

# Town of Andover, New Hampshire Hazard Mitigation Plan Update, 2025

*Prepared by the:* Andover Hazard Mitigation Update Committee



Flooding US Rte. 4 between Plains Road and Main St Dec. 2023

**Spring 2025**

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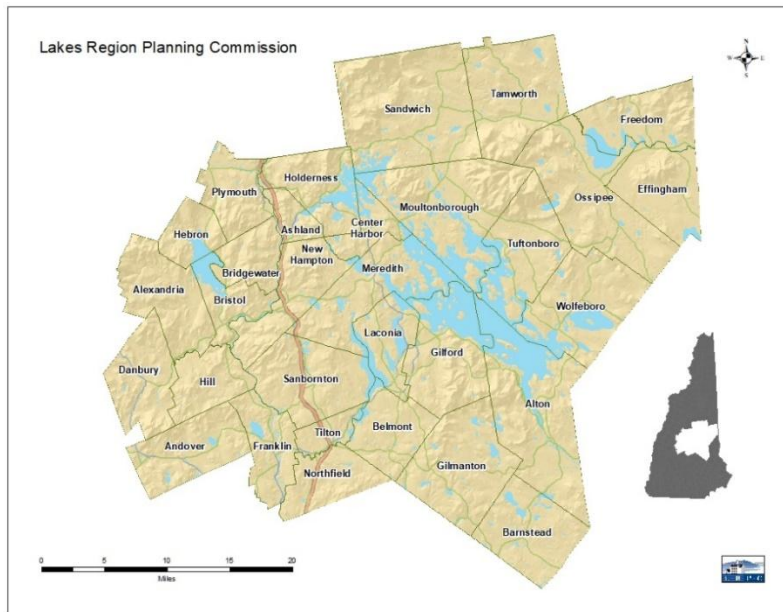
# Town of Andover, New Hampshire Hazard Mitigation Plan Update

Spring 2025

With Assistance from:  
**Lakes Region Planning Commission**  
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## Lakes Region Planning Commission

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(07/01/24 to 06/03/25)



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## TABLE OF CONTENTS

|                                                                                          |            |
|------------------------------------------------------------------------------------------|------------|
| <b>SECTION I: PLANNING PROCESS.....</b>                                                  | <b>2</b>   |
| A. BACKGROUND .....                                                                      | 2          |
| B. AUTHORITY.....                                                                        | 2          |
| C. FUNDING SOURCE.....                                                                   | 2          |
| D. PURPOSE .....                                                                         | 2          |
| E. SCOPE OF PLAN.....                                                                    | 3          |
| F. METHODOLOGY .....                                                                     | 4          |
| G. PUBLIC INVOLVEMENT .....                                                              | 5          |
| <b>SECTION II: COMMUNITY PROFILE .....</b>                                               | <b>7</b>   |
| A. GEOGRAPHY.....                                                                        | 7          |
| B. WEATHER CONDITIONS.....                                                               | 7          |
| C. PUBLIC SERVICES AND INFRASTRUCTURE .....                                              | 7          |
| D. DEMOGRAPHICS AND POPULATION CHARACTERISTICS .....                                     | 9          |
| E. LAND USE AND DEVELOPMENT TRENDS.....                                                  | 9          |
| <b>SECTION III: RISK ASSESSMENT .....</b>                                                | <b>14</b>  |
| A. INVENTORY OF ASSETS .....                                                             | 14         |
| B. IDENTIFYING NATURAL HAZARDS .....                                                     | 17         |
| C. PROFILING NATURAL HAZARD EVENTS .....                                                 | 18         |
| <b>SECTION IV: VULNERABILITY ASSESSMENT .....</b>                                        | <b>58</b>  |
| <b>SECTION V: MITIGATION STRATEGIES .....</b>                                            | <b>59</b>  |
| A. CURRENT PLANS, POLICIES, AND REGULATIONS.....                                         | 59         |
| B. STATUS OF 2019 ACTIONS.....                                                           | 63         |
| C. MITIGATION GOALS AND TYPES OF ACTIONS.....                                            | 65         |
| D. MITIGATION ACTIONS.....                                                               | 67         |
| E. PRIORITIZATION OF ACTIONS.....                                                        | 72         |
| F. IMPLEMENTATION OF MITIGATION ACTIONS.....                                             | 74         |
| <b>SECTION VI: PLAN ADOPTION AND MONITORING.....</b>                                     | <b>77</b>  |
| A. IMPLEMENTATION.....                                                                   | 77         |
| B. PLAN MAINTENANCE & PUBLIC INVOLVEMENT .....                                           | 77         |
| ❖ POST NOTICES OF MEETINGS AT THE TOWN OFFICE AND ON THE TOWN WEBSITE; .....             | 78         |
| C. SIGNED CERTIFICATE OF ADOPTION .....                                                  | 79         |
| <b>APPENDIX A: TECHNICAL RESOURCES .....</b>                                             | <b>81</b>  |
| <b>APPENDIX B: MITIGATION FUNDING RESOURCES .....</b>                                    | <b>84</b>  |
| <b>APPENDIX C: PUBLICITY AND INFORMATION .....</b>                                       | <b>91</b>  |
| <b>APPENDIX D: MEETINGS, AGENDAS, PARTICIPATION, and SURVEY .....</b>                    | <b>97</b>  |
| <b>APPENDIX E: HAZARD EVENTS PRIOR TO 2019 .....</b>                                     | <b>105</b> |
| <b>APPENDIX F: POTENTIAL HAZARDS MAP .....</b>                                           | <b>109</b> |
| <b>APPENDIX G: SUPPLEMENTARY INFORMATION (Hazards &amp; Prep/Response Actions ).....</b> | <b>110</b> |
| <b>APPENDIX H: PRIORITIZATION DETAILS .....</b>                                          | <b>114</b> |
| <b>APPENDIX I: EXISTING PLANS, STUDIES, REPORTS, AND TECHNICAL INFORMATION .....</b>     | <b>118</b> |
| <b>APPENDIX J: FEMA WEBLIOGRAPHY.....</b>                                                | <b>119</b> |
| <b>APPENDIX K: MONITOR, EVALUATE, &amp; UPDATE .....</b>                                 | <b>126</b> |

## EXECUTIVE SUMMARY

The *Andover Hazard Mitigation Plan Update* (the Plan) serves to reduce future losses from natural hazard events before they occur. The Plan was developed by the Andover Hazard Mitigation Planning Update Committee (the Committee) with assistance from the Lakes Region Planning Commission and contains statements of policy adopted by the Board of Selectmen in Section VI.

The Committee agreed that some of the natural hazards identified in the 2019 Plan continue today; but the Committee's evaluation of past hazards and potential future events, along with their extent and impact resulted in a different assessment than in the past. The matrix below shows the natural hazards considered to be high risks.

| Hazard Event                      | Overall Risk |
|-----------------------------------|--------------|
| High Wind Events                  | High         |
| Tropical & Post-Tropical Cyclones | High         |
| Inland Flooding                   | High         |
| Severe Winter Weather             | High         |

There have been no changes to the list of the town's Critical Facilities. Existing programs related to hazard mitigation include the following:

| Existing Plans, Regulations and Practices Supporting Hazard Mitigation |                                        |
|------------------------------------------------------------------------|----------------------------------------|
| Hazard Mitigation Plan 2019                                            | Subdivision Regulations (2018)         |
| Code Enforcement                                                       | Site Plan Review Regulations (2017)    |
| Zoning Ordinance (2023)                                                | Master Plan (2013)                     |
| Floodplain Ordinance (2023)                                            | School Emergency Operation Plan (2022) |
| Emergency Power Generation                                             | Emergency Response Training and Drills |

Some of the 17 Mitigation Actions from the 2019 Plan have either been completed (2) or are considered no longer pertinent (3). The twelve remaining Mitigation Actions are being carried over and considered in this plan along with several new actions. In its effort to further reduce the vulnerability of the town to future hazards, new general and hazard-specific mitigation actions were developed and prioritized. based on local criteria. A schedule for implementing proposed mitigation actions was developed.

The release of new requirements from FEMA and the update to the NH State Hazard Mitigation Plan (HMP), both in 2023 led to several changes to this plan, including adjustments to a few of the hazards considered, specific consideration being given to the impact climate change may have on hazards, the impacts of hazards on socially vulnerable populations, and consequently some of the stated hazard mitigation goals.

## SECTION I: PLANNING PROCESS

### A. BACKGROUND

To be eligible to receive disaster related Federal Emergency Management Agency (FEMA) grant funding to be used for hazard mitigation projects and actions that will ultimately reduce and mitigate future losses from natural hazard events, FEMA has required that municipalities within the State of New Hampshire establish local hazard mitigation plans. In response to this requirement, the NH Department of Safety's Division of Homeland Security and Emergency Management (HSEM) and the nine regional planning commissions in the state entered into agreements to aid municipalities with plan development and updates. This plan development and update process generally followed the steps outlined in FEMA's *Local Mitigation Planning Policy Guide (2023)*.

### B. AUTHORITY

This Hazard Mitigation Plan was prepared pursuant to Section 322, Mitigation Planning of the Robert T Stafford Disaster Relief and Emergency Assistance Act and Section 104 of the Disaster Mitigation Act (DMA) of 2000. Section 322 of DMA 2000 emphasizes the need for state, local and tribal entities to closely coordinate mitigation planning and implementation efforts.

### C. FUNDING SOURCE

NH HSEM funded this update through FEMA's Pre-Disaster Mitigation Grant Program with local soft match (participants' time) and additional funds from the Lakes Region Planning Commission.

### D. PURPOSE

The Andover Hazard Mitigation Plan is a planning tool to be used by the town of Andover, as well as other local, state, and federal government entities, in their efforts to reduce the negative effects from natural hazards. The Plan contains statements of policy as outlined in the Implementation Schedule for Mitigation Actions (Section V.F.) and in Section VI: Plan Adoption and Monitoring. All other sections of this plan are support and documentation for informational purposes only and are not included as a statement of policy.

Developing a hazard mitigation plan allows for the following:

- Increased education and awareness around threats, hazards, and vulnerabilities.
- Building partnerships for risk reduction which include government, organizations, businesses, and the public.
- Identifying long-term, broadly supported strategies for risk reduction.
- Developing local mitigation efforts that support local mitigation efforts.
- Identifying strategies and activities that focus resources on the greatest risks and vulnerabilities; and,
- Communicating priorities to potential sources of funding.

A FEMA-approved hazard mitigation plan is a requirement for receiving certain types of non-emergency disaster assistance including funding for mitigation projects including:

- Public Assistance
- Fire Management Assistance Grants (FMAG)
- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- High Hazard Potential Dam (HHPD)
- Building Resilient Infrastructure & Communities (BRIC).

#### Why Develop a Mitigation Plan?

The full cost of the damage resulting from natural hazards – personal suffering, loss of lives, disruption of the economy, loss of tax base – is difficult to measure. Our State is subject to many types of natural hazards: floods, severe winter weather, earthquakes, tornadoes, downbursts, tropical depressions/hurricanes, and wildfires, all of which can have significant economic and social impacts. Some, such as hurricanes, are seasonal and strike in predictable locations. Others, such as floods, can occur anytime of the year and almost anywhere in the State.

#### **E. SCOPE OF PLAN**

The scope of this Plan includes the identification of natural hazards affecting the town of Andover, assessment of the threats these pose to the town, and the development & prioritization of mitigation actions to be implemented. Supplemental information regarding some human-caused and technological hazards that could impact Andover and a few preparation/response actions, are included in Appendix G.

In the 2023 State Hazard Mitigation Plan (SHMP), three new areas of focus were introduced: inclusive planning for equitable outcomes, the impacts of climate change, and community lifelines. While these topics are not new, this is the first time that the New Hampshire SHMP addressed them in depth, not only relative to each hazard, but also by incorporating them throughout the Plan into over-arching goals and mitigation actions. While the connections were not always explicit or direct, an effort was made to incorporate these focus areas into the Andover HMP.

The scope of this Plan includes a review of natural hazards affecting the town, as identified by the Hazard Mitigation Planning Committee. The hazards considered under the scope of this plan include the relevant natural hazards that are outlined in the [State of New Hampshire's Hazard Mitigation Plan Update 2023](#). Some hazards identified in the State Plan were deemed not applicable to the Town of Andover (Avalanche, and Landslide)

## F. METHODOLOGY

The Lakes Region Planning Commission (LRPC) corresponded with the Andover Emergency Management Director (EMD) to initiate the hazard mitigation update process. The EMD established the Andover Hazard Mitigation Planning Update Committee for the purpose of updating a plan for hazard mitigation. The Committee consisted of representatives from the Police, Fire, and Public Works departments, as well as Emergency Management Director (EMD), the Board of Selectmen (Town Administrator), the Planning Board, the Budget Committee, and members of the public.

The Committee developed the content of the Plan by following the process set forth in FEMA's *Local Hazard Mitigation Planning Guide (2023)*. Technical and historical information used during the development of this Plan Update was compiled from a variety of sources including local input as well as published information; a list of these resources can be found in Appendix I. Updated information on hazards in New Hampshire informed discussion of recommended mitigation actions.

Communication with committee members occurred at meetings and through correspondence. Meetings with the committee were open to the public. The committee reviewed and rated the risk of natural hazards to the town. They reviewed implementation progress and applicability of actions identified in the last plan. Existing challenges were identified. Additional mitigation actions were developed to address challenges/problems. All mitigation actions were evaluated, and an implementation schedule developed.

Neighboring municipalities were notified of Andover's plan update. Some comments were received from the public during the development of the plan update through surveys, and these were incorporated into the risk analysis and development of mitigation actions phases of the process.

It is important to note that this is Andover's Hazard Mitigation Plan (HMP). While all HMPs in the state (and country) must incorporate the elements set forth by FEMA, the plan update, "needs to reflect the unique situation and most effective path...to meet their specific needs"<sup>1</sup>. Andover, a small rural community has done that by reviewing the existing plan and mitigation actions, considering what has and has not changed in the community since the last plan was adopted, identified problems associated with natural hazards, and developed a prioritized list of mitigation actions to address these problems and a plan to implement them.



<sup>1</sup> FEMA, *Local Hazard Mitigation Guide (2023)*, Section 3.1 Right-Sizing Plan Development and Update.

## G. PUBLIC INVOLVEMENT

A variety of Hazard Mitigation Planning stakeholders were invited to join the Hazard Mitigation Planning Committee. Other specific opportunities for public input occurred at each meeting. EMDs in adjacent communities and organizations working with vulnerable and underserved communities were notified of the update process and encouraged to provide input (see emails and press release Appendix C). Organizations that work with socially vulnerable communities were invited to provide input during plan development. Local businesses, neighboring communities, academia, and members of the public were encouraged to attend all meetings through press releases and postings (Appendix C & D).

A survey was made available to members of the public at the Town Hall and by posting a link <https://arcg.is/1en8iv0> and QR Code on the town website. More than two dozen people submitted their concerns and comments which were shared with committee members (see Appendix D) and, where applicable, incorporated into the update. This resulted in refinement of the Risk Rating.



A local resident joined in on the initial meeting and continued to attend and participate in meetings. This resident also serves on several local committees.

The Andover Hazard Mitigation Committee was comprised of the following individuals.

| Committee Representation            | Person             |
|-------------------------------------|--------------------|
| EMD (Emergency Management Director) | Anthony Booth      |
| Police                              | Joseph Mahoney     |
| Fire                                | Steven Barton      |
| Public Works/Highway/Road Agent     | Kevin Duval        |
| EMS                                 | Andrew Perkins     |
| Selectboard/Town Administrator      | Scott Hilliard     |
| Planner/Planning Board member       | Ken Wells          |
| Budget Committee                    | Donna Crisp Duclos |
| School representative               | Kelly George       |
| Proctor Academy                     | Kurt Meier         |
| Local Residents                     | Scott Kidder       |
| Local resident/FD                   | Rene Lefebvre      |
| Andover Village District (Water)    | John Dickinson     |

|                                  |               |
|----------------------------------|---------------|
| <b>Additional participants:</b>  |               |
| Lakes Region Planning Commission | David Jeffers |
| NH HSEM field representative     | Jill Piwoski  |

The committee members listed above participated in several committee meetings, provided departmental information, contributed in their field of expertise, reviewed and commented on committee meeting notes, reviewed drafts of the Plan, and worked together to identify and prioritize mitigation projects.

Many thanks for all the hard work and effort from each one of you. This plan would not exist without your knowledge and experience.

## **SECTION II: COMMUNITY PROFILE**

### **A. GEOGRAPHY**

The Town of Andover is in Merrimack County in central New Hampshire. The town is bordered to the north by Danbury and Hill, to the east by Franklin, to the south by Salisbury, and to the west by Wilmot. Andover is 41 miles to Manchester; 93 miles to Boston, MA; 275 miles to New York, NY; and 220 to Montreal, Canada.

The eastern half of Andover is rolling hills with several active farms. The west has a steeper, wooded character. The town of Andover contains 40 square miles of land and water area.

Danbury's Ragged Mountain dominates the northwest. Highland Lake and Bradley Lake along with numerous ponds are important parts of the landscape. The Blackwater River and its tributaries run through the central portion of town and create wetland areas, especially near the southeaster border with Salisbury.

### **B. WEATHER CONDITIONS**

Like many New England towns, the temperature and precipitation in Andover varies greatly. The average temperature for the area varies from 19 degrees Fahrenheit in January to 80.0 degrees Fahrenheit in July. The average annual precipitation is 41.4 inches.

The Selectboard commented on the increased intensity of rainfall events, leading to more frequent flooding events.

### **C. PUBLIC SERVICES AND INFRASTRUCTURE**

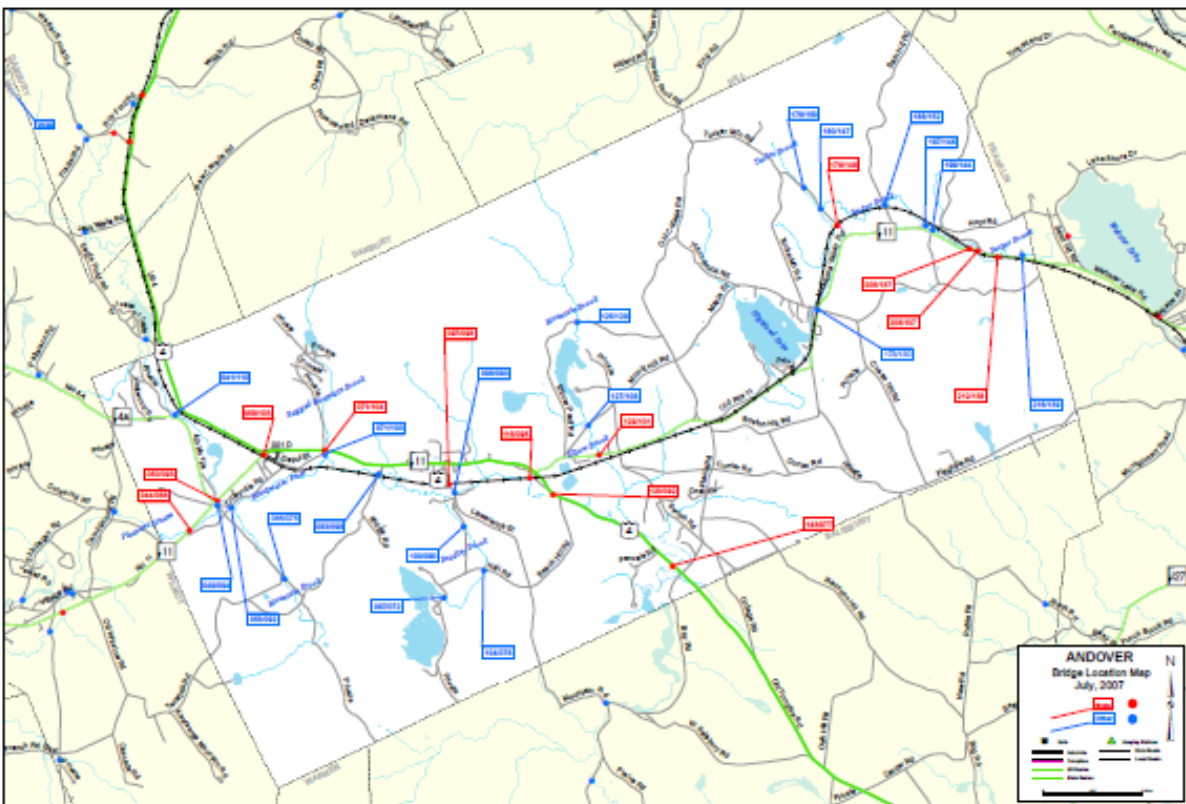
A three-member Board of Selectmen governs the town of Andover with the assistance of a Town Administrator. The Town holds its annual town meetings in March.

