF ALEXANDRIA COMMENCES HAZARD MITIGATION PLANNING

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

During these public meetings, the Hazard Mitigation Planning Team (HMPT) will address natural, technological, and human-caused hazards such as Inland Flooding, Long-Term Utility Outages, and Transport Accidents; the Team will also 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 (FEMA) funding should a natural disaster occur. FEMA grants make the planning processes possible.

The HMPT is currently being formed. Alexandria citizens and any interested stakeholders are invited to participate. The first meeting is scheduled for **Wednesday, July 10, 2024, from 2:00 to 4:00 PM** via "Zoom". The public is encouraged to attend all meetings.

To be included in the process, all interested parties should contact George Clayman, Fire Chief & EMD, by email at fire@alexandrianh.com; interested parties will be added to the Zoom meeting invitation list. Future meetings are scheduled for August 14, September 18, October 16, November 13,m and December 11, 2024. All meetings are scheduled for Wednesdays, 2:00 PM to 4:00 PM.

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

CALENDAR/SCHEDULE:

Thursday, July 4, 2024: Town Offices Closed

Tuesday, July 9, 2024: Budget Committee Meeting at 6:00 pm

Wednesday, July 10, 2024: Hazard Mitigation Planning Team Meeting from 2 to 4 pm via Zoom

- **The Town of Alexandria commences hazard mitigation planning.** The Alexandria Emergency Management Director (EMD) will meet with June Garneau of Mapping and Planning Solutions to work on the required five-year update to the **Alexandria Hazard Mitigation Plan**. The Town and Mapping and Planning Solutions are conducting a series of hazard mitigation meetings over the next few months to develop the plan. During these public meetings, the Hazard Mitigation Planning Team (HMPT) will address natural, technological, and human-caused hazards such as Inland Flooding, Long-Term Utility Outages, and Transport Accidents; the Team will also 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 (FEMA) funding should a natural disaster occur. FEMA grants make the planning processes possible. The HMPT is currently being formed. Alexandria citizens and any interested stakeholders are invited to participate. The first meeting is scheduled for **Wednesday, July 10, 2024, from 2:00 to 4:00 PM** via "Zoom". The public is encouraged to attend all meetings. To be included in the process, all interested parties should contact George Clayman, Fire Chief & EMD, by email at fire@alexandrianh.com; interested parties will be added to the Zoom meeting invitation list. Future meetings are scheduled for August 14, September 18, October 16, November 13,m and December 11, 2024. All meetings are scheduled for Wednesdays, 2:00 PM to 4:00 PM. More information on the hazard mitigation planning process is available from June Garneau at Mapping and Planning Solutions,

Lastly, the Planner sent a monthly calendar (see below) and an email inviting stakeholders to participate in MAPS' planning meetings. This email blast included EMDs, Police Chiefs, Fire Chiefs, Rangers, and other state, federal, and private officials. Alexandria's neighbors, Orange, Grafton, Groton, Hebron, Bristol, Hill, and Danbury, were also included in MAPS' monthly email.

Upcoming Zoom Meetings

Colored by county
August 10, 2024 – January 11, 2025

Day	Date	Time	Town/Location	Plan Type	
Wednesday	8/14/24	2:00 PM	Alexandria Zoom Meeting	HMP	Grafton
Tuesday	8/20/24	10:00 AM	Conway Zoom Meeting	HMP	Carroll
Monday	8/26/24	10:00 AM	Salem Zoom Meeting	HMP	Rockingham
Monday	9/9/24	10:00 AM	Salem Zoom Meeting	HMP	Rockingham
Tuesday	9/10/24	10:00 AM	Woodstock Zoom Meeting	HMP	Grafton
Wednesday	9/11/24	9:30 AM	Jackson Zoom Meeting	HMP	Carroll
Tuesday	9/17/24	10:00 AM	Bartlett & Hart's Location Zoom Meeting	HMP	Carroll
Wednesday	9/18/24	2:00 PM	Alexandria Zoom Meeting	HMP	Grafton
Tuesday	9/24/24	10:00 AM	Conway Zoom Meeting	HMP	Carroll
Monday	10/7/24	10:00 AM	Salem Zoom Meeting	HMP	Rockingham
Tuesday	10/8/24	10:00 AM	Bartlett & Hart's Location Zoom Meeting	HMP	Carroll
Tuesday	10/15/24	10:00 AM	Conway Zoom Meeting	HMP	Carroll
Wednesday	10/16/24	2:00 PM	Alexandria Zoom Meeting	HMP	Grafton
Wednesday	11/13/24	2:00 PM	Alexandria Zoom Meeting	HMP	Grafton
Monday	11/18/24	10:00 AM	Salem Zoom Meeting	HMP	Rockingham
Tuesday	11/19/24	10:00 AM	Bartlett & Hart's Location Zoom Meeting	HMP	Carroll
Tuesday	12/10/24	10:00 AM	Bartlett & Hart's Location Zoom Meeting	HMP	Carroll
Wednesday	12/11/24	2:00 PM	Alexandria Zoom Meeting	HMP	Grafton
Tuesday	1/14/25	10:00 AM	Bartlett & Hart's Location Zoom Meeting	HMP	Carroll
Tuesday	2/11/25	10:00 AM	Bartlett & Hart's Location Zoom Meeting	HMP	Carroll

Team composition can be impacted in some communities due to lower population and because many "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.

Alexandria had excellent participation in developing this Plan. The Emergency Management Director (EMD)/Fire Chief, the Police Chief, the Select Board Chair, the Fire Department Secretary, the Administrative Assistant, the Health Officer, and the Road Agent participated in meetings. Comments made by all team members, including the public, were integrated into the narrative discussion and incorporated into the document. One member of the public attended the meetings.

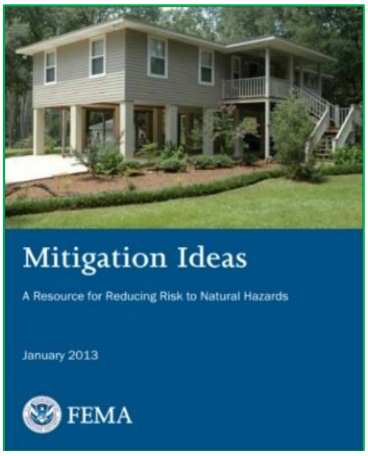
§201.6(b) requires that there be an open public involvement process in the formation of a plan. This process shall provide an opportunity for the public to comment on the Plan during its formation as well as an opportunity for any neighboring communities, businesses, and others to review any existing 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

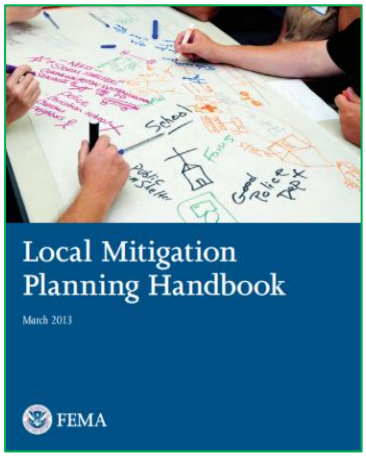
The planning process included a complete Alexandria Hazard Mitigation Plan 2018 review for updates, development changes, and accomplishments. The Team worked with the Planner to identify pertinent information from the reviewed documents; this information was then added to the appropriate place in the 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:

The Alexandria Hazard Mitigation Plan 2018 .....Compare & Contrast
Alexandria Master Plan (2014) .....Community Information
Alexandria Annual Reports (2024).....Fire Report & Development
Other Hazard Mitigation Plans (Sugar Hill, Gorham, Chester).....Formats & Mitigation Ideas
The Alexandria Subdivision Regulations (2019).....New Development Regulations
Floodplain Development Ordinance (2023).....Floodplain Regulations
Census 2020 Redistricting Data .....Population Data
The NH DRA Summary of Inventory of Valuation MS-1 2024 for Alexandria .....Structure Evaluation
The Economic & Labor Market Information Bureau Community Profile.....Population Trends
The American Community Survey (ACS2023) .....Population Trends
Mitigation Ideas, FEMA, January 2013.....Mitigation Strategies
The Department of Cultural & Natural Resources (DNCR) .....DNCR Fire Report
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 State of New Hampshire Multi-Hazard Mitigation Plan Update 2023 goals.[4] The 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 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 Town 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 the local level to encourage data integration, plan alignment, 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 local level to ensure the continuation of essential services through training, outreach, and education.
6. Promote equity by challenging 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-caused 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 previous plan was the foundation for this mitigation plan; each completed table started 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.

HAZARD MITIGATION PROCESS
THE BUILDING BLOCKS

HAZARD IDENTIFICATION & RISK ASSESSMENT (HIRA)
WHAT ARE THE HAZARDS AND WHICH ARE MOST LIKELY TO IMPACT ALEXANDRIA?
TABLE 3.1

CRITICAL INFRASTRUCTURE & KEY RESOURCES (CIKR)
ARE ANY CIKR IN HARM'S WAY?
TABLES 4.1-4.4

CAPABILITIES ASSESSMENT
DO ANY CAPABILITIES NEED IMPROVEMENT? TABLE 6.1

WILDLAND URBAN INTERFACE (WUI)
WHAT ARE THE WILDFIRE RISKS THROUGHOUT ALEXANDRIA?
HAZARD DESCRIPTIONS

HISTORIC HAZARD IDENTIFICATION
WHAT AREAS OF ALEXANDRIA ARE THE HARDEST HIT?
TABLE 3.2

ACCOMPLISHMENTS SINCE THE LAST PLAN
WERE STRATEGIES COMPLETED OR SHOULD THEY BE DELETED OR DEFERRED TO THIS PLAN?
TABLE 7.1

MITIGATION ACTION ITEMS
WHAT CAN WE DO TO LESSEN, DIMINISH OR ELIMINATE THE RISK OF HAZARDS?
WHAT PROBLEMS ARE WE TRYING TO SOLVE?
TABLE 9.1 – THE END GOAL

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 review of the 2018 Alexandria Hazard Mitigation Plan. Using the 2018 plan as a base, each element of the old plan was examined and revised to reflect changes in development and the Community's priorities. Strategies from the past were also reassessed and improved upon for the future.

The following narrative explains how the 2018 Alexandria Hazard Mitigation Plan was used during each step of the planning process to make revisions that resulted in this Plan.

MEETING 1, JULY 10, 2024

The first virtual meeting with the Alexandria Hazard Mitigation Team was held on July 10, 2024. Meeting attendance included Dana Lacasse (Citizen), Darren Downing (Firefighter), Dave Suckling (Police Chief), George Clayman (Fire Chief & Emergency Management Director), George Tuthill (Select Board Chair), Heidi Downing (Fire Department Secretary), Jennifer Dostie (Administrative Assistant), and June Garneau (Owner, Mapping & Planning Solutions).

To introduce the Team to the planning process, the Planner reviewed the evolution of hazard mitigation plans, funding, the 12-step process, collaboration with other agencies, and 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. There was some discussion about the seasonal population change in Alexandria, with summer and winter homes. However, it was determined that Alexandria does not have a significant influx of seasonal tourists.

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 – July 10, 2024

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) Wednesday, August 14, 2024, @ 2:00 PM
- b) Wednesday, September 18, 2024, @ 2:00 PM
- c) Wednesday, October 16, 2024, @ 2:00 PM
- d) Wednesday, November 13, 2024, @ 2:00 PM
- e) Wednesday, December 11, 2024, @ 2:00 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. Thirteen natural hazards and nine technological and human-caused hazards were identified. After analyzing the natural hazards in Table 3.1, Inland Flooding, Severe Winter Weather, and High Wind Events were designated "Very High" risk natural hazards for the Town.

With time running out, the Planner explained what would occur at the next meeting, including discussing past hazards and their effect on the Town and critical infrastructure, and how they are affected by hazards. The next meeting was scheduled for August 14, 2024, and the meeting was adjourned.

MEETING 2, AUGUST 14, 2024

Virtual meeting attendees included Dana Lacasse, Dave Suckling, George Clayman, George Tuthill, Heidi Downing, Jennifer Dostie, Mike Provost (Health Officer), 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 that the Town data was accurate; no changes were made. 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 was content with the order of the hazards, so no changes were made to this table either.

Having completed Table 3.1 at the previous meeting, the Team started working 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 Alexandria.

Meeting 2 – August 14, 2024

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) Wednesday, September 18, 2024, @ 2:00 PM
- b) Wednesday, October 16, 2024, @ 2:00 PM
- c) Wednesday, November 13, 2024, @ 2:00 PM
- d) Wednesday, December 11, 2024, @ 2:00 PM

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?*

These questions raised awareness of the hazards and provided additional information to analyze their impact on the Community. The Planner noted that these descriptions would be used in Chapter 5.

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 2018 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 Critical Infrastructure & Key Resource 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 think about past events that have affected the Town.

The next meeting was scheduled for Wednesday, September 18, 2024.

MEETING 3, SEPTEMBER 18, 2024

Virtual meeting attendees included Dana Lacasse, George Clayman, George Tuthill, Heidi Downing, Jennifer Dostie, Mike Provost, Paul Sirard (Road Agent), Olin Garneau, and June Garneau.

The Planner first brought the Team through a review of what had occurred at the previous meetings: Table 2.1, Table 3.1, and 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.

The Team began work 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

Meeting 3 – September 18, 2024

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) Tables 4.1-4.4, Critical Infrastructure & Key Resources

2) Today's Topics
- a) Review…
  - i) Tables 4.1-4.4, Critical Infrastructure & Key Resources
- b) Work on…
  - i) Table 3.2, Historic Hazard Identification
  - ii) Table 7.1, Past Hazard Mitigation Plan Assessment

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

4) Future Meetings
- a) Wednesday, October 16, 2024, @ 2:00 PM
- b) Wednesday, November 13, 2024, @ 2:00 PM
- c) Wednesday, December 11, 2024, @ 2:00 PM

occurred statewide, specifically in Grafton County. The Team described the events during each disaster in Alexandria in each instance.

Table 7.1, Accomplishments since the Last Plan, pre-populated with data from the 2018 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 2018 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.

With time running out, Table 7.1 was completed. The Planner adjourned the meeting and promised to write statements supporting the concepts and ideas in Table 7.1. The next meeting was scheduled for October 16, 2024, but was later rescheduled for November 13, 2024.

MEETING 4 – NOVEMBER 13, 2024

Virtual meeting attendees included Dana Lacasse, Dave Suckling, George Clayman, George Tuthill, Heidi Downing, Jennifer Dostie, Mike Provost, Paul Sirard, 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 Alexandria, 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.

Meeting 4 – November 13, 2024

1) Last Meeting
- a) Reviewed…
  - i) Tables 4.1-4.4, Critical Infrastructure & Key Resources
- b) Worked on…
  - i) Table 3.2, Historic Hazard Identification
  - ii) Table 7.1, Past Hazard Mitigation Plan Assessment

2) Today's Topics
- a) Review…
  - i) Table 3.2, Historic Hazard Identification
  - ii) Table 7.1, Past Hazard Mitigation Plan Assessment
- b) Work on…
  - i) Table 6.1, Capabilities Assessment

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

4) Future Meetings
- a) Wednesday, December 11, 2024, @ 2:00 PM

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.

Then, the Team worked on *Table 6.1, Capabilities Assessment*; like other tables, this table was also pre-populated with information from the 2018 plan. Looking closely at the existing policies from the last plan and current mechanisms, the Team determined whether 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.

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

Lastly, the Planner provided virtual handouts 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 Alexandria (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 and Table 6.1 complete, the Planner promised to write statements supporting the concepts and ideas in Table 6.1. The next meeting was scheduled for December 11, 2024, and the meeting was adjourned.

MEETING 5 – DECEMBER 11, 2024

Virtual meeting attendees included Dana Lacasse, Dave Suckling, George Clayman, George Tuthill, Heidi Downing, Jennifer Dostie, Mike Provost, Paul Sirard, and June Garneau.

The meeting began with an overall recap of the work already done. 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*
- *Table 7.1, Accomplishments since the Last Plan*

This review helped the Team understand how these tables serve as building blocks for the final two tables, *Table 8.1, Potential Mitigation Strategies & the STAPLEE,* and *Table 9.1, The Mitigation Action Plan*.

Meeting 5 – December 11, 2024

1) Last Meeting
- a) Reviewed….
  - i) Table 3.2, Historic Hazard Identification
- b) Worked on….
  - i) Table 6.1, Current Plans, Policies & Mutual Aid
  - ii) Table 7.1, Accomplishments since the prior Plan

2) Today's Topics
- a) Review….
  - i) Table 6.1, Capabilities 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) January 15, 2025

Next, the Team reviewed several items in Table 6.1 that the Planner had changed after the last meeting to ensure that the Team's comments and ideas were fully represented. Work on this table resulted in new action items for this Plan, some of which are also in Table 7.1.

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).

Then, the Team 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 a visual presentation, the Team could go through the STAPLEE process for the identified action items. 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. 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.

Although most of Tables 8.1 and 9.1 were complete, there were a few loose ends, newly added action items to discuss at the next meeting, and the ranking and prioritizing of each action item.

The Planner briefly explained to the Team the ranking and prioritizing process. The next meeting was set for January 15, 2025. The meeting was adjourned.

MEETING 6 – JANUARY 15, 2025

Virtual meeting attendees included Dana Lacasse, Dave Suckling, George Clayman, George Tuthill, Heidi Downing, Jennifer Dostie, Mike Provost, Paul Sirard, and June Garneau.

The Planner displayed one last document that explained the ranking and prioritizing methodology (Chapter 9, Section A). The meeting began where we had left off in Tables 9.1 and 8.1. After considering each strategy forwarded from Tables 6.1 and 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 multiple "Mitigation Action Items" that they felt were achievable and could help diminish the impact of natural hazards in the future.

Meeting 6 – January 15, 2025

1) Last Meeting
- a) Reviewed….
  - i) Table 6.1, Capabilities Assessment
- b) Worked on….
  - i) Table 9.1, Mitigation Action Plan
  - ii) STAPLEE

2) Today's Topics
- a) Tie up any loose ends
- b) Work on…
  - i) Ranking and Priority

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

4) Future Meetings
- a) _____

Upon determining the mitigation action items and completing the STAPLEE process, the Team was 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.

The Team's work was complete with the completion of Tables 8.1 and 9.1, 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.

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

Alexandria is a beautiful community in the southeast corner of Grafton County, New Hampshire. It borders several towns in Grafton County, including Orange, Grafton, Bristol, Groton, and Hebron, and two towns in Merrimack County, Hill and Danbury. Alexandria is situated on the shores of Newfound Lake and lies within the Lakes Region Tourism Area.

TOWN GOVERNMENT

A three-member Select Board governs the Town of Alexandria. The Town's departments include, but are not limited to, fire, police, highway, planning, and conservation. The largest employers in Alexandria are JPS Industries, Carroll Concrete, and Cantara's Auto Body, each with fewer than ten employees.

DEMOGRAPHICS & HOUSING

According to the US Census 2020, Alexandria's population increased from 1,173 in 1990 to 1,776 in 2020, an increase of 603.[6] This data represents a growth rate of approximately 51%.

There are an estimated 941 housing units, most of which are occupied (714), while vacant housing units total 227, thus confirming the presence of second and seasonal homes. The estimated median household income is $84,125, and the median age is 53 years.[7]

EDUCATION & CHILD CARE

Alexandria students in grades K-12 attend school in the Newfound Area School District with students from Bridgewater, Bristol, Danbury, Hill, Groton, Hebron, and New Hampton. There are no private schools, colleges, or universities; however, there is one childcare facility with 16 children.[8]

Incorporated: 1782

Origin: First granted in 1753, this town was most likely named for Alexandria, Virginia, the site of the first American governor's conference. In 1755, five colonial governors met in Alexandria to decide upon action to be taken against the French, who had established a string of forts and trading posts nearly surrounding the colonies. The result of the conference was a declaration of war against the French and their Indian allies. Alexandria, New Hampshire, was the birthplace of Luther C. Ladd, famous as the first enlisted soldier to lose his life in the Civil War.

Villages and Place Names: South Alexandria

Population, Year of the First Census Taken: 298 residents in 1790

Population Trends: Population change for Alexandria totaled 1,320 over 50 years, from 466 in 1970 to 1,786 in 2020. The largest decennial percent change was a 66 percent increase from 1980 to 1990, after a 52 percent increase from 1970 to 1980. The town's population increased by 11 percent from 2010 to 2020.

Population Density and Land Area: 2023 (*US Census Bureau*): 40.7 persons per square mile of land area. Alexandria contains 43.5 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 7/2/2024

[6] US Census 2020
[7] American Community Survey (ACS 2023) 5-Year Estimate Data
[8] DHHS-Bureau of Child Care Licensing

NATURAL FEATURES

Alexandria covers approximately 43.5 square miles of land area and 0.1 square miles of inland water. The Community has an abundance of lakes, rivers, and streams typical of central New Hampshire. The most notable natural features are Newfound Lake and Mount Cardigan. The lowest elevation in the Town is 623' above sea level, and the highest peak is Mount Cardigan's Firescrew Ridge at 3,040' above sea level. Mount Cardigan's highest elevation is 3,121' above sea level at the summit in the Town of Orange. Alexandria is home to Wellington State Park, Welton Falls State Forest, and Cardigan Mountain State Park.

Vegetation is typical of northern New England, including deciduous and conifer forests, open fields, swamps, and riverine areas. The terrain lends itself to abundant small ponds, streams, and rivers, most notably the Fowler River and the Smith River, which drain into the Pemigewasset River, part of the Merrimack River watershed.