The town has a stand-alone Emergency Management Director. The Fire Department has a part-time Fire Chief and deputy. The Police Chief is full-time, assisted by three Patrolmen and an Administrative Assistant. The Highway Supervisor and two staff are responsible for the maintenance of 49 miles of town roads (25 mi. paved, 24 mi. unpaved). The town does not have a Building Inspector.

New London Hospital is 11 miles to the southwest. Branches of Concord Hospital are available in Franklin 12 miles to the east, Laconia 24 miles to the east, and in Concord, 26 miles to the south. Speare Memorial Hospital is in Plymouth, 37 miles to the north and Dartmouth-Hitchcock in Lebanon 38 miles to the west.

NH Route 11 runs east-west through the center of Andover, near the south shore of Highland Lake and through East Andover. This connects Franklin in the east and New London in the west. US Route 4 runs through the western half of town, connecting Salisbury in the south to Danbury in the north. US 4 also coincides with NH 11 for a couple of miles as it passes through the village area. NH 4A enters Andover from Wilmot in the northwest.

Andover has more than 30 bridges, with about a dozen owned and maintained by the State (red labels below), the rest are owned and maintained either by the town or private entities (blue labels below).



#### **Bridges:**

Andover continues to struggle with multiple, red-lined bridges - bridges in need of significant repair. Currently, Hall Road bridge is open to one-way traffic only until repairs can be made. Kenniston Bridge will soon be undergoing roof repairs and upgrades which is a cost-effective way to decrease potential snow load and increase the longevity of the historic covered bridge. Cilleyville-Bog Bridge, which was open to foot traffic only, has been closed completely as it has been deemed unsafe by the state. Fortunately, the Town received unanticipated state funds to help offset the costs of some of these repairs and we continue to contract with Hoyle & Tanner to regularly evaluate and repair our bridges. Additionally, we are proposing to the Town in a warrant article to contract with Hoyle & Tanner to provide a comprehensive town-wide bridge evaluation and capital improvement plan. The Select Board is proposing to fund these services through the unexpended fund balance.

Power is provided to Andover residents and businesses by two utilities: NH Electric Cooperative serves most of the homes and business throughout the town (1,299 properties), the remainder (49 properties) are served by Eversource.

Many Andover residences and businesses rely on private wells and septic systems. Andover Village District provides water to the village area. <https://www.andover-nh.gov/andover-village-district>

#### D. DEMOGRAPHICS AND POPULATION CHARACTERISTICS

Like many Lakes Region communities, the population of Andover grew rapidly from 1980-2010, from 1,587 to 2,371 residents. Growth since then has slowed a bit. Population growth is projected to continue but at a much slower pace in the foreseeable future.

##### Year-Round Population, 1980-2020 Census and Population Projections\* 2030, 2040

| Year                      | 1980  | 1990  | 2000  | 2010  | 2020  | 2030* | 2040* |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| <b>Andover Population</b> | 1,587 | 1,880 | 2,114 | 2,371 | 2,406 | 2,567 | 2,638 |
| <b>Andover Change</b>     | ---   | 18%   | 12%   | 12%   | 1%    | 7%    | 3%    |
| <b>NH Change</b>          | ---   | 20%   | 11%   | 7%    | 5%    | 7%    | 3%    |

Sources: US Census and Population Projections\*

Some characteristics of a community's population can put them at greater risk of being impacted by hazards. Utilizing Census data the NH Department of Health and Human Services (Environmental Public Health Tracking) developed a tool called the [Social Vulnerability Index](#). This tool references sixteen determinants of health associated with health and emergency response outcomes. The most recent data available through this index (2015-2019) indicate very little Social Vulnerability for Andover.<sup>2</sup>

#### E. LAND USE AND DEVELOPMENT TRENDS

There are 1,151 housing units in Andover, according to *Current Estimates and Trends in New Hampshire's Housing Supply 2024*, published by the NH Department of Business and Economic Affairs. Eighty-eight percent of them are single family homes.

Andover has a relatively small proportion of seasonal residents, compared with the Lakes Region average (2020) of 19.8%. The US Census indicates that while there has been slow growth in the number of housing units in Andover and that many of the seasonal (vacant) housing were being converted to year-round (occupied).

<sup>2</sup> Data for Andover alone is not directly available, as the US Census groups Andover and Salisbury together in one census tract.

**Housing Units - Andover, NH 2010-2020**

|                        | <b>2010</b> | <b>2020</b> | <b>Change</b> |
|------------------------|-------------|-------------|---------------|
| Total Housing Units    | 1,121       | 1,132       | 11            |
| Occupied Housing Units | 890         | 962         | 172           |
| Vacant Housing Units   | 231         | 170         | -61           |
| % Seasonal (Vacant)    | 20.6%       | 15.0%       | -5.6%         |

**Development Trends**

Existing land use, according to the 2013 Andover Master Plan has “...a strong influence on future development patterns. It is important to understand how land and other resources are currently used before recommendations can be developed regarding future land uses. Several factors have influenced Andover’s current land use patterns, including natural resource constraints, the transportation network, agricultural and forestry practices, and the development of commerce and industry. Another significant factor is the influence of the Andover Zoning Ordinance, which has been in place without significant change since the adoption of zoning in 1974.

Examination of the existing land use maps reveals several characteristics of land use patterns in Andover. The characteristics were identified by the committee, as listed below:

- Development has taken place primarily along existing roads.
- Farms are distributed throughout Andover, although the majority of farms are in the eastern part of town.
- Residences are distributed throughout town.
- Light industrial uses are clustered in specific areas: near Monticello Drive; near the intersection of Plains Road and Route 4; near the westerly junction of routes 4 and 11.
- A large number of wetlands are adjacent to developed areas.
- There is virtually no development on the west side of Bradley Lake, the town’s public water supply.
- In general, there is little to no development at higher elevations.
- The Plains area (one-acre zoning) has a higher residential density compared to other areas of the town.
- Little multiple unit residential use is evident, but it is distributed throughout town.
- Commercial use is limited except along route 11 in the far west of Andover.

**Development Activity: 2019 – 2023**

(from Andover Town Reports)

**2019**

- Focus on Enforcement and compliance with the Town’s Ordinance and policies.
- Two zoning ordinance amendments: expansion of Andover Village District and Cilleyville Village District.

**2020**

- Study creation of new Highway Department and garage
- 62 building permits were issued.

**2021**

- New Conservation Subdivision amendment to the Zoning Ordinance on the March 2022 ballot
- 75 building permits were issued, of which 4 are new homes and 3 ADU's.

**2022**

- The Planning Board worked on an amendment to the zoning ordinance to allow workforce housing within the Village and Rural Residential zones for the March 2023 ballot.

**2023**

- The Workforce Housing Zoning Ordinance amendment passed.

**Traffic Volume**

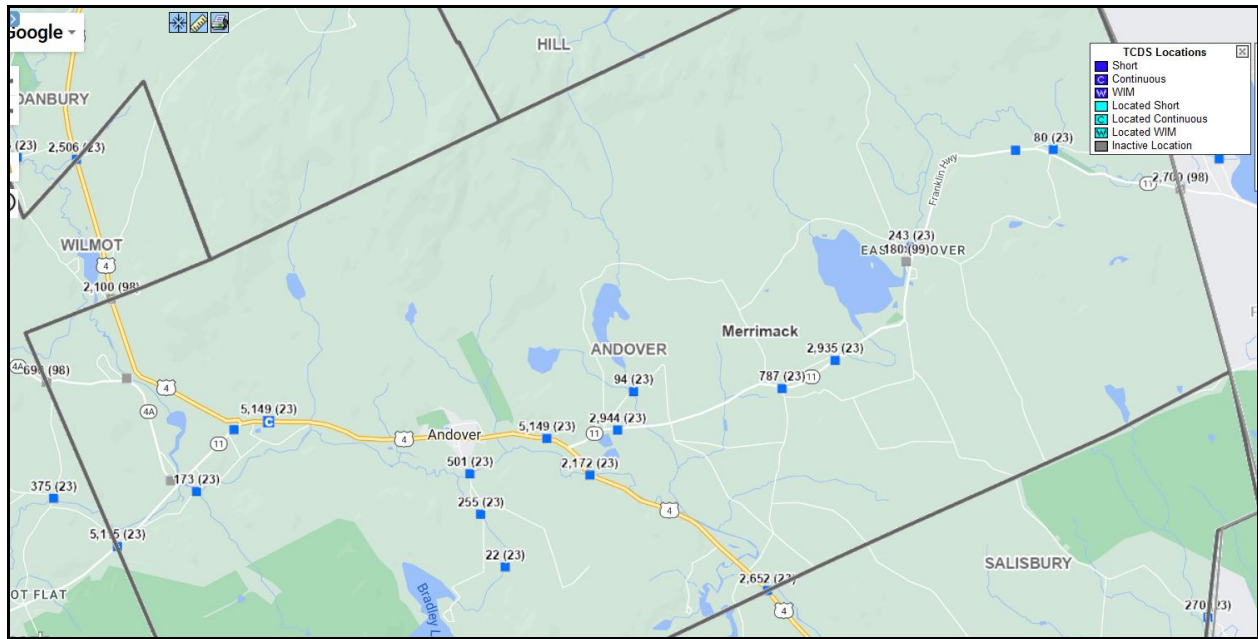
A standard measure of traffic volume is Average Annual Daily Traffic (AADT) counts, measured in vehicles per day.<sup>3</sup> As this is a projected average over the entire year, there are certainly many summer days when the volume of traffic on any one of these roads exceeds these figures.

There are twenty locations throughout Andover where traffic volume is measured on a regular basis. While there is some variability over the years, there has been very little change in traffic volume through Andover over the last five years (with the exceptions of 2020 and 2021 due to COVID-related changes – and even these were minimal changes).

**Traffic Counts in Andover** ('Latest' is the AADT – average number of vehicles each day)

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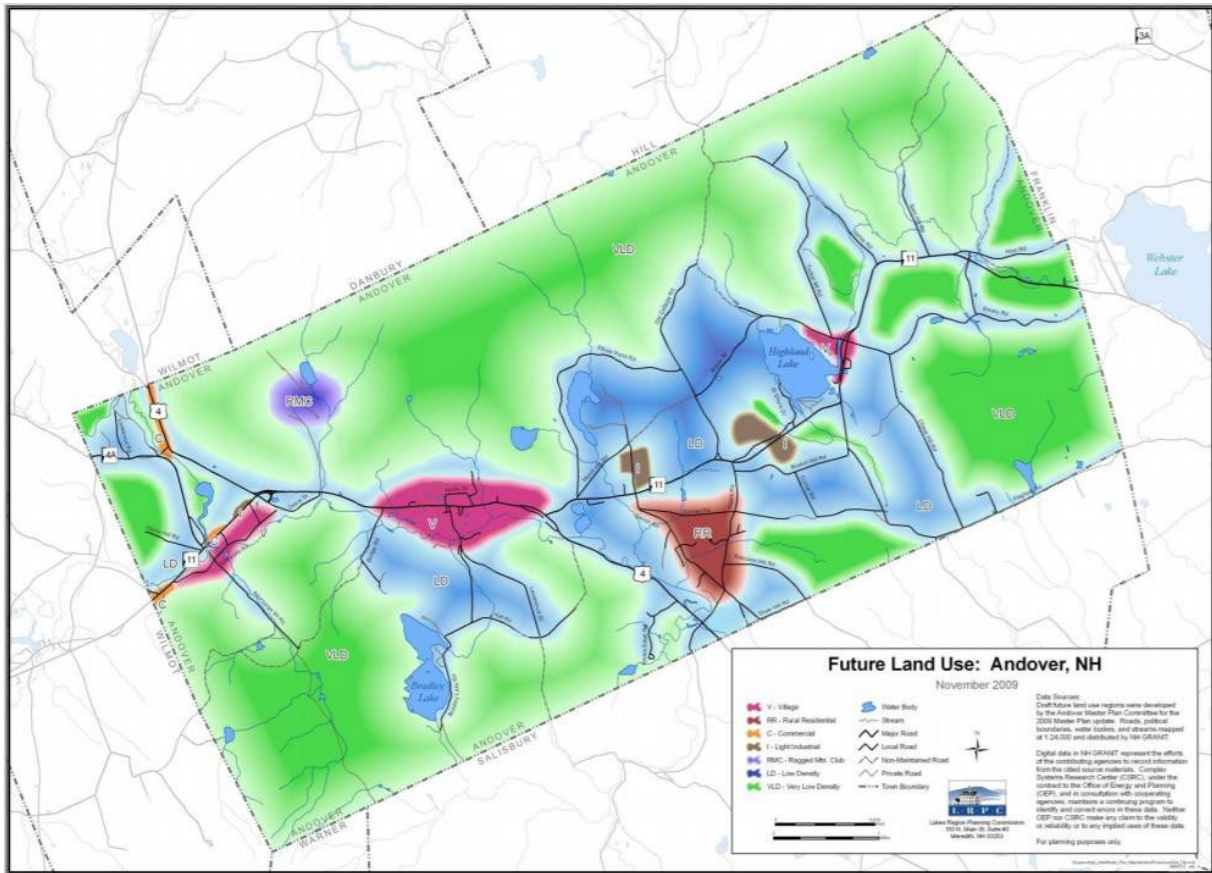
<sup>3</sup> The complete set of current and historic Andover Traffic Count volumes can be found at <https://nhdot.public.ms2soft.com/tcds/tsearch.asp?loc=Nhdot&mod=TCDS> using the NH DOT TDMS data mapping tool.



| Loc ID                   | County    | Community | On                | From | To | At | Dir   | Latest |
|--------------------------|-----------|-----------|-------------------|------|----|----|-------|--------|
| <a href="#">02015001</a> | MERRIMACK | ANDOVER   | Main St           |      |    |    | 2-WAY | 5149   |
| <a href="#">62015051</a> | MERRIMACK | ANDOVER   | Main St           |      |    |    | 2-WAY | 5115   |
| <a href="#">62401052</a> | MERRIMACK | ANDOVER   | Salisbury Hwy     |      |    |    | 2-WAY | 2652   |
| <a href="#">82015011</a> | MERRIMACK | ANDOVER   | NH Route 4A       |      |    |    | 2-WAY | 690    |
| <a href="#">82015012</a> | MERRIMACK | ANDOVER   | NH Route 4A       |      |    |    | 2-WAY | 790    |
| <a href="#">82015015</a> | MERRIMACK | ANDOVER   | Main St           |      |    |    | 2-WAY | 5615   |
| <a href="#">82015050</a> | MERRIMACK | ANDOVER   | Franklin Hwy      |      |    |    | 2-WAY | 2674   |
| <a href="#">82015053</a> | MERRIMACK | ANDOVER   | Salisbury Hwy     |      |    |    | 2-WAY | 2172   |
| <a href="#">82015054</a> | MERRIMACK | ANDOVER   | Franklin Hwy      |      |    |    | 2-WAY | 2944   |
| <a href="#">82015055</a> | MERRIMACK | ANDOVER   | Channel Rd        |      |    |    | 2-WAY | 180    |
| <a href="#">82015056</a> | MERRIMACK | ANDOVER   | Main St           |      |    |    | 2-WAY | 6087   |
| <a href="#">82015057</a> | MERRIMACK | ANDOVER   | Franklin Hwy      |      |    |    | 2-WAY | 2935   |
| <a href="#">82015059</a> | MERRIMACK | ANDOVER   | Cilleyville Rd    |      |    |    | 2-WAY | 173    |
| <a href="#">82015060</a> | MERRIMACK | ANDOVER   | Lawrence St       |      |    |    | 2-WAY | 501    |
| <a href="#">82015061</a> | MERRIMACK | ANDOVER   | Bradley Lake Rd   |      |    |    | 2-WAY | 255    |
| <a href="#">82015062</a> | MERRIMACK | ANDOVER   | Hall Rd           |      |    |    | 2-WAY | 22     |
| <a href="#">82015063</a> | MERRIMACK | ANDOVER   | Morrill Hill Rd   |      |    |    | 2-WAY | 94     |
| <a href="#">82015064</a> | MERRIMACK | ANDOVER   | Plains Rd         |      |    |    | 2-WAY | 787    |
| <a href="#">82015065</a> | MERRIMACK | ANDOVER   | Maple St          |      |    |    | 2-WAY | 243    |
| <a href="#">82015066</a> | MERRIMACK | ANDOVER   | Dyers Crossing Rd |      |    |    | 2-WAY | 80     |

### Future Development

In 2013 Master Plan update process engaged the public in determining an appropriate future land use plan for the town of Andover. The zoning ordinance is intended to implement the vision of the Master Plan. Slightly more dense development is being encouraged in the Village areas.



Overall, the Committee feel that the town is better protected from natural hazard events than it was at the time of the last update.

## **SECTION III: RISK ASSESSMENT**

### **A. INVENTORY OF ASSETS**

The Critical Facilities List for the Town of Andover has been identified by the Andover Hazard Mitigation Planning Committee. A critical facility is defined as a building, structure or location which is: vital to the emergency response; maintains an existing level of protection from hazards within the community and would create a secondary disaster if a hazard were to impact it. The Critical Facilities List for the Town of Andover has been identified using the following categories:

#### **CATEGORY 1 (Facilities needed for Emergency Response)**

- Fire
- Emergency Medical Services (EMS)
- Police
- Hospital
- Shelter
- Town Hall
- Emergency Operations Center (EOC)
- Public Works
- Water Supply/Treatment
- Sewer Treatment
- Emergency Fuel

#### **CATEGORY 2 (Facilities NOT necessary during an emergency event)**

- Public Utilities
- Transportation
- Evacuation Routes

#### **CATEGORY 3 (Populations & Places to Protect)**

- Schools
- Daycares
- High Concentration Populations
- Elderly Facilities
- Healthcare Facilities
- Recreation areas
- Historic Resources

| Andover, NH<br>Inventory of Critical Facilities and Assets |                                                                                                                                                                                                     |                |                               |          |                                                                                                        |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------|----------|--------------------------------------------------------------------------------------------------------|
| Facility                                                   | Name/Location                                                                                                                                                                                       | Owner          | Back-Up Power                 | Category | 2024 Comment/Change                                                                                    |
| Town Hall                                                  | Andover Town Hall, 31 School Street                                                                                                                                                                 | Municipal      | Yes                           | 1        | Generator was installed and is operational                                                             |
| EOC Primary<br>Secondary                                   | Andover Town Hall, 31 School Street                                                                                                                                                                 | Municipal      | Yes                           | 1        |                                                                                                        |
|                                                            | Andover Fire Station, 197 Main Street                                                                                                                                                               | Municipal      | Yes                           | 1        |                                                                                                        |
| Police Station                                             | Andover Police Station, 32 School Street                                                                                                                                                            | Municipal      | Yes                           | 1        |                                                                                                        |
| Fire Station/<br>EMS                                       | Andover Fire Station, 197 Main Street                                                                                                                                                               | Municipal      | Yes                           | 1        |                                                                                                        |
|                                                            | East Andover Fire Station, 23 Channel Road                                                                                                                                                          | Municipal      | Yes                           | 1        |                                                                                                        |
|                                                            | Andover EMS                                                                                                                                                                                         | Municipal      | n/a                           | 1        |                                                                                                        |
| Hospital /<br>Medical Facility                             | Proctor Health Center, North Street                                                                                                                                                                 | Private        | n/a                           | 1        |                                                                                                        |
| Shelter                                                    | Andover Elementary Middle School, 20 School Street                                                                                                                                                  | Municipal      | No                            | 1        |                                                                                                        |
|                                                            | Proctor Academy, Main Street                                                                                                                                                                        | Private        | Generator @ various buildings | 1        |                                                                                                        |
| Public Works                                               | Road Agent provides equipment, services and direction to Town Public Works.                                                                                                                         | Municipal      | Yes                           | 1        | The building is new.                                                                                   |
| Water Supply/<br>Treatment                                 | Andover Village District, within district from Mitchell Brook to Bridge Road North Street down Lawrence Street & Peg Shop Road, park street block house lane – surface water from Bradley Lake Road | Govt. Precinct | Yes                           | 1        | Sufficient capacity, good condition for future needs. Chlorinating plant Needs lead & arsenic testing. |
| Emergency Fuel Supply w/<br>Back-up power                  | DOT Shed on Switch Road (diesel only)                                                                                                                                                               | State          | Yes                           | 1        |                                                                                                        |
|                                                            | Diesel and gas at the State DOT shed on Rt. 127                                                                                                                                                     | City           | Yes                           | 1        |                                                                                                        |
| Sewer Treatment                                            | Private systems only                                                                                                                                                                                | n/a            | n/a                           | n/a      |                                                                                                        |
| Public Utilities                                           | NH Electric Coop                                                                                                                                                                                    | Private        | No                            | 2        |                                                                                                        |
|                                                            | PSNH (about 3 dozen residents)                                                                                                                                                                      | Private        | No                            | 2        |                                                                                                        |
|                                                            | Verizon cell tower                                                                                                                                                                                  | Private        | No                            | 2        |                                                                                                        |
|                                                            | TDS Telephone and internet (2 switching stations on School Street and Chase Hill Road)                                                                                                              | Private        | No                            | 2        |                                                                                                        |

| Facility                | Name/Location                                                                 | Owner              | Back-Up Power | Category | 2024 Comment/Change                       |
|-------------------------|-------------------------------------------------------------------------------|--------------------|---------------|----------|-------------------------------------------|
| Transportation Services | First Student Bus Company                                                     | Private            | n/a           | 2        |                                           |
|                         | Proctor Academy                                                               | Private            | n/a           | 2        |                                           |
| Evacuation Routes       | Route 4 East & West                                                           | n/a                | n/a           | 2        | Bridge replacement closure in 2024 /2025  |
|                         | Route 11 East & West                                                          | n/a                | n/a           | 2        | Bridge replacement one lane in 2024/2025  |
| Schools                 | Andover Elementary Middle School, 20 School Street                            | Municipal          | No            | 3        |                                           |
|                         | Proctor Academy                                                               | Private            | Yes           | 3        |                                           |
| High Population Areas   | Proctor Academy, Main Street                                                  | Private            | Yes           | 3        |                                           |
|                         | Andover Village District                                                      | Mixed              | n/a           | 3        |                                           |
|                         | East Andover Village District                                                 | Mixed              | n/a           | 3        |                                           |
| Elderly                 | Pine View Haven, 85 Franklin Hwy                                              | Private            | No            | 3        |                                           |
|                         | Mildred Longfellow's, Franklin Hwy                                            | Private            | No            | 3        |                                           |
|                         | Singh, Branden O'Malley-Elderly Shelter                                       | Private            |               | 3        |                                           |
| Recreational Areas      | Blackwater Ski Area, Lawrence Street                                          | Private            | n/a           | 3        |                                           |
|                         | Proctor Academy Athletic Fields and Ice Rink                                  | Private            | n/a           | 3        |                                           |
|                         | Chaffee Park – Town Beach                                                     | Municipal          | n/a           | 3        |                                           |
|                         | Blackwater Park                                                               | Municipal          | n/a           | 3        |                                           |
|                         | Corson Park                                                                   | Municipal          | n/a           | 3        |                                           |
|                         | Bradley lake                                                                  | Mixed              | n/a           | 3        |                                           |
|                         | Highland Lake                                                                 | Mixed              | n/a           | 3        |                                           |
| Historic                | Durgin, Gershom, House, 391 Franklin Highway                                  | Private            | No            | 3        |                                           |
|                         | East Andover Village Center Historic District, Jct. Rt. 11 and Chase Hill Rd. | Mixed              | No            | 3        |                                           |
|                         | Potter Place Train Station Area                                               | Historical Society | No            | 3        |                                           |
|                         | Covered Bridges (Bridge Street & Cilleyville)                                 | Municipal          | No            | 3        |                                           |
|                         | Hersey Farm, Franklin Highway                                                 | Private            | No            | 3        |                                           |
|                         | Taunton Hill (Old College Road) – various houses                              | Mixed              | No            | 3        | Added Hub to NH Historic Register in 2022 |

## B. IDENTIFYING NATURAL HAZARDS

The town of Andover is prone to a variety of natural, human-caused, and technological hazards. The following hazards were identified as posing a risk to Andover in the 2019 Hazard Mitigation Plan.

### Risk Rating (2019) - Natural Hazards

| Medium                           | Low          |
|----------------------------------|--------------|
| Severe Winter Weather            | Extreme Heat |
| Severe Wind (Tornado, Downburst) | Wildfire     |
| Hurricane                        | Drought      |
| Flood                            | Earthquake   |
| Lightning                        | Dam Failure  |

### Risk Rating (2019) – Human-Caused Hazards

| Medium               | Low                            |
|----------------------|--------------------------------|
| Utility Interruption | Haz Mat (fixed)                |
| Transport Incident   | Mass Casualty (Trauma/Medical) |
| Haz Mat (Transport)  | Bomb Detonation                |
|                      | Terrorist Attack (WMD)         |
|                      | Biological Terrorism           |
|                      | Armed Attack (assault, sniper) |
|                      | Urban Fire                     |
|                      | Civil Disorder                 |
|                      | Radiological Release           |

While updating the Plan, the committee considered the hazards identified in the latest *State of New Hampshire Multi-Hazard Mitigation Plan (2023)*, developed by the New Hampshire Department of Safety's Division of Homeland Security and Emergency Management, for identification and definition of hazards that might affect the town. Since the last local plan, the State Plan now utilizes a somewhat different hazard nomenclature, grouping some hazard types together, adding several hazards, and deleting some. All winter Weather events have been grouped under Severe Winter Weather. Extreme Temperature now encompasses both heat and cold. Hurricane is now Tropical & Post-Tropical Cyclone. Solar Storms & Space Weather is a newly specified natural hazard.

Following a review of the natural hazards identified in the 2023 State Plan and in Andover's 2019 Plan, as well as historical information from internet sources about past hazard events in and near Andover since 2019, the following natural hazards were identified as posing the greatest risk to the town. Higher risk score indicates higher risk (See end of Section III for more information on risk ratings).

Due to topography and geography, coastal flooding, avalanche, and landslides were not considered pertinent by the committee. While there are some steep areas in town, the committee indicated that they are not severe enough to lead to avalanche or landslide nor is there development in that area. Dams are addressed under inland flooding. While solar storms and space weather were acknowledged as potentially impacting communications equipment, it was seen as a hazard which would impact the entire state and that remaining abreast of notices from NH HSEM regarding this hazard would be the wisest course of action.

| Andover HMP 2024                     | Risk |
|--------------------------------------|------|
| High Wind Events (Tornado/Downburst) | 39.6 |
| Tropical & Post-Tropical Cyclones    | 33.3 |
| Inland Flooding                      | 32.4 |
| Severe Winter Weather                | 30.0 |
| Lightning                            | 21.6 |
| Extreme Temperatures                 | 18.4 |
| Drought                              | 13.8 |
| Wildfires                            | 13.8 |
| Earthquake                           | 10.8 |
| Infectious Diseases                  | 8.0  |
| Dam Failure                          | 8.0  |
| Solar Storms & Space Weather         | 2.0  |
| Avalanche                            | 1.0  |
| Landslides                           | 1.0  |

The natural hazards with the highest relative risk ratings have not changed. Changes since the last update include dropping lightning from the medium risk to low risk. Flooding, winter weather, and high winds are now viewed locally as high risk, not medium risk. The risk associated with Infectious Diseases was acknowledged to be higher than in the last plan.

Human-caused and Technological hazards are acknowledged in the State Hazard Mitigation Plan. They are not, however, required by FEMA to be addressed in local Hazard Mitigation Plans. The potential for long-term utility outage, hazardous materials, transportation accident, aging infrastructure, terrorism/violence, and conflagration events all have the potential to occur in Andover. Any of these hazards that the committee felt applicable are addressed in Appendix G.

### C. PROFILING NATURAL HAZARD EVENTS

This section of the plan **defines** each of the natural hazards that might impact Andover. It also describes the **extent** of the hazard, the recent **history** of these events, the likely **location** of each hazard, as well as the **probability** of an occurrence in Andover. These are listed alphabetically.

The **extent** is a description of "how bad the hazard could get" considering three factors: magnitude, onset, and duration.

- *Magnitude* is the size of the hazard, such as depth of floodwaters or wind speed.

- *Onset* is how quickly the hazard approaches. Depending on geography as well as the nature of the rainstorm, floodwaters might rise over a period of days, or it might take just a few hours to build up a concentrated flow.
- *Duration* is a matter of how long the hazard is present. A downburst or tornado exists for minutes or hours, while a hurricane or tropical depression can be around for days.

Within the Risk Assessment completed for this plan, **extent** was measured on a scale ranging from Weak through Moderate, Severe, and Extreme based on magnitude, onset, and duration.

**Probability** is a description of how likely it is that an event will occur in town within the next 10 years. Potential hazards were rated on a five-point descriptive scale including improbable, remote, occasional, probable, and frequent. These were based mainly on past occurrences in the town, region, and state.

If a hazard event has occurred in the past it is listed under **history**, with a focus on those occurring since the last plan. If some parts of the town are more likely to be impacted by a particular hazard, either based on past events or local knowledge of geography, that is described under **location**.

### Impact

The **impact** of a hazard is the potential degree of damage that could occur. To rate the impact of a hazard, the damages and consequences that might result from an event were considered in three separate areas Human, Property, and Business & Services. This incorporates the likelihood of injury or death, the assessed value of each critical facility, and the vulnerability of these facilities. It also anticipated disruption of services to residents and visitors. Four levels of impact were used, as defined here:

- Low: Limited structural damage, the town's ability to respond is not compromised, and residents can handle the hazard event without help from outside sources
- Moderate: Some structural damage, the town's ability to respond is compromised, regional or assistance is needed to survive and/or recover
- High: Substantial structural damage, the town's ability to respond is greatly compromised, state or federal assistance is necessary to survive and/or recover
- Catastrophic: Multiple injuries or deaths will likely result from this hazard. Damage to properties will be widespread and extensive. Essential services and other services that residents and visitors depend upon would likely be interrupted for days or weeks.

The assessed value of the critical facilities identified in Section A totals more than \$17M. This does not, however, include the contents of the building. Also not reflected in this assessment is the value of built infrastructure such as streets, bridges, curbs, drainage, and utility transmission lines. These values can also be used to determine potential loss estimates in the event of a natural hazard event that damages a part of or an entire facility.

Of course, critical facilities are not the only resources at risk during a hazard event. There are numerous structures in town, both residential and commercial. The total valuation of the

structures in Andover is nearly \$250 million dollars. If even a small percentage of those structures are destroyed or damaged during a hazard event, it could be quite costly to repair or replace. 64% of the structural valuation in Andover comes from residential structures.

#### Andover Structure Assessment

|                                 | <b>Value - Structures<br/>2022</b> | <b>1%</b>          | <b>2%</b>          | <b>5%</b>           |
|---------------------------------|------------------------------------|--------------------|--------------------|---------------------|
| <b>Residential</b>              | \$158,948,154                      | \$1,589,481        | \$3,178,963        | \$7,947,408         |
| <b>Manufactured<br/>Housing</b> | \$3,648,000                        | \$36,480           | \$72,960           | \$182,400           |
| <b>Comm./Industrial</b>         | \$21,115,900                       | \$211,159          | \$422,318          | \$1,055,795         |
| <b>Exempt</b>                   | \$34,472,400                       | \$344,724          | \$689,448          | \$1,723,620         |
| <b>Public Utilities</b>         | \$30,880,100                       | \$308,801          | \$617,602          | \$1,544,005         |
| <b>Total</b>                    | <b>\$249,064,554</b>               | <b>\$2,459,064</b> | <b>\$4,981,291</b> | <b>\$12,453,227</b> |

Source: MS-1 form in Andover Annual Report 2022

Aging infrastructure, local implementation of land use and zoning laws, and various social vulnerabilities may increase the risk to natural hazards. Local jurisdictions are provided with the ability to address zoning through RSAs to adopt ordinances that can reduce risk to infrastructure and vulnerable individuals within their communities. By taking advantage of federal funding available through NH HSEM, NH DOT, and NH DHHS, Andover can address the areas of greatest risk in town.

[Social Vulnerability](#) refers to the resilience of communities (the ability to survive and thrive) when confronted by external stresses on human health, stresses such as natural or human-caused disasters, or disease outbreaks. Socially Vulnerable Populations can include those who have special needs, such as, but not limited to, people without vehicles, people with disabilities, older adults, and people with limited English proficiency.<sup>4</sup>

The aspects considered in this plan focus on those socially vulnerable groups that comprise at least 10% of the residents or households according to the State Hazard Mitigation Plan. In Andover this includes Single Parent Households (24%), Individuals Aged 65 or greater (17%), those with Disabilities (14%), and people living below the federal poverty line (11%).

<sup>4</sup> NH State Hazard Mitigation Plan (2023), p. 70.

## **NATURAL HAZARDS**

Below is a list of declared disasters or incidents listed on the HSEM Resource Center page for which public assistance was made available.

| <b>Incident Description</b>        | <b>Event date, name</b>               | <b>Declaration Type</b>                  | <b>DR #</b>    | <b>Declaration Date</b> | <b>Total Funds</b>   |
|------------------------------------|---------------------------------------|------------------------------------------|----------------|-------------------------|----------------------|
| <i>Severe Storm and Flooding</i>   | <i>July 11 Storms</i>                 | <i>Major Disaster Declaration</i>        | <i>4457</i>    | <i>8/15/2019</i>        | <i>\$3,202,283</i>   |
| <i>Public Health Outbreak</i>      | <i>COVID-19 (1/20/2020-5/11/2023)</i> | <i>Emergency Declaration</i>             | <i>EM 3445</i> | <i>3/13/2020</i>        | <i>N/A</i>           |
| <i>Public Health Outbreak</i>      | <i>COVID-19 (1/20/2020-5/11/2023)</i> | <i>Major Disaster Declaration</i>        | <i>DR 4516</i> | <i>4/3/2020</i>         | <i>\$126,873,601</i> |
| <i>Severe Storms and Flooding</i>  | <i>July 17-19 Flooding</i>            | <i>Major Disaster Declaration</i>        | <i>4622</i>    | <i>9/30/2021</i>        | <i>TBD</i>           |
| <i>Severe Storms and Flooding</i>  | <i>July 29-30 Flooding</i>            | <i>Major Disaster Declaration</i>        | <i>4624</i>    | <i>10/4/2021</i>        | <i>TBD</i>           |
| <i>Severe Storms and Flooding</i>  | <i>Dec. 21-25, 2022</i>               | <i>Major Disaster Declaration</i>        | <i>DR 4693</i> | <i>3/15/2023</i>        | <i>TBD</i>           |
| <i>Severe Storms and Flooding</i>  | <i>July 9-17, 2023</i>                | <i>Major Disaster Declaration</i>        | <i>4740</i>    | <i>9/14/2023</i>        | <i>TBD</i>           |
| <i>Severe Storms and Flooding</i>  | <i>Dec. 17-21, 2023</i>               | <i>Major Disaster Declaration</i>        | <i>4761</i>    | <i>2/27/2024</i>        | <i>TBD</i>           |
| <i>Severe Storms and Flooding</i>  | <i>Jan. 9-14, 2024</i>                | <i>Major Disaster Declaration</i>        | <i>4771</i>    | <i>4/19/2024</i>        | <i>TBD</i>           |
| <i>Winter Storm &amp; Flooding</i> | <i>April 3-5, 2024</i>                | <i>Presidential Disaster Declaration</i> | <i>4799</i>    | <i>6/10/2024</i>        | <i>TBD</i>           |
| <i>Severe Storm and Flooding</i>   | <i>July 10-13, 2024</i>               | <i>Presidential Disaster Declaration</i> | <i>DR 4812</i> | <i>8/5/2024</i>         | <i>TBD</i>           |

The information above was utilized as a guide for further discussion of hazards by the Committee with an emphasis on those most likely to impact Andover. The following section describes the hazard, its **extent**, **probability** of occurrence, and **history**, likely **location**, its likely **impact** in Andover. Hazard names are highlighted based on local risk (Orange - high, yellow – medium, blue – low).

### **AVALANCHE**

An avalanche is a slope failure consisting of a mass of rapidly moving, fluidized snow that slides down a mountainside. The flow can be composed of snow, ice, water, soil, rocks, and trees. An avalanche is a large mass of snow and ice, falling, sliding, or flowing under the force of gravity. An avalanche can be comparable to a landslide, only with snow instead of earth.

Natural and human-caused snow avalanches most often result from structural weaknesses of mountainside and unstable snow and ice formations. Factors leading to these conditions

include recent heavy snow, temperature, wind direction, snowpack conditions, slope angle, and slope orientation. Heavy snowfall followed by high winds often create areas of unstable snow accumulations that can be set in motion by human activities, such as hiking, ice climbing, skiing, and snowboarding.

There are three categories of avalanches:

- Soft Slab – consists of soft, low-density snow
- Hard Slab – consists of dense, hard-packed snow
- Loose Snow (also called sluffs or point releases) – release from a single point, typically on a very steep slope

**Extent:** Weak

The North American Public Avalanche Danger Scale (NAPADS) from the National Avalanche Center ([www.avalanche.org](http://www.avalanche.org)) is a system that rates avalanche danger and provides general travel advice based on the likelihood, size, and distribution of expected avalanches. It consists of five levels, from least to highest amount of danger: 1 – Low, 2 – Moderate, 3 – Considerable, 4 – High, 5 – Extreme. Danger ratings are typically provided for three distinct elevation bands. Although the danger ratings are assigned numerical levels, the danger increases exponentially between levels. In other words, the hazard rises more dramatically as it ascends toward higher levels on the scale.

**History:** Records (NOAA Storm Events database) indicate no avalanches have occurred in Merrimack County. There was no local knowledge of a landslide occurring in Andover.

**Location:** The mountainous regions of Carroll, Coos, and Grafton counties are at risk for avalanches, with the highest risk of avalanches occurring in the Presidential Range, particularly on Mount Washington. The committee determined that there are no locations in Andover where avalanches would occur.

**Probability of Occurrence:** Improbable

Avalanches are a common occurrence in high terrain areas in New Hampshire during the winter and spring months. Early warning systems have resulted in less impact lately, however, as more people get involved in outdoor recreation, the number exposed to avalanche threat could increase.

**Impact:** Low

Avalanches present a significant threat to hikers, skiers, and other people recreating on the mountain. Falling ice and rocks can cause injury or death. Cracks, holes, and crevasses in the snowpack can cause individuals to become trapped or buried in snow, which can result in extreme cold injuries, suffocation, and possibly death. Twenty-five to thirty people die each year nationally from avalanches. As there are no known instances of nor likely areas of avalanche, the impacts are considered low.

**Probability and Impact of Climate Change on Avalanche events:** Increasing precipitation associated with climate change are likely to lead to heavier, wetter snowfalls and more layers of snow and ice (less stability). Increased temperatures will raise the snow line to higher elevations, reducing the risk of lower altitude avalanches. As there are no avalanche locations in Andover, climate change will have no effect on the probability and impact of avalanche.

**Impact on Vulnerable Communities:** There are no known potential impacts associated with avalanche on Andover's vulnerable populations.

## **DROUGHT**

Drought occurs when less than the normal amount of water is available for extended periods of time. It often but not always, accompanies elevated temperatures. Effects may include decreased soil moisture, groundwater levels, streamflow, and lake, pond, and well levels may drop. Factors that may contribute to drought include reduced rain/snowfall, increased rates of evaporation, and increased water usage. New Hampshire generally receives adequate rainfall; it is rare that the state experiences extended periods of below normal water supplies.