TRANSPORTATION

The major highway in Alexandria is NH Route 104, the designated primary evacuation route. Secondary routes include NH Route 3A and Cass Mill Road. Interstate 93 is approximately nine miles away via Exit 23. Other, more minor and less traveled roadways lend access to other areas of the Town

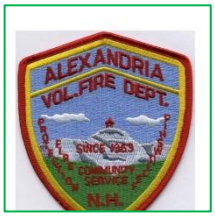
B. EMERGENCY SERVICES

EMERGENCY OPERATIONS CENTER & EMERGENCY MANAGEMENT DIRECTOR

The Town of Alexandria 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 Alexandria, the designated EOC is the Town Office.

FIRE DEPARTMENT & EMS

The Alexandria Fire Department is an all-volunteer department that provides quality fire and emergency medical services to the residents and visitors of Alexandria 24 hours a day, 365 days a year. The department staffs a volunteer Chief and 27 volunteer firefighters and operates one station within the Community. The Department also provides emergency medical services (EMS). The Bristol Fire Department provides medical transportation. The Alexandria Fire Department is a Lakes Region Fire Mutual Aid member with other area departments. Lakes Region Fire Mutual Aid dispatches the Fire Department.



POLICE DEPARTMENT

The Alexandria Police Department is a full-time department providing quality law enforcement services to the residents and visitors of Alexandria. The department staffs a full-time Chief and one full-time officer. The Alexandria Police Department has mutual aid with the NH State Police (Troop F), the Grafton County Sheriff's Office, and surrounding towns. The Franklin Police Department dispatches the Alexandria Police Department.

PUBLIC WORKS

The Alexandria Highway Department operates year-round, 24 hours daily, as needed. The department staffs a full-time Road Agent and four full-time crew members. The department's mission is to support the citizens of Alexandria 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

Alexandria's primary medical facility is Speare Memorial Hospital in Plymouth (21 miles). An alternative medical facility is Franklin Regional Hospital (15 miles).

EMERGENCY SHELTER(S)

The primary shelter is where evacuees are directed during an emergency. Alexandria's designated primary shelter is the Town Hall, which has a permanent generator to keep the building operational during power outages. The designated secondary shelter for the Town is the Newfound Regional High School or the Alexandria United Methodist Church.

C. ALEXANDRIA'S CURRENT & FUTURE DEVELOPMENT TRENDS

Nearly every New Hampshire community experienced a significant drop in new home construction after the 2008 Great Recession. Alexandria was no exception. Between 2009 and 2015, single-family new home construction in Alexandria was slow, consistent with New Hampshire trends. However, from 2016 to 2022, single-family home construction was even slower, as shown in the chart (see right) from City-Data.com[9].

Since the pandemic's beginning in 2020, development in New England has undergone several changes. One of the most significant changes was that occasionally used homes were modified as permanent residences 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. The NH housing market remains stressed, with limited affordable housing and high prices.

In Alexandria, development has been slow but well-regulated. The Team reported that no large subdivisions or new town-owned facilities had been built since the last hazard mitigation plan that compromised the Town's hazard vulnerability, and that no large subdivisions were being planned. Most development consisted of single-family homes or additions.

Single-family new house Construction building permits

- 2022: 1 building, cost: $15,000
- 2021: 1 building, cost: $15,000
- 2020: 1 building, cost: $15,000
- 2019: 1 building, cost: $15,000
- 2018: 1 building, cost: $15,000
- 2017: 1 building, cost: $15,000
- 2016: 1 building, cost: $15,000
- 2015: 3 buildings, average cost: $226,800
- 2014: 6 buildings, average cost: $211,200
- 2013: 10 buildings, average cost: $193,300
- 2012: 3 buildings, average cost: $184,000
- 2011: 7 buildings, average cost: $172,800
- 2009: 4 buildings, average cost: $168,800
- 2008: 15 buildings, average cost: $163,300
- 2007: 14 buildings, average cost: $150,000
- 2006: 25 buildings, average cost: $100,000
- 2005: 25 buildings, average cost: $110,000
- 2004: 25 buildings, average cost: $138,800
- 2003: 24 buildings, average cost: $132,800
- 2002: 16 buildings, average cost: $118,000
- 2001: 15 buildings, average cost: $118,000
- 2000: 14 buildings, average cost: $118,000
- 1999: 12 buildings, average cost: $109,200
- 1998: 9 buildings, average cost: $91,700
- 1997: 8 buildings, average cost: $91,700

[9] City-Data.com; http://www.city-data.com/city/Alexandria-New-Hampshire.html

The Alexandria Planning Board's process for all subdivision applications is extensive and involves on-site examinations and the expertise of other departments and commissions as appropriate. Local regulations are designed to meet state regulations and maintain the Community's local character. Alexandria's regulations address stormwater flow, flood hazard areas, erosion control, road specifications, and shoreland protection. 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 and Subdivision Regulations; no zoning or site plan review regulations exist. Building permits are not required; however, building notifications and driveway permits are.

As a relatively 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.

TABLE 2.1: TOWN STATISTICS

Table 2.1 - Town Statistics				
Census Population Data	**2020**	**2010**	**2000**	**1990**
Alexandria, NH - Census Population Data	**1,776**	**1,613**	**1,334**	**1,173**
Grafton County	**91,118**	**89,118**	**81,826**	**74,998**
30-year Growth Rate	51.41%	*Growth Rate = 2020POP-1990POP/1990POP*		
Elderly Population-% over 65 (2023 ACS 5-Year)	24.0%			
Median Age (2023 ACS 5-Year)	53			
Median Household Income (2023 ACS 5-Year)	$84,125			
Poverty Rate (2023 ACS 5-Year)	8.8%			
Change in Population- Winter (%)	0%			
Change in Population- Summer (%)	25%			
Housing Statistics *(2020 Decennial Census)*				
Total Housing Units	941			
Occupied Housing Units	714			
Vacant Housing Units	227 (vacant, recreational, seasonal, or occasional use)			
Assessed Building Values				
Building types	**Value**		**1% Damage**	**5% Damage**
Residential	$184,861,200		$1,848,612	$9,243,060
Manufactured Housing	$8,179,400		$81,794	$408,970
Commercial	$3,567,300		$35,673	$178,365
Discretionary Preservation Easement	$0		$0	$0
Tax Exempt	$1,839,600		$18,396	$91,980
Utilities	$0		$0	$0
Totals	$198,447,500		$1,984,475	$9,922,375
The above chart shows the 2024-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: Town of Alexandria				

Table 2.1 - Town Statistics	
Regional Coordination	
County	Grafton
Tourism Region	Lakes Region
Municipal Services & Government	
Town Hall or Town Office	Town Offices
Town Manager or Administrator	No
Select Board (3-member)	Yes
Planning Board	Yes
School Board	Yes (part of Newfound School District)
Zoning Board of Adjustment	No
Conservation Commission	Yes
Master Plan	Yes, October 2014 (currently rewriting)
Emergency Operation Plan (EOP)	Yes, September 20, 2016
Hazard Mitigation Plan (HMP)	Yes, January 2018
Zoning Ordinances	No
Subdivisions Regulations	Yes, July 2019
Site Plan Review Regulations	No
Capital Improvement Plan (CIP)	No
Capital Reserve Funds (CRF)	Yes, reviewed annually
Building Permits Required	No - Building Notification and Driveway Permits
Adopted IBC & IRC	No
Town Website	Yes, www.alexandrianh.com
Floodplain Ordinance	Yes, last update in 2023
National Flood Insurance Program (NFIP) Member	Yes, July 16, 2007
Flood Insurance Rate Maps (DFIRMs)	February 8, 2024
Flood Insurance Rate Study (FIS)	February 8, 2024
Percent of Local Assessed Valuation by Property Type - 2023 ***(NH Department of Revenue)***	
Residential Buildings	92.0%
Commercial Land & Buildings	2.4%
Other (including Utilities)	5.6%
Emergency Services	
Town Emergency Warning Systems	Genasys (formerly CodeRED)
School Emergency Warning System	Infinite Campus System
Emergency Page	Yes
Social Media	**Facebook**: Town, Fire Department, Police Department & Animal Control **Instagram**: Police Department
ListServ	No
Local Newspapers	Alexandria Today (newsletter/monthly) & Newfound Landing
Public Access TV	No
Local TV Stations	WMUR Channel 9
Local Radio Stations	Mix 94.1 FM & NHPR 99.1 FM
Police Department	Yes, full-time Chief & one full-time

Table 2.1 - Town Statistics	
Police Dispatch	Franklin Police Dispatch
Police Mutual Aid	NH State Police - Troop F, Grafton County Sheriff's Office & surrounding towns' police departments
Animal Control Officer	Yes, works for the Police Department
Fire Department	Yes, a volunteer Chief & 27 volunteer firefighters
Fire Dispatch	Lakes Region Fire Mutual Aid
Fire Mutual Aid	Lakes Region Fire Mutual Aid
Fire Stations	One
Forest Fire Warden	Yes
Emergency Medical Services (EMS)	Alexandria Fire Department
EMS Dispatch	Lakes Region Fire Mutual Aid
Emergency Medical Transportation	Bristol Fire Department
HazMat Team	Central NH HazMat Team
Established Emergency Management Director (EMD)	Yes
Established Deputy EMD	No
Line of Succession (If EMD is unavailable)	1st…Deputy Fire Chief
	2nd…Police Chief
Public Health Network	Central NH Regional Public Health Network
Health Officer	Yes
Deputy Health Officer	No
Building Inspector	No
Established Public Information Officer (PIO)	No (except for PD)
Nearest Hospital	Speare Memorial Hospital, Plymouth (21 miles)
Alternative Hospitals	Franklin Regional Hospital, Franklin (15 miles)
Primary EOC	Town Offices (generator)
Secondary EOC	Bristol Fire Station (generator)
Primary Shelter	Town Hall (generator)
Secondary Shelter	Newfound Regional High School (regional) or the Alexandria United Methodist Church
Cooling & Warming Shelter	Town Hall (generator) or Town Offices (generator)
Household Pet Shelter	Local farms would assist & NH SPCA (Stratham)
Large Animal & Livestock Shelter	Local farms would assist & NH SPCA (Stratham)
Local Humane Society & Veterinarians	Bristol Veterinary Hospital, NH Humane Society & Pope Memorial SPCA
Utilities	
Town Sewer	Private septic
Highway Department	Yes, full-time Road Agent & four full-time crewmen
Miles of Class V Roads (RSM/Jen)	16.10 paved, 27.73 gravel, 43.83 total miles
NH Public Works Mutual Aid	Yes
Water Supply	Private wells
Wastewater Treatment Plant	No
Electric Supplier	Eversource & NH Electric Coop
Natural Gas Supplier	None
Cellular Telephone Access	Limited

Table 2.1 - Town Statistics	
Alternative Energy Projects	No
Pipelines or Gaslines	No
High-Speed Internet	Broadband only
Telephone Company	Consolidated Communications & Breezeline
Transportation	
Primary Evacuation Routes	NH Route 104
Secondary Evacuation Routes	NH Route 3-A & Cass Mill Road
Nearest Interstate	I-93, Exit 23 (9 miles)
Nearest Airstrip	Newfound Valley, Bristol (1,900 ft. runway)
Helicopter Landing Zone	Town Offices
Nearest Commercial Airport(s)	Lebanon Municipal Airport, Lebanon (42 miles)
	Manchester-Boston Regional Airport, Manchester (58 miles)
	Logan International Airport, Boston, MA (109 miles)
Public Transportation	No
Railroad	No
Education & Childcare	
Elementary/Middle/High Schools	Grades K-12 are part of the Newfound Area School District with Bridgewater, Bristol, Danbury, Hill, Groton, Hebron & New Hampton
School Administrative Unit (SAU)	SAU 4
Private Schools	No
Colleges/Universities	No
Licensed Child Care Facilities	1 facility with a capacity of 16
Fire Statistics ***(NH Division of Forests & Lands, Fire Warden Report, and the Town)***	
Wildfire Fires (2023-2024)	None
Grafton County Fire Statistics (Estimate - 2024)	47 fires, 5 acres
State Forest Fires Statistics (2024)	123 fires, 125 acres
Unless otherwise noted, the 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 6/5/2023, https://www2.nhes.nh.gov/GraniteStats/SessionServlet?page=Community.jsp&SID=1&city=000501&cityName=Alexandria	

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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 thirteen 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 instances[10], 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 Alexandria. 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.

State Hazard	Reason for Exclusion from this Plan
*Coastal Flooding	Distance away from the sea
*Avalanche	No known areas of avalanches
Radiological	Distance away from radiological sites

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 classification.[11] 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.

[10] 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)

[11] 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

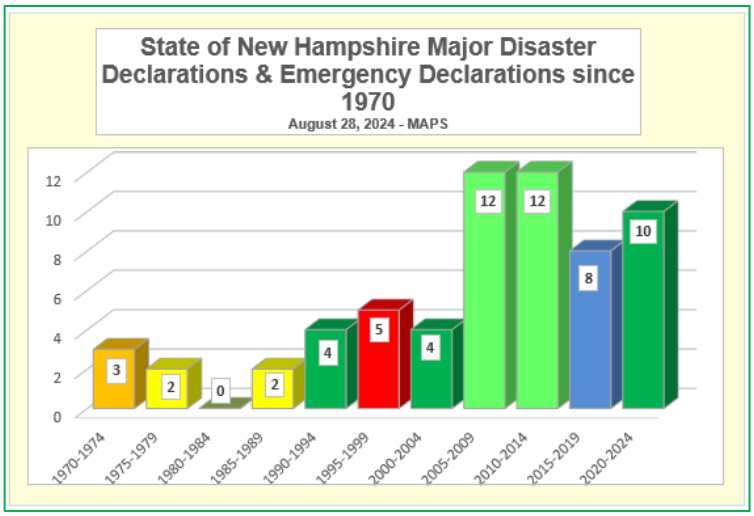
The determination of the probability of occurrence is contained within Column D in Table 3.1, which assesses hazards based on the likelihood that the hazards will occur within 25 years. The probability scores indicate whether the identified hazard has a *Very Low, Low, Moderate, High, or Very High* probability.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

Alexandria is reasonably safe from natural, technological, and human-caused hazards. However, due to Alexandria's geographic location, within the lower peaks of the White Mountains, 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 Guide[12]. 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.[13] The decade beginning in 2020 includes ten disaster declarations: DR-4516 and EM-3445, DR-4622, DR-4624, DR-4693, DR-4740, DR-4761, DR-4771, DR-4799, and DR-4812.



Communities in New Hampshire, such as Alexandria, should become increasingly aware of climate change's impact on the hazards they have already experienced and anticipate an increase in their probability. In Alexandria, incentives are available for installing solar panels.

HAZARD PROBABILITY COMBINED WITH LONG-TERM UTILITY OUTAGE

Any potential disaster in Alexandria 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 quickly become 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.

[12] State Mitigation Planning Policy Guide, FEMA, Released April 19, 2022, page 6
[13] 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** 0-2.9
Natural Hazards - as determined by NH HSEM and the Town							
1) Inland Flooding	2.00	4.00	3.00	5.00	3.00	15.00	**Very High**
2) Severe Winter Weather	2.00	3.00	3.00	5.00	2.67	13.33	**Very High**
3) High Wind Events	2.00	3.00	2.00	5.00	2.33	11.67	**High**
4) Infectious Disease	3.00	1.00	2.00	5.00	2.00	10.00	**High**
5) Wildfire	1.00	3.00	1.00	5.00	1.67	8.33	**Medium**
6) Landslides	2.00	3.00	1.00	4.00	2.00	8.00	**Medium**
7) Lightning	1.00	2.00	1.00	5.00	1.33	6.67	**Medium**
8) Drought	1.00	4.00	4.00	2.00	3.00	6.00	**Medium**
9) Dam Failure (Beavers)	1.00	4.00	3.00	2.00	2.67	5.33	**Low**
10) Extreme Temperatures	1.00	1.00	1.00	5.00	1.00	5.00	**Low**
11) Solar Storms & Space Weather	2.00	2.00	2.00	2.00	2.00	4.00	**Low**
12) Earthquake	3.00	4.00	3.00	1.00	3.33	3.33	**Low**
13) Tropical/Post Tropical Cyclones	1.00	1.00	1.00	3.00	1.00	3.00	**Low**
Hazards that scored a zero in this analysis can be seen in Chapter 3, Section A.							
Technological & Human-caused Hazards							
1) Long-Term Utility Outage	2.00	2.00	2.00	5.00	2.00	10.00	**High**
2) Aging Infrastructure	1.00	3.00	1.00	4.00	1.67	6.67	**Medium**
3) Cyber Events	2.00	1.00	2.00	4.00	1.67	6.67	**Medium**
4) Hazardous Materials	4.00	4.00	2.00	1.00	3.33	3.33	**Low**
5) Mass Casualty Incidents	2.00	1.00	1.00	2.00	1.33	2.67	**Very Low**
6) Transport Accidents	2.00	2.00	2.00	1.00	2.00	2.00	**Very Low**
7) Terrorism & Violence	1.00	1.00	1.00	1.00	1.00	1.00	**Very Low**
8) Conflagration	1.00	1.00	1.00	1.00	1.00	1.00	**Very Low**
9) Known & Emerging Contaminants	1.00	1.00	1.00	1.00	1.00	1.00	**Very Low**

D. NATIONAL FLOOD INSURANCE PROGRAM (NFIP) STATUS

Alexandria entered the National Flood Insurance Program (NFIP) on July 16, 2007. The floodplain areas are primarily along the western shore of Newfound Lake, along the Fowler River, Bog Brook, and leading to a swampy area and Foster Pond. Alexandria has several other smaller rivers and streams; however, they are not in the FEMA floodplain. Alexandria is likely to experience flooding on several roads and along most rivers and streams, but the overall flood risk due to riverine and 100-year flood events is minimal.

The latest Flood Insurance Rate Studies (FIRS) and Digital Flood Insurance Rate Maps (DFIRMS) are dated February 8, 2024. The latest DFIRM and FIS are incorporated by reference when amended in the Floodplain Development Ordinance.

According to FEMA, two NFIP policies are in effect in Alexandria, including one for single-family homes and one for other residential building. There have been no paid or repetitive losses.[14]

FLOODPLAIN MANAGEMENT ORDINANCE

Article 19 of the 2007 Alexandria Town Meeting, held on March 15, 2007, adopted the Town of Alexandria Floodplain Management Ordinance. Section I – Purpose states, *"Certain areas of the Town of Alexandria, New Hampshire are subject to periodic flooding, causing serious damages 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 Alexandria, New Hampshire has chosen to become a participating community in the National Flood Insurance Program, and agreement to comply with the requirements of the National Flood Insurance Act of 1968 (P.L. 90-488 as amended) as detailed in the Floodplain Management Ordinance".*[15]

NATIONAL FLOOD INSURANCE PROGRAM

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

The article details the exact specifications for building or substantial improvements in the flood zone. Section II discusses the establishment of the ordinance and states, *"The following regulations in this ordinance shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its Flood Insurance Rate Maps dated June 8, 1998 or as amended, which are declared to be a part of this ordinance and are hereby incorporated by reference".*[16]

[14] FEMA, November 2024
[15] https://alexandrianh.com/wp-content/uploads/2017/12/floodplain-management-ordinance.pdf
[16] Ibid

Additional sections of the floodplain management ordinance further discuss, in detail, the requirements for building in the flood zone, including, but not limited to, permitting requirements, the review process, assurances to minimize infiltration of flood water, as built elevation and floodproofing, alteration or relocation of watercourses, flood elevations, manufactured homes, recreational vehicles, and the variance and appeals process.[17] The additional sections are as follows:

- Section III – Permits
- Section IV – Construction Requirements
- Section V – Water and Sewer Systems
- Section VI – Certification
- Section VII – Other Permits
- Section VII – Watercourses
- Section IX – Special Flood Hazard Areas
- Section X – Variances and Appeals
- Section XI – Distribution and Review
- Section XII – Definitions

The Town uses the Floodplain Development Ordinance 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 Alexandria Zoning Ordinance can be found on the Town's website.[18]

Alexandria's Floodplain Administrator is responsible for determining 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.

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.

[17] https://alexandrianh.com/wp-content/uploads/2017/12/floodplain-management-ordinance.pdf
[18] Ibid

The Team understands that the NFIP's benefits extend to structures not in the 100-year floodplain. They felt it worthwhile to have NFIP brochures and information available at the Town Hall 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 Alexandria.