Drought is the absence of water due to below-average precipitation over an extended period, resulting in low stream flows, low surface water, and low groundwater levels. According to NOAA, the climatological community has defined four types of droughts to address their cause(s), timeframe, and effects:

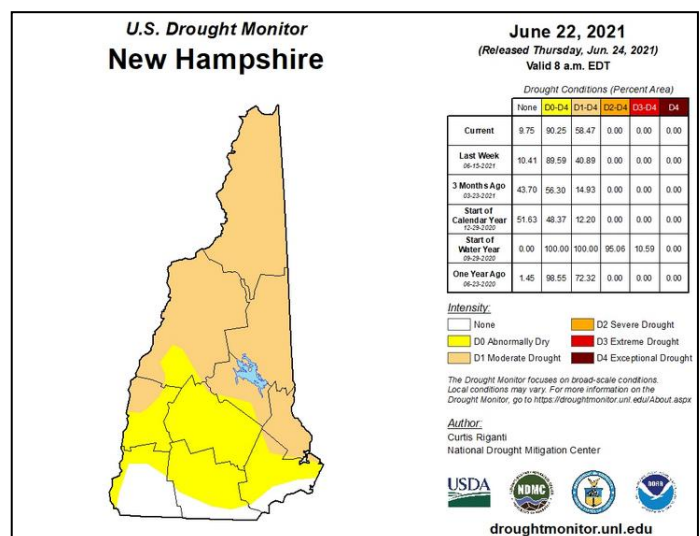
- **Meteorological Drought:** Occurs when dry weather patterns dominate an area, resulting in a lack of precipitation
- **Hydrological Drought:** Occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels—usually after many months of meteorological drought
- **Agricultural Drought:** Occurs when crops become affected by drought conditions
- **Socioeconomic Drought:** Effects of supply and demand of commodities affected by drought conditions

**Extent:** Moderate

A drought can last for months, or even years. Since 1990 New Hampshire has had a state Drought Emergency Plan, which identifies four levels of action indicating the severity of the drought:

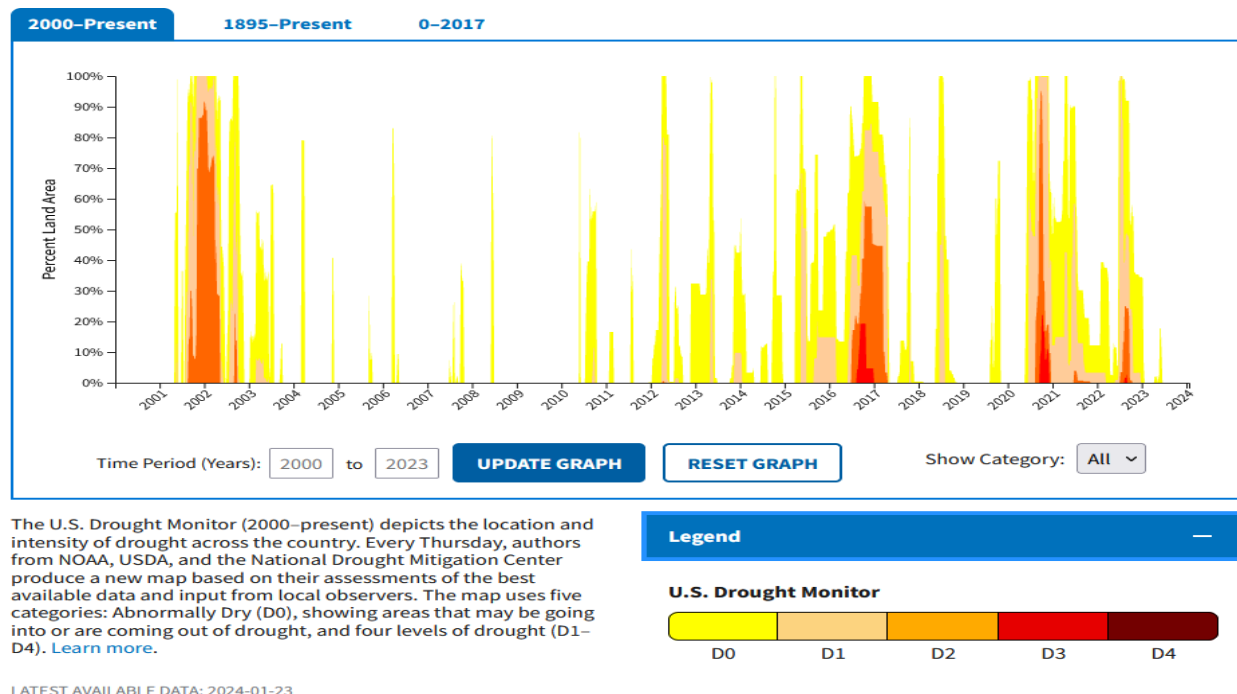
- Alert
- Warning
- Severe
- Emergency

Effects may include decreased soil moisture, groundwater levels, streamflow, and lake,



pond, and well levels may drop. Factors that may contribute to drought include reduced precipitation, increased rates of evaporation, and increased water usage. New Hampshire generally receives adequate rainfall; it is rare that the state experiences extended periods of below normal water supplies. The US Drought Monitor uses a five-level drought intensity scale ranging from Abnormally Dry to Exceptional Drought.

**History:** There have been five extended droughts in New Hampshire in the past century: 1929 to 1936, 1939 to 1944, 1947 to 1950, 1960 to 1969, and 2001 to 2002 and 2010. The statewide drought of 2001/02 had a minimal impact on water sources for fire protection in Andover. While much of the country experienced drought conditions in 2012, New Hampshire received adequate precipitation. Moderate drought conditions existed in New Hampshire during parts of 2015, 2016 and into April of 2017. In 2020 the state experienced a severe drought (D2-D3) leading water restrictions and \$500K of crop damages.



**Location:** Since drought is a state-wide or regional event, it would affect most areas of the town. Those with shallow (or dug) wells would likely be affected first. Drought can affect fire suppression where access to water for this purpose is limited.

**Probability of Occurrence:** Occasional

**Impact:** Moderate

A severe drought can affect public water supply, increase the probability of fires, and impede fire suppression. Those areas with minimal fire protection are at a higher risk because of a prolonged drought. Those with shallow wells would also be affected by drought. The committee discussed measures that can be taken to make water available both for consumption and fire

suppression. Including through coordination with the Andover Village District (water supply). As there is some reliance on agriculture in Andover, a limited number of shallow wells, and capacity to supply emergency water, the impact of a drought on Andover would be moderate; there would be no direct impact to structures. During the 2020 drought a hydrant in town was opened to provide water.

**Impact of Climate Change on Drought events:** Heat waves can exacerbate droughts, leading to negative impacts on the agriculture sector. More intense rain events certainly may reduce drought, conversely because of their intensity, it can be a situation of so much rain coming down in a short period of time that much of the water runs off as stormwater and does not have an opportunity to seep in and replenish the aquifer. More frequent or more intense drought could have negative impacts on the agriculture sector.

**Impact on Vulnerable Communities:** Potential impacts associated with drought on Andover's vulnerable populations include:

- Living in poorly maintained housing with aging infrastructure, such as shallow wells
- May be dependent upon others to travel
- Limited resources for seeking medical assistance

#### Earthquake > 4.0 Richter

An earthquake is a series of vibrations induced in the Earth's crust by the abrupt rupture and rebound of rocks in which elastic strain has been slowly accumulating.

**Extent:** Moderate

Earthquakes are commonly measured using *magnitude*, or the amount of seismic energy released at the epicenter of the earthquake. The Richter magnitude scale is a

| Richter Magnitude | Earthquake Effects                                            |
|-------------------|---------------------------------------------------------------|
| 2.5 or less       | Usually not felt, but can be recorded by seismograph.         |
| 2.5 to 5.4        | Often felt, but only causes minor damage.                     |
| 5.5 to 6.0        | Slight damage to buildings and other structures.              |
| 6.1 to 6.9        | May cause a lot of damage in very populated areas.            |
| 7.0 to 7.9        | Major earthquake. Serious damage.                             |
| 8.0 or greater    | Great earthquake. Can destroy communities near the epicenter. |

mathematical device used to compare the size of earthquakes, shown in the table above. Note: The 2023 NH State HMP now qualifies this hazard as *Earthquakes>4.0* as opposed to simply *Earthquakes*.

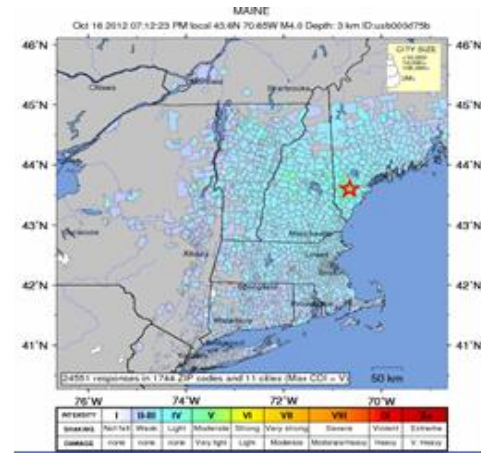
New Hampshire is in an area of moderate seismic activity with respect to other regions of the country. There is the potential for nearby earthquakes to register 5.5 on the Richter Scale, causing slight damage to buildings and structures. Due to the unique geology of New Hampshire, earthquake propagation waves travel up to 40 times further than they do in the western United States, possibly enlarging the area of damage.<sup>5</sup> The strongest earthquakes to strike New Hampshire occurred December 20 and 24, 1940 in the town of Ossipee. Both

<sup>5</sup> <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html> visited February 8, 2011.

earthquakes had a magnitude of 5.5 and were felt over an area of 400,000 square miles. The image at left shows the expected number of damaging earthquakes shaking in 10,000 years.

However, if a large earthquake occurred in or around the town, it is assumed that structural damage would be moderate to high.

**History:** On average, every other year the Lakes Region experiences an earthquake, though these earthquakes are mild and go mostly undetected by people. Sanbornton and Tamworth are identified as two epicenters in the region.<sup>6</sup> A search of the USGS National Earthquake Information Center database shows that since 1977 there have been 15 earthquakes with a magnitude of at least 3.0 within a 100 km (62 mi.) radius of Andover; the largest was magnitude 4.5. Two such earthquakes have occurred since 2006; a 3.4 event in 2010 centered in Penacook, NH and a 4.0 quake in southern Maine shook the region on October 16, 2012. The image at right indicates the communities where people reported feeling this event.<sup>7</sup>



Areas where the October 16, 2012 earthquake

| Location          | Date              | Magnitude |
|-------------------|-------------------|-----------|
| Ossipee           | December 24, 1940 | 5.5       |
| Ossipee           | December 20, 1940 | 5.5       |
| Ossipee           | October 9, 1925   | 4         |
| Portsmouth        | November 10, 1810 | 4         |
| Off Hampton       | July 23, 1823     | 4.1       |
| 15km SE of Berlin | April 6, 1989     | 4.1       |
| 5km NE of Berlin  | October 20, 1988  | 4         |
| W. of Laconia     | January 19, 1982  | 4.7       |
| Central NH        | June 11, 1638     | 6.5       |

Since the last plan (2019) there have been three earthquake events within 100 km of Andover, none reached a magnitude of 4.0. Andover has not experienced any significant earthquakes.

**Location:** An earthquake of 4.0 or greater could affect all areas of Andover, mainly multi-level structures and those that are either constructed of masonry or have masonry chimneys. Some bridges and dams might be impacted.

**Probability of Occurrence:** Remote

<sup>6</sup> <http://des.nh.gov/organization/commissioner/pip/factsheets/geo/documents/geo-3.pdf>, pg. 3, visited January 25, 2011.

<sup>7</sup> USGS, Earthquake Archive Search. <https://earthquake.usgs.gov/earthquakes/map/>

**Impact: Moderate-High**

According to the US Geologic Survey, the overall earthquake risk to the state is high due to the built environment which means that many structures in the state (buildings, bridges, dams, and power infrastructure) are old or not built to withstand an earthquake.

A relatively large earthquake would likely impact the roads, including bridges limiting the ability of emergency services to be rendered. Damages could range from cracked foundations, chimneys, and supports to full collapse. Structures that are taller, older, or built of masonry are most at risk. Additionally, earthquake shaking could damage the dams controlling water that passes through Andover.

Damage from the 1940 earthquakes in Ossipee included some damage to most of the chimneys in the epicenter region of Ossipee, ranging from cosmetic cracks to total collapse. Sections of several foundations collapsed and at least one house rotated on its foundation. In the town of Conway, 15 miles from the epicenter, one house was lost to fire when sparks in a cracked chimney started the blaze. Splits found in the rafters and trusses temporarily closed Ossipee High School. No damages were associated with the October 2012 earthquake, but the potential does exist for some damages to occur.

The fire department could have some response problems if the bridges were impacted, requiring redeployment of apparatus and people or mutual aid assistance. Areas of town with only one egress could become isolated from direct assistance.

All structures in Andover are susceptible to damage by an earthquake. Assuming 1% town-wide damage to buildings, an earthquake could result in nearly \$2.5 million in damages any given year.

**Impact of Climate Change on Earthquake events:** The impacts to Andover associated with an earthquake would not be affected by climate change.

**Impact on Vulnerable Communities:** Potential impacts associated with earthquakes on Andover's vulnerable populations include:

- living in poorly maintained housing with aging infrastructure
- May have limited mobility for getting assistance, dependence upon others to travel
- Limited resources for seeking medical assistance

**EXTREME TEMPERATURES**

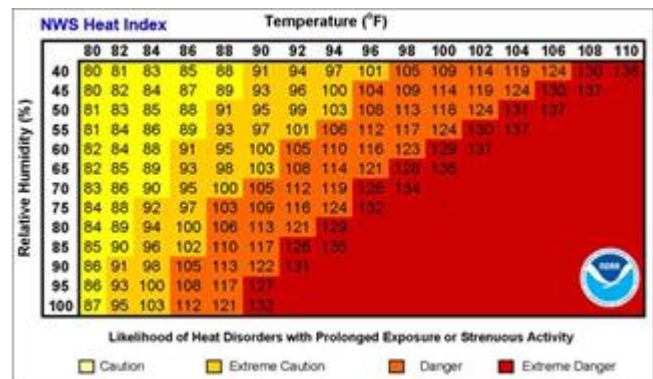
Extreme temperatures are a period of prolonged and/or excessive heat or cold that presents a danger to human health and life. Extreme Heat events occur because of above normal temperatures, which often coincide with high relative humidity, that increase the likelihood of heat disorders with prolonged exposure or strenuous activity. Heat related disorders include heat cramps, heat exhaustion, and heat stroke. High heat and humidity can also adversely affect air quality, leading to respiratory problems. Extreme heat can also damage or kill crops and animals (wild, farm, or domesticated), potentially presenting a risk to the economy.

Extreme Cold events are caused by the southern transport of arctic airmasses into the Northeast. This effect is exacerbated when there are winds present that effectively lower the temperature that is perceived by the human body, known as the wind chill. The risk comes from when the body is losing heat faster than it can produce it. Wind acts to carry heat away from the body, therefore amplifying the perceived temperature by the human body and reducing the body's core temperature. Cold disorders can include frostbite and hypothermia.

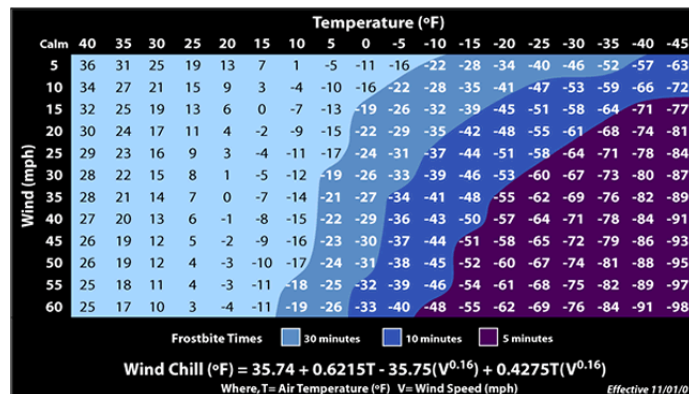
Frostbite occurs when uncovered skin/extremities are exposed to extreme cold and the body tissue is either injured or killed. Hypothermia is when the body is unable to heat itself at the rate it is being cooled and the body's core temperature begins to drop below normal values. A normal core body temperature is 98.6°F: mild hypothermia occurs when core body temperature drops between 90 to 95°F and severe hypothermia occurs at core body temperatures of below 90°F. If left untreated, hypothermia can result in unconsciousness and eventually death. Extreme cold can also damage or kill crops and animals (wild, farm, or domesticated), potentially presenting a risk to the economy.

**Extent: Moderate**

- Heat Advisory—Two or more consecutive hours of Heat Index values of 95-99 °F for two or more days *OR* any duration of Heat Index values of 100-104 °F. A Heat Advisory is issued within 12 hours of the onset of extremely dangerous heat conditions.
- Excessive Heat Warning—Two or more hours with Heat Index values of 105 °F or greater. An Excessive Heat Warning is issued within 12 hours of the onset of extremely dangerous heat conditions.
- Excessive Heat Watches—Heat watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
- Excessive Heat Outlooks—Issued when the potential exists for an excessive heat event in the next 3-7 days. An outlook provides information to those who need considerable lead-time to prepare for the event.
- Wind Chill Watch: The National Weather Service (NWS) issues a wind chill watch when dangerously cold wind chill values are *possible*. As with a warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least half a tank of gas and update your winter survival kit.



- **Wind Chill Advisory:** NWS issues a wind chill advisory when seasonably cold wind chill values but not extremely cold values are expected or occurring. Be sure you and your loved ones dress appropriately and cover exposed skin when venturing outdoors. A Wind Chill Advisory is issued for New Hampshire is wind chill values are expected to be -20°F to -29°F and winds are greater than 5 mph.
- **Wind Chill Warning:** NWS issues a wind chill warning when dangerously cold wind chill values are expected or occurring. A Wind Chill Advisory is issued for New Hampshire is wind chill values are expected to be -30°F and winds are greater than 5 mph.



### History:

Andover has experienced regular extreme hot and cold temperatures annually since the last plan update. The Town of Andover experiences extreme heat temperatures several days during the summer, but usually with little impact on the population.

| Event Date     | Event Description        | Impacts                                                          | Location      | Additional Information                                                                                                                                                                                                                                                                                                   |
|----------------|--------------------------|------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| July 1911      | Heat Wave                | Record high temperatures set in Concord, New Hampshire           | Statewide     | Extreme heat was recorded from July 3 <sup>rd</sup> through July 5 <sup>th</sup> , with high temperatures ranging from 101-102°F in Concord on these days. <sup>116</sup> These three days account for three of the top 10 hottest days on record for Concord, New Hampshire.                                            |
| March 2012     | Heat Wave                | Record high temperatures set in Concord, New Hampshire           | Statewide     | High temperature records in Concord, New Hampshire were broken for 5 consecutive days, with the hottest day being 84°F.                                                                                                                                                                                                  |
| September 2017 | Heat Wave                | High temperature records set across New Hampshire                | Statewide     | Mount Washington set record a daily high temperatures for four consecutive days. Manchester, Concord, and other areas across the State and New England also saw daily temperature records broken. <sup>117</sup>                                                                                                         |
| December 2017  | Cold Wave                | Record low temperatures set across New Hampshire                 | Statewide     | Record low temperatures were set across the State as a result of a cold wave. Portsmouth saw a low of -1°F and Mount Washington saw a low of -33°F (with a wind chill of -51°). Wind Chill Advisories were posted in central and southern New Hampshire, and Wind Chill Warnings were posted for northern New Hampshire. |
| February 2018  | One Day Winter Heat Wave | High temperature records set across New Hampshire                | Statewide     | Exceptionally strong high pressure ridge in place across the Eastern Seaboard. Record high temperatures were broken across the State. <sup>118</sup>                                                                                                                                                                     |
| 2/3/2023       | Wind Chill               | Most areas recorded top 3 coldest wind chill readings on record. | Merrimack Co. | Plym. airport Windchill -43 F.<br>NOAA Events                                                                                                                                                                                                                                                                            |

### Location:

Extreme temperatures can occur anywhere throughout the town of Andover. Those at higher elevation and greater exposure to wind are most likely to be impacted by cold. People living in less accessible parts of town are more likely to be impacted during winter cold spells.

**Probability of Occurrence:** Probable

**Impact:** Moderate

Heat related disorders include heat cramps, heat exhaustion, and heat stroke. Extreme heat can also damage or kill crops and animals (wild, farm, or domesticated), potentially presenting a risk to the economy. Facilities without generators and air-conditioners that house the elderly and disabled are very susceptible to human health issues. Utilities are also vulnerable as the demand for air-conditioners rises.

While most of the impact from extreme temperatures is on people and animals, there can also be structural impacts, especially from freezing and expansion of water in pipes and the resulting damages.

**Impact of Climate Change on Extreme Temperature events:** An increase in extreme temperatures will create ecosystem stress based on more intense heat waves and more extreme cold weather waves. The extreme temperatures will create additional health impacts due to high heat/extreme cold exposure, and poor outdoor air quality during extreme heat events. Heat waves can exacerbate droughts and wildfire, which can lead to negative impacts on the agriculture sector.