Photos: Road Damage, June 2023
Photo Credit: The Town of Alexandria

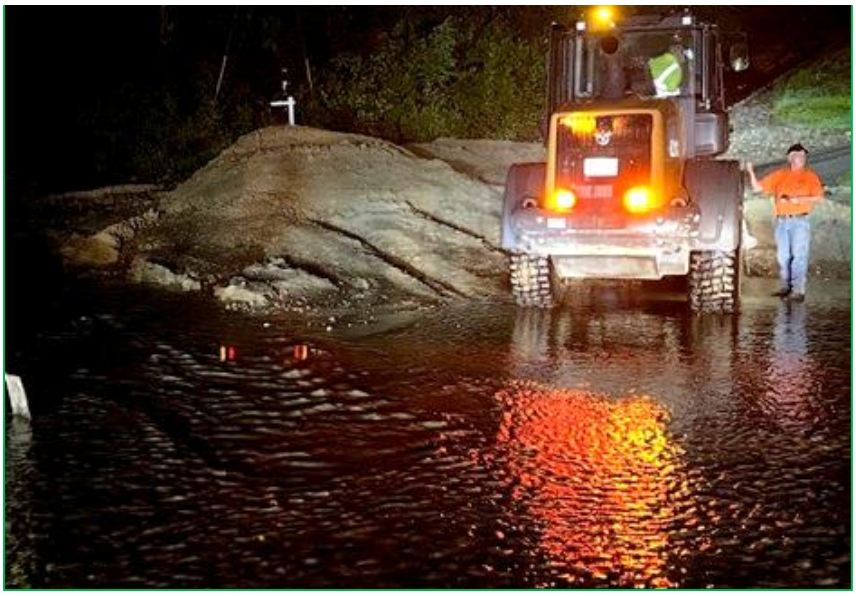


TABLE 3.2: HISTORIC HAZARD IDENTIFICATION

Key for Table 3.2

2018 HMPT ..... 2018 Hazard Mitigation Planning Team
2025 HMPT ..... 2025 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
B. Wildfire
C. High Wind Events
D. Severe Winter Weather
E. Earthquake
F. Drought
G. Miscellaneous Hazards
H. Other Hazards

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, dam failure, 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 17-21, 2023, no significant flooding has occurred in Alexandria.				
A summary of flood events, including Major Disaster and Emergency Declarations in the State and region				
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)**, 2023 **(DR-4761),** 2024 **(DR-4771),** 2024 **(DR-4799**), 2024 **(DR-4812)**			

Type of Event	Date of Event	Location	Description	Source
A detailed summary of flood events in the Community				
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. There was no significant damage in Alexandria.	FEMA & 2025 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). In Alexandria, several roads were impacted by washouts and flood damage, including Washburne Road, which took over a year to repair. The total cost of the storm in Alexandria was $126,633; the Town received reimbursement amounts of $85,008.06, $11,252.90, and $17,905.18.	FEMA & 2025 HMPT
Inland Flooding (Heavy Rain)	April 15-23, 2007	All Ten NH Counties	**Major Disaster Declaration DR-1695:** FEMA and SBA obligated more than $27.9 million in disaster aid for flood damages following the April nor'easter (Tax Day Storm). In Alexandria, many roads were impacted, costing $198,949.25. The Town received two reimbursements for storm damage: $88,290.24 and $65,899.99.	FEMA & 2025 HMPT
Inland Flooding (Heavy Rain & Tornado)	July 24-August 14, 2008	Belknap, Carroll & Grafton & Coos	**Major Disaster Declaration DR-1787:** There was a period of severe storms and flooding from July 24 to August 14, and a tornado occurred on July 24, 2008. The tornado did not reach Alexandria, and no significant damage occurred.	FEMA & 2025 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 & 2025 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). This storm traveled mainly along the Connecticut River. There was no impact in Alexandria.	FEMA & 2025 HMPT
Inland Flooding (Tropical Storm Irene)	August 26-September 6, 2011	**EM 3333**: All Ten NH Counties **DR-4026:** Seven NH Counties	**Major Disaster Declaration DR-4026 & Emergency Declaration EM-3333:** See below, Section C	FEMA & 2025 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. There was no significant impact in Alexandria.	FEMA & 2025 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. In Alexandria, the Fire Department was called to two weather-related incidents. There was no significant flooding.	FEMA & 2025 HMPT

Type of Event	Date of Event	Location	Description	Source
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. During this event, Alexandria sustained significant damage to fifteen miles of roads. The Fowler River changed course due to the high volume of stormwater, and caused five residents in the area to be stranded. The Alexandria Fire Department evacuated these residents. Swift water teams were deployed where the water level at the Gale Road and Fowler River Road intersection rose to approximately 40 inches. Under emergency approval from the Department of Environmental Services (DES), an excavating contractor dredged the river, removing rock and debris to shape the river flow back to its original path. Firefighters were deployed to the Cole Hill Road bridge, where the Fowler River rose to 17 feet, threatening to overflow the bridge. Fowler River Road was closed at Akerman's bridge due to a complete road failure just before the bridge, necessitating a 9-mile detour for road crews and emergency vehicles. It took the road crew and contractors 72 hours to make the roads passable, though not fully repaired. The Town Hall shelter was open on October 30th and 31st from 8 AM to 7 PM, providing meals for five residents, Highway Department employees, contractors, and emergency service workers. In total, over 50 meals were served. The total cost of this storm was $290,592.81; Alexandria was reimbursed for $221,574.11.	FEMA & 2025 HMPT
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. There was no significant impact in Alexandria.	FEMA & 2025 HMPT
Inland Flooding (Heavy Rain) & **Long-Term Utility Outage**	21-Jul-22	Alexandria	A localized summer storm struck Alexandria, causing townwide power outages, downed trees, and inland flooding. The Alexandria Fire Department responded to ten incidents on July 21, 2022. Roads impacted by this storm included Cass Mill Road, Fowler River Road, Lakeview Heights, Cole Hill Road, Eastman Hill Road, Gordon Hill Road, Pattee Hill Road, and Berry Road.	2025 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. In Alexandria, trees and power lines were down in parts of the Community.	FEMA & 2025 HMPT
Inland Flooding (Heavy Rain)	June 19, 2023	Alexandria	Alexandria experienced a severe weather event on June 19, 2023, which caused heavy rain and wind to leave extensive road damage across the Community. The Alexandria Fire Department responded to a person on Fairview Lane in a vehicle who could not get past water-covered roads. One home was evacuated on Thissell Road because trees had hampered egress. On Mt. Cardigan Road, there were two feet of water. Matthews Road was also impacted, making it inaccessible, and one home had water in the basement. The estimated total cost of the storm was $438,772.31 (FEMA rates); the Community did not receive FEMA funding as the storm was not declared in the County.	2025 HMPT
Inland Flooding (Heavy Rain)	July 9-17, 2023	Coos, Grafton, Belknap, Sullivan & Cheshire	**Major Disaster Declaration, DR-4740:** On September 14, 2023, the Federal Emergency Management Agency announced a major disaster declaration and notified individuals and public assistance for five NH Counties. In Alexandria, a sinkhole was created on Akerman Road at the end of a driveway. This storm did not have a significant impact, but it caused additional issues as the Community was coping with the devastation from the prior storm.	FEMA & 2025 HMPT

Type of Event	Date of Event	Location	Description	Source
Inland Flooding (Heavy Rain)	December 5, 2023	Alexandria	On December 5, 2023, Alexandria experienced a localized heavy rain and high wind event. Power lines were down on Washburn Road, Perkins Hill Road, and Pine Hill Road. A suspected microburst struck one area of the Community. The damage was not eligible for FEMA post-disaster funding, as it occurred outside the date parameters for the following declaration, DR-4761.	2025 HMPT
Inland Flooding (Heavy Rain)	December 17-21, 2023	Coos, Grafton & Carroll	**Major Disaster Declaration, DR-4761:** A significant rainstorm, similar to a 100-year flood event, struck multiple areas in New Hampshire, causing widespread damage to rivers, roads, and bridges. Although the Fire Department did not receive many calls and there were no life-safety issues, the Community was impacted. Roads impacted were Matthews, Thissell, Plummer Hill, Bailey, and Mountain View.	FEMA & 2025 HMPT
Inland Flooding (Heavy Rain)	January 9-14, 2024	Grafton & Rockingham	**Major Disaster Declaration, DR-4771:** Severe storms brought winter rains and flooding to towns in two counties in New Hampshire. The higher elevations in Alexandria got snow from this storm, but the storm brought mostly light rain within the Village and lower elevations. There was no significant damage in Alexandria.	FEMA & 2025 HMPT
Inland Flooding (Heavy Rain)	July 10-13, 2024	Grafton & Coos	**Major Disaster Declaration, DR-4812:** Severe storms brought significant summer rains and flooding to towns in two counties in New Hampshire. This storm brought road washouts and erosion primarily to towns along the Connecticut River. There was no significant impact in Alexandria.	FEMA & 2025 HMPT
B. Wildfire: 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 Alexandria.				
A summary of wildfire events, including Major Disaster and 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 Alexandria.	Local Resources & 2025 HMPT
Wildfire (Shaw Mountain Fire)	July 2, 1953	Carroll County	**Major Disaster Declaration DR-11:** This wildfire occurred in Carroll County at Shaw Mountain. This fire did not reach Grafton County or Alexandria.	FEMA & 2025 HMPT
Wildfire (Table Mountain)	October 16, 1984	Carroll County	**Table Mountain Fire:** This Class D fire burned 100 acres in Carroll County before being extinguished. This fire did not reach Grafton County or Alexandria.	Local Resources & 2025 HMPT
Wildfire (Lucy Brook)	November 16, 2004	Carroll County	**Lucy Brook Fire:** 136 acres burned in the Lucy Brook Fire before it was extinguished. This fire did not reach Grafton County or Alexandria.	Local Resources & 2025 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 no damage to homes. This fire did not reach Grafton County or Alexandria.	Local Resources & 2025 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 Alexandria.	FEMA & 2025 HMPT
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 Alexandria.	Local Resources & 2025 HMPT

Type of Event	Date of Event	Location	Description	Source
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 Alexandria; however, crews were sent to Woodstock to assist.	Local Resources & 2025 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 Alexandria.	Local Resources & 2025 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 Alexandria.	Local Resources & 2025 HMPT
Wildfire	2017	Alexandria	In 2017, a campfire that got out of control off Fowler River caused a fire that spread to 3-4 acres of land and took multiple days to extinguish because of difficult terrain.	2025 HMPT
No wildfires of significance have occurred in Alexandria since the 2018 Hazard Mitigation Plan was completed.				2025 HMPT
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 Alexandria.				
A summary of high wind events and tropical/post-tropical cyclone events, including Major Disaster and Emergency Declarations in the State and region				
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
A detailed summary of high wind and tropical/post-tropical cyclone events in the Community				
Tropical/Post Tropical Cyclone (Great New England Hurricane)	September 21, 1938	All Ten NH Counties	**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 Alexandria. (Source http://nhpr.org/post/75th-anniversary-new-englands-greatest-hurricane)	FEMA & 2025 HMPT
Tropical/Post Tropical Cyclone (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. No significant impact in Alexandria.	FEMA & 2025 HMPT

Type of Event	Date of Event	Location	Description	Source
Tropical/Post Tropical Cyclone (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 made federal funding available to all 10 New Hampshire counties to accept pets and evacuees. No pets or evacuees came to Alexandria.	FEMA & 2025 HMPT
Tropical/Post Tropical Cyclone (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. Tropical Storm Irene caused damage to fifteen roads in Alexandria. Most damage occurred on Fowler River Road, Gove Road, McMurphy Road, Perkins Hill Road, and Shem Valley Road. The Town received $20,340.07 in post-disaster funding from FEMA based on a total damage cost of $43,337.78	FEMA & 2025 HMPT
Tropical/Post Tropical Cyclone (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. No significant impact in Alexandria.	FEMA & 2025 HMPT
Microburst	2017	Alexandria	In 2017, an unexpected microburst impacted Washburn Road, Cardigan Mountain, and across the mountains at higher elevations. The suspected microburst went down Brook Road, and although it caused tree damage, no structures were impacted.	2025 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 February 3-4, 2023, no significant winter weather events have occurred in Alexandria.				
A summary of severe winter weather events, including Major Disaster and Emergency Declarations in the State and region				
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 & 2025 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 **(DR-4799)**		The major severe winter weather events with snowfalls exceeding 2' in parts of the State. Power and transportation systems were disrupted.	FEMA & 2025 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. Like the rest of the State, Alexandria experienced heavy snow accumulation.	2025 HMPT

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather (Snowstorm) **High Wind Events**	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 storms 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. The Highway Department handled the heavy snow accumulation in Alexandria.	FEMA & 2025 HMPT
Severe Winter Weather (Ice Storm) & **Long-term Utility Outage**	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. Alexandria had multiple road closures and power outages for up to four days. Significant ice damage occurred in Alexandria with long-term power outages, particularly at the higher elevations.	FEMA & 2025 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 Alexandria.	FEMA & 2025 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 Alexandria.	FEMA & 2025 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. During the 2005 winter season, the Highway Department handled the heavy snow accumulation in Alexandria.	FEMA & 2025 HMPT
Severe Winter Weather (Snowstorms)	2007-2008	Alexandria	The winter of 2007-2008 brought several storms to Alexandria and one major storm, leading to a higher-than-usual snow accumulation and the potential for roof collapse.	2025 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. No significant ice damage occurred in Alexandria.	FEMA & 2025 HMPT
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. The Highway Department handled the heavy snow accumulation in Alexandria.	FEMA & 2025 HMPT

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather (Snowstorm) & **Long-term Utility Outage**	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 Alexandria. The Highway Department handled the heavy snow accumulation in Alexandria. Halloween festivities took place as usual.	FEMA & 2025 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 Alexandria.	FEMA & 2025 HMPT
Severe Winter Weather (Extreme Temperatures) & **Long Term Utility Outage**	February 3-4, 2023	Regionwide	Dangerously cold temperatures struck most of New Hampshire in early February 2023, the coldest recorded temperatures in five years. Wind chills on top of Mount Washington were recorded at -109°. Alexandria opened and staffed a warming shelter for personnel and individuals as cleanup from downed trees and power lines continued. The Alexandria Fire Department was called to assist with two power line incidents on Ragged Mountain Highway and Walker Road. Foster Pond Road also had fallen trees and downed power lines.	2025 HMPT
Severe Winter Weather (Snowstorm)	April 3-5, 2023	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. This storm was not declared in Grafton County, and although heavy snow fell throughout Alexandria and several trees were down, the Highway Department was about to handle the accumulations.	2025 HMPT
E. Earthquake: 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 Alexandria.				
A summary of earthquakes with a magnitude of 4.0 or more significant in the State and region				
Earthquakes	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 since 1900.	State of NH Multi-Hazard Mitigation Plan, Update 2023
A summary of most earthquakes with a magnitude over 2.0 that may have been felt in New Hampshire since 1960				
Earthquake	June 26, 1964	Salisbury, NH	Magnitude 3.2	United States Geological Society (USGS), State of NH Multi-Hazard Mitigation Plan Update & 2025 HMPT
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; felt in Alexandria, no damage reported	
Earthquake	October 25, 1986	Northfield, NH	Magnitude 3.9	
Earthquake	October 20, 1988	Milan, NH	Magnitude 3.9	

Type of Event	Date of Event	Location	Description	Source
Earthquake	November 22, 1988	Milan, NH	Magnitude 3.2	United States Geological Society (USGS), State of NH Multi-Hazard Mitigation Plan Update & 2025 HMPT
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; felt in Alexandria, no damage reported	
Earthquake	February 15, 2018	East Kingston, NH	Magnitude 2.7	
Earthquake	February 4, 2022	Gorham, NH	Magnitude 2.9	
Earthquake	April 25, 2023	Center Sandwich	Magnitude 2.9	
Earthquake	May 31, 2023	Andover, NH	Magnitude 2.2	
Earthquake	December 23, 2023	Chichester, NH	Magnitude 2.7	
Earthquake	January 3, 2024	Loudon, NH	Magnitude 2.0	
Earthquake	March 28, 2024	Gilford, NH	Magnitude 2.2	
Earthquake	June 18, 2024	Haverhill, NH	Magnitude 2.6	
Earthquake	January 27, 2025	Portsmouth, NH	Magnitude 3.8; felt in Alexandria, no damage reported	
F. Drought: Drought is generally less damaging and disruptive than 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 2022 drought, no significant droughts have occurred in Alexandria.				
A summary of drought in the State and region				
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 2023
A summary of drought in the Community since 1929				
Drought	1929-1936	Statewide	Regional	State of NH Multi-Hazard Mitigation Plan, Update 2023, 2018 HMPT & 2025 HMPT
Drought	1939-1944	Statewide	Severe in the southeast and moderate elsewhere	
Drought	1947-1950	Statewide	Moderate	
Drought	1960-1969	Statewide	The longest recorded regional continuous spell of less-than-average precipitation	
Drought	2001-2002	Statewide	The third-worst drought on record	

Type of Event	Date of Event	Location	Description	Source
Drought	2016-2017	Statewide	The summers of 2016 and 2017 experienced a declared drought, ranging from extreme in southern New Hampshire to dry in the northern areas. Some residents faced dried-up wells in Alexandria, and static water sources became limited.	State of NH Multi-Hazard Mitigation Plan, Update 2023, 2018 HMPT & 2025 HMPT
Drought	2020-2021	Statewide	The drought declared for 2020-2021 hit NH's north country harder than the southern areas. Some dug wells dried up in Alexandria, and seasonal water sources were unavailable.	
Drought	2022	Statewide	A declared drought during the summer and fall of 2022 lessened as fall transitioned into winter following several rainy periods. This drought eased progressively from south to north. By January 2023, major drought conditions had almost disappeared. Some wells dried up as in the past; numerous camps, older homes, and many dug wells exacerbate the situation in any drought.	
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, Alexandria has had no significant miscellaneous hazards.				
Drug Bust	February 3, 2017	Townwide	A routine traffic stop led to a large drug bust. The drug that was found within the stopped vehicle was methamphetamine.	2018 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 & 2025 HMPT
Infectious Disease	January 2020-May 11, 2023	All Ten NH Counties	**Emergency Declaration EM-3445:** A ten-county declaration to provide individual and public assistance as a result of the impact of COVID-19**.**	FEMA & 2025 HMPT
Solar Storms & Space Weather	May 3-9, 2024	Statewide	NASA's Solar Dynamics Observatory observed 82 solar flares from May 3-9, 2024. These flares caused minor utility and emergency service interruptions throughout the State and the region. No significant impact in Alexandria.	NASA & 2025 HMPT
H. Other Hazards: Identified hazards with no specific example of occurrence.				

Natural Hazards
Landslides
Lightning
Dam Failure
Technological & Human-caused Hazards
Aging Infrastructure
Cyber Events
Hazardous Materials
Mass Casualty Incidents
Transport Accidents
Terrorism & Violence
Conflagration
Known & Emerging Contaminants

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.

See *Table 3.1, Hazard Threat Analysis,* and Chapter 5 for more details on these hazards.

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 States 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.***

Chapter 4: Critical Infrastructure & Key Resources (CIKR)

Team discussion and brainstorming identified Critical Infrastructure & Key Resources (CIKR) within Alexandria. 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 Office & Police Station (generator)	Town government, records, law enforcement services & primary EOC	All hazards & Inland Flooding	1
Fire Station (no generator)	Fire services	All hazards	1
Town Shed (generator)	Heavy equipment, sand & gravel	All hazards	1
Town Hall (generator)	Primary shelter	All hazards & Inland Flooding	1
Evacuation Routes			
NH Route 104	Primary evacuation route	All hazards & Transport Accidents	1
Fowler River to West Shore Road to NH Route 3-A	Secondary evacuation route	All hazards & Inland Flooding	3
Cass Mill Road	Secondary evacuation route	All hazards & High Wind Events	2
Bog Road	Secondary evacuation route	All hazards & Inland Flooding	3
Helicopter Landing Zones			
Town Offices	Helicopter landing zone	All hazards & Inland Flooding	1
Active Dams			
Bailey Brook Dam	Non-menace	All hazards	1
Koury Farm Dam	Non-menace	All hazards	1
Alexandria has five additional inactive dams, including one exempt dam and four dams classified as ruins. There are no high, significant, or low-hazard dams in Alexandria.			

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**	
Electric substation (Route 104)	Switching Station	All hazards	1
Alexandria United Methodist Church (no generator)	Potential shelter	All hazards & Inland Flooding	1
Newfound High School (generator)	Potential shelter	All hazards	1

TABLE 4.3 – FACILITIES & POPULATIONS TO PROTECT (FPPS)

Facilities & People to Protect (FPPs)			
FPPs are facilities that must be protected because of their importance to the Town and residents who may need help during a hazardous event.			
Facility	**Type of Facility**	**Hazard Risk**	
Alexandria Village School	Gathering of people/School	All hazards	1
Dead River	Fuel storage	All hazards & Hazardous Materials	2
Lynne Avenue Assisted Living	Assisted living facility	All hazards	1
Marie's Day Care	Child Care	All hazards	1
AMC Cardigan Mountain Lodge	Gathering of people/lodging	All hazards	1
Alexandria United Methodist Church (no generator)	Potential shelter	All hazards & Inland Flooding	1

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.			
Old Town Shed	Sand & gravel	All hazards	1
AMC Cardigan Mountain Lodge	Lodging, food & water	All hazards	1
Please refer to the Resource Inventory List in the Alexandria Emergency Operations Plan for additional resources.			

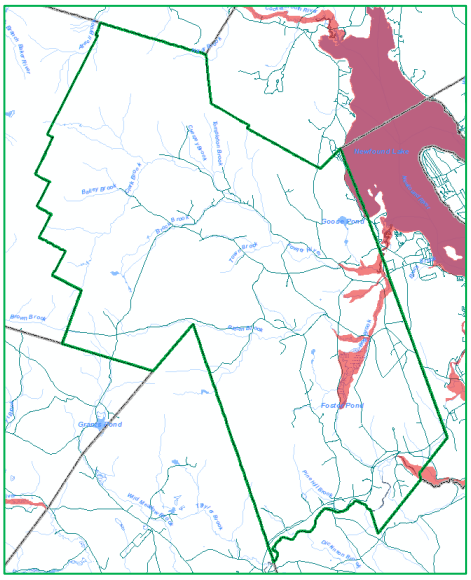
Chapter 5: Hazard Effects in Alexandria

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

Although flooding scored the highest HIRA rating in Table 3.1, Hazard Identification & Risk Assessment, the overall risk for CIKR from riverine flooding is low. The HIRA rating is more indicative of road flooding and washouts. The floodplain areas are primarily along the western shore of Newfound Lake, along the Fowler River, Bog Brook, and Foster Pond, as shown in red in the image to the right.