**Impact on Vulnerable Communities:** Potential impacts associated with extreme temperature events on Andover's vulnerable populations include:

- May have limited access to early warning alerts
- Living in poorly maintained housing with aging infrastructure
- May have limited mobility for getting assistance/evacuation, dependence upon others to travel
- Limited resources for seeking medical assistance

#### **HIGH WIND EVENT (THUNDERSTORM/TORNADO/DOWNBURST)**

Andover is likely to experience either of two types of high wind events that usually result from other severe storms and can occur at any time of the year: tornados and straight-line winds. A **tornado** is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. It is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust and debris. Tornadoes are the most violent of all atmospheric storms. **Straight-line winds** describe any thunderstorm wind that is not associated with rotation and is usually used to differentiate from tornadic winds. There are several sub-types of straight-line winds, including **downdraft**, which is a small-scale column of air that rapidly sinks towards the ground; and **downburst**, which is the result of a downdraft, referred to as a **macroburst** when the area affected is greater than 2.5 miles and **microburst** when less than 2.5 miles.<sup>8</sup>

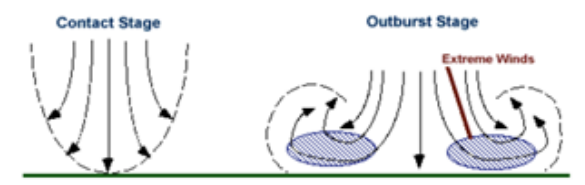


Image source: NH HSEM

<sup>8</sup> <http://www.nssl.noaa.gov/education/svrwx101/wind/types>

**Extent: Severe**

Tornadoes are violent rotating storms that extend to the ground with winds that can reach 300 miles per hour. They are produced from thunderstorms and can uproot trees and buildings. According to the National Oceanic and Atmospheric Administration (NOAA) a downburst is a strong downdraft, rotational in nature, which causes damaging winds on or near the ground. Winds can exceed 130 mph.

The Enhanced Fujita Scale is used to categorize tornados based on a combination of wind speed and the type of damage that is observed.

**Operational Enhanced Fujita (EF) Scale**

| <b>Enhanced Fujita Scale</b> |              |                                       |                                     |                                |                                 |                                                  |
|------------------------------|--------------|---------------------------------------|-------------------------------------|--------------------------------|---------------------------------|--------------------------------------------------|
| <b>EF Number</b>             | <b>0</b>     | <b>1</b>                              | <b>2</b>                            | <b>3</b>                       | <b>4</b>                        | <b>5</b>                                         |
| <b>3-Second Gust (mph)</b>   | <b>65-85</b> | <b>86-110</b>                         | <b>111-135</b>                      | <b>136-165</b>                 | <b>166-200</b>                  | <b>Over 200</b>                                  |
| <b>Damage Indicator</b>      |              | <b>Small barns, Farm Outbuildings</b> | <b>One-or two-family residences</b> | <b>Single-Wide Mobile Home</b> | <b>Double-Wide Mobile Homes</b> | <b>Apt, Condo, Townhouse (3 Stories or less)</b> |

**History:**

The most recent damaging tornado to touch down in New Hampshire was on July 24, 2008 rendering around 100 homes “uninhabitable” and killing one person. This event traveled from Epsom to Effingham. Although damage resulted in some Lakes Region locations, areas affected were many miles southeast of Andover. Since 2019 there have been zero reported high wind events in Merrimack County.

**History of High Wind Events**

| <b>Event Type</b>               | <b>Date</b> | <b>Location</b>                | <b>Extent</b>            | <b>General Impacts</b>                      | <b>Source</b>       |
|---------------------------------|-------------|--------------------------------|--------------------------|---------------------------------------------|---------------------|
| High Wind Events                | 2018        | Main Street, Hidden Valley Rd. | microburst               | Power outages                               | Haz. Mit. Committee |
| High Wind Events (Torn./Downb.) | 12/23/2022  | State-wide                     | Wind>50 mph Rain 2-5 in. | Downed Trees and wires (120K without power) | NOAA Events         |

**Location:** While thunderstorms can be localized, they often hit the whole town. On average, six tornadoes touch down somewhere in New England each year. There is no way of knowing where or when the next damaging tornado will strike as they are among the most unpredictable weather phenomena. Downbursts are 10 times more likely to occur than tornadoes. All areas of town are susceptible to damage from high winds.

**Probability of Occurrence:** Probable**Impact:** High

In Andover, the major damage from downbursts or tornados would come from falling limbs and trees, which may take down power lines, block roads, or damage structures and vehicles. Damage can occur to most structures in town because of downed trees in any high wind event, including the common thunderstorms. These winds can bring down limbs and trees, causing damage to structures, as well as pulling down power and telephone lines and blocking roads. This is particularly the case along private roadways that may only get limited cutback of vegetation. Trees and wires down across evacuation routes could slow evacuation efforts and draw limited emergency response personnel away from other safety efforts.

Tornados and downbursts could strike anywhere in town with little, if any warning. While individual events may be small and rare, their impacts could be devastating. All structures, especially older ones, which are not necessarily built to the current building code standards, could be at risk.

All structures in Andover, including most critical facilities, are susceptible to damage by high wind events, whether through downburst, tornado, or hurricane. Assuming 1% to 5% town-wide damage to buildings, high winds could result in \$2.5M to \$12.5M in damages in Andover.

**Impact of Climate Change on High Wind Events:** Changes in New Hampshire's climate could potentially lead to an increase in any of high wind events. This will lead to additional damage being created from these storms, including more extreme and widespread power outages statewide due to increased sustained wind speeds and gusts, downing trees and wires. This will result in greater damage to natural resources, property, and infrastructure. The increased damage and loss will also lead to larger, more complex, and longer lasting restoration efforts for each storm that occurs.

**Impact on Vulnerable Communities:** Potential impacts associated with high wind events on Andover's vulnerable populations include:

- Living in poorly maintained housing with aging infrastructure
- May have limited mobility for getting assistance, dependence upon others to travel
- May have limited access to early warning alerts
- Limited resources for seeking medical assistance

**INFECTIOUS DISEASES**

Infectious diseases are illnesses caused by organisms such as bacteria, viruses, fungi or parasites. Some infectious diseases can be passed from person to person, some are transmitted by bites from insects or animals, and others are acquired by ingesting contaminated food or water or being exposed to organisms in the environment. Signs and symptoms vary depending on the organism causing the infection but often include fever and fatigue. Mild infections get better on their own without treatment, while some life-threatening infections may require hospitalization.

While some diseases are so rare in each population that a single case warrants an epidemiologic investigation (e.g., rabies, plague, polio), there are other diseases that occur more common, so that only deviations from the norm (i.e. seeing more cases than expected) warrants investigation.

**Extent:** Moderate

Experience with the Covid-19 pandemic has dramatically changed views on the risk of infectious diseases as compared to risk mitigation planning for the 2019 Plan. The magnitude and severity of infectious diseases is described by its speed of onset (how quickly people become sick or cases are reported) and how widespread the infection is. Some infectious diseases are inherently more dangerous and deadly than others, but the best way to describe the extent of infectious diseases relates to the occurrence of the disease:

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

The NH Department of Health and Human Services (DHHS) developed an epidemic response plan so that communities can be prepared and respond to outbreaks.

**History:** The 2012-13 flu season was much more severe in New Hampshire than in the previous decade; 35 deaths occurred statewide, the most since 1997. In 2016, the DHHS responded to a total of 102 outbreaks: 73 gastrointestinal illnesses, 23 respiratory illnesses, and 6 other types of illness.

Since March of 2020, the Covid-19 pandemic has had a significant impact on all facets of life, including on emergency medical responders and the operations of municipal services and local schools. While there certainly have been minor outbreaks of flu in town, other outbreaks of infectious disease haven't compared to the coronavirus pandemic.

| Date      | Description      | Impacts                           | Location  | Additional Info                                                  |
|-----------|------------------|-----------------------------------|-----------|------------------------------------------------------------------|
| Fall 2014 | Enterovirus D-68 | >40 ill children in New Hampshire | Statewide | A rare strain of enterovirus resulting in infections nationwide. |
| 2016      | Gonorrhea        | 465 people infected               | Statewide | 465 cases reported; 250% higher than previous years              |

| Date      | Description                                          | Impacts                                                                                                                     | Location  | Additional Info                                                                     |
|-----------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------|
| 2017-2018 | Seasonal Influenza Outbreak                          | As of 2018, 63 influenza related deaths were identified in NH                                                               | Statewide | In 2018 the overall effectiveness of the flu vaccine at this time was 36%           |
| 2020-23   | COVID-19 or Coronavirus pandemic                     | Hospitals, schools, municipalities, & businesses have taken extra precautions, cancelled many events, and adjusted policies | Worldwide | Respiratory disease >379K cases and 3,495 deaths in NH >376 deaths in Merrimack Co. |
| Annually  | Foodborne outbreaks                                  | Ill individuals associated with outbreaks                                                                                   | Statewide | 5-10 outbreaks per year                                                             |
| Annually  | Influenza and other respiratory virus outbreaks      | Ill individuals associated with outbreaks                                                                                   | Statewide | 25-50 outbreaks per year primarily to vulnerable populations                        |
| Annually  | Norovirus and other gastrointestinal virus outbreaks | Ill individuals associated with outbreaks                                                                                   | Statewide | 60-80 outbreaks a year primarily to vulnerable populations                          |

**Location:** An epidemic is an outbreak of a disease, generally isolated to one area. The disease spreads easily person-to-person and can cause serious illness, with long-lasting side effects and deaths. An outbreak could impact anyone in town. Transmission of germs and diseases between people is accelerated in a close living and socializing environment. Schools, and congregate care centers for the elderly are places where transmission is likely to occur.

**Probability of Occurrence:** Remote

Epidemics do occur in Andover and other Lakes Region communities from time to time. The Central NH Regional Health Network representative has noted that it is likely that a future epidemic could involve multiple outbreaks at once.

**Impact:** Moderate

The concerns associated with infectious disease include the local capacity to respond to not only the residents of Andover but also any visitors. The cost of infectious diseases in Andover is difficult to calculate as any cost would primarily result from health care response. Experience with COVID-19 pandemic has revealed the human and economic costs resulting from the shut down or slowdown of many businesses in town and the region.

**Impact of Climate Change on Infectious Disease events:** Changes in New Hampshire's climate could potentially lead to an increase in precipitation. Increased precipitation may lead to more flooding. This could lead to increased impacts from mold in affected areas including homes and businesses. This could also result in greater instances of stagnant water, leading to more vector-borne diseases.

**Impact on Vulnerable Communities:** Potential impacts associated with infectious disease on Andover's vulnerable populations include:

- Limited resources for seeking medical assistance
- Living in poorly maintained housing with aging infrastructure
- May have limited mobility for accessing attention
- More likely to have compromised immune systems

### INLAND FLOODING

Flooding is defined as a temporary overflow of water onto lands that are not normally covered by water. It results from the overflow of rivers and tributaries or inadequate drainage. Flooding is rarely associated with lakeshore properties, especially if there are appropriate setbacks, and is more likely to be associated with rivers, such as the Blackwater.

Flooding is most associated with structures and properties located within the 1% annual (or 100-year) floodplain. Areas in this floodplain have been identified as having a 1% chance of flooding any given year. This means that flooding in this area is projected to have an average recurrence interval of 100 years; however, that does not mean that a flood in this area will only occur once every 100 years.

Andover participates in the **National Flood Insurance Program (NFIP)** through the administration of its floodplain ordinance by the Board of Selectmen and the Zoning Administrator. By actively participating in the NFIP property owners can purchase flood insurance through the FEMA program. Active participation includes administration of site plan review, subdivision regulations and zoning, to regulate development in the floodplain using federal standards. Andover joined the National Flood Insurance Program on June 17, 1991. The original Flood Insurance Rate Maps (FIRM) were published by FEMA on June 17, 1991; the FIRM were updated February 20, 2008; and are available at Town Hall and in digital form (DFIRM) at <https://msc.fema.gov/portal/home>.

From the Floodplain Development Ordinance, **Article XIII** of the Andover Zoning Ordinance, revised 2023.

#### **Administration and Enforcement:**

1. The Board of Selectmen shall enforce the provisions of this Ordinance, and shall be entitled to recover reasonable attorney's fees, as well as all other costs, where they prevail.
2. The Zoning Administrator shall have authority to enforce the provisions of this Ordinance.

#### **Article XIII Floodplain Development – B & C Enforcement:**

- B. All proposed development in any special flood hazard areas shall require a permit.
- C. The Zoning Administrator shall review all building permit applications for new construction or substantial improvements to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is located in a special flood hazard area, all new construction or substantial improvements shall:
  - 1) be designed (or modified) and adequately anchored to prevent

floatation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,

2) be constructed with materials resistant to flood damage,

3) be constructed by methods and practices that minimize flood damages,

4) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment, and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

**Definitions: (Article XIII Floodplain Development – A. Definition of Terms)**

Substantial Damage: Is damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

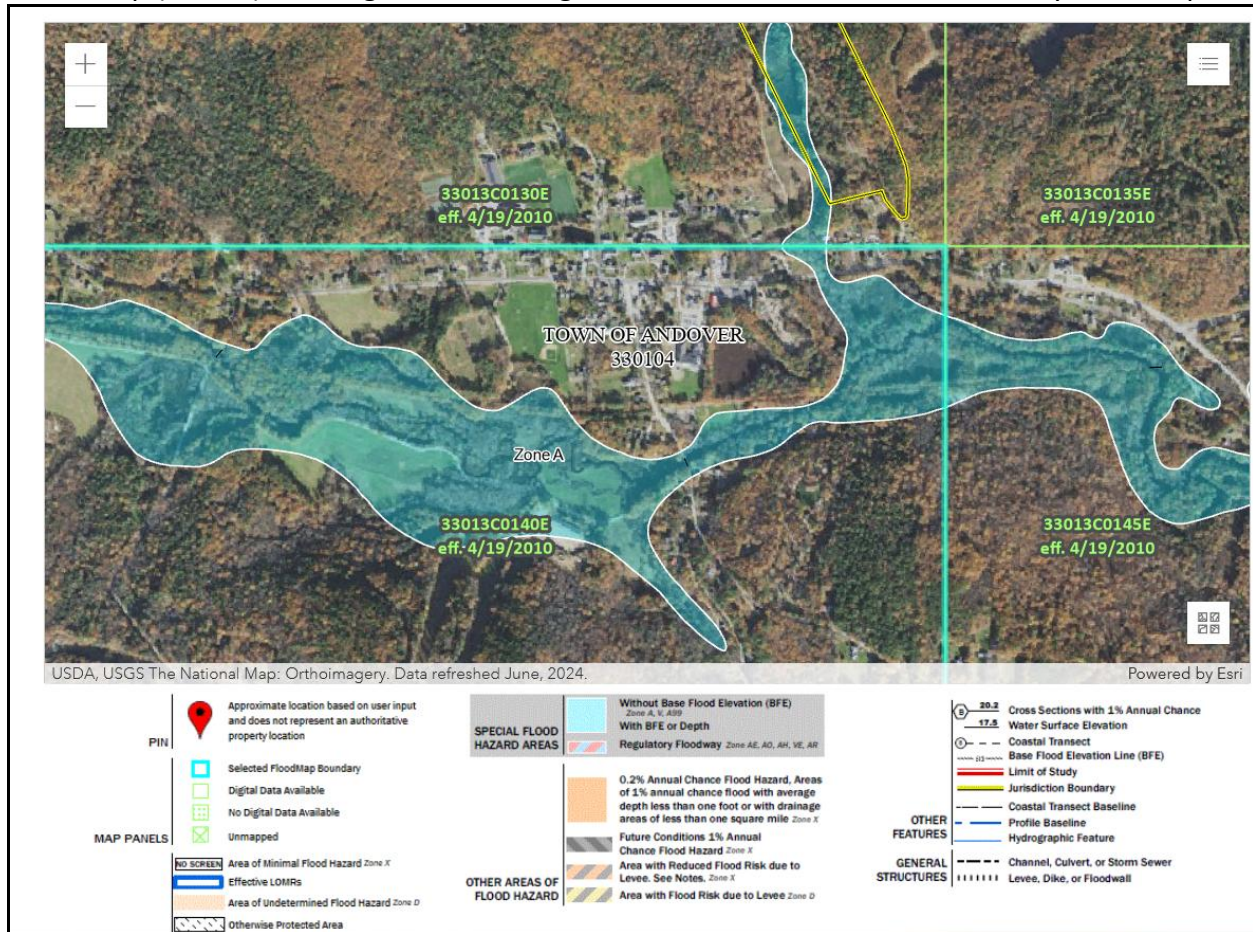
Substantial Improvement: Is any combination of repairs, reconstruction, alteration, or improvements to a structure in which the cumulative cost equals or exceeds fifty percent of the market value of the structure. The market value of the structure should equal:

a) the appraised value prior to the start of the initial repair or improvement or

b) in the case of damage, the value of the structure prior to the damage occurring.

For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. This term includes structures which have incurred substantial damage, regardless of actual repair work performed. The term does not, however, include any project for improvement of a structure required to comply with existing health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions or any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure".

FEMA map (DFIRM) showing Andover Village with the Blackwater River and 100-year-floodplain



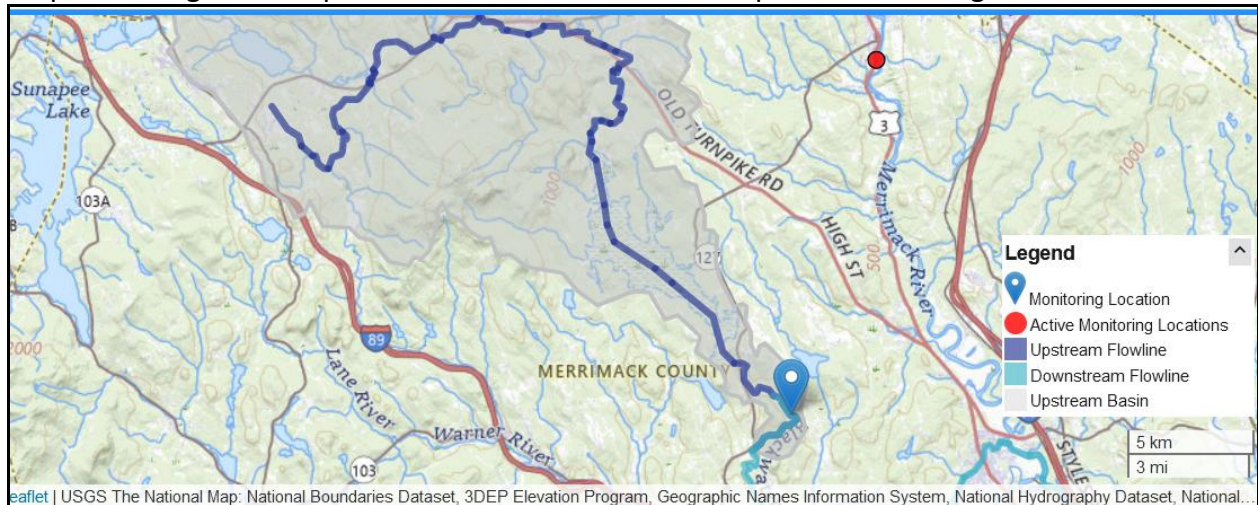
As of July 2024, there were eleven flood insurance policies in force in Andover, seven covering single-family residential (SFR) properties with the remaining three covering non-residential properties. Seven of these properties are in the A-zone, and three are in X-zone. There have been four paid losses totaling \$58,293, all on SFR properties. Three of the losses were in the A-zone, one was in the B-, C-, or D-zone. There have been no repetitive losses in Andover. The amount of insurance in force in Andover was \$2,535,000, according to FEMA's database.

#### **Extent:** Flooding – Severe

FEMA defines flood hazards by the 100-year and 500-year flood events. A 100-year flood event is defined as a flood event having a 1% chance of being equaled or exceeded in any given year. The 500-year flood event is defined as a flood event having a 0.2% chance of being equaled or exceeded in any given year. The Town of Andover Flood Insurance Rate Maps (FIRM) identify both A and AE zones. A-zones are subject to the 100-year flood, however because there have been no detailed hydraulic studies, there is no Base Flood Elevation (BFE) determined for these zones. The AE zones are subject to the 100-year flood and have BFEs delineated on the FIRM.