Alexandria's CIKR were identified and listed in Chapter 4, and each CIKR was analyzed for its flooding potential. This analysis revealed that most Alexandria CIKR are safe from flooding, but the secondary evacuation routes, Fowler River Road and Bog Road, are susceptible. Please refer to Chapter 4, Tables 4.1-4.4 for more information.

All CIKR are outside the flood zone. However, it is expected that there are other structures and homes within the flood zone. Town officials should consider all at-risk properties when a flood hazard is likely.

Overall Wildfire Risk

CIKRs 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 Alexandria, this would cover the entire town. A different method to determine the WUI in suburban and exurban communities includes identifying developments, streets, roads with limited egress, a high canopy of old-growth softwoods, or older wooden structures.

Alexandria's primary facilities are within the 300' WUI buffer of roadways, therefore easily accessible by fire apparatus and hoses. The Town's CIKR also have adequate defensible space. Alexandria has numerous dead-end streets. Some of these may have higher-than-average wildfire risk due to the distance between structures, the number of old-growth softwoods that line the streets, and the lack of a second egress. On West Shore Road, several wooden multi-family units are close, creating a risk for wildfires and even conflagration. No CIKR at high risk for wildfires were identified in Tables 4.1-4.4.

Many structures in Alexandria are expected to be prone to wildfires, particularly, as suggested above, in neighborhoods with limited egress and a canopy of old-growth trees or where forests surround structures. Because Alexandria is so forested, it can be assumed that nearly every structure in 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.

This Plan assumes that the potential loss from the identified natural hazards would range from **$0 to $1,984,475** or **$1,984,475 to $9,922,375**, based on the 2024 MS1 total structure value of **$198,447,500.** (See chart to the right)

MS-1 Assessed Value of All Structures 2024 Town Report			
Building types	**Value**	**1% Damage**	**5% Damage**
Residential	$184,861,200	$1,848,612	$9,243,060
Manufactured Housing	$8,179,400	$81,794	$408,970
Commercial	$3,567,300	$35,673	$178,365
**DPE*	$0	$0	$0
Tax Exempt	$1,839,600	$18,396	$91,980
Utilities	$0	$0	$0
Totals	$198,447,500	$1,984,475	$9,922,375
**DPE=Discretionary Preservation Easement*			

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.

Photo: Fowler River Road Intersection, October 2017
Photo Credit: The Town of Alexandria

C. NATURAL HAZARDS

The descriptions below represent the **local impact** on the Community of 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 ..... $1,984,475 to $9,922,375

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, Alexandria has a relatively small 100-year floodplain. The floodplain is primarily along the western shore of Newfound Lake, along the Fowler River, Bog Brook, and leading to a swampy area and Foster Pond. Despite the floodplain, riverine flood events are uncommon in Alexandria.

Table 3.2 details the inland flooding events, including riverine and excessive stormwater events. Several stormwater events occurred since the last hazard mitigation plan; among these were events in October 2017 (DR-4355), July 2022 (not declared), another in December 2022 (DR-4693), June 2023 (not declared), July 2023 (DR-4740), December 2023 (not declared), December 2023 (DR-4761), and January 2024 (DR-4771). In most instances, heavy rainfall created washouts and road flooding, but no significant structure damage occurred.

While staying within its budget, the Highway Department has been proactive in the maintenance and repairs of culverts, reducing the incidence of local road erosion and washouts. To further improve stormwater flow in the Community, culvert improvement projects are included in *Table 9.1, The Mitigation Action Plan*.

The Highway Department cares for nearly 44 miles of Class V roads, 27.7 of which are gravel. In addition, the State maintains several major arteries, chiefly NH Routes 104 and 3A. Nonetheless, significant rain, particularly if combined with rapid snow melt, can cause considerable damage to Alexandria'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 ..... Very High
Estimated Structure Loss Value ..... $1,984,475 to $9,922,375

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 Alexandria. These impacts are a risk to the Community, including isolation, especially to senior citizens (24%) and other vulnerable populations. In addition, the ability to get in and out of town and emergency service access can be hindered.

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.

Snowstorms and nor'easters have struck Alexandria in the past, but the Highway Department could keep up with the accumulation. Several winter storms have impacted Alexandria since the last hazard mitigation plan. On April 4, 2023 (DR-4799), although not declared in Grafton County, Alexandria experienced heavy snow accumulations, causing several trees to fall. Other winter storms, although declared as inland flooding events, impacted Alexandria on December 22-25, 2022 (DR-4693), December 5, 2023 (not declared), December 17-21 (DR-4761), and January 9-14, 2024 (DR-4771). These storms primarily impacted power lines and some roads, as detailed in Table 3.2.

Although Alexandria's Highway Department handles usual snow amounts without difficulty, Alexandria's roads are often impacted by poor weather conditions. Travel can be difficult with heavy traffic, particularly on Route 104 and 3A, which are the State's responsibilities; 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 ice storm 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.

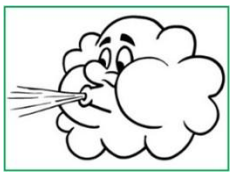
There have been significant ice storms in New Hampshire, but Alexandria had no damage in three of the most significant events (1979, 1998, and 2010). However, the 2008 Ice Storm caused some loss; trees, phone lines, and minor structural damage were reported. The Team also reported significant icing from a storm in 2013.

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 ..... Very High
Estimated Structure Loss Value ..... $0 to $1,984,475

Isolated High Wind Events



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

The Team noted that high winds often occur in Alexandria due to its location in the foothills of the White Mountains of New Hampshire. High winds could come down from Cardigan Mountain or across Newfound Lake and impact the Community. The Team noted, however, that the power companies have recently increased their trimming efforts. The Highway Department and the power companies have repeatedly removed downed trees.

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. Its winds blow circularly, leaving behind downed trees 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 Alexandria, a microburst would be more likely than a tornado. Since the previous hazard mitigation plan, Alexandria has had no reports of downbursts or tornadoes; however, an unexpected microburst in 2017 impacted Washburn Road, Cardigan Mountain, and across the mountains at higher elevations. The suspected microburst went down Brook Road, and although it caused tree damage, no structures were impacted.

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 0% and 1% of the total structure value.

4) INFECTIOUS DISEASE

Hazard Identification & Risk Assessment (HIRA) ..... High
Probability ..... Very High
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 Alexandria. Alexandria 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, and even the common seasonal flu virus. The United States and the world have been coping with the COVID-19 pandemic for nearly 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.

Alexandria's unique geography provides hikers and summer and winter recreation enthusiasts opportunities to visit the Town; the Community's population slightly increases during the summer. Facilities in Alexandria hold events and activities that could increase the likelihood of spreading infectious diseases. All students attend school outside of Alexandria as part of the Newfound Area School District, along with students from Bridgewater, Bristol, Danbury, Hill, Groton, Hebron, and New Hampton. Churches, meeting houses, and social facilities also invite infectious disease outbreaks. Interactions between students and out-of-town sports teams and clubs can also bring infectious diseases.

With assistance from public health networks, town officials did their best to mitigate the onset of COVID-19 in Alexandria. A few months before COVID-19 became an outbreak nationwide, a viral outbreak occurred in Alexandria, which may have been one of the earliest outbreaks of the disease. To help mitigate the crisis, the Town Office remained open with mitigation measures in place. Initially, the schools went virtual. The Town continues to encourage social distancing and protecting the Town's most vulnerable citizens. There is one assisted living facility in the Town.

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

Alexandria's EMD and other town officials, in coordination with emergency service personnel and the Central NH Regional Public Health Network, 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 the 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

5) WILDFIRE

Hazard Identification & Risk Assessment (HIRA) ..... Medium
Probability ..... Very High
Estimated Structure Loss Value ..... $1,984,475 to $9,922,375

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 Alexandria.

The Team described the forests of Alexandria 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."*[20] 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 Alexandria, as they are throughout the State, but often, burning occurs without the proper permits. Sometimes, it is difficult for the fire department to monitor all conditions, and the occasional unauthorized burn will occur.

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 Alexandria Fire Department strives to improve and maintain firefighting equipment, maintain water resources, and manage a Capital Reserve Fund to help pay costs for new equipment. Alexandria has had no significant wildfires since the last hazard mitigation plan; however, in 2017, a 3-4-acre fire occurred on Robie Road, taking firefighters multiple days because of challenging terrain.

Significant wildfires in New Hampshire are uncommon; six large fires have occurred in the State since 2015. 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. The Alexandria Fire Department sent crews to assist with the Dilly Cliff Fire in Woodstock.

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.

[20] https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fswdev3_009827.pdf

6) LANDSLIDES

Hazard Identification & Risk Assessment (HIRA) ..... Medium
Probability ..... High
Estimated Structure Loss Value ..... $0 to $1,984,475

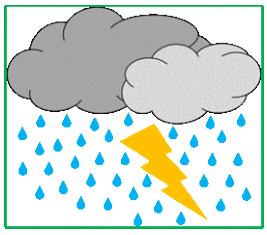
Landslides are often associated with heavy rains, steep terrain, and the overflow of riverbanks. Landslides often occur where unstable slopes threaten to collapse on homes, buildings, and local roads.

One area along West Shore Road in Alexandria was reported as susceptible to landslides. Roadside cliffs adjacent to the road frequently drop debris and trees, once knocking a car and a boat into a nearby river. Action Item #8 in Table 9.1 has been added to lobby the State to recognize the issue on this state road and to mitigate the danger to motorists.

Although landslides are an issue, no structures appear to be in harm's way at this time. In the unlikelihood that structure loss would be experienced, it would be localized; therefore, the structure loss value was estimated to be between 0% and 1% of the total assessed structure value.

7) LIGHTNING

Hazard Identification & Risk Assessment (HIRA) ..... Medium
Probability ..... Very High
Estimated Structure Loss Value ..... $0 to $1,984,475



Lightning strikes have occurred in Alexandria as a result of severe summer storms. Some of the Town's structures are older and historic buildings. 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.

Although lightning is a potential problem, the Town reports few occurrences, none of which were significant. However, the Team discussed one lightning strike in the past year that struck a home on Bog Road, causing a fire. The Fire Department was able to save the home.

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.

8) DROUGHT

Hazard Identification & Risk Assessment (HIRA) ..... Medium
Probability ..... Low
Estimated Structure Loss Value ..... $0 to $1,984,475

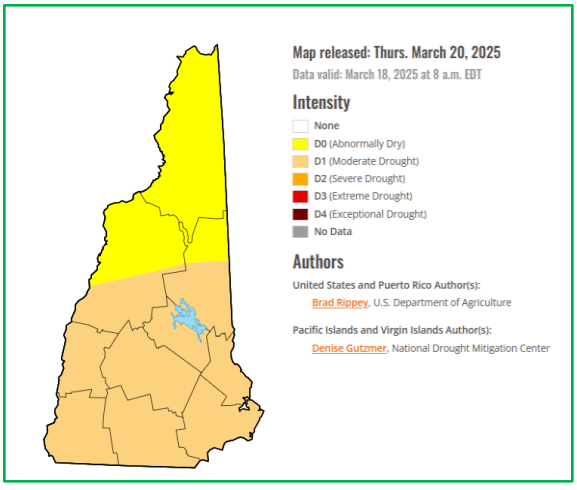
A drought, an extended period without precipitation, could elevate the risk of wildfire and blowdowns in the Community's forested areas. With an extreme drought, the water supply and aquifer levels could be threatened. According to the NH Department of Environmental Services (DES), drought is not rare 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."*[21]

A concern is that more frequent and longer-lasting droughts will occur with climate change. In addition, drought conditions damage the local forests and farms and increase the risk of wildfire. Besides being heavily forested, Alexandria has several open fields, although it is not a predominately agricultural community.

Only four significant droughts occurred before 2000, while four have occurred in just the past nine years (2016, 2020, 2022, and 2024). During the 2016 drought, the Team reported the loss of a few dug wells and springs; other wells went low but were not dry, and static water resources became limited. The 2020-21 drought had a similar impact as the 2016 drought, although it was reported that some seasonal water sources were unavailable. The 2022 and 2024 droughts also impacted Alexandria, as in the past, some dug wells went dry, particularly at older camps and homes.

The 2016-2017 drought brought extreme drought conditions in the south and dry or no drought conditions in the north. The 2020-2021 drought was less significant than the 2016 drought in southern NH but more significant in northern NH. During the summers of 2022 and 2024, additional droughts impacted NH. Once again, these droughts were more significant in the southern part of the State. As of March 20, 2025, the southern half of New Hampshire is in "moderate drought", while the northern half is "moderately dry" (see chart below).[22]

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.



[21] https://www.des.nh.gov/climate-and-sustainability/
[22] https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH

9) DAM FAILURE

Hazard Identification & Risk Assessment (HIRA) ..... Low
Probability ..... Low
Estimated Structure Loss Value ..... $0 to $1,984,475

Two active dams are listed by the Department of Environmental Services (DES) in Alexandria. The Bailey Brook Dam and the Koury Farm Pond Dam are classified as "Non-menace". There are five additional inactive dams, including one exempt and four dams classified as ruins. There are no "High Hazard" dams in Alexandria.

Out-of-town dams, particularly the Newfound Dam, are more concerning than in-town dams. The impact could include minor road closures and flooding on NH Route 104. Beaver dams are also impactful; these are monitored closely by town officials and private residences.

Although road damage could occur with the failure of the out-of-town dams, overall, the risk related to dam failure would primarily be for minor road washouts, and the impact would be localized. Therefore, the estimated structure loss value, including road damage, was determined to be 0-1% of the total structure value.

10) EXTREME TEMPERATURES

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

Extreme Cold & Heat

Winter temperatures in Alexandria 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 senior population in Alexandria is 24.0%, and the estimated poverty rate is 8.8% of the total population[23]. No deaths or illnesses due to cold or heat have been reported in Alexandria since the prior hazard mitigation plan, although these are possible impacts that could be experienced.

[23] American Community Survey, 2023 ACS 5-Year Estimate

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 Offices as "cooling or warming centers (Action Item #15).

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.

11) SOLAR STORMS & SPACE WEATHER

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

"*Space weather describes the "dynamic conditions in the Earth's outer space environment, in the same way that "weather" and" climate" refer to conditions in Earth's lower atmosphere. Space weather includes any and all conditions and events on the sun, in the solar wind, in near-Earth space, and in our upper atmosphere that can affect space-borne and ground-based technological systems and through these, human life and endeavor. Heliophysics is the science of space weather."*[24]

Solar storms and space weather are direct products of activity on the surface, or corona, of the Sun. As the Sun continuously changes, its wind blows charged particles in every direction, including the direction of Earth. 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.

These particles can also produce their own magnetic field, disrupting navigation and communication systems and GPS satellites and potentially producing Geomagnetic Induced Currents (GICs), affecting the power grid and pipelines. An electromagnetic surge from a solar storm has the potential to produce an Electromagnetic Pulse (EMP). An EMP could cause significant damage to critical infrastructures such as nuclear power plants, banking systems, the electrical grid, sewage treatment facilities, cell phones, landlines, and even vehicles.

The Team felt that recognizing Solar Storms and Space Weather was necessary for this hazard mitigation plan. However, they also understand that the Town cannot truly mitigate this hazard; continued education and monitoring of such events is the most they can do. Alexandria had no impact from the well-publicized solar storm in May 2024.

[24]NASA, https://science.nasa.gov/science-research/heliophysics/space-weather/solar-flares/what-is-a-solar-flare#q2

12) EARTHQUAKE

Hazard Identification & Risk Assessment (HIRA) ..... Low
Probability ..... Very Low
Estimated Structure Loss Value ..... $1,984,475 to $9,922,375

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 Hollis Center, ME, earthquake in October 2012. The Team noted that the Hollis earthquake was felt in Alexandria, but no damage occurred. A more recent earthquake, with a magnitude of 3.8, occurred in Portsmouth in January 2025. The Portsmouth quake was felt in Alexandria, but no damage occurred. Many small earthquakes frequently occur in New Hampshire (see Table 3.2), but generally, there is no impact.[25]

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.

13) TROPICAL/POST TROPICAL CYCLONES

Hazard Identification & Risk Assessment (HIRA) ..... Low
Probability ..... Moderate
Estimated Structure Loss Value ..... $1,198,475 to $9,922,375

Damaging winds due to tropical and post-tropical cyclones (hurricanes) are considered a medium risk, primarily because of Alexandria's abundance of forested land. Significant forest damage could occur, like during the 1938 hurricane. Although tropical and post-tropical cyclones could fit into several categories (wind and flooding), the Team considered tropical and post-tropical cyclones separate events. Tropical and post-tropical cyclones are rare in New Hampshire but should be considered potential hazards. In most cases, tropical cyclones have been downgraded to post-tropical cyclones when they reach northern New Hampshire.

Tropical Storm Irene in 2011, the remnants of Hurricane Irene, brought heavy rain, fallen trees, scattered power losses, and wind to Alexandria, but did not create significant structural damage in the Community. Tropical Storm Sandy had little impact in Alexandria, except for heavy rain. Since the prior hazard mitigation plan, no tropical or post-tropical cyclones have reached Alexandria.

The probability that a tropical and post-tropical cyclone would remain a Category 1 or higher in this part of the State is low; however, flooding rains can cause significant damage to roadways and a considerable cost. 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.

[25] 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 Alexandria. The estimated structure loss was not determined for these hazards.

1) LONG-TERM UTILITY OUTAGE

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

Although rare, long-term utility outages of five or more days have occurred in Alexandria 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, disabled people, or people experiencing poverty. 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 virtually 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 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.

2) AGING INFRASTRUCTURE

Hazard Identification & Risk Assessment (HIRA) ..... Medium
Probability ..... 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."[26]

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.[27] The American Society of Civil Engineers gave NH an overall C- in its 2017 report card.[28]

Aging infrastructure is a concern in Alexandria, as it is throughout New Hampshire and the United States. In Alexandria, older roads and aging culverts are part of the Town's aging infrastructure. In addition, a new transfer station is being built, and the old Town Hall is being restored. The Municipal Building, which houses the Town Offices and the Police Station, is in good shape. However, the Highway Garage is in rough shape, and the Fire Station will need a rebuild as the space required and the size of any new apparatus will dictate the need for improvements.

[26] https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-NH-Report-Card-hq-with-cover.pdf
[27] https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2023/11/2023-NH-STATE-HAZARD-MITIGATION-PLAN-APPENDICES-2.pdf, page 87
[28] Ibid

3) CYBER EVENTS

Hazard Identification & Risk Assessment (HIRA) ..... Medium
Probability ..... High

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."*[29]

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 did not report any cyberattacks, but the threat is real. The Town stores essential documents on a server at the Town Offices; the information is also stored in the "cloud". Security on computer networks, off-site backup, and user education are vital to protecting sensitive town information and data.

4) HAZARDOUS MATERIALS

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

Hazardous material in fixed locations is a concern in many New Hampshire communities, and Alexandria. 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.

Alexandria has only two Tier II properties, which are noted as susceptible to damage from a fixed hazardous material event; these include a propane bulk plant on NH Route 104 and Carroll Concrete. Otherwise, the concern is at auto repair shops, of which there are at least two in the Community. Alexandria is relatively safe from a hazardous materials incident, with just two Tier II properties. 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. Losses could also be relatively high in property and structural damage in a hazardous materials incident, depending on the scope and location of the incident. However, the losses are expected to be localized and unlikely in densely populated areas.

[29] PPD-41; https://obamawhitehouse.archives.gov/the-press-office/2016/07/26/presidential-policy-directive-united-states-cyber-incident

5) MASS CASUALTY INCIDENTS

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

A Mass Casualty Incident (MCI) is defined as *"any number of casualties that exceed the resources normally available from local resources"*[30]. 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.

An MCI could happen anywhere in Alexandria, but is more likely on NH Routes 104 and 3A. These roads are moderately traveled year-round but 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 outside of Alexandria for all K-12 classes, the potential for an MCI is increased. Fortunately, there have been no reported MCIs since the last hazard mitigation plan.

6) TRANSPORT ACCIDENTS

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

The possibility of vehicular accidents involving hazardous materials is identified as potentially significant in Alexandria. The Town's major road, NH Route 104, is known to be used by vehicles carrying hazardous materials, traveling from the Upper Valley region in the north to Interstate 93 north of Concord. NH Route 104 traverses the southern end of the Alexandria area, traveling through terrain with little or no population and, at other times, through more densely populated areas.

Most of Alexandria's roads are narrow and winding and subject to severe winter weather; they become treacherous when affected by flooding, winter snow conditions, and ice. Vehicular accidents, wildlife collisions, and truck accidents involving hazardous materials are always possible in these conditions. A major ice storm or another significant event can make egress and access difficult for individuals and first responders. All roadways in Alexandria are susceptible to hazards such as road flooding and high winds, leading to downed trees in the roadways and potentially hazardous materials spills.

7) TERRORISM & VIOLENCE

Hazard Identification & Risk Assessment (HIRA) ..... Very Low
Probability ..... Very 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.*[31]

Alexandria has a few soft targets - the Town Offices, the Alexandria Village School, and the AMC Cardigan Mountain Lodge. Other soft targets, such as small businesses and lodging facilities, could also be targeted. Highways could

[30] DeValle Institute Learning Center; https://delvalle.bphc.org/mod/wiki/view.php?pageid=89
[31] Homeland Security Soft Targets and Crowed Places, https://www.cisa.gov/sites/default/files/publications/DHS-Soft-Target-Crowded-Place-Security-Plan-Overview-052018-508_0.pdf

also be targets; any closure of NH Route 104 in Alexandria could cause statewide disruptions in the transportation system. Disruption of this significant route could affect Alexandria's businesses 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 have been no significant terrorist or violent incidents since the prior hazard mitigation plan.

8) CONFLAGRATION

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

A conflagration is an uncontrolled burning that threatens human life, health, property, or ecology. A conflagration can be accidentally or intentionally created. The main difference between a wildfire and a conflagration is the density of the human interface at the site of the fire.

In Alexandria, the risk of a sizeable uncontrolled fire threatens the entire Town because of its proximity to forested land and the developments and neighborhoods created in the Wildland Urban Interface (WUI). Areas like Wellington Village West and the Ledges are built within the WUI and surrounded by forested lands.

When combined with high winds, a sizeable uncontrolled fire could spread from building to building across the Community. Fire could easily begin as a wildfire and quickly escalate to a conflagration. Alternatively, a conflagration could ignite a major wildfire. The amount of damage from any fire depends on many factors; the location of the fire and emergency accessibility are just two of those factors.

9) KNOWN & EMERGING CONTAMINANTS

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

Known contaminants in drinking water occur naturally or when introduced by humans. Damage to the environment, the local flora and fauna, a reduction in land values, restrictions on public water sources, and an increase in short and long-term health issues are just some of the impacts of contaminants. There may also be a need for more robust water treatment equipment. However, emerging contaminants have not been historically monitored due to either a lack of laboratory capabilities or an understanding of the risk posed to human health.

Naturally occurring contaminants could include trace elements such as arsenic, lead, manganese, and uranium. The most concerning of these for private well water is arsenic; arsenic is naturally occurring and common in groundwater.

Hazardous material spills and other accidental introductions of chemicals into the ground and surface water can affect the safety of public and private water supplies. Human-made contaminants generally include pesticides and metals impacting groundwater or surface water. Emerging contaminants, such as poly or perfluoroalkyl substances (PFAs), have also been found in ground and surface water in New Hampshire; additional emerging contaminants, such as Methyl Tertiary Butyl Ether (MtBE), have also been found. Increased public awareness and testing of PFAs and MtBEs help counteract emerging contaminants.

Alexandria's residents have private well water; thus, radon and arsenic contamination in the aquifer may be a concern. Town officials should encourage testing by individual homeowners for known and emerging contaminants.

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 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
Subdivision Regulations (2019)	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.	Planning Board	Good	**Improvements Needed:** Alexandria's regulations address setbacks, road frontage, and the size of the lot. Regulations also address driveways, structures, roads, erosion, sediment control, and maintaining adequate stormwater flow. This strategy was deferred to review the Town's Subdivision Regulations and to discuss changes that may mitigate the occurrence of and damage from the natural hazards identified in this Plan. **Action Item #35**
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	Good	**Improvements Needed:** As trees become damaged and threaten structures and town roads, the Highway Department removes them per state RSAs. The NH DOT, Eversource, and NH Electric Coop do this for state roads as needed. Due to Ash Borer disease, fallen ash trees are a significant problem in Alexandria and the region. 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 #7**

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
Dry Hydrants & other Water Resources	Alexandria Fire Department maintains the Town's dry hydrants and water resources. The Community has several dry hydrants and multiple locations for water drafting.	Fire Department	Inadequate (Need more water resources)	**Improvements Needed:** Dry hydrants and drafting sites throughout Alexandria provide water resources for firefighting. This strategy was deferred to maintain the dry hydrants and other water resources to help mitigate the effects of structure fires and wildfires, and continue seeking new water resources to help combat wildfires in difficult-to-reach locations. **Action Item #5**
Life Safety & Fire Codes	Guides all buildings for life safety and fire codes	Fire Department	Good	**Improvements Needed:** The National Fire Protection Association (NFPA) and the NH Safety and Fire Codes guide the Alexandria Fire Department to inspect all commercial, public assembly, and rental properties (3 units or more). The Alexandria Fire Department does its best to provide timely inspections based on limited staffing. This strategy is deferred to consider additional staffing. **Action Item #33**
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	**Improvements Needed:** All three emergency departments in Alexandria (Police/Fire/Highway Departments) have radio interoperability. Communications systems and radios are updated with state and federal requirements and work as intended. However, some areas of the Town have "dead spots". This strategy is deferred to look for solutions for the dead spots by locating repeaters on multiple towers, in particular, to help alleviate the problem for the highway department. **Action Item #26**
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:** Alexandria is about 70% compliant with E-911 signage. The Town has purchased signs for residents to install, and the program is working to improve the 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 an Emergency Management webpage, a mailer, or social media to promote better compliance and develop other means of increasing compliance. **Action Item #6**
Bridge Maintenance Program	Although six red-listed bridges are in the Community, two have been repaired or replaced since the State's inspection. Bridges are inspected and cleaned annually, and the State inspects all state bridges every other year and maintains them regularly.	Highway Department	Good	**Improvements Needed:** The Alexandria Highway Department has established a short and long-term bridge maintenance and replacement schedule. There are six red-listed bridges; however, two have been repaired or replaced since the State inspection. The remaining red-listed bridges are Shem Valley Road over Clark Brook (large culvert), Cole Hill Road over Fowler River, Mt. Cardigan Road over Town Line Brook, and Washburn Road over Patten Brook. This strategy is deferred to repair the remaining red-listed bridges. **Action Items #25, #34, #18, and #24.**

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
Building Code	The Town has not adopted the International Building Codes (IBC) or the International Residential Codes (IRC). However, it 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	Inadequate	**Improvements Needed:** The Town of Alexandria does not have a Building Inspector or Code Enforcement Officer, nor does it require building permits (inventories only; permits have been struck down by voting). The 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 burden of inspecting, if not done by the Alexandria Fire Department, falls upon the State Fire Marshal as needed. This strategy is deferred to revisit the building process, address the need for building permits and a Building or Code Enforcement Officer, and establish Town building codes that adequately address climate change and the increased vulnerability to hazards. **Action Item #28**
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 their location, size, etc. The Alexandria 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	Good	**Improvements Needed:** The Alexandria Highway Department does an excellent job cleaning and repairing ditches and culverts, and has established an inventory of culverts in the Community. However, a written Culvert & Stormwater Maintenance Plan has not been developed to ensure continuity of actions and efficient stormwater management. This strategy was deferred for continued maintenance of ditches and culverts 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) with each culvert in the Town. **Action Item #4 (also in Table 7.1)**
Emergency Operation Plan (2016)	An emergency operations plan identifies the response procedures and capabilities of the Town in the event of a disaster.	Emergency Management Director	Good	**Improvements Needed:** The Alexandra Emergency Operations Plan (EOP) was last updated in 2016 and is overdue for an update based on the State's 5-year recommendation. The new EOP should 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 #19**
Emergency Training	Fire, Police, and EMS personnel training for all fire, law enforcement, and EMS situations.	Fire Chief, Police Chief & Emergency Management Director	Excellent	**Improvements Needed:** Training of all fire responders includes many aspects of emergency response, including EMS, confined space, wildfire, and HazMat training. Fire & EMS training is done locally or through Lakes Region Fire Mutual Aid, the State of New Hampshire Fire & EMS Training Facilities, or the Fire Academy. Police training includes many aspects of law enforcement response, including active shooters and terrorism. Police training is done locally or through the NH Police Academy and federally funded training. Although training is preparedness, not mitigation, emergency responder training was deferred to continue for the life of the Plan. **Action Item #9**

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
Genasys	Genasys is a reverse calling system that uses residents' landline phone numbers. Genasys does not include cell and unlisted numbers or email addresses. The Newfound Area School District uses "Infinite Campus", a reverse calling system for school activities and emergency notification.	Emergency Management Director	Good	**Improvements Needed:** 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 in the past. This strategy was deferred to provide public outreach to encourage all residents to contact Genasys to add cell numbers, emails, and unlisted numbers and verify their information. Use the Town's website, a possible brochure at the Town Office, social media platforms, or a sign-up at a Town Meeting. **Action Item #12**
Emergency Generators	The Town has emergency backup power at many of its Town's Critical Infrastructure & Key Resources (CIKR), including the Town Offices (EOC) and Town Hall (shelter). However, the Town would benefit from a permanent generator for the Fire Station.	Emergency Management Director	Excellent	**Improvements Needed:** Although Alexandria has emergency backup power at many of the Town's CIKR, the Town could benefit from a permanent generator for the Fire Station. This strategy was deferred to obtain and install an emergency generator for the Fire Station to improve the effectiveness of this facility during a disaster. **Action Item #22**
Alexandria Hazard Mitigation Plan (2018)	A hazard mitigation plan is designed to address natural and other 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	Good	**Improvements Needed:** The Alexandria Hazard Mitigation Plan (2018) is being updated to this Plan. This strategy was deferred to review this Plan, the Alexandria, NH Hazard Mitigation Plan Update 2025, annually, and to update the Plan again in 2030. **Action Item #20**
Master Plan (2014)	A Master Plan includes goals, objectives, and expectations for the future development of the Town.	Planning Board	Good	**Improvements Needed:** The Alexandria Master Plan was last updated in 2014, but is currently being completely rewritten. This strategy was deferred to update the Master Plan and consider including a natural hazards section, a discussion on climate change, and action items from this Plan in the update. **Action Item #27**
National Flood Insurance Program (NFIP) & Floodplain Ordinance (2023)	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 located in the 100-year floodplain, as identified on the FEMA Flood Maps, which in Alexandria are dated February 8, 2024.	Planning Board & Select Board	Good	**Improvements Needed:** The Town developed a flood ordinance and became a National Flood Insurance Program (NFIP) member on July 16, 2007. The Town's Flood Ordinance works well to successfully prohibit or force compliance with the ordinance for building and substantial improvements to structures within the FEMA flood zone. The Flood Ordinance was last amended in 2023. This strategy was deferred to this Plan to continue compliance with the NFIP, obtain NFIP brochures to have available at the Town Offices, 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 #13**

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:** NIMS and ICS training have been done by most first responders. 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 #10**
Public Education & Awareness	Alexandria is very well situated to provide public information and outreach to its citizens.	Emergency Management Director & Other Departments	Good (social media platforms) Inadequate (webpage)	**Improvements Needed:** The Town has 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 that property owners can use to reduce or eliminate the impact of natural hazards. This strategy was deferred to this Plan to develop and provide 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 #11**
Mutual Aid Agreements (Fire, Police, Highway & EMS)	Mutual Aid agreements provide communications capabilities and cooperative assistance between area cities and towns; mutual aid provides access to resources appropriate to the scope of the emergency.	Police Department, Fire Department & Highway Department & EMS	Excellent	**No Improvements Needed:** The Alexandria Fire Department has a mutual aid agreement with the Lakes Region Fire Mutual Aid. The Alexandria Police Department has mutual aid agreements with surrounding towns, the NH State Police (Troop F), the Grafton County Sheriff's Office, and Fish & Game. The Highway Department is a NH Public Works Mutual Aid Association member. The Alexandria Fire Department performs EMS services, and the Bristol Fire Department performs medical transportation. All mutual aid systems in Alexandria work well.
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 Alexandria Health Officer attends public health meetings whenever possible.
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 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.

Current Program or Activity	Description	Managing Department	How Effective	Improvements Needed
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 Alexandria follows and exceeds 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	Excellent	**No Improvements Needed:** Facebook pages are maintained by the Town Offices, the Fire Department, the Police Department, and Animal Control. These social media accounts work very well to keep the citizens of Alexandria informed about things happening in their town.
NH Forest & 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	Good	**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	NH Forests & Lands (DNCR) has a burning index that measures the wildfire risk and how likely fires are to start on a given day. It also evaluates the potential damage wildfires can create, the number of people needed to fight them, and the type of equipment that might be needed.	NH Forests & Lands (DNCR) & Fire Department	Good	**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.
Expendable Trust Funds & 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	Good	**No Improvements Needed:** The Town's Expendable Trust Funds and 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 Alexandria Funds programs work well and are part of the Town Warrant at the annual Town Meeting.

Chapter 7: Last Mitigation Plan

A. DATE OF LAST PLAN

Based on the Disaster Mitigation Act (DMA) of 2000, Alexandria has developed hazard mitigation plans in the past. The most recent update was formally approved in 2018. The Alexandria Hazard Mitigation Plan Update 2025 updates the 2018 plan.

Below are the action items that were identified in the 2018 plan. The Team identified the current status of each strategy based on three sets of questions:

COMPLETED

- Has the strategy been completed?
- If so, what was done?

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.

DELETED

- Should the strategy be deleted?
- Is the strategy mitigation or preparedness?
- Is the strategy useful to the Town under the current circumstances?

DEFERRED

- 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?

In *Table 7.1: Accomplishments since the Last Plan*, the Team assessed what had been accomplished and determined what additional work may be needed. The column in red font is extracted word-for-word from the 2018 Hazard Mitigation Plan. Additional columns not shown here can be found in the 2018 Hazard Mitigation Plan.

TABLE 7.1: ACCOMPLISHMENTS SINCE THE LAST PLAN

Proposed Mitigation Action	Completed, Deleted, or Deferred
Continue to inventory all culverts and bridges to add to a standardized database with GPS locations, size, age, condition, maintenance, and other pertinent information.	**Completed & Deferred:** The Alexandria Highway Department does an excellent job cleaning and repairing ditches and culverts, and has established an inventory of culverts in the Community. However, a written Culvert & Stormwater Maintenance Plan has not been developed to ensure continuity of actions and efficient stormwater management. This strategy was deferred for continued maintenance of ditches and culverts 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) with each culvert in the Town. **Action Item #4 (also in Table 6.1)**
Revise subdivision regulations to include fire suppression measures.	**Deferred:** The strategy from the prior plan to revise the subdivision regulations to include fire suppression measures has not been completed. This strategy was deferred to review and revise the subdivision regulations to require adequate water resources for fire protection for all newly approved subdivisions. **Action Item #35**

Proposed Mitigation Action	Completed, Deleted, or Deferred
Revise subdivision regulations to limit development on steep slopes.	**Deferred:** The strategy from the prior plan to revise the subdivision regulations to limit development on steep slopes has not been completed. This strategy was deferred to review and revise the subdivision regulations to include language limiting building roads and structures on steep slopes based on the agreed-upon criteria of the Town. **Action Item #36**
Welton Fall Road: Raise roadbed 3'-4' for 1,400' to reduce flooding and washouts.	**Deferred:** The strategy from the prior plan to raise the roadbed on Welton Fall Road was not completed. This strategy was deferred to raise the roadbed three to four feet for a length of road measuring 1,400' to improve stormwater flow and decrease washouts. **Action Item #32**
Work with the New Hampshire Department of Environmental Services (NHDES) toward the development of a stream maintenance program.	**Deferred:** The strategy from the prior plan to work with the Department of Environmental Services (DES) to develop a stream maintenance program was not completed. This strategy was deferred to lobby the State to bring their attention to areas of the Community where a stream maintenance program would be helpful. **Action Item #37**
Fowler River Road: 0.5 miles north of Cole Hill Road: Construct a retaining wall of concrete and rip rap to prevent undercutting of the road by the Fowler River.	**Deferred:** The strategy from the prior plan to construct a retaining wall and rip rap north of Cole Hill Road was not completed. This strategy was deferred to construct a concrete retaining wall to protect Fowler River Road's surface. **Action Item #29**
Apply for a grant for the installation of addition firefighting water sources at key sites in the community.	**Completed & Deferred:** The Alexandria Fire Department has developed a program with the New Hampshire Rural Fire Protection Initiative (NH RFPI) to install one new hydrant yearly to help protect the Community from wildfires. This strategy was deferred to continue the program and seek additional areas that would benefit from installing new dry hydrants. **Action Item #2**
Monitor beaver activity	**Completed & Deferred:** Beavers continue to cause issues in Alexandria, particularly on Bogg and Town Pound Roads. This strategy was deferred to continue to monitor beaver activities and take the necessary steps to protect the Town's roads. **Action Item #3**
Continually update the paper map of all flood events that have caused roadway damage.	**Deleted:** The strategy from the prior plan to update paper maps of all flood events that have caused roadway damage was not completed. The Team felt that this is not something the Town can achieve until or if a GIS system is developed; therefore, it was deleted.
Continually update the inventory for active and inactive man-made dams in Alexandria.	**Deleted:** Table 4.1 in this Plan provides an inventory of active and inactive dams in the Community. Alexandria has only two notable non-menace dams and no low, significant, or high-hazard dams. The strategy from the prior plan was deleted, as it was deemed unnecessary.
Fowler River Road at Akerman bridge: Raise the roadbed 5' for 500', install dry culverts, and repave to reduce washouts.	**Completed & Deleted:** The strategy from the prior plan to repair the Fowler River Road at Akerman Bridge was completed and, therefore, deleted. Akerman Bridge has been replaced, and a single dry culvert has been installed.
Bridge on Knowles Hill Road: Clean abutments and streambed to improve drainage and replace bridge deck and structure, and re-align road for safer approaches.	**Completed & Deleted:** The strategy from the prior plan to repair the bridge on Knowles Hill Road was completed and, therefore, deleted. The abutments were cleaned, the streambed was improved, and the bridge deck was replaced and realigned for safer vehicular approaches.
Karl Gordon Road: Raise roadbed for 0.75 miles, replace and enlarge culverts, and repave.	**Completed & Deleted:** The strategy from the prior plan to raise Karl Gordon Road, enlarge culverts, and repave has been completed and was, therefore, deleted.

Proposed Mitigation Action	Completed, Deleted, or Deferred
Purchase mobile emergency evacuation route signs and barricades to direct community member out of town in the event of an emergency.	**Deleted:** The strategy for purchasing emergency evacuation route signs and barricades from the prior plan was deleted as the Team felt alternative communications systems (such as Genesys) provide adequate notice to residents. This strategy was also deleted as it is preparedness, not mitigation.
Set up weather alerts and instructions to residents for broadcast on local radio and TV stations.	**Deleted:** The strategy from the prior plan to set up weather alerts and instructions on local radio and TV stations was deleted as the Team felt that communications systems (such as Genesys and Facebook pages) provide residents adequate notice of pending emergencies. This strategy was also deleted as it is preparedness, not mitigation.
NHDOT outreach to assess options to address Brooke Road - clay bank erosion.	**Deleted:** The strategy from the prior plan to address erosion issues on the clay bank of Brooke Road was deleted as the Team felt there was no existing issue at this location.
Electric company outreach to establish a power map for the town.	**Deleted:** The strategy from the prior plan to contact the electric company and request that they establish a power map for the Town was deleted as the Team felt there was no need for it.
Citizens Academy - Public Safety Awareness Group	**Completed & Deleted:** The Town has established a list of volunteers with special skills and/or equipment who can be contacted during an emergency. This strategy was completed and is preparedness, not mitigation; therefore, it was deleted.

Photos: Road Damage, June 2023
Photo Credit: The Town of Alexandria

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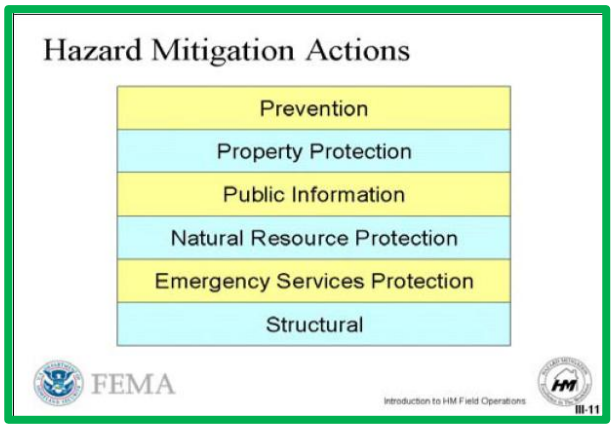
Chapter 8: New Mitigation Strategies & STAPLEE

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 upsize 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 Alexandria, emphasizing new and existing buildings and infrastructure.