Land development can contribute to flood hazards. As areas are covered with additional impervious surfaces, less water is allowed to infiltrate, evaporate, or be transpired by vegetative growth, resulting in more water runoff directly into surface drainages and water bodies. This increases the likelihood of flash floods and substantial overland flow.

Map indicating the flow path of the Blackwater River and part of its drainage area.



### Dam Failure

Although Dam Failure is classified as a technological hazard, it seems appropriate to include a discussion of dams in Andover when assessing risks associated with Inland Flooding.

According to the NH Department of Environmental Services (DES), a dam is any artificial barrier which impounds or diverts water which: has a height of 6 feet or more; or is located at the outlet of a great pond, regardless of height or storage; or is an artificial barrier which impounds liquid Industrial or liquid commercial wastes, or septage or sewage, regardless of height or storage.

### Extent:

Dams in New Hampshire are classified by the New Hampshire Department of Environmental Services Dams Bureau. The four dam hazard classifications (High, Significant, Low, and Non-Menace) are based on the potential losses associated with a dam failure (see Appendix G for a detailed description). High (H) and Significant (S) Hazard dams have the highest potential for damage; this could include damage to state or municipal roadways as well as structures.

There are twelve active dams in Andover; two are **Significant** Hazard dams, four are **Low** Hazard, and six are **Non-Menace** Hazard dams. There are no High Hazard dams in Andover, nor any upstream of the town. Failure or mis-operation of a Non-Menace dam would not result in probable loss of life or loss of property. Failure or mis-operation of a Low Hazard dam would not result in the possible loss of life. It would result in any of the following:

- Low economic loss to structures or property.

- Structural damage to a 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 contaminated sediment under certain conditions.
- Reversible environmental losses to environmentally sensitive sites.

| HAZQ | STATUS | US | NAME                         | RIVER            | LENGTH | IMPND | HEIGHT |
|------|--------|----|------------------------------|------------------|--------|-------|--------|
| S    | ACTIVE | R  | BRADLEY LAKE DAM             | HAMESHOP BROOK   | 240    | 170   | 19     |
| S    | ACTIVE | R  | HIGHLAND LAKE DAM            | TR SUCKER BROOK  | 180    | 210   | 10.3   |
| L    | ACTIVE | C  | FARM POND DAM                | TR SUCKER BROOK  | 195    | 0.89  | 13     |
| L    | ACTIVE | R  | SUCKER BROOK I DAM           | SUCKER BROOK     | 70     | 0.15  | 11     |
| L    | ACTIVE | R  | COLE POND DAM                | TR BLACK RIVER   | 110    | 14.6  | 10     |
| L    | ACTIVE | R  | MOREY POND DAM               | MOUNTAIN BROOK   | 35     | 6.9   | 12     |
| NM   | ACTIVE | C  | FARM POND DAM                | HAMESHOP BROOK   | 159    | 0.21  | 13     |
| NM   | ACTIVE | C  | EMERY POND DAM               | TR SUCKER BROOK  | 90     | 3.1   | 12     |
| NM   | ACTIVE | C  | FARM POND DAM                | UNNAMED STREAM   | 345    | 0.76  | 11     |
| NM   | ACTIVE | C  | FARM POND DAM                | UNNAMED STREAM   | 330    | 0.5   | 10     |
| NM   | ACTIVE | W  | INFILTRATION BASIN DAM       | NA               | 315    | 0.12  | 15     |
| NM   | ACTIVE | R  | CURRIER FISH POND DAM        | UNNAMED BROOK    | 300    | 1.5   | 10     |
|      | RUINS  | M  | HAMESHOP BROOK DAM           | HAMESHOP BROOK   | 72     | 0     | 12     |
|      | RUINS  | M  | HOPKINS POND DAM             | MITCHELL BROOK   | 100    | 3.5   | 18     |
|      | RUINS  | M  | EMERY SAWMILL DAM            | SUCKER BROOK     | 117    | 0     | 11     |
|      | BREACH | M  | BOG POND DAM                 | BLACKWATER RIVER | 137    | 25    | 18     |
|      | EXEMPT | D  | PROCTOR ACADEMY TENNIS COURT | RUNOFF           | 150    | 0.08  | 5.6    |

Source: NH Department of Environmental Services

### History – Dam Failure:

There is no history of significant dam failures in Andover.

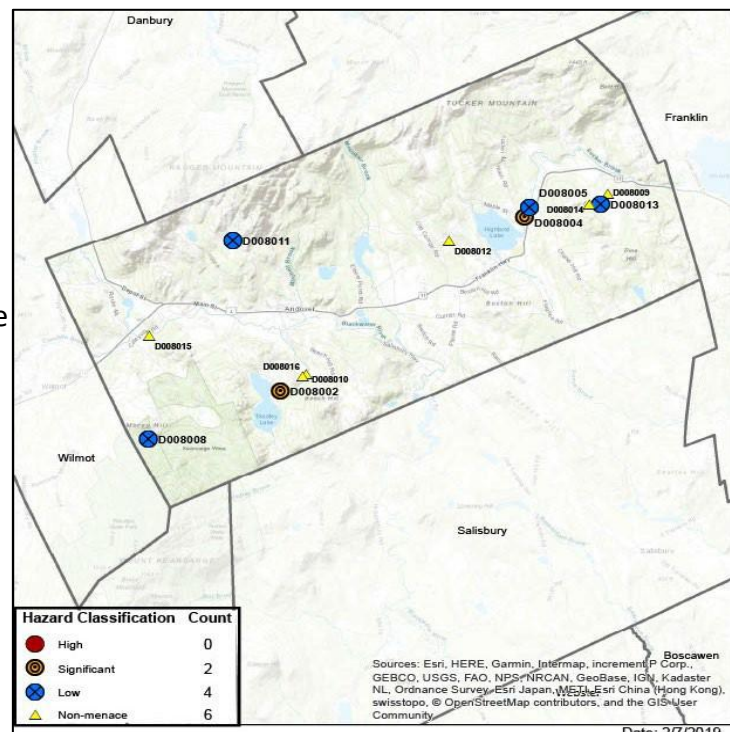
### Location:

Highland Lake Dam and Bradley Lake Dam are classified as Significant Hazard dams. The Town and the Andover Village District maintain Emergency Action Plans for these two dams. The map at right identifies the location of these dams.

**Probability:** Remote

### Impact:

A dam failure or breach could occur due to extreme rainfall and/or a human



caused incident. A failure or breach would result in rapid loss of water that is normally held by the dam resulting in an inundation downstream.

**History - Inland Flooding:**

Historically, the state's two largest floods occurred in 1936 and 1938. The 1936 flood was associated with snowmelt and heavy precipitation. The 1938 flood was caused by the Great New England Hurricane of 1938. Those floods prompted the construction of a series of flood control dams throughout New England, built in the 1950s and 1960s. They continue to be operated by the US Army Corps of Engineers.

A series of floods in New Hampshire began in October 2005 with a flood that primarily affected the southwest corner of the state and devastated the town of Alstead. The flood killed seven people. It was followed by floods in May 2006 and April 2007 and a series of floods during the late summer and early fall of 2008, one caused substantial flash flooding and washouts in Ashland, New Hampton, Center Harbor, and Meredith. In addition to property damages, one young girl died in Ashland because of the floodwaters from this storm.

Flooding in the region was associated with Tropical Storm Irene in September 2011 and Tropical Storm Sandy in October 2012.

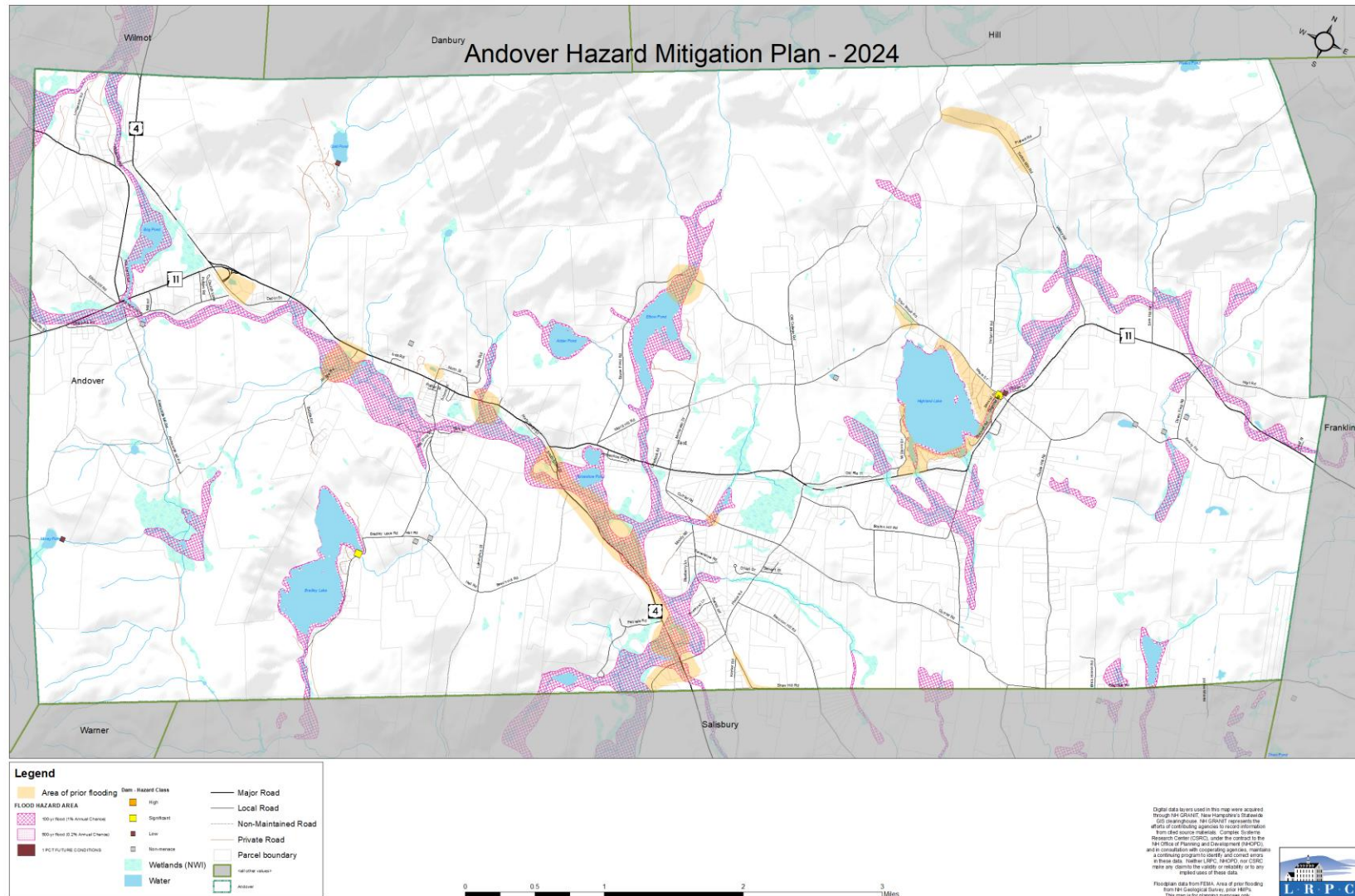
The NOAA database reports only one documented flooding event in or near Andover since 2019; street flooding in neighboring Danbury from the Smith River on July 10, 2023. There are several areas in Andover that experience flooding annually or several times per year. Specific areas are noted under **Impact**.

**Probability of Occurrence:** Flooding – Probable, Dam Failure - Remote

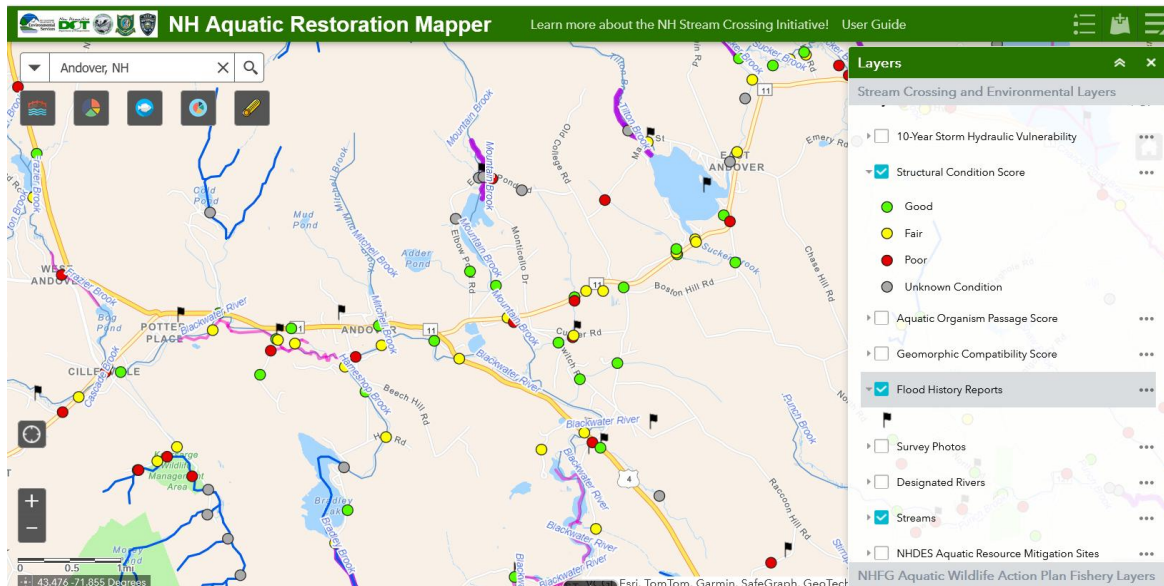
**Location:** The [FEMA Flood maps](#) identify floodplains including the Blackwater River, Highland Lake, Elbow Pond, Bradley Lake and other minor tributaries.

Committee members reviewed a map of past flooding events (NH Geological Society Flood Hazard Database), survey comments, and members' knowledge to identify several areas that pose flooding issues on next page.

Map showing 500-year floodplains (pink) and areas of prior flooding (orange).



The [NH Stream Crossing Initiative and Mapping Tool](#) and the [NH Aquatic Restoration Mapper](#) are mapping and assessment tools coordinated by UNH T2 can be useful resources for tracking the location and status of bridges and culverts along with areas that have flooded in the past. Many state-owned features have been mapped by state agencies. Mapping local features is usually done through the regional planning commission.



### **Impact – Flooding – High, Dam Failure - Moderate**

Flooding, whether from heavy rains or ice jams, carries great risk for the town of Andover. Floods could impact dams and bridges and have the potential to cause damage to roads, properties, and structures, as well as loss of life. Most of the past flooding events resulted in erosion and damage to culverts and roads throughout town.

The Committee noted that US Rte. 4 and NH Rte. 11 have had a history of flooding. Other areas that have problems with flooding roads include:

- annual flooding along Valley Rd
- Currier and Switch Roads, north of Moody Road
- Switch Road between Blueberry and Pinewood Lanes
- Sam Hill Road
- West Shore Drive (culvert that backs up)
- flooding along Bridge Road (culvert upgrades and road elevation planned for 2025)
- regular flooding on Elbow Pond Rd. (a box culvert is scheduled for installation in 2026).

In addition to flooding roads, the area between Boston Hill Rd and West Shore Rd. has a culvert that regularly backs up and is where many residents live and these residences can be impacted.

These are indicated on the map on the previous page.

Some structures in Andover are susceptible to damage due to flooding. Those in the floodplain are most likely to be impacted. Assuming 1% to 2% town-wide damage to buildings, flooding could result in \$2.5M to \$5M in damages.

**Impact of Climate Change on Flooding:** Flooding is influenced by how much water enters the watershed upstream. With warmer temperatures, more water evaporates and then falls as precipitation. Increased precipitation is likely to increase stream flow. Increased stream flow can increase soil erosion, impair water quality, and disrupt ecosystems. Increased temperatures could also impact the amount of snowpack and timing of snow melting & ice out.

**Impact on Vulnerable Communities:** Potential impacts associated with flooding on Andover's vulnerable populations include:

- May have limited access to early warning alerts
- May live in areas prone to flooding
- Living in poorly maintained housing with aging infrastructure
- May have limited mobility for getting assistance/evacuation, dependence upon others to travel
- Limited resources for seeking medical assistance

#### **LANDSLIDE**

A landslide is the downward or outward movement of earth materials on a slope that is reacting to a combination of the force of gravity and a predisposed weakness in the material that allows the sliding process to initiate. The broad classification of landslides includes mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides and earth flows. Landslides may be formed when a layer of soil on a slope becomes saturated by significant precipitation and slides along a more cohesive layer of soil or rock. Although gravity becomes the primary reason for a landslide once a slope has become weak through a process such as the one just described, other causes can include: <sup>1</sup>

- Erosion by rivers or the ocean that creates over-steepened slopes through erosion of the slope's base. In the case of rivers, this can occur because of flash flooding
- Rock and soil slopes are weakened through saturation by snowmelt or heavy rains
- Earthquake creates stress that makes weak slopes fail—earthquakes of 4.0 magnitude and greater have been known to trigger landslides
- Wildfires (loss of vegetation)
- Excess weight from accumulation of rain or snow, stockpiling of rock or ore, the formation of waste piles, or building of man-made structures may stress weak slopes to the point of failure.

#### **Extent: Weak**

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

- Steepness/grade of the Slope (measured as a percent)
- Geographical Area

- o Measured in square feet, square yards, etc.
- o More accurately measured using LiDAR/GIS systems
- Earthquake, either causing the event or caused by the event  
measured using the Moment Magnitude Intensity or Mercalli Scale

There are also multiple types of landslides:

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

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

Although the overall vulnerability for landslides in the state is low, there is considerable terrain susceptible to landslide action. This was exemplified in May of 2003 when the Old Man of the Mountain collapsed. The continuous action of freezing and thawing of moisture in rock fissures causes it to split and separate. This action occurs frequently on the steeply sloped areas of the state, increasing the risk of landslides. In addition to being susceptible to this freeze/thaw process, the Ossipee Mountain Range, Squam Range, and other mountains throughout the Lakes Region are also close to seismic faults and at risk of increased pressure to development.

Consideration should be given to the vulnerability of man-made structures in these areas due to seismic- and/or soils saturation-induced landslide activity. Landslide activities are also often attributed to other hazard events. For example, during a recent flood event, a death occurred when a mass of saturated soil collapsed. This death was attributed to the declared flood event.<sup>9</sup> Also, during the 2007 Nor'easter a landslide occurred in Milton, NH resulting in the temporary closure of NH Route 101.

**History:** Records (NOAA Storm Events database) indicate no landslides have occurred in northern Merrimack County. There was no local knowledge of a landslide occurring in Andover.

**Location:** Although New Hampshire is mountainous, it consists largely of relatively old geologic formations that have been worn by the forces of nature for eons. Consequently, much of the landscape is relatively stable and the exposure to this hazard type is generally limited to areas in the north and north central portion of the state. Formations of sedimentary deposits along the Connecticut and Merrimack Rivers also create potential landslide conditions. There are

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<sup>9</sup> <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html> visited February 8, 2011.

some steep slopes near US Route 4, but there is no one living near there and the road is state maintained.

**Probability of Occurrence:** Improbable

**Impact:** Low

The primary impacts of a landslide are the damage and destruction to property and infrastructure located in the area where the landslide occurred. The land material moved during a landslide can cause damage to roads, buildings, and infrastructure at the base of the slope on which the landslide occurred. Buildings or infrastructures that are atop the slide, or on the side of the slope where the slide occurs, can be severely damaged or destroyed through its consumption by the slide. The hazard of death and injury to individuals atop, on, or at the base of a slide exists if such individuals are present in those locations when the landslide occurs.

Landslides that occur adjacent to a waterbody, such as a river or lake, can introduce excess sediment, increasing the turbidity of the receiving waterbody and impacting water quality if the quantity of sediment is of sufficient quantity. A very large landslide into a river could cause an obstruction that acts like a dam, creating an impoundment of water which leads to sediment and woody material deposition within it. This could also further create an additional risk of a “dam failure” at some future time when the natural dam breaks down, resulting a rapid release of the stored water from upstream.

As there are no significant steep slopes near structures nor adjacent to rivers or lakes, the potential impact to Andover is minimal.

**Probability and Impact of Climate Change on Landslide events:** As there are no significant steep slopes near structures nor adjacent to rivers or lakes, the potential impact to Andover is minimal.