Strategies that may apply to more than one hazard	**Type of Project**
Community Outreach and Education	*Public Awareness*
Changes to Zoning Regulations	*Prevention*
Changes to Subdivision Regulations	*Prevention*
Steep Slopes Ordinance	*Prevention*
Density Controls	*Prevention*
Driveway Standards	*Prevention*
Emergency Website Creation	*Public Awareness*
Critical Infrastructure & Key Resources	*Emergency Service Protection*
Emergency Training for Town Officials	*Emergency Service Protection*
High-risk Notification to Homeowners	*Property Protection*
Master Plan Update or Development	*Prevention*
Capital Improvement Plan	*Prevention*

Flood Mitigation Ideas	**Type of Project**
Stormwater Management Ordinances	*Prevention*
Floodplain Ordinances	*Prevention*
Updated Floodplain Mapping	*Prevention*
Watershed Management	*Natural Resource Protection*
Drainage Easements	*Prevention*
Purchase of Easements	*Prevention*
Wetland Protection	*Natural Resource Protection*
Structural Flood Control Measures	*Prevention*
Bridge Replacement	*Structural Project*
Dam Removal	*Structural Project*
NFIP Compliance	*Prevention*
Acquisition, Demolition & Relocation	*Structural Project*
Structure Elevation	*Structural Project*
Floodproofing	*Property Protection*
Erosion Control	*Natural Resource Protection*
Floodplain/Coastal Zone Management	*Prevention*
Building Codes Adoption or Amendments	*Prevention*
Culvert & Hydrant Maintenance	*Prevention*
Culvert & Drainage Improvements	*Structural Protection*
Transfer of Development Rights	*Property Protection*

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 managing and tracking potential emergency planning action items. For instance, the Team knew some action items were more appropriately identified as preparedness or readiness issues. As no other established planning mechanism recognizes 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 1,800 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 Alexandria 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 Alexandria 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
Action Item #1: As the budget and priorities are established, replace other aging or overwhelmed culverts, likely by upgrading them to larger culverts, to allow for sufficient drainage and to prevent road washouts and damage. **(F13)** **(Team input)**	**Affected Location** -Areas that flood/aging culverts **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #2: Inspect the functionality of all hydrants and maintain and repair all hydrants and other water resources in Alexandria. **(WF8)** **(Table 6.1)**	**Affected Location** -Dry Hydrants & Drafting Sites **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #3: Continue to monitor beaver activities on private and public property that may create problems in the Community. Take the necessary steps to protect the Town's roads. **(MU13)** **(Table 7.1)**	**Affected Location** -Bog & Town Pond Rds **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	3	2	3	3	3	20
		Political: *Some folks do not agree with beaver removal; relocation is preferred, but not always possible*							

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
Action Item #4: Maintain 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, Global Positioning Satellite (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)**	**Affected Location** -Culverts & Ditches **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	2	3	3	3	3	20
		Administrative: *Staff time may be limited*							
Action Item #5: Continue the program with NH RFPI to install a new hydrant yearly and seek additional areas that would benefit from installing new dry hydrants. 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, MU12 & MU13) (Table 7.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	3	3	3	3	2	20
		Environmental: *DES and other approvals may be needed*							
Action Item #6: Consider ways to get E911 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 provides signs for residents to install themselves to promote compliance better, and has recently sent a notice to residents about this issue. **(MU14) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Public Education & Awareness -Emergency Service Protection -Property Protection	3	3	3	2	3	3	3	20
		Political: *People may not want to participate and would rather use their own signs where they want*							
Action Item #7: 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, following regulations in the State's RSAs. Create defensible space around power lines, oil and gas lines, and other infrastructure. Work to reduce the effects of invasive species such as Ash Borer Disease, 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)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	2	2	2	2	3	17
		Administrative: *Limited staff time* ***Political:*** *People resist tree removal* ***Legal:*** *Must only trim in the right-of-way* ***Economical:*** *Budget constraints* ***Environmental:*** *Environmentalists may object in some locations*							
Action Item #8: Lobby the State to mitigate the danger of falling rocks along the sides of West Shore Road to prevent future occurrences. **(ER5) (Team Input)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection -Property Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #9: The Fire Chief, Police Chief, and the EMD are to provide ongoing training for all emergency responders. Training will include the many aspects of emergency response, including EMS, wildfire suppression, confined spaces, HazMat, active shooter, and terrorism. Training is done locally, through the Lakes Region Fire Mutual Aid, the State of New Hampshire at the NH Fire and Police Academies, or through federally funded programs. **(Emergency Preparedness) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #10: 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). Additionally, the EMD should encourage key personnel to learn about and become adept at WEB-EOC. **(Emergency Preparedness) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
Action Item #11: Provide robust information on the Emergency Management 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)** **(Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Public Education & Awareness -Property Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #12: Provide public outreach to encourage all residents to contact Genasys (formerly CodeRED) 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)** **(Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Public Education & Awareness -Emergency Service Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #13: Advise the public about the local flood hazard, flood insurance, and flood protection measures by obtaining and keeping a supply of NFIP brochures available in the Town Offices. 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)** **(Table 6.1)**	**Affected Location** -Areas prone to flooding **Type of Activity** -Prevention -Public Education & Awareness -Property Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #14: 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)** **(Other Plans)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Public Education & Awareness -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #15: Provide public outreach to the citizens of Alexandria regarding the availability of the Town Hall as a warming center and the Town Office as a cooling center during extended high temperatures and severe winter weather. **(ET3 & WW6)** **(Other Plans)**	**Affected Location** -Town Hall & Town Offices **Type of Activity** -Prevention -Public Education & Awareness	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #16: To promote private mitigation efforts, provide public outreach to the citizens of Alexandria on the importance of maintaining private roads and culverts to allow for safe access for fire apparatus into wildland-urban interface neighborhoods and properties. This education will help ensure accessibility for emergency response, decrease the wildfire risk, and diminish the chance of inland flooding on Alexandria's roads. **(MU16)** **(Other Plans)**	**Affected Location** -Private Roads **Type of Activity** -Prevention -Public Education & Awareness -Emergency Service Protection -Property Protection -Natural Resource Protection	3	3	3	2	3	3	3	20
		Political: *Some residents may resist the town's advice*							

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
Action Item #17: Replace the existing 4'x50' culvert with a 6'x6'x60' concrete box culvert to improve stormwater runoff and flood damage caused by heavy rainstorms. **(F13) (Team input)**	Affected Location -Thisselll Road Type of Activity -Prevention -Emergency Service Protection -Structural Project	2	3	3	3	3	2	2	18
		Social: *Traffic inconveniences* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other approvals will be needed*							
Action Item #18: Replace the state-red-listed Mount Cardigan Bridge over Town Line Brook 126/119) as soon as funding becomes available. **(MU13) (Table 6.1)**	**Affected Location** -Mt. Cardigan Rd Bridge **Type of Activity** -Structural Project	1	3	2	1	3	1	2	13
		Social: *The will be traffic inconveniences* ***Administrative:*** *Outside assistance will be required* ***Political:*** *Some people may not see the need to spend taxpayer funding on this project* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other permits will be required*							
Action Item #19: Update the Alexandria 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 will include an EOC Call Alert List, a detailed Resource Inventory List, and Player Packets. **(Emergency Preparedness) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #20: Complete annual reviews of the Alexandria Hazard Mitigation Plan Update 2025, 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) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #21: 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)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Property Protection -Natural Resource Protection	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
Action Item #22: Obtain funding and install an emergency generator for the Fire Station to improve the effectiveness of this facility during a disaster. Steps have been taken to secure a grant. **(MU13) (Table 6.1)**	**Affected Location** -Fire Station **Type of Activity** -Prevention -Emergency Service Protection	3	3	3	3	3	2	3	20
		Economical: *Budget constraints*							
Action Item #23: Revisit the building process, address the need for building permits and a Building or Code Enforcement Officer, and establish building codes that are reflective of the state-adopted codes, the NFPA, the views of the public, climate change, and the Town's vulnerability to hazards. **(MU14) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection -Property Protection	3	3	2	1	3	3	3	18
		Administrative: *Staff time may be limited* ***Political:*** *The addition of any new regulation is frowned upon by some citizens*							

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
		1	3	2	1	3	1	2	13
Action Item #24: Repair the concrete abutment of the Washburn Road Bridge over Patten Brook (160/109) as soon as funding becomes available. **(MU13)** **(Table 6.1)**	**Affected Location** -Washburn Road Bridge **Type of Activity** -Structural Project	***Social:*** *The will be traffic inconveniences* ***Administrative:*** *Outside assistance will be required* ***Political:*** *Some people may not see the need to spend taxpayer funding on this project* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other permits will be required*							
		1	3	2	3	3	1	1	14
Action Item #25: Replace the Shem Valley Road Bridge (074/112) (large culvert) as soon as funding becomes available. **(MU13)** **Table 6.1)**	**Affected Location** -Shem Valley Bridge **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection -Structural Project	***Social:*** *There will be traffic inconveniences* ***Administrative:*** *Outside assistance will be needed* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other permits may be needed*							
		3	3	3	3	3	2	3	20
Action Item #26: Look for solutions for the dead spots by locating repeaters on multiple towers, in particular, to help alleviate the problem for the highway department. **(MU13)** **(Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection	***Economical:*** *Budget constraints*							
		3	3	3	3	3	3	3	21
Action Item #27: Review this Plan, the Alexandria Hazard Mitigation Plan Update 2025, whenever working on the Master Plan. Consider incorporating a discussion on climate change, natural hazards, and mitigation action items from this Plan. **(MU6)** **(Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention	*No apparent difficulty with this action item*							
		3	3	1	1	3	3	3	17
Action Item #28: Review and revise the subdivision regulations to require adequate water resources for fire protection for all newly approved subdivisions. **(WF2)** **(Table 7.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	***Administrative:*** *Staff time may be limited* ***Political:*** *Some people may not agree with changes in the regulations that were to be recommended*							
		3	3	2	2	3	1	2	16
Action Item #29: Construct a concrete retaining wall to protect the Fowler River Road's surface. **(F17)** **(Table 7.1)**	**Affected Location** -Fowler River Road **Type of Activity** -Prevention -Emergency Service Protection -Structural Project	***Administrative:*** *Staff time may be limited* ***Political:*** *People may not see the need for this action item* ***Economical:*** *Budget constraints* ***Environmental:*** *DES & other approvals may be needed*							
		2	3	3	3	2	2	1	16
Action Item #30: Replace the existing 2'x24' culvert with a 6'x6'x35' concrete box culvert to improve stormwater runoff and flood damage caused by heavy rainstorms. **(F13)** **(Team input)**	**Affected Location** -Gove Road **Type of Activity** -Prevention -Emergency Service Protection -Structural Project	***Social:*** *Traffic inconveniences* ***Legal:*** *Not legal, but historic potential concerns for rebuilding the stone culvert* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other approvals will be needed*							

Proposed Mitigation Action Items	Type of Activity	S	T	A	P	L	E	E	TTL
		1	3	2	2	3	1	1	13
Action Item #31: According to engineering studies, raise the roadbed on Bog Road to improve stormwater flow and decrease washouts. **(F13) (Team input)**	**Affected Location** -Bog Road **Type of Activity** -Prevention -Emergency Service Protection -Structural Project	***Social:*** *There will be traffic inconveniences* ***Administrative:*** *Will need outside assistance* ***Political:*** *Some people may not see the need to spend the money* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other approvals will be needed*							
		2	3	3	3	3	1	1	16
Action Item #32: Raise the roadbed on Welton Falls Road three to four feet for a length of road measuring 1,400' to improve stormwater flow and decrease washouts. **(F13) (Table 7.1)**	**Affected Location** -Welton Road **Type of Activity** -Prevention -Emergency Service Protection -Structural Project	***Social:*** *There will be traffic inconveniences* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other approvals will be needed*							
		3	3	3	1	3	2	3	18
Action Item #33: Work with the Select Board to consider adding a new town position to assist with inspection services. **(Emergency Preparedness) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention	***Political:*** *Some won't see the need for a new position* ***Economical:*** *Budget constraints would come with a new hire*							
		2	3	2	1	3	1	2	14
Action Item #34: Replace the Cole Hill Road Bridge over Fowler River (136/131) when funding becomes available. **(MU13) (Table 6.1)**	**Affected Location** -Coal Hill Road Bridge **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection -Structural Project	***Social:*** *The will be traffic inconveniences* ***Administrative:*** *Outside assistance will be required* ***Political:*** *Some people may not see the need to spend taxpayer funding on this project* ***Economical:*** *Budget constraints* ***Environmental:*** *DES and other permits will be required*							
		3	3	3	3	3	3	3	21
Action Item #35: Review the Town's Subdivision Regulations and discuss changes that may mitigate the occurrence of and damage from the natural hazards identified in this Plan. Consider changes that will enhance mitigation efforts across the Community. Update the regulations and integrate elements from this Plan where possible. **(WF2, F1) (Table 6.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	*No apparent difficulty with this action item*							
		3	3	1	1	3	3	3	17
Action Item #36: Review and revise the subdivision regulations to include language limiting building roads and structures on steep slopes based on the agreed-upon criteria of the Town. **(MU6) (Table 7.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Emergency Service Protection -Property Protection -Natural Resource Protection	***Administrative:*** *Staff time may be limited* ***Political:*** *Some people may not agree with changes in the regulations, should they occur*							
		3	3	3	3	3	3	3	21
Action Item #37: Lobby the State to bring their attention to areas of the Community where a stream maintenance program would be helpful. **(F2) (Table 7.1)**	**Affected Location** -Townwide **Type of Activity** -Prevention -Natural Resource Protection	*No apparent difficulty with this action item*							

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, 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 2025-2030 (0-60 months)
Short Term.....1 year 2025-2026 (0-12 months)
Medium Term.....2 years starting in 2026 – 2028 (12 – 36 months)
Long-term .....3 years starting in 2028 – 2030 (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	**Problem Statement:** Although several larger culvert projects are listed below, several smaller culverts (12" to 24") are on the Road Agent's list to be improved. **Action Item #1:** As the budget and priorities are established, replace other aging or overwhelmed culverts, likely by upgrading them to larger culverts, to allow for sufficient drainage and to prevent road washouts and damage. **(F13)** **(Team input)**	Inland Flooding	Road Agent	Local	Life of the plan	Medium Cost
A-2	**Problem Statement:** Dry hydrants and drafting sites throughout Alexandria provide water resources for firefighting. This maintenance needs to continue. **Action Item #2:** Inspect the functionality of all hydrants and maintain and repair all hydrants and other water resources in Alexandria. **(WF8)** **(Table 6.1)**	Wildfire & Structural Fires	Fire Department	Local	Life of the plan	Very Low Cost
A-3	**Problem Statement:** Beavers continue to cause issues in Alexandria, particularly on Bog and Town Pound Roads. **Action Item #3:** Continue to monitor beaver activities and take the necessary steps to protect the Town's roads. **(MU13)** **(Table 7.1)**	Inland Flooding	Road Agent	Local	Life of the plan	Very Low Cost
A-4	**Problem Statement:** The Alexandria Highway Department does an excellent job cleaning and repairing ditches and culverts, and has established an inventory of culverts in the Community. However, a written Culvert & Stormwater Maintenance Plan has not been developed to ensure continuity of actions and efficient stormwater management. **Action Item #4:** Maintain 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, Global Positioning Satellite (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)**	Inland Flooding	Road Agent	Local	Life of the plan	Low Cost
A-5	**Problem Statement:** The Alexandria Fire Department has developed a program with the New Hampshire Rural Fire Protection Initiative (NH RFPI) to install one new hydrant yearly to help protect the Community from wildfires. This program will continue. **Action Item #5:** Continue the program with NH RFPI to install a new hydrant yearly and seek additional areas that would benefit from installing new dry hydrants. 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, MU12 & MU13)** **(Table 7.1)**	Wildfire & Structural Fires	Fire Department	Local & Grants	Life of the plan	Low Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
A-6	**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 70% compliant with the proper E911 signage. **Action Item #6:** Consider ways to get E911 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 provides signs for residents to install themselves to promote compliance better, and has recently sent a notice to residents about this issue. **(MU14)** **(Table 6.1)**	All Hazards	Road Agent & Fire Department	Local	Life of the plan	Low Cost
A-7	**Problem Statement:** As trees become damaged and threaten structures and town roads, the Road Agent removes them following NH State Laws. The NH DOT, Eversource, and NH Electric Coop do this for state roads as needed. Due to Ash Borer disease, fallen ash trees are a significant problem in Alexandria and the region. **Action Item #7:** 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, following regulations in the State's RSAs. Create defensible space around power lines, oil and gas lines, and other infrastructure. Work to reduce the effects of invasive species such as Ash Borer Disease, 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)**	High Wind Events, Wildfires, Severe Winter Weather & Inland Flooding	Road Agent	Local	Life of the plan	Medium Cost
A-8	**Problem Statement:** Rockslides on West Shore Road continue to occur. **Action Item #8:** Lobby the State to mitigate the danger of falling rocks along the sides of West Shore Road to prevent future occurrences. **(ER5)** **(Team Input)**	Landslide & Erosion	Select Board	Local	Life of the plan	Very Low Cost
A-9	**Problem Statement:** The Fire Chief, Police Chief, and the EMD coordinate all responders' training, which includes the many aspects of emergency response. This training needs to continue. **Action Item #9:** The Fire Chief, Police Chief, and the EMD are to provide ongoing training for all emergency responders. Training will include the many aspects of emergency response, including EMS, wildfire suppression, confined spaces, HazMat, active shooter, and terrorism. Training is done locally, through the Lakes Region Fire Mutual Aid, the State of New Hampshire at the NH Fire and Police Academies, or through federally funded programs. **(Emergency Preparedness)** **(Table 6.1)**	All Hazards	Fire Department, Police Department, & Emergency Management Director	Local & Grants	Life of the plan	Low Cost
A-10	**Problem Statement:** Although first responders, including firefighters, have received NIMS & ICS training, not all of Alexandria's town officials have. **Action Item #10:** 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). Additionally, the EMD should encourage key personnel to learn about and become adept at WEB-EOC. **(Emergency Preparedness)** **(Table 6.1)**	All Hazards	Emergency Management Director	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-11	**Problem Statement:** The Town's website has an emergency management webpage with some emergency-related links. The Town has continuously provided the residents with emergency preparedness and mitigation techniques; this practice is ongoing. **Action Item #11:** Provide robust information on the Emergency Management 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)** **(Table 6.1)**	High Wind Events, Drought, Earthquakes, Extreme Temperatures, Lightning & Hail, Severe Winter Weather, Tornados, Wildfires, Known & Emerging Contaminants & Infectious Diseases	Emergency Management Director & Administrative Assistant (as the Website Administrator)	Local	Life of the plan	Very Low Cost
A-12	**Problem Statement:** Genasys (formerly CodeRED) 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. **Action Item #12:** Provide public outreach to encourage all residents to contact Genasys (formerly CodeRED) 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)** **(Table 6.1)**	All Hazards	Emergency Management Director & Administrative Assistant (as the Website Administrator)	Local	Life of the plan	Very Low Cost
A-13	**Problem Statement:** Residents and builders may not be aware of flood regulations & 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. **Action Item #13:** Advise the public about the local flood hazard, flood insurance, and flood protection measures by obtaining and keeping a supply of NFIP brochures available in the Town Offices. 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)** **(Table 6.1)**	Inland Flooding	Administrative Assistant (as the Floodplain 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-14	**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. **Action Item #14:** 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)** **(Other Plans)**	Wildfire & Structural Fires	Fire Chief	Local	Life of the plan	Very Low Cost
A-15	**Problem Statement:** Although public outreach has been done to advise the citizens of Alexandria of the possibility of using the Town Offices/Town Hall 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. **Action Item #15:** Provide public outreach to the citizens of Alexandria regarding the availability of the Town Hall as a warming center and the Town Office as a cooling center during extended high temperatures and severe winter weather. **(ET3 & WW6)** **(Other Plans)**	Extreme Temperatures & Severe Winter Weather	EMD & Administrative Assistant (as the Website Administrator)	Local	Life of the plan	Very Low Cost
A-16	**Problem Statement:** Residents may not be aware of the importance of maintaining their private roads to allow emergency responders access to prevent wildfires and diminish the risk of inland flooding. **Action Item #16:** To promote private mitigation efforts, provide public outreach to the citizens of Alexandria on the importance of maintaining private roads and culverts to allow for safe access for fire apparatus into wildland-urban interface neighborhoods and properties. This education will help ensure accessibility for emergency response, decrease the wildfire risk, and diminish the chance of inland flooding on Alexandria's roads. **(MU16)** **(Other Plans)**	Wildfires & Structural Fires	EMD & Administrative Assistant (as the Website Administrator)	Local	Life of the plan	Very Low Cost
B-1	**Problem Statement:** A section of Thissell Road has a history of washouts, particularly during heavy rainstorms. **Action Item #17:** Replace the existing 4'x50' culvert with a 6'x6'x60' concrete box culvert to improve stormwater runoff and flood damage caused by heavy rainstorms. **(F13)** **(Team input)**	Inland Flooding	Road Agent	Local & Grants	Short Term	High Cost
B-2	**Problem Statement:** The Mount Cardigan Bridge over Town Line Brook (126/119) is on the State's red list. **Action Item #18:** Replace the state-red-listed Mount Cardigan Bridge over Town Line Brook 126/119) as soon as funding becomes available. **(MU13)** **(Table 6.1)**	Aging Infrastructure	Road Agent	Local & Grants	Short Term	High Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
B-3	**Problem Statement:** The Alexandria Emergency Operations Plan (EOP) was last updated in 2016. The recommended update is overdue. **Action Item #19:** Update the Alexandria 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 will include an EOC Call Alert List, a detailed Resource Inventory List, and Player Packets. **(Emergency Preparedness) (Table 6.1)**	All Hazards	Emergency Management Director	Local & Grants	Short Term	Low Cost
B-4	**Problem Statement:** This Plan, the Alexandria Hazard Mitigation Plan Update 2025, will require an annual review and a complete update in five years. **Action Item #20:** Complete annual reviews of the Alexandria Hazard Mitigation Plan Update 2025, 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) (Table 6.1)**	All Hazards	Emergency Management Director	Local	Short Term & Long Term	Low Cost
B-5	**Problem Statement:** This Plan, the Alexandria Hazard Mitigation Plan Update 2025, will need to be approved again as a Community Wildfire Protection Plan (CWPP). **Action Item #21:** 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)**	Wildfires & Conflagration	Mapping & Planning Solutions	Local	Short Term	Very Low Cost
B-6	**Problem Statement:** Although Alexandria has emergency backup power at many of the Town's Critical Infrastructure & Key Resources (CIKR), the Fire Station does not have backup emergency power. **Action Item #22:** Obtain funding and install an emergency generator for the Fire Station to improve the effectiveness of this facility during a disaster. Steps have been taken to secure a grant. **(MU13) (Table 6.1)**	Long-Term Utility Outages	Emergency Management Director	Local & Grants	Short Term	Low Cost
B-7	**Problem Statement:** The Town of Alexandria does not have a Building Inspector or Code Enforcement Officer, nor does it require building permits (inventories only; permits have been struck down by voting) or established building codes. The process expects builders to abide by the International Building Codes (IBC) and the International Residential Codes (IRC) adopted by the State of New Hampshire. Enforcement of the codes is difficult without a Building Inspector or codes. **Action Item #23:** Revisit the building process, address the need for building permits and a Building or Code Enforcement Officer, and establish building codes that are reflective of the state-adopted codes, the NFPA, the views of the public, climate change, and the Town's vulnerability to hazards. **(MU14) (Table 6.1)**	High Wind Events, Earthquakes, Extreme Temperatures, Lightning & Hail, Severe Winter Weather, Tornados, Wildfires & Infectious Diseases	Select Board & other Department Heads	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-2	**Problem Statement:** The Shem Valley Road Bridge over Clark Brook (074/112) is a large culvert on the State's red list. This bridge is the only access to the AMC Lodge. **Action Item #25:** Replace the Shem Valley Road Bridge (074/112) (large culvert) as soon as funding becomes available. **(MU13) Table 6.1)**	Erosion & Aging Infrastructure	Road Agent	Local & Grants	Medium Term	High Cost
C-3	**Problem Statement:** The Town's emergency radio capabilities do not reach the entire community, and communications "dead spots" remain. **Action Item #26:** Look for solutions for the dead spots by locating repeaters on multiple towers, in particular, to help alleviate the problem for the highway department. **(MU13) (Table 6.1)**	All Hazards	Emergency Management Director	Local & Grants	Medium Term	Medium Cost
C-4	**Problem Statement:** The Alexandria Master Plan (2014) is being completely updated. The new update should include information on the natural hazards identified in this plan and a discussion of climate change. **Action Item #27:** Review this Plan, the Alexandria Hazard Mitigation Plan Update 2025, whenever working on the Master Plan. Consider incorporating a discussion on climate change, natural hazards, and mitigation action items from this Plan. **(MU6) (Table 6.1)**	All Hazards	Planning Board	Local	Medium Term	Very Low Cost
C-5	**Problem Statement:** The strategy from the prior plan to revise the subdivision regulations to include fire suppression measures has not been completed. **Action Item #28:** Review and revise the subdivision regulations to require adequate water resources for fire protection for all newly approved subdivisions. **(WF2) (Table 7.1)**	Wildfires & Structural Fires	Planning Board & Fire Department	Local	Medium Term	Very Low Cost
C-6	**Problem Statement:** The strategy for constructing a retaining wall and rip rap north of Cole Hill Road, as suggested in the prior plan, was not completed. **Action Item #29:** Construct a concrete retaining wall to protect the Fowler River Road's surface. **(F17) (Table 7.1)**	Inland Flooding	Road Agent	Local & Grants	Medium Term	High Cost
D-1	**Problem Statement:** A section of Gove Road has a history of washouts, particularly during heavy rainstorms. **Action Item #30:** Replace the existing 2'x24' culvert with a 6'x6'x35' concrete box culvert to improve stormwater runoff and flood damage caused by heavy rainstorms**. (F13) (Team input)**	Inland Flooding	Road Agent	Local & Grants	**Long Term**)	High Cost
D-2	**Problem Statement:** Inland flood waters sometimes overwhelm a low portion of Bog Road. **Action Item #31:** According to engineering studies, raise the roadbed on Bog Road to improve stormwater flow and decrease washouts. **(F13) (Team input)**	Inland Flooding	Road Agent	Local & Grants	Long Term	Very High Cost

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
D-3	**Problem Statement:** The strategy for raising the roadbed on Welton Falls Road from the prior plan was not completed. **Action Item #32:** Raise the roadbed on Welton Falls Road three to four feet for a length of road measuring 1,400' to improve stormwater flow and decrease washouts. **(F13)** **(Table 7.1)**	Inland Flooding	Road Agent	Local & Grants	Long Term	High Cost
D-4	**Problem Statement:** The Alexandria Fire Department does its best to provide timely inspections based on limited staffing. More staff are needed. **Action Item #33:** Work with the Select Board to consider adding a new town position to assist with inspection services. **(Emergency Preparedness)** **(Table 6.1)**	All Hazards	Fire Department	Local	Long Term	Very Low Cost
D-5	**Problem Statement:** The Cole Hill Road Bridge over Fowler River (136/131) is on the State's red list. **Action Item #34:** Replace the Cole Hill Road Bridge over Fowler River (136/131) when funding becomes available. **(MU13)** **(Table 6.1)**	Aging Infrastructure	Road Agent	Local & Grants	Long Term	High Cost
D-6	**Problem Statement:** Alexandria's Subdivision Regulations were last updated in 2019. When this hazard mitigation plan is completed, the regulations should be reviewed for changes that integrate action items from this plan and climate change into future planning. **Action Item #35:** Review the Town's Subdivision Regulations and discuss changes that may mitigate the occurrence of and damage from the natural hazards identified in this Plan. Consider changes that will enhance mitigation efforts across the Community. Update the regulations and integrate elements from this Plan where possible. **(WF2, F1)** **(Table 6.1)**	Wildfires & Inland Flooding	Planning Board	Local	Long Term	Very Low Cost
D-7	**Problem Statement:** The strategy from the prior plan to revise the subdivision regulations to limit development on steep slopes has not been completed. **Action Item #36:** Review and revise the subdivision regulations to include language limiting building roads and structures on steep slopes based on the agreed-upon criteria of the Town. **(MU6)** **(Table 7.1)**	Landslides	Planning Board	Local	Long Term	Very Low Cost
D-8	**Problem Statement:** The strategy from the prior plan to work with the Department of Environmental Services (DES) to develop a stream maintenance program was not completed. **Action Item #37:** Lobby the State to bring their attention to areas of the Community where a stream maintenance program would be helpful. **(F2)** **(Table 7.1)**	Inland Flooding	Select Board	Local	Long Term	Very Low Cost

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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 Offices. 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 effects 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. Alexandria completed its last hazard mitigation plan in 2018 and has completed many projects. Examples in Table 7.1 include improving a culvert on Fowler River Road, repairing the Knowles Hill Road Bridge, and raising Karl Gordon Road. As a result, the Town was able to integrate these actions into other town activities, budgets, plans, and mechanisms.

The Town of Alexandria has agreed to incorporate a Community Wildfire Protection Plan (CWPP) into this planning document, the Alexandria Hazard Mitigation Plan Update 2025. 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:

ALEXANDRIA MASTER PLAN

Traditionally, Master Plans are updated every 5 to 10 years. A complete update of Alexandria's Master Plan was completed in 2014 and is due for a recommended update. This last update of the Master Plan did not include a Natural Hazards section and integrated elements of the 2018 HMP. Future reviews and updates of the Master Plan will consider integrating concepts, ideas, and action items from this Hazard Mitigation Plan **(Action Item #28).**

ALEXANDRIA EMERGENCY OPERATIONS PLAN 2016 (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 Alexandria EOP was completed in 2016. After completing this Plan in 2025, an update for the Emergency Operations Plan is expected to be completed. The new EOP will incorporate elements from this hazard mitigation plan **(Action Items #19).**

TOWN BUDGET & CAPITAL RESERVE FUNDS

The Town of Alexandria 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 CRF.**

THE ALEXANDRIA ORDINANCES & SUBDIVISION REGULATIONS

As time passes and the Town's needs 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. Examples of this integration can be seen in this Plan's mitigation action items **(Action Items #29, 36, and 37).**

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 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 July 10, 2024. 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

PARTIES TO THE AGREEMENT
Mapping and Planning Solutions
Town of Alexandria, NH

Current Plan Ex
HMPG #4516 Grant Expi

This agreement between the Town of Alexandria (the Town), or its official designee, and Mapping and Planning Solutions (MAPS) outlines the Town's desire to engage the services of MAPS to assist in planning services to produce the Alexandria Hazard Mitigation Plan Update (the Plan).

Agreement

This agreement outlines the responsibilities that will ensure plan development with the involvement of town members and local, federal, and state emergency responders and organizations. It 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 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 & Emergency Management (HSEM) on behalf of the Federal Emergency Management Agency (FEMA). When adopted, the Plan guides the Town, commissions, and departments; 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, human-caused, and wildfire disasters on life and property and be written to integrate them into other town planning initiatives.

Scope of Work

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

- MAPS will collect the necessary data 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.
- With the Team's assistance, MAPS will coordinate and facilitate two-hour virtual meetings to complete the project; generally, meetings are held monthly and do not exceed eight. These meetings will be held online unless unanticipated circumstances prevail. MAPS will provide any materials, handouts, and maps necessary to fully understand each step in the planning process.[32]
- MAPS will assist the Team in developing goals, objectives, and action items and 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 potentially hazardous areas and analyze the risk severity of each.

[32] *If unanticipated circumstances prevail and meetings are held in person, MAPS will make every effort to proceed. However, the Town shall ensure that attendance at any meeting is adequate to proceed. Mapping and Planning Solutions reserves the right to invoice the Town for travel, meal expenses and staff costs incurred when meeting attendance is inadequate.*

- MAPS will author, edit, and prepare the Plan for review by the Team before submitting it to HSEM for conditional approval. Upon conditional approval by HSEM, MAPS will provide the planning team with the necessary documents for plan adoption by the Alexandria Select Board and continue to work with them until final approval and distribution of the Plan are complete.

- MAPS shall provide all supplies and space necessary to complete the Alexandria Hazard Mitigation Plan at its office.

- Once final documents are received, MAPS will print and distribute the Plan. The final documents include the HSEM formal approval email, 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 approvals, and a flash drive containing these same documents in digital form. Additional flash drives may be requested at an additional cost. Copies of the Plan will be distributed by MAPS to collaborating agencies, including, but not limited to, HSEM, FEMA, the Department of Natural and Cultural Resources (DNCR), and the US Forest Service.

- MAPS will provide all "Quarterly Reports" HSEM requires for this project's duration. These quarterly reports will be done online, and a copy of the report will be forwarded to the primary contact for Alexandria.

- As long as MAPS is in operation, MAPS will provide annual plan maintenance reminders leading up to the next five-year plan update, provided staffing and time allows.

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

- The Town shall ensure that the planning team includes members 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 principal contact to work with MAPS. This contact shall assist with recruiting participants for planning 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 to MAPS in developing the work program to produce the Plan.

- The Town shall gain the support of stakeholders for the recommendations found within the Plan.

- The Town shall provide public access for all meetings and provide public notice at the start of the planning process and at the time of adoption, as required by FEMA and the Code of Federal Regulations (CFRs).

- The proposed Plan shall be submitted to the Select Board for consideration and adoption.

- After adoption and final approval from HSEM is received, the Town will:

    - *Distribute copies of the Plan as it sees fit throughout the local community.*
    - *Develop a team to monitor and work toward completing the determined Action Items.*
    - *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 $9000.00; an invoice will be sent to the Town for each payment as outlined below. (Level 2, HMPG4516)

  - 1. Initial payment upon receipt of the first invoice, before the first meeting $4,400.00
  - 2. Second payment upon plan submittal to HSEM for APA (Approve Pending Adoption).....$4,400.00
  - 3. Final payment upon project completion and receipt of the final hard copy of the Plan $200.00

  Total Fees.....$9,000.00

- **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 prescribed match amounts have been met.

- **Required Matching Funds:** This project's total cost under HMPG #4516 is $10,000, with a federal share of $9,000 and a matching amount of $1,000 (90%/10% split). Matching funds are the responsibility of the Town of Alexandria, not MAPS. The Town will provide and document 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 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:** This project shall begin upon grant approval from HSEM and the signing of this agreement with MAPS. It will continue until a date is determined or the planning process 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.

  The grant provided for this project is funded through HMGP #4516. Per the grant agreement between the Town and HSEM, all work must be completed by May 2, 2026, the end of the Period of Performance. The exact dates for this grant round are included in the grant award from HSEM.

- **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 which could reasonably be considered confidential.

- **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 completed work.

- **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 Alexandria. 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 and 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 Alexandria and Mapping and Planning Solutions.
- **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 100 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, 91 Cherry Mountain Place
Twin Mountain, NH 03595
jgarneau@mappingandplanning.com
(603) 991-9664 (cell)

For the Town of Alexandria

George Clayman, Fire Chief & EMD
Town of Alexandria
47 Washburn Road
Alexandria, NH 03222
(603) 744-3220
fire@alexandrianh.com

THE SIGNATURES BELOW INDICATE ACCEPTANCE OF AND AGREEMENT TO THE DETAILS OUTLINED IN THIS AGREEMENT.

FOR THE TOWN OF ALEXANDRIA, NH

George Tuthill
Signature

George Tuthill
Printed Name

5/6/24
Date

FOR MAPPING AND PLANNING SOLUTIONS

June L. Garneau
Signature
June Garneau, Owner
June 12, 2024

Signatures are scanned facsimiles; original signatures are on file.

B. APPROVED PENDING ADOPTION (APA) FROM FEMA

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

Reply | Reply All | Forward | ...

NJ

Neiderbach, Josiah <josiah.neiderbach@

To fire@alexandrianh.com

Cc FEMA-R1-MitigationPlans; Doyle, Lynne; DOS: Hazard Mitigation; Brown, Austin; Norman, Dena; Markesich, Christopher; **+1 other**

Fri 8/1/2025 2:27 PM

Alexandria NH APA Review.docx 94 KB

Dear Official:

The FEMA Region 1 Mitigation Division has determined the *Alexandria, NH Hazard Mitigation Plan Update 2025* meets all applicable FEMA Mitigation Planning requirements (Local Mitigation Planning Policy Guide, effective April 11, 2025), except its adoption by: Town of Alexandria, NH.

Mitigation plans may include additional content to meet Element H: Additional State Requirements or content the local government included beyond applicable FEMA mitigation planning requirements. Determination that the plan is "Approvable Pending Adoption" does not include the review or approval of content that exceeds these applicable FEMA mitigation planning requirements.

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:

- Hazard Mitigation Grant Program (HMGP)
- HMGP Post-Fire
- Flood Mitigation Assistance (FMA)
- Safeguarding Tomorrow Revolving Loan Fund
- 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 | Mitigation Division | Region 1
Mobile: (202) 285-7769
josiah.neiderbach@fema.dhs.gov

Signatures are scanned facsimiles; original signatures are on file.

C. FORMAL APPROVAL LETTER FEMA

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INSERTION OF FINAL APPROVAL LETTER FROM
FEMA

Signatures are scanned facsimiles; original signatures are on file.

D SIGNED CERTIFICATE OF ADOPTION

CERTIFICATE OF ADOPTION

ALEXANDRIA, NH

SELECT BOARD

A RESOLUTION ADOPTING THE ALEXANDRIA, NH HAZARD MITIGATION PLAN UPDATE 2025

WHEREAS the Town of Alexandria 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 Alexandria has received Approved Pending Adoption (APA) status from the Federal Emergency Management Agency (FEMA) for its Hazard Mitigation Plan Update 2025 under the requirements of 44 CFR 201.6 and

WHEREAS, public and committee meetings were held between July 10, 2024 and January 15, 2025, regarding the development and review of the Hazard Mitigation Plan Update 2025 and

WHEREAS the Plan specifically addresses hazard mitigation strategies and plan maintenance procedures for the Town of Alexandria and

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

RESOLVED by the Select Board:

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

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

3. Future revisions and plan maintenance required by 44 CFR 201.6 and FEMA are now 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 to the Select Board on the progress of the Plan's action items.

Adopted this day, the _____ of _____, 2025

Select Board Chair

_____
Signature

_____
Print Name

Member of the Select Board

_____
Signature

_____
Print Name

Member of the Select Board

_____
Signature

_____
Print Name

Emergency Management Director

_____
Signature

_____
Print Name

IN WITNESS WHEREOF, the undersigned has affixed their signature and notary stamp on this day, **the _____ of _____, 2025**

_____
Notary Signature

_____
Expiration

Signatures are scanned facsimiles; original signatures are on file.

E. CWPP APPROVAL LETTER FROM DNCR

Alexandria, NH
A Resolution Approving the
Alexandria, NH Hazard Mitigation Plan Update 2025
As a Community Wildfire Protection Plan

Several public and committee meetings were held between July 10, 2024 and January 15, 2025, regarding the development and review of the Alexandria, NH Hazard Mitigation Plan Update 2025. The Plan contains potential future projects to mitigate hazard and wildfire damage in the Town of Alexandria.

The Select Board and the Emergency Management Director/Fire Chief request that the Department of Natural and Cultural Resources (DNCR) accept this plan as a Community Wildfire Protection Plan, having adhered to its requirements.

The Select Board and the Emergency Management Director/Fire Chief approve the Alexandria Hazard Mitigation Plan Update 2025 and understand that, with approval by DNCR, this Plan will also serve as a Community Wildfire Protection Plan.

For the Town of Alexandria

APPROVED and SIGNED this day, _____, 2025.

_____ _____
Chairman of the Select Board Printed Name

_____ _____
Fire Chief/Emergency Management Director Printed Name

For the Department of Natural & Cultural Resources (DNCR)

APPROVED and SIGNED this day, _____, 2025.

_____
Forest Ranger – NH Division of Forest and Lands, DNCR

APPROVED and SIGNED this day, _____, 2025.

_____
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.

Alexandria, 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 2025 Hazard Mitigation Plan Update

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_____

Please use the reverse side for additional notes ➡

Additional Notes – Year One:

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.

Alexandria, 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 2025 Hazard Mitigation Plan Update

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Please use the reverse side for additional notes ➡

Additional Notes – Year Two:

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.

Alexandria, 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 2025 Hazard Mitigation Plan Update

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Please use the reverse side for additional notes 

Additional Notes – Year Three:

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.

Alexandria, 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 2025 Hazard Mitigation Plan Update

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Please use the reverse side for additional notes ➡

Additional Notes – Year Four:

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)*
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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**
    - Alexandria Hazard Mitigation Plan, 2018
    - Sugar Hill Hazard Mitigation Plan, 2024
    - Gorham Hazard Mitigation Plan, 2024
    - Chester Hazard Mitigation Plan, 2024
- **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 Alexandria, Received, 7/12/2024, Census 2000 and Revenue Information derived from this site;
    - *http://www.nhes.nh.gov/elmi/products/cp/profiles-htm/Alexandria.htm*

Photos

- Photos are taken by MAPS unless otherwise noted.

Map Images

- Map images (screen prints) are created by MAPS using readily available data from NH Granite unless otherwise indicated.

Wildfire Links & Wildfire Grant Assistance 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/*
- Funding for Community Wildfire Risk Reduction; *https://wildfirerisk.org/reduce-risk/funding/*
- Pre-Disaster Mitigation (PDM) Grant Program; *https://www.fema.gov/grants/mitigation/learn/pre-disaster*
- Fire Prevention and Safety (FP&S); *https://www.fema.gov/grants/preparedness/firefighters/safety-awards*
- Assistance to Firefighters Grants; *https://www.fema.gov/grants/preparedness/firefighters/assistance-grants*
- Community Wildfire Defense Grant Program; *https://www.fs.usda.gov/managing-land/fire/grants/cwdg*
- Federal Wildfire Resources; *https://www.fs.usda.gov/sites/default/files/2022-08/Fed-Wildfire-Mitigation-Resources.pdf*

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 of 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 suffering[33]:

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 can apply for funding. The funding amount is pre-calculated, based on historical FMAG declarations, and reassessed every fiscal year.

FLOOD MITIGATION ASSISTANCE (FMA)

FMA is a competitive grant program funding 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). An annual congressional appropriation funds the program 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.

[33] 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 funding is based on a 6% set aside for FEMA's assistance following major disaster declarations through the Public Assistance and Individuals and Households Program. The BRIC program was designed to foster innovation and provide a yearly grant cycle, offering applicants a consistent funding source.

PRE-DISASTER MITIGATION (PDM)

PDM is a grant program that helps 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 with 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. [34]

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.