**Impact on Vulnerable Communities:** As there are no significant steep slopes near structures nor adjacent to rivers or lakes, the potential impact to Andover is minimal.

## **LIGHTNING**

Lightning is a giant spark of electricity that occurs within the atmosphere, or between the atmosphere and the ground. As lightning passes through the air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the Sun. During a lightning discharge, the sudden heating of the air causes it to expand rapidly, resulting in thunder.

**Extent:** Moderate

All thunderstorms have the potential to create lightning, which can cause death, injury, and property damage and have great potential to cause damage to electronic equipment as well as structure and wildfires. Although the numbers have trended downward in recent decades, during the last half of the twentieth century more people were killed in the United States each

year by lightning than by any other weather event. It can also wreak havoc with electrical and communications systems.

The National Weather Service does utilize a six-point scale for characterizing lightning activity called the Lightning Activity Level (LAL) based on frequency of ground strikes along with rainfall and ground conditions.

| <b>Lightning Activity Level (LAL)</b> |                                                                                                                                                                                                   |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LAL 1                                 | No thunderstorms                                                                                                                                                                                  |
| LAL 2                                 | Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud-to-ground strikes in a five-minute period.                                      |
| LAL 3                                 | Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud-to-ground strikes in a 5-minute period.                                      |
| LAL 4                                 | Scattered thunderstorms. Moderate rain is commonly produced, lightning is frequent, 11 to 15 cloud-to-ground strikes in a 5-minute period.                                                        |
| LAL 5                                 | Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud-to-ground strikes in a 5-minute period.                                           |
| LAL 6                                 | Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning. |

#### **History:**

According to the NOAA database, there have not been any recorded lightning events in Andover or northern Merrimack County since the last plan update.

**Location:** Lightning can strike anywhere in town. Exactly where and when lightning will strike is unknown.

#### **Probability of Occurrence:** Probable

In the Lakes Region, fewer than two lightning strikes occur per square kilometer annually. While this value is not particularly high compared with other parts of the country, the frequency of storms with lightning is a local concern, especially during the summer months.

#### **Impact:** Moderate - High

Forest fires or structural fires can result from lightning strikes. Lightning can injure or kill people near the strike. Structures that are not grounded are the most susceptible to damage.

Power outages, associated with natural hazards like lightning, high winds, inland flooding, severe winter weather have the potential to cause disruption to residents and the functioning of the town. The elderly and disabled who rely on powered medical devices are at risk.

All structures in Andover are susceptible to damage by lightning and resulting fires. There is back-up power for most municipal facilities. Assuming 1% town-wide damage to buildings, each year lightning could result in \$2,5 in damages.

**Impact of Climate Change on Lightning events:** Climate change is beginning to shift seasons resulting in longer, warmer summer months, and an earlier spring onset, which may create more intense heat waves. Lightning is mostly observed during the warmer summer months, and the longer the season becomes, the opportunity for damaging lightning increases. The impact of any individual lightning strike would remain the same, but they may become more frequent with a warmer, wetter climate.

**Impact on Vulnerable Communities:** Potential impacts associated with lightning on Andover's vulnerable populations include:

- May have limited access to early warning alerts
- Living in poorly maintained housing with aging infrastructure
- May have limited mobility for getting assistance/evacuation, dependence upon others to travel
- Limited resources for seeking medical assistance

### SEVERE WINTER WEATHER (SNOWSTORMS, ICE STORMS)

Andover experiences four types of severe winter weather: heavy snow, blizzards, nor'easters, and ice storms.

**Extent:** Moderate

A heavy snowstorm can be defined as one that deposits four or more inches of snow in a 12-hour period. Snowstorms are a common occurrence throughout the Lakes Region. Blizzards, which may dump 12 to 36 inches or more of snow in a one- to three-day period are less frequent, but can have a serious impact on structures,

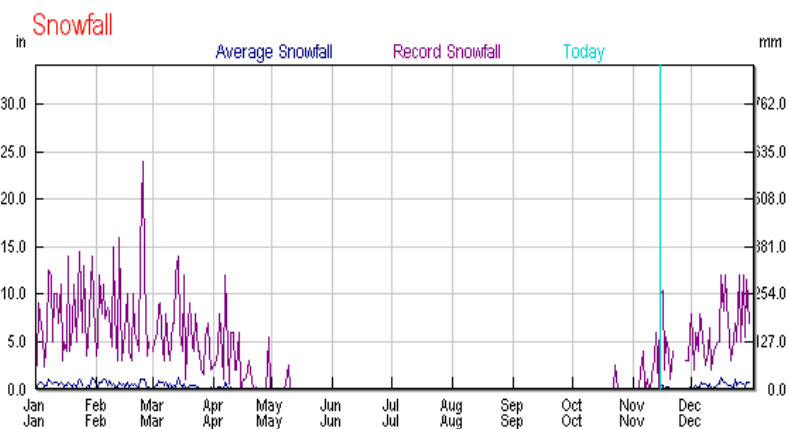
utilities, and services. The region typically receives greater than 66 inches of snow annually.

Records indicate that eight or more inches have fallen in a single day on most dates from late November through mid-March but the average snowfall on any day from November through

| CATEGORY | NESIS VALUE | DESCRIPTION |
|----------|-------------|-------------|
| 1        | 1–2.499     | Notable     |
| 2        | 2.5–3.99    | Significant |
| 3        | 4–5.99      | Major       |
| 4        | 6–9.99      | Crippling   |
| 5        | 10.0+       | Extreme     |

April is less than an inch. This record also shows that deposits of more than 10 inches have happened in each of these months and on several days in February the area has seen more than 15 and even 20 inches of snow in one day.

A couple of scales have been adopted by NOAA for comparing snowstorms that incorporate the number of inches of snow that accumulate, the area of the



storm, and the number of people that could be impacted by the storm. The Northeast Snowfall Impact Scale (NESIS) applies specifically to the northeastern United States. It groups high-impact snowstorms into five categories.

An ice storm coats trees, power lines, streets, vehicles, and roofs with a very slick and heavy coating of ice. In the winter of 1998, a major ice storm crippled much of New Hampshire, coating everything with as much as three inches of ice. The U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory estimates a 40- to 90-year return period for an event with a uniform ice thickness of between 0.75 and 1.25 inches. In 2008, just 10 years later, however, New Hampshire was struck again by another severe ice storm.

The Sperry-Piltz Ice Accumulation (SPIA) Index is used to forecast and classify ice storms based on a combination of the average thickness of ice coating (referencing expected temperature and precipitation levels) and wind speed; ratings range from 0 to 5.

Snow load in severe winter storms is of concern as well. This is particularly true for flat roofed structures.

Several small storms can produce the same snow load as a single larger storm and the combined weight of the snow load can damage rooftops. Ice adds additional weight as well. It is not uncommon in New Hampshire to experience mixes of winter precipitation as temperatures fluctuate above and below the freezing mark. While not widespread, instances of collapsed roofs are not uncommon.

New Hampshire generally experiences at least one or two nor'easters each year with varying degrees of severity. A nor'easter is defined as a large anticyclone weather system (moving south to north) that resides near the New England region. These storms have the potential to inflict more damage than many hurricanes because high winds can last from 12 hours to three days, while the duration of hurricanes ranges from 6 to 12 hours. A nor'easter also has the potential to sustain hurricane force winds, produce torrential rain, and create blizzard conditions in winter months.

In the winter months, the state may experience the additional coincidence of blizzard conditions with many of these events. A blizzard is characterized by sustained winds or frequent gusts to 35 miles per hour or greater and considerable amounts of falling or blowing

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

| ICE DAMAGE INDEX | * AVERAGE NWS ICE AMOUNT (in inches)<br>*Revised-October, 2011 | WIND (mph) | DAMAGE AND IMPACT DESCRIPTIONS                                                                                                                                                       |
|------------------|----------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>0</b>         | < 0.25                                                         | < 15       | Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.                                                                            |
| <b>1</b>         | 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       |                                                                                                                                                                                      |
| <b>2</b>         | 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       |                                                                                                                                                                                      |
| <b>3</b>         | 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       |                                                                                                                                                                                      |
| <b>4</b>         | 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       |                                                                                                                                                                                      |
| <b>5</b>         | 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.)

snow that last for a duration of three hours or longer. The combination of winds and snow reduces visibility to less than a quarter mile.

**History:** The 1998 ice storm was the costliest FEMA/Presidential Declared disaster in New Hampshire's history. The ice load bent trees and power lines and led to massive power outages throughout the state. The December 2008 ice storm surpassed the 1998 storm, in terms of state-wide damage. The President declared this storm as a major disaster and the state received \$15 million in federal aid for recovery.

The NOAA Storm database lists 15 severe winter storm events since 2019. While there have not been any Declared Disasters for Severe Winter Weather three of the seven Severe Storms and Flooding declarations since 2019 have been winter-time events.

- December 2022 (major disaster declaration)
- December 2023 (major disaster declaration)
- January 2024 (major disaster declaration)

**Location:** Severe winter weather occurs frequently in the northeast and the possibility exists for Andover residents to have to withstand several days without power. There are segments of the population that are more at risk. These include the elderly, people that need regular medical care, and young children. These weather events can vary greatly based on slight differences in temperature, humidity, and elevation. Some events will produce a combination of winter weather types. Snow and ice storms can affect the entire town.

**Probability of Occurrence:** Frequent

**Impact:** High

Major roads, essential services, and flat-roofed buildings are all likely to be impacted by winter storms. While the town is accustomed to seasonal heavy snowfall, any particularly severe event with significant accumulations, especially combined with severe cold can be a burden. These events often lead to ice accumulation, and power loss, significantly increasing the vulnerability of populations and facilities.

Heavy snow can cause damage to property, disrupt services, and make travel unsafe, even for emergency responders. Due to poor road conditions, residents may be stranded for several days. Extra pressure is placed on road crews and emergency services under these conditions.

The major threats to a community due to ice storms include structural damage due to heavy loads on roofs, interruptions of services such as electricity, fuel, water, and communications, as well as hazardous road conditions. Downed limbs and wires and unplowed or untreated roads can severely limit emergency access to many residences.

The potential for very cold temperatures and loss of power can quickly compound the issue. A severe ice storm struck central and southern New Hampshire and New England on December

11, 2008. Over 400,000 people were without power, some for over two weeks, and overall damages exceeded \$15 million.

No specific critical facilities in Andover were identified as being vulnerable to snow or ice event. Flat-roofed buildings are all susceptible to damage from snow and ice loads.

While maintenance on the major arteries (NH 11 and US4) falls to NH DOT, most of the other roads in Andover are the town's responsibility. The precipitation from some storms, especially multi-day nor'easters, can outpace the capacity of equipment and staff.

All structures in Andover are susceptible to damage by winter weather events, whether through ice storms, blizzards, or the heavy, wet snow often associated with a nor'easter. Town facilities are not particularly at risk to Severe Winter Weather. Assuming 1% to 5% town-wide damage to buildings, winter weather could result in \$2.5M to \$12.5M in damages annually. The potential for impact to the town from severe winter weather is seen as high.

**Impact of Climate Change on Winter Weather Events:** Changes in New Hampshire's climate could potentially lead to an increase in any of the four types of winter precipitation. This possible increase could result in an increase of unsafe structures due to increased weight of snow, ice, and rain accumulating on rooftops. It could also lead to roof collapses, compromising personal safety. An increase of winter precipitation also creates unsafe travel conditions throughout the state. These events also use a considerable amount of resources to deal with the clean-up.

**Impact on Vulnerable Communities:** Potential impacts associated with severe winter weather on Andover's vulnerable populations include:

- May have limited access to early warning alerts
- Living in poorly maintained housing with aging infrastructure
- May have limited mobility for getting assistance/evacuation, dependence upon others to travel
- Limited resources for seeking medical assistance
- The committee noted that the rising costs of heating fuel and insulation can be challenging for those with a fixed income.

### **SOLAR STORMS & SPACE WEATHER**

The term space weather is relatively new and describes conditions in the Earth's outer space environment. Space weather includes conditions and events on the sun, in the solar wind, in near-Earth space, and in Earth's upper atmosphere that can affect space-borne and ground-based technological systems.<sup>10</sup> Although space weather has occurred since the beginning of time, little was understood about the causes and impacts of these instances on the planet. It has only been in the last 200 or so years that multiple science fields have come together to study space weather. Not all space weather is damaging or effects humans or technology.

<sup>10</sup> [https://www.nasa.gov/mission\\_pages/sunearth/spaceweather/index.html#q12](https://www.nasa.gov/mission_pages/sunearth/spaceweather/index.html#q12)

Perhaps one of the most well-known effects of space weather on the Earth's atmosphere is the Aurora Borealis (aka Northern Lights – northern hemisphere) and the Aurora Australis (southern hemisphere). Aurora displays are a result of solar wind where some of the charged particles become trapped in the Earth's atmosphere.

### Extent: Weak

The State of New Hampshire Hazard Mitigation Plan (2023) describes three different types of events: Geomagnetic Storms, Solar Radiation Storms, and Radio Blackout. Each of these is then rated on a five-level scale (minor, moderate, strong, severe, extreme), with descriptions of increasing impacts on power, spacecraft, biological, satellite, high frequency radio, and navigation systems. A solar storm may exacerbate radio communications problems. The Radio Blackout Scale<sup>11</sup> offers a measure of the extent of solar storms on radio communications.

| Scale | Description | Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Physical measure           | Average Frequency (1 cycle = 11 years) |
|-------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------|
| R 5   | Extreme     | <b>HF Radio:</b> Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and en route aviators in this sector.<br><b>Navigation:</b> 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<br>( $2 \times 10^3$ ) | Less than 1 per cycle                  |
| R 4   | Severe      | <b>HF Radio:</b> HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time.<br><b>Navigation:</b> Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.                                                                                                                                                                                                           | X10<br>( $10^3$ )          | 8 per cycle<br>(8 days per cycle)      |
| R 3   | Strong      | <b>HF Radio:</b> Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth.<br><b>Navigation:</b> Low-frequency navigation signals degraded for about an hour.                                                                                                                                                                                                                                                                                                                                                        | X1<br>( $10^4$ )           | 175 per cycle<br>(140 days per cycle)  |
| R 2   | Moderate    | <b>HF Radio:</b> Limited blackout of HF radio communication on sunlit side, loss of radio contact for tens of minutes.<br><b>Navigation:</b> Degradation of low-frequency navigation signals for tens of minutes.                                                                                                                                                                                                                                                                                                                                                         | M5<br>( $5 \times 10^3$ )  | 350 per cycle<br>(300 days per cycle)  |
| R 1   | Minor       | <b>HF Radio:</b> Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact.<br><b>Navigation:</b> Low-frequency navigation signals degraded for brief intervals.                                                                                                                                                                                                                                                                                                                                                               | M1<br>( $10^5$ )           | 2000 per cycle<br>(950 days per cycle) |

**History:** There have not been any known occurrences in Andover of solar storms or space weather, and no significant events have been reported statewide. Nearby events include Quebec, Canada, which experienced a 9-hour blackout in March 1989 when solar winds caused a fluctuation in the Earth's magnetic field and caused Hydro-Quebec's transmission to go down.

**Location:** All of Andover and the entire State of New Hampshire are at risk of solar storms and space weather. While the Earth is somewhat protected from solar storms and space weather by its upper atmosphere, the potential for a loss of communications, power, and GPS exists.

**Probability of Occurrence:** Remote

### Impact: Low

Solar storms and space weather impact the Earth daily, although the effects are not often felt. It is difficult to estimate the impact of this hazard on Andover as knowledge of this hazard is evolving, but committee members acknowledge that while human and property impacts are low, compromised communications could impact communications and response during other types of hazards, including reaching out for mutual aid.

**Probability and Impact of Climate Change on Solar Storm events:** The probability and impacts associated with a solar storm would not likely be affected by climate change.

<sup>11</sup> [https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018\\_FINAL.pdf](https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf), p. 141

**Impact on Vulnerable Communities:** Potential impacts associated with solar storms and space weather on Andover's vulnerable populations are all related to compromised electronic communication and response associated with some other emergency.

### **TROPICAL & POST-TROPICAL CYCLONES**

Tropical and Post-Tropical cyclones are large storms with winds rotating in a counterclockwise manner. Tropical depressions and hurricanes form over the Atlantic Ocean and often come ashore in the southeastern United States, frequently moving up the Eastern Seaboard. Occasionally such storms come ashore along the northeast coast. Sustained high winds and heavy rains for 12 to 36 hours are characteristic of tropical depressions and hurricanes. There are many stages throughout the life cycle of a tropical cyclone.

- Potential Tropical Cyclone: Describes a disturbance that is not yet a tropical cyclone, however, poses the threat of becoming one
- Tropical Disturbance: A cluster of showers and thunderstorms that flare up over the tropics. These are usually 100-300 miles in diameter and generally move westward.
- Tropical Storm: Sustained wind levels are between 34 knots and 64 knots (39 to 74 MPH)
- Hurricane: Once a tropical cyclone sustains wind levels between 64 and 96 knots (74 to 111 MPH)
- Major Hurricane: A tropical cyclone with maximum sustained winds of 96 knots (111 MPH) and higher. Major hurricanes are classified as category 3 or higher.
- Post-tropical Cyclone: A former tropical cyclone, this term is used to describe a cyclone that no longer possesses sufficient tropical characteristics to be considered a tropical cyclone. These post-tropical cyclones often undergo an extratropical transition and form frontal boundaries. Post-tropical cyclones can continue carrying heavy rains and high winds and cause a storm surge in coastal areas.

#### **Extent: Severe**

Hurricanes are severe tropical storms that have winds at least 74 miles per hour. In the Lakes Region they could produce heavy rain and strong winds that could cause flooding or damage buildings, trees, power lines, and cars. Because hurricanes form over the ocean and move relatively slowly, people usually have time to prepare for the event. However, this also means that once the storm arrives, heavy rain and wind can be expected for a couple of days.

Hurricanes are measured by the Saffir-Simpson Hurricane Scale: a 1-5 rating based on a hurricane's intensity using wind speed as the determining factor (see table below). The scale is used to give an estimate of the potential property damage and flooding expected from a hurricane landfall.

**Saffir-Simpson Hurricane Scale**

| Category | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | Winds 74-95 mph (64-82 kts or 119-153 km/hr). Storm surge generally 4-5 ft above normal. No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>2</b> | Winds 96-110 mph (83-95 kts or 154-177 km/hr). Storm surge generally 6-8 feet above normal. Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings.                                                                                                                                                                                                                                                                                                                                 |
| <b>3</b> | Winds 111-129 mph (96-113 kts or 178-209 km/hr). Storm surge generally 9-12 ft above normal. Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Flooding near the coast destroys smaller structures with larger structures damaged by battering from floating debris. Terrain continuously lower than 5 ft above mean sea level may be flooded inland 8 miles (13 km) or more. Evacuation of low-lying residences with several blocks of the shoreline may be required. |
| <b>4</b> | Winds 130-156 mph (114-135 kts or 210-249 km/hr). Storm surge generally 13-18 ft above normal. More extensive curtainwall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km).                                                                                                                                             |
| <b>5</b> | Winds greater than 156 mph (135 kts or 249 km/hr). Storm surge generally greater than 18 ft above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required.                                        |

Source: <http://www.nhc.noaa.gov/aboutshs.shtml>

**History:** On September 21, 1938, a Category 3 hurricane claimed 13 lives in New Hampshire and many more throughout New England. Official records at the Weather Bureau in Concord show sustained winds of 56 miles per hour, but around the state, gusts around 100 miles per hour were reported, mostly due to topographical acceleration. The Merrimack River rose nearly 11 feet above its flood stage, *The Hanover Gazette* reported that in New Hampshire, 60,000 people were homeless, and many areas were without power. Damages were estimated at \$22 million. New Hampshire has not experienced a severe hurricane directly since 1938.

Hurricane Bob, a category 2 storm, in 1991, was declared a major federal disaster in New Hampshire and is recorded as a severe storm in the state's history.

In the past five years no hurricanes have hit the region. By the time that a hurricane reaches central New Hampshire, it is rare that it retains the characteristics of a hurricane. Wind speeds usually dissipate but they can still bring a great deal of rainfall to the region. That was the case with the remnants of Hurricanes Irene and Sandy, which hit the area in 2011 and 2012 as tropical depressions.

**Location:** A cyclone could affect all areas of Andover. Stream crossings, floodplains, and steep slopes are most likely to be impacted.

**Probability of Occurrence:** Occasional

**Impact:** High

Hurricanes in the Lakes Region could produce heavy rain and strong winds that could lead to flooding and damage to property and infrastructure. Tropical and post-tropical cyclones can cause the same damage that high wind events cause, with the added hazard of possible flooding.

The committee noted that infrastructure such as roads, bridges, communications, and utilities are most vulnerable. All structures in Andover are susceptible to damage by cyclonic events, whether through tropical depression or hurricane. Assuming 2% to 5% town-wide damage to buildings, high winds could result in \$5M to \$12.5M in damage in Andover in any given year.

**Impact of Climate Change on Tropical & Post-Tropical Cyclone events:** An increase in temperature could potentially lead to stronger, and more frequent storms. Storms that produce a higher level of precipitation will lead to an increase in flooding and potential flooding damage.

**Impact on Vulnerable Communities:** Potential impacts associated with cyclonic events on Andover's vulnerable populations include:

- May have limited access to early warning alerts
- Living in poorly maintained housing with aging infrastructure
- May live in areas prone to flooding
- May have limited mobility for getting assistance/evacuation, dependence upon others to travel
- Limited resources for seeking medical assistance

## **WILDFIRE**

Wildfire is defined as a fire in wooded, potentially remote areas that may endanger lives. A wildfire is any non-structural fire, other than prescribed fire, that occurs in wildland areas consisting of vegetation or natural fuels. Wildfires can be referred to as brush fires, wildland fires, or grass fires depending on the location and what is burning.

**Extent:** Moderate

New Hampshire has about 500 wild land fires each year; most burn less than half an acre. Much of the Lakes Region (and Andover) is forested and susceptible to fire.

The National Wildfire Coordinating Group (NWCG) has defined seven classes of wildfire based on size:

- Class A - one-fourth acre or less;
- Class B - more than one-fourth acre, but less than 10 acres;

- Class C - 10 acres or more, but less than 100 acres;
- Class D - 100 acres or more, but less than 300 acres;
- Class E - 300 acres or more, but less than 1,000 acres;
- Class F - 1,000 acres or more, but less than 5,000 acres;
- Class G - 5,000 acres or more.

**History:**

In 1902, 50 acres burned on Plains Road because of spark from a train. In 1957 one hundred acres burned on Plains Road.

In April 2012: Andover fire fighters responded to a multiple-alarm wildfire in the neighboring Town of Hill, which ultimately burned 83 acres in Hill.

May 2015: This month saw a very high level of fire activity. The dry weather made fire conditions in the woods very unsafe. The Andover Fire Department responded to five multiple-alarm fires, which is unusual for most years.

No forest fires were noted since the last HMP.

**Location:** Portions of Andover are heavily wooded; a fire could occur anywhere.

**Probability of Occurrence:** Occasional

**Impact:** Moderate

Some sections of town may have limited access to potential wildfire areas, especially due to steep slopes, but fires in these locations would have a limited impact on structures. Due to the heavily wooded nature of the town, all properties in town have the potential to be impacted by a wild land fire. Assuming 1% town-wide damage to buildings, each year wildfire could result in \$2.5M in damages.

**Impact of Climate Change on Wildfire events:** Increased precipitation from severe thunderstorms, hurricanes, wind events, ice storms may damage trees and forests. This can lead to insect or disease outbreaks that may result in a significant amount of woody debris in the forests which may increase the risk of wildfires. Increased temperatures associated with climate change increase the likelihood of drought, enhancing the chance of wildfire.

**Impact on Vulnerable Communities:** Potential impacts associated with wildfire on Andover's vulnerable populations include:

- May have limited access to early warning alerts
- Living in poorly maintained housing with aging infrastructure
- May have limited mobility for getting assistance/evacuation, dependence upon others to travel
- Likely to be more prone to the effects of air pollutants (smoke) associated with wildfire – noted by committee members
- Limited resources for seeking medical assistance

### Summary of Risk

A matrix was created to determine an overall hazard risk assessment rating (next page). Each criterion (**Extent**, **Probability** of occurrence, and **Impact** – an average of three types) was given a rating to show which hazards are the greatest threat to the community, based on historic events and local knowledge, the town's ability to respond, along with economic and environmental issues.

These ratings were transformed into numerical values. The **overall risk rating** associated with each hazard was determined by multiplying the three factors. For Natural Hazards, a total score of 30 or more was deemed to be High Risk, a total of between 18 and 30 was deemed to be Medium Risk, and a score of less than 18 was deemed Low Risk.

### Definitions

#### Probability of Future Events

**Improbable:** Not likely to occur in any 25 year period.

**Remote:** Less than 1% probability in the next 25 year period.

**Occasional:** Between 1% and 50% probability in the next 25 year period.

**Probable:** Between 50% and 99% probability in the next 25 year period.

**Frequent:** Near 100% probability in the next year.

#### Extent - How bad could it get?

- **Weak:** limited magnitude, slow onset, short duration, little damage.
- **Moderate:** moderate magnitude, moderate onset speed, moderate duration, some damage/loss of service for days.
- **Severe:** Severe magnitude, fast speed of onset, long duration, devastating damage and loss of service for weeks
- **Extreme:** Extreme magnitude, immediate onset, extended duration, catastrophic damage, uninhabitable conditions.

#### Impact - Human, Property, Business

**Low:** There is little likelihood that injury or death will result from this hazard. The damage to land and property will likely be limited. Essential services and other services that residents and visitors depend upon will not be interrupted.

**Moderate:** There is some likelihood that injury or death will result from this hazard. There will likely be some damage to land and property. There will likely be some interruption of essential services and other services that residents and visitors depend upon for hours of days.

**High:** It is quite likely that injury or death will result from this hazard. There will be damage to multiple properties. Essential services and other services that residents and visitors depend upon be likely be interrupted for days.

**Catastrophic:** Multiple injuries or deaths will likely result from this hazard. Damage to properties will be widespread and extensive. Essential services and other services that residents and visitors depend upon be likely be interrupted for days or weeks.

| <b>Andover Hazard Risk</b>           | <b>Probability</b>                                                        | <b>Extent</b>                                        | <b>Average Impact</b>                               | <b>Risk</b>                        |
|--------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------|------------------------------------|
|                                      | Likelihood this will occur w/in 10 yrs                                    | (Magnitude/ Strength)                                | Average of Human, Property, Business                | Probability x Extent x Avg. Impact |
|                                      | 1: Improbable<br>2: Remote<br>3: Occasional<br>4: Probable<br>5: Frequent | 1: Weak,<br>2: Moderate,<br>3: Severe,<br>4: Extreme | 1: Low<br>2: Moderate<br>3: High<br>4: Catastrophic | Low<br>Medium<br>High              |
| Avalanche                            | <b>1.0</b>                                                                | <b>1.0</b>                                           | <b>1.0</b>                                          | <b>1.0</b>                         |
| Drought                              | <b>3.0</b>                                                                | <b>2.0</b>                                           | <b>2.3</b>                                          | <b>13.8</b>                        |
| Earthquake                           | <b>2.0</b>                                                                | <b>2.0</b>                                           | <b>2.7</b>                                          | <b>10.8</b>                        |
| Extreme Temperatures                 | <b>4.0</b>                                                                | <b>2.0</b>                                           | <b>2.3</b>                                          | <b>18.4</b>                        |
| High Wind Events (Tornado/Downburst) | <b>4.0</b>                                                                | <b>3.0</b>                                           | <b>3.3</b>                                          | <b>39.6</b>                        |
| Infectious Diseases                  | <b>2.0</b>                                                                | <b>2.0</b>                                           | <b>2.0</b>                                          | <b>8.0</b>                         |
| Inland Flooding & Erosion            | <b>4.0</b>                                                                | <b>3.0</b>                                           | <b>2.7</b>                                          | <b>32.4</b>                        |
| Dam Failure                          | <b>2.0</b>                                                                | <b>2.0</b>                                           | <b>2.0</b>                                          | <b>8.0</b>                         |
| Landslides                           | <b>1.0</b>                                                                | <b>1.0</b>                                           | <b>1.0</b>                                          | <b>1.0</b>                         |
| Lightning                            | <b>4.0</b>                                                                | <b>2.0</b>                                           | <b>2.7</b>                                          | <b>21.6</b>                        |
| Severe Winter Weather                | <b>5.0</b>                                                                | <b>2.0</b>                                           | <b>3.0</b>                                          | <b>30.0</b>                        |
| Solar Storms & Space Weather         | <b>2.0</b>                                                                | <b>1.0</b>                                           | <b>1.0</b>                                          | <b>2.0</b>                         |
| Tropical & Post-Tropical Cyclones    | <b>3.0</b>                                                                | <b>3.0</b>                                           | <b>3.7</b>                                          | <b>33.3</b>                        |
| Wildfires                            | <b>3.0</b>                                                                | <b>2.0</b>                                           | <b>2.3</b>                                          | <b>13.8</b>                        |

It should be noted that the ranking of individual hazards for the purposes of planning discussion should not in any way diminish the potential severity of the impacts of a given hazard event. Further, hazards ranked as low risk may have the impact of increasing the risk of other hazards when they occur. For example, in the event of a drought, the risk of woodland fire may be greater. In combination, hazard events may have the impact of overwhelming existing emergency response systems.

## SECTION IV: VULNERABILITY ASSESSMENT

After reviewing the various natural hazards and the town's critical facilities and other resources, the Andover HMP Committee considered how susceptible they considered the town to be to damage or economic loss (vulnerability). After individually rating the town's vulnerability to each hazard and averaging the scores, committee members discussed their various reasons for scoring as they did. Eventually they came to a consensus on the **vulnerability ratings** below, indicating that the town's greatest vulnerabilities were flooding, winter weather, and post-tropical cyclones.

Key: None – 0, Low – 1, Medium – 2, High – 3.

| <b>Vulnerability</b>                    |                                           |
|-----------------------------------------|-------------------------------------------|
|                                         |                                           |
|                                         | 0: None<br>1: Low<br>2: Medium<br>3: High |
| Avalanche                               | <b>0.33</b>                               |
| Drought                                 | <b>1.33</b>                               |
| Earthquake                              | <b>1.17</b>                               |
| Extreme Temperatures                    | <b>1.33</b>                               |
| High Wind Events<br>(Tornado/Downburst) | <b>2.00</b>                               |
| Infectious Diseases                     | <b>1.00</b>                               |
| Inland Flooding                         | <b>2.50</b>                               |
| Dam Failure                             | <b>1.00</b>                               |
| Landslides                              | <b>0.50</b>                               |
| Lightning                               | <b>1.67</b>                               |
| Severe Winter Weather                   | <b>2.50</b>                               |
| Solar Storms & Space<br>Weather         | <b>0.67</b>                               |
| Tropical & Post-Tropical<br>Cyclones    | <b>2.50</b>                               |
| Wildfires                               | <b>1.33</b>                               |

\*Vulnerability is susceptibility to damage or economic loss.

## SECTION V: MITIGATION STRATEGIES

### A. CURRENT PLANS, POLICIES, AND REGULATIONS

The planning decisions that affect community growth patterns have evolved over the years as Andover has developed. Many local programs have the effect of mitigating disasters; some of these have been in effect for years, others were implemented since the development of the 2019 Hazard Mitigation Plan. A review of existing mitigation strategies was conducted and included review of pertinent documents including the zoning ordinance, subdivision regulations, emergency management plan, site plan regulations, and discussion with Committee members. The following strategies detail existing plans and regulations related to hazard mitigation. Also included is a column with comments noted by the Committee. The review of existing effectiveness utilized these categories:

**Poor** ..... The policy, plan or mutual aid system does **not work as well as it should and often falls short of meeting its goals.**

**Fair** ..... The policy, plan or mutual aid system does **not work as well as it should and sometimes falls short of meeting its goals.**

**Good** ..... The policy, plan or mutual aid system **works well and is achieving its goals.**

**Excellent** ..... The policy, plan or mutual aid system **works very well and often exceeds its goals.**

**Untested** ..... The policy, plan or mutual aid system **has not yet been tried or put to the test.**

The primary planning mechanism in Andover addressing land use development is the master plan. Andover's Master Plan was last revised in 2013. The town's Zoning Ordinance (2013) along with Subdivision (2018) and Site Plan Review Regulations (2017) are the tools for implementing the vision and goals of the master plan. These various planning documents are responsible for promoting the health, safety, and welfare of the community.

The town's Zoning Ordinance was updated since the last HMP. NH RSA 674:2(e) does allow for the inclusion of a natural hazards Section in a local master plan. The town should consider adopting this HMP as part of the master plan by reference.

How the town appropriates its funds is another form of planning, indicating local priorities. In Andover, the Selectmen are responsible for the development of annual and long-term town budgets, which could include some hazard mitigation expenses. Recent town budgets have funded mitigation and response expenses identified in the hazard mitigation plan notably upgrading several culverts.

**Table V-1: Existing Protections and Policies**

| <b>Existing Protection</b>         | <b>Description</b>                                                                                                                                                                              | <b>Responsible Agent</b>            | <b>Effectiveness</b> | <b>Comments</b>                                                                |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------|--------------------------------------------------------------------------------|
| Emergency Operations Plan          | The EOP identifies the response procedures and capabilities of the Town.                                                                                                                        | Emergency Management Director (EMD) | Good                 | Updated in 2022                                                                |
| Zoning Enforcement / Building Code | State Residential International Building Code, as amended                                                                                                                                       | Selectmen                           | Average              | None                                                                           |
| Floodplain Ordinance               | The town is currently participating the NFIP and has adopted the required floodplain ordinance.                                                                                                 | Planning Board                      | Average              | Continue to update NFIP Ordinance to meet state and federal requirements.      |
| Elevation Certificates Maintained  | Elevation Certificate Permits required for development in the 100-year floodplain only.                                                                                                         | Planning Board                      | Average              | Continue to maintain Elevation Certificates for development in the Floodplain. |
| Emergency Warning System           | E911 ENS, Public access channel, Cable, website, door- to-door, Reverse 911, Code Red                                                                                                           | EMD                                 | Average              | None                                                                           |
| Subdivision Regulations            | The purpose of Andover's subdivision regulations is to provide for the orderly development of the town by promoting the public health, safety, convenience and welfare of the town's residents. | Planning Board & Selectmen          | Average              | Update regulations as necessary.                                               |
| Road Design Standards              | Andover's Subdivision Regulations include road design standards that control the amount and retention of storm water runoff.                                                                    | Planning Board                      | Average              | Update regulations as necessary.                                               |

| Existing Protection               | Description                                                                                                          | Responsible Agent           | Effectiveness | Comments                                                                                                                   |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|
| Bridge Maintenance Program        | Inspection and clean-up occur annually. The state inspects all bridges every other year and maintains their bridges. | Road Agent & Selectmen      | Average       | Continue to inspect and upgrade bridges.                                                                                   |
| Storm Drain / Culvert Maintenance | Town-wide                                                                                                            | Road Agent                  | Average       | Inventory culverts on GPS with condition, type & age of culvert. 8"-10" culverts being replaced with culverts at least 15" |
| Road Maintenance Plan             | A written schedule of work to be conducted on the roads for the next several years                                   | Road Agent                  | Average       | Should be updated at least every five years.                                                                               |
| Wellhead Protection               | None                                                                                                                 | n/a                         | n/a           | Research wellhead protection regulations around Bradley Lake.                                                              |
| Wetlands Protection               | No Town Ordinance                                                                                                    | NHDES                       | Average       | Activity in wetlands requires state approval.                                                                              |
| Aquifer Protection Ordinance      | No town ordinance.                                                                                                   | n/a                         | n/a           | Research aquifer protection regulations for the Plains Road area.                                                          |
| Hazardous Materials Response Team | Central NH Haz Mat Response Team                                                                                     | Fire Department             | Average       | Continue to participate in the regional haz mat team.                                                                      |
| Public Education Programs         | The Fire Department & EMS conducts fire prevention programs. The Police Department conducts periodic programs.       | EMD/Fire Chief/Police Chief | Average       | Research & apply for grant money for public education.                                                                     |
| School Emergency Response Plan    | Andover Elementary School maintains an emergency response plan and conducts at least 10 drills a year.               | School Principal/EMD        | Average       | Update as required by the State, or as necessary.                                                                          |
| Master Plan                       | The Master Plan serves as the guiding document for future development in Andover.                                    | Planning Board              | Good          | Updated in 2023                                                                                                            |

| Existing Protection               | Description                                                                                                                                               | Responsible Agent      | Effectiveness | Comments                                                 |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|----------------------------------------------------------|
| Capital Improvement Program       | Long-term budget program.                                                                                                                                 | Planning Board         | Average       | Include Haz Mit Projects where applicable.               |
| Dam Emergency Action Plans (EAPs) | Highland Lake Dam and Bradley Lake Dam are owned by the Town and the Village District. Both Dams have Emergency Actions Plans on file at the Town Office. | NHDES Dam Bureau & EMD | Average       | Include as part of the Town's Emergency Operations Plan. |

A Capital Improvements Program (CIP) is a tool that can be useful in helping a community budget for a variety of expensive capital projects, including those that mitigate hazards (NH RSA 674.5). The CIP can be developed by the Planning Board or a committee appointed by the Board of Selectmen. Andover does have a CIP Committee.

**B. STATUS OF 2019 ACTIONS**

The 2019 HMP contained 25 recommended actions, 17 mitigation actions and 8 preparedness or response (non-mitigation) actions. The status of the mitigation actions recommended in the 2019 plan is indicated in Table V-2 as either Completed (C), Deleted (X), or Deferred (D) [Preparedness and response activities are addressed in Appendix G.] Some of the deleted Actions are now listed above as “Current Plans, Policies, and Regulations” (Table V-1). A review of the status of these actions reveals that two have been completed and three others are no longer considered pertinent. Deferred Actions (or portions of deferred Actions) were carried forward to be considered along with new Mitigation Actions (Table V-3).

**Table V-2: Status of Mitigation Actions from the 2019 Plan** Key: C-Completed, X – Delete, D – Deferred

**Status of Andover HMP 2019 Actions**

| Hazard      | Projects                                                                                                                                                                                                              | Project Status (2024) | Comments                                                            |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------|
| Dam Failure | Include the Highland Lake and Bradley Lake Dam Emergency Action Plans (EAP) to the EOP and test the EAPs every 2 years.                                                                                               | D                     | Incorporated in EAP. Testing the EAP should be an ongoing practice. |
|             | Install erosion control (i.e. riprap) at the face of Bradley Lake dam.                                                                                                                                                | C                     | More will be done in 2025.                                          |
|             | Add signage for the 12” pipe on the east side of Bradley Lake Dam, located in the woods and vulnerable to vehicle load.                                                                                               | C                     | Done.                                                               |
| Drought     | Replace generator at the water treatment plant with a large sized generator.                                                                                                                                          | D                     | Insufficient funding.                                               |
|             | Develop Water Resource Protection Plan (WRPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.) | D                     | In process with grant funding.                                      |
| Earthquake  | Identify and map the water system infrastructure.                                                                                                                                                                     | D                     | In process, expected completion July 2025.                          |

| Hazard                                               | Projects                                                                                                                                                                                                              | Project Status (2024) | Comments                                 |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------|
| Extreme Heat                                         | Educate the general public and vulnerable populations on the steps to mitigate extreme heat, including establishing and promoting accessible cooling centers in the community.                                        | D                     | This is an ongoing maintenance practice. |
| Flooding or Erosion                                  | Inventory culverts, including the age and condition, using GPS and associated hardware & software. Road Service Management System. (RSMS)                                                                             | D                     | In process.                              |
|                                                      | Replace and upgrade multiple culverts on Shaw Hill Road (from Keyser property to Raccoon Hill intersection)                                                                                                           | X                     | Completed 2022.                          |
|                                                      | Continue to ensure town regulations meet the National Flood Insurance Program (NFIP) standards                                                                                                                        | D                     | This is an ongoing maintenance practice. |
| Hurricane (Tropical & Post-Tropical Cyclones)        | Install a repeater on the Verizon Tower to enhance police and fire radio communications.                                                                                                                              | D                     | Location change. 1-2 years               |
|                                                      | Install a generator at the Andover Police Department.                                                                                                                                                                 | X                     | Have portable generator.                 |
| Lightning                                            | Purchase Uninterrupted Power Supply (UPS) for all town owned computer systems.                                                                                                                                        | X                     | Have alternate