[34] 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

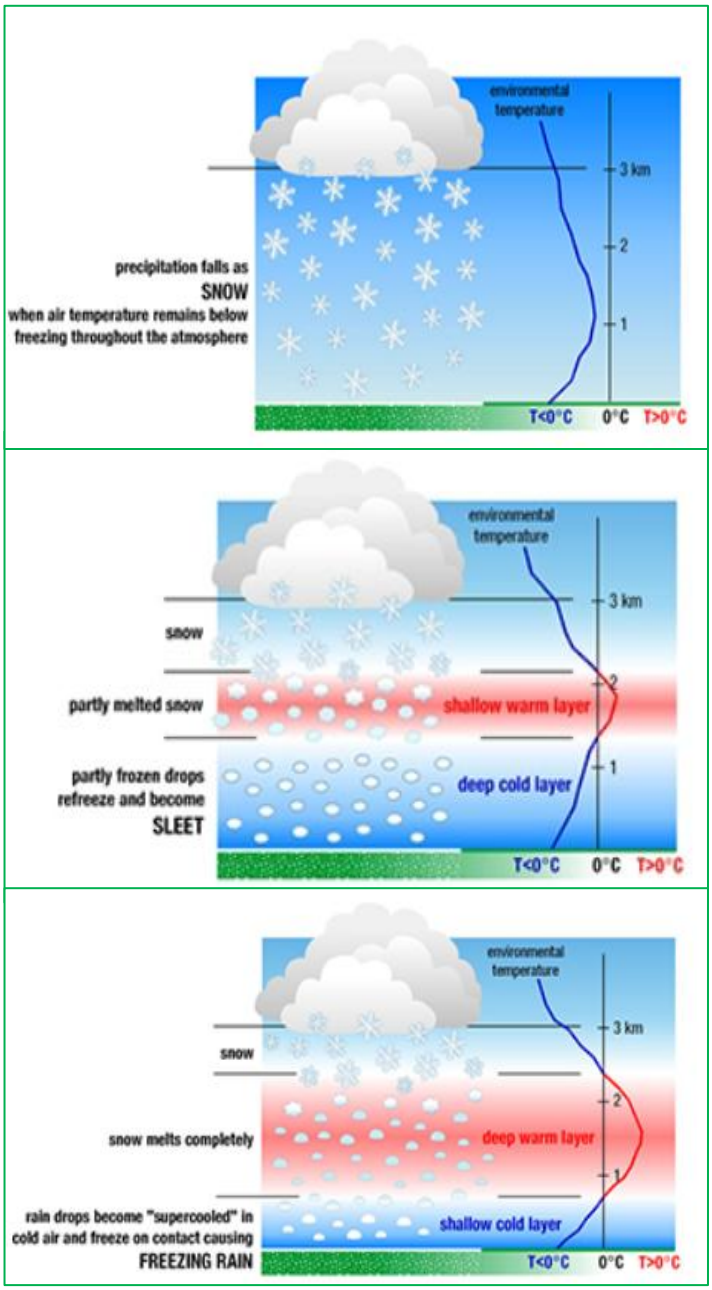
A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow for 12 hours or six inches for 24 hours.

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.”[35]



Types of Severe Winter Weather
NOAA – National Severe Storms Laboratory

[35] 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 predicted ice storms.[36]

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

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) *Revised-October, 2011	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	

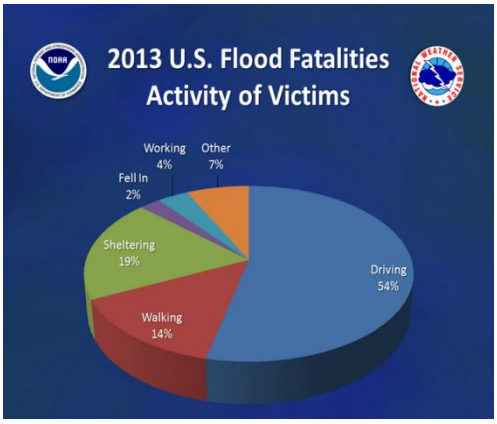
(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

*INLAND FLOODING

General Flooding Conditions

Floods are defined as a temporary overflow of water onto lands 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 too much 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.



[36] 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 pond[37]. 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 manner[38]:

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

[37] https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/vol2-appC.pdf
[38] 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, 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.

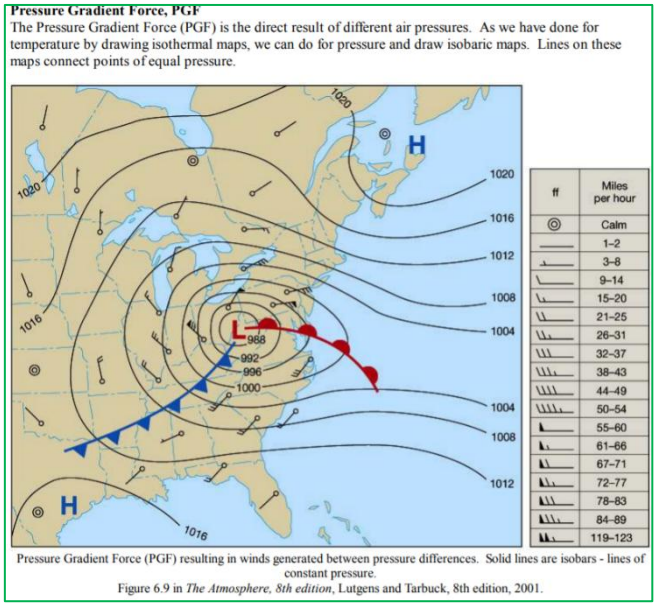
Erosion

Erosion is the wearing away of land, 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.[39]

***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.[40] [41]



[39] https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf
[40] NOAA; https://w1.weather.gov/glossary/index.php?letter=w
[41] 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

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. 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."[42] 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, and automobiles, will create secondary damage to structures.

[42] 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. Both a microburst and a larger macroburst 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.[43]

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.[44]

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	

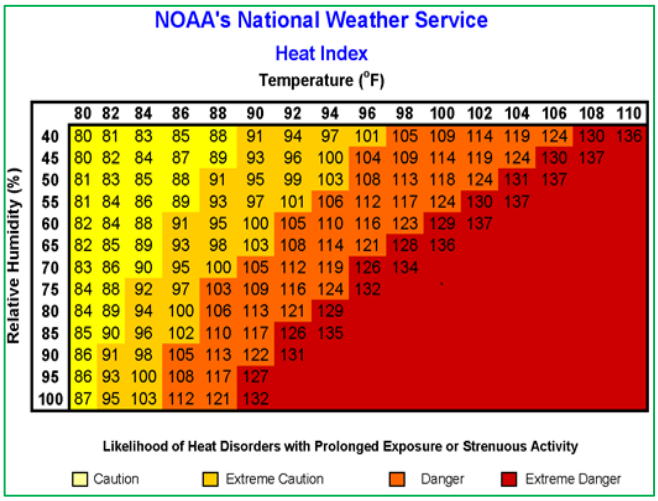
[43] NOAA - https://www.noaa.gov/jetstream/wind_damage
[44] NOAA, Storm Prediction Center, https://www.spc.noaa.gov/faq/tornado/beaufort.html

*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.

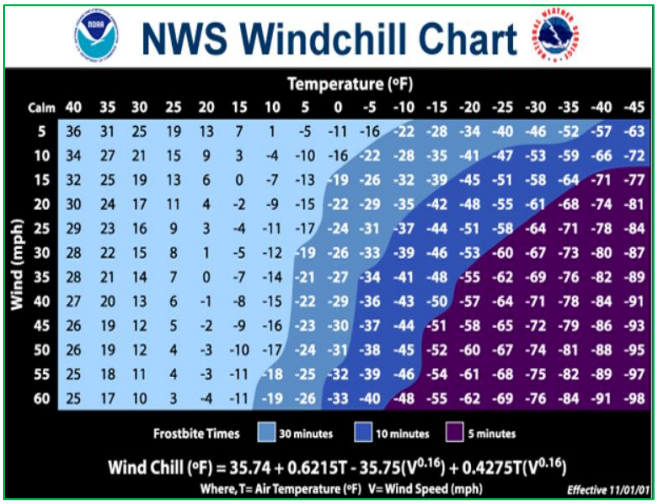
Most heat disorders occur when a victim is overexposed to heat or has overexercised for their age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.



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.[45]

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 wind chill due to wind and temperature.[46]

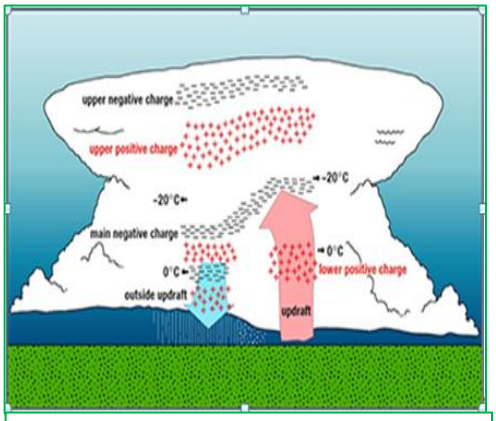


[45] NOAA; https://www.weather.gov/safety/heat-index
[46] National Weather Service; https://www.weather.gov/safety/cold-wind-chill-chart

*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."[47]



"A conceptual model shows the electrical charge distribution inside deep convention (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

Thunder, a result of lightning, is created when the "lightning channel heats the air to around 18,000 degrees Fahrenheit..."[48] 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 that 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 cloud-to-ground lightning frequency 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 coast. 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."[49]

[47] NOAA National Severe Storms Laboratory, https://www.nssl.noaa.gov/education/svrwx101/lightning
[48] Ibid
[49] 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*."[50]

Two major potential losses from wildfire are 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.

[50]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 page[51]) 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."[52]

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.[53]

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.

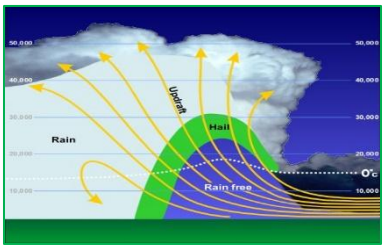
[51] National Hurricane Center; https://www.nhc.noaa.gov/aboutsshws.php
[52] Ibid
[53] https://www.wpc.ncep.noaa.gov/research/mcs_web_test_test_files/Page1637.htm

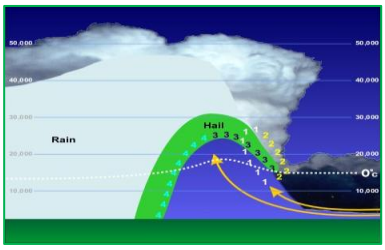
Hail

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 includes. It weighed 1 lb. 15 oz."[54]

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.[55] The charts to the right show how hail is formed.[56]





*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.[57]

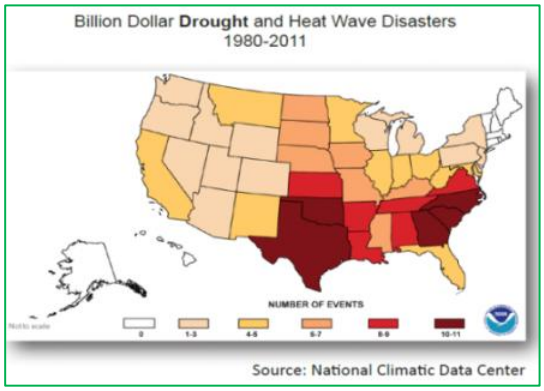
It is well documented that fault lines run throughout New Hampshire, but high-magnitude earthquakes have not been common in New Hampshire's history. Four earthquakes occurred in New Hampshire between 1924 and 1989, having a magnitude of 4.2 or more. Two occurred in Ossipee, one west of Laconia and one 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
		7.5
		8

[54] NOAA National Severe Storms Laboratory; https://www.nssl.noaa.gov/education/svrwx101/hail/
[55] https://www.pinterest.com/pin/126171227030590678/
[56] https://www.noaa.gov/jetstream/hail
[57] 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 plants and animals' growing seasons or living conditions. 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: • short-term dryness slowing planting, growth of crops or pastures Coming out of drought: • some lingering water deficits • pastures or crops not fully recovered
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested
D2	Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages or restrictions
D4	Exceptional Drought	• 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 Montor

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 affecting different geographic, topographic, and geologic areas. Therefore, the severity of the landslide event must be determined by considering many measurements.[58]

*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.[59]

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.[60]

"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."[61]

[58] State of New Hampshire Multi-Hazard Mitigation Plan Update 2023 & https://oas.org/dsd/publications/Unit/oea66e/ch10.htm
[59] https://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/syc-20351173
[60] https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control
[61] 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 consequences. 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

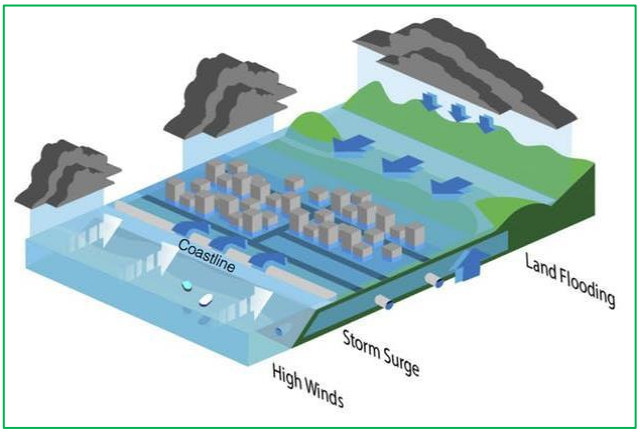
Epidemic.....Disease that shows an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area

Outbreak.....Disease 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

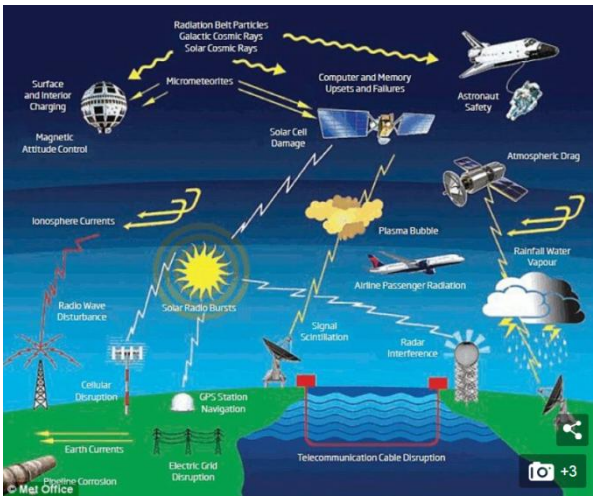
COASTAL FLOODING



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).*"[62]

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*.[63]

*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.[64]

[62] 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
[63] Ibid, page 127
[64]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 Extent[65]

Geomagnetic Storms				
Scale	**Description**	**Effect**	**Physical Measure**	**Average Frequency (1 cycle = 11 years)**
G 5	Extreme	**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. **Spacecraft operations**: May experience extensive surface charging, problems with orientation, uplink/downlink, and tracking satellites. **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.).	Kp. = 9	4 per cycle (4 days per cycle)
G 4	Severe	**Power systems:** Possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid. **Spacecraft operations:** May experience surface charging and tracking problems; corrections may be needed for orientation problems. **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.).	Kp. = 8, including a 9-	100 per cycle (60 days per cycle)
G 3	Strong	**Power systems:** Voltage corrections may be required; false alarms are triggered on some protection devices. **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. **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.).	Kp. = 7	200 per cycle (130 days per cycle)
G 2	Moderate	**Power systems:** High-latitude power systems may experience voltage alarms; long-duration storms may cause transformer damage. **Spacecraft operations**: Corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions. **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.).	Kp. = 6	600 per cycle (360 days per cycle)
G 1	Minor	**Power systems:** Weak power grid fluctuations can occur. **Spacecraft operations:** Minor impact on satellite operations possible. **Other systems:** Migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).	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	**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.**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.**Other systems:** Complete blackout of HF (high frequency) communications possible through the polar regions and position errors make navigation operations extremely difficult.	10^{5}	Fewer than 1 per cycle
S 4	Severe	**Biological:** Unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. **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. **Other systems:** Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.	10^{4}	3 per cycle

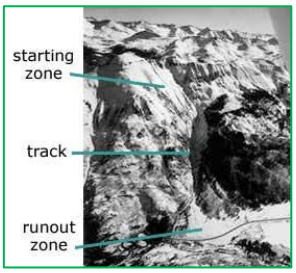
[65] Extent charts taken from https://www.weather.gov/akq/SpaceWeather

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

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

AVALANCHE

According to the National Snow & Ice Data Center, an avalanche is a rapid snow flow 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.[66]



[66] Copyright Richard Armstrong, NSIDC, https://nsidc.org/learn

All that is necessary for an avalanche is a mass of snow and a slope 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."[67]

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 daily or hourly."[68]

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.[69]

[67] NSIDC, https://www.sierraavalanchecenter.org/introduction-north-american-avalanche-danger-scale
[68] Copyright Richard Armstrong, NSIDC, http://nsidc.org/cryosphere/snow/science/avalanches.html
[69] 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-4812	Inland Flooding	July 10-13, 2024	Coos & Grafton	**Major Disaster Declaration, DR-4812:** FEMA announced that federal disaster assistance is available to the state of New Hampshire to supplement recovery efforts in the areas affected by the severe storms and flooding on July 10-13, 2024
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 rainstorm, similar 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.

Number	Hazard	Date of Event	Counties	Description
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.
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 Strafford 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).

Number	Hazard	Date of Event	Counties	Description
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.
DR-4006	Severe Storm & Flooding	May 26-30, 2011	Coos & Grafton Counties	**Major Disaster Declaration DR-4006:** The 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.

Number	Hazard	Date of Event	Counties	Description
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)
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:**

Number	Hazard	Date of Event	Counties	Description
DR-1199	Ice Storm	January 7-25, 1998	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Strafford & Sullivan	**Major Disaster Declaration DR-1199:**
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
ACS ..... Acute Care Site
ARC ..... American Red Cross
ARES ..... Amateur Radio Emergency Service
BFE ..... Base Flood Elevation
BOCA ..... Building Officials and Code Administrators
CBRNE ..... Chemical, Biological, Radiological,
CDC ..... Centers for Disease Control and Prevention
CDP ..... Center for Domestic Preparedness
CERT ..... Community Emergency Response Team
CFR ..... Code of Federal Regulations
CIKR ..... Critical Infrastructure & Key Resources
CIP ..... Capital Improvements Program
COG ..... Continuity of Government
COGCON ..... Continuity of Government Readiness Conditions
COOP ..... Continuity of Operations
CPCC ..... Continuity Policy Coordination Committee
CWPP ..... Community Wildfire Protection Plan
DBHRT ..... Disaster Behavioral Health Response Team
DEMD ..... Deputy Emergency Management Director
DES ..... Department of Environment Services
DFO ..... Disaster Field Office
DHHS ..... Department of Health and Human Services
DHS ..... Department of Homeland Security
DMCR ..... Disaster Management Central Resource
DBEA ..... Department of Business & Economic Affairs
DNCR ..... Department of Natural & Cultural Resources
DOD ..... Department of Defense
DOE ..... Department of Energy
DOJ ..... Department of Justice
DOT ..... Department of Transportation
DPW ..... Department of Public Works
DRC ..... Disaster Recovery Center
EAS ..... Emergency Alert System
EMD ..... Emergency Management Director
EMS ..... Emergency Medical Services
EO ..... Executive Order
EOC ..... Emergency Operations Center
EPA ..... U.S. Environmental Protection Agency
EPZ ..... Emergency Planning Zone
ERF ..... Emergency Response Facility
ERG ..... Emergency Relocation Group
ESF ..... Emergency Support Functions
FEMA ..... Federal Emergency Management Agency
FIRM ..... Flood Insurance Rate Map
FPP ..... Facilities & Populations to Protect
GIS ..... Geographic Information System
HazMat ..... Hazardous Material(s)
HFRA ..... Healthy Forest Restoration Act
HMGP ..... Hazard Mitigation Grant Program
HSAS ..... Homeland Security Advisory System
HSEM ..... Homeland Security Emergency Management
HSPD ..... Homeland Security Presidential Directive
IAP ..... Incident Action Plan
IC ..... Incident Commander
ICC ..... Incident Command Center
ICS ..... Incident Command System
JIC ..... Joint Information Center
LEOP ..... Local Emergency Operations Plan
MAPS ..... Mapping and Planning Solutions
MCI ..... Mass Casualty Incident
MEF ..... Mission Essential Function
MOU ..... Memorandum of Understanding
NAWAS ..... National Warning System
NEF ..... National Essential Function
NERF ..... Non-Emergency Response Facility
NFIP ..... National Flood Insurance Program
NGVD ..... National Geodetic Vertical Datum of 1929
NIMS ..... National Incident Management System
NOAA ..... National Oceanic and Atmospheric Association
NRP ..... National Response Plan
NSPD ..... National Security Presidential Directive
NTAS ..... National Terrorism Advisory System Nuclear and Explosive
NWS ..... National Weather Service
PA ..... Public Assistance
PDA ..... Preliminary Damage Assessment
PDD ..... Presidential Decision Directive
PIO ..... Public Information Officer
PMEF ..... Primary Mission Essential Function
POD ..... Point of Distribution
PPE ..... Personal Protective Equipment
PR ..... Potential Resources
PSA ..... Public Service Announcement
RERP ..... Radiological Emergency Response Plan
RNAT ..... Rapid Needs Assessment Team
SERT ..... State Emergency Response Team
SITREP ..... Situation Report (Also SitRep)
SNS ..... Strategic National Stockpile
SOG ..... Standard Operating Guidelines
SOP ..... Standard Operating Procedures
SPNHF ..... Society for the Protection of NH Forests
UC ..... Unified Command
USDA-FS ..... US Department of Agriculture – Forest Service
USGS ..... United States Geological Survey
VOAD ..... Volunteer Organization Active in Disasters
WMD ..... Weapon(s) of Mass Destruction
WMNF ..... White Mountain National Forest
WUI ..... Wildland Urban Interface

APPENDIX F: POTENTIAL MITIGATION IDEAS[70]

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 of 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

[70] 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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Storm Damage, June 2023
Photo Credit: *The Town of Alexandra*

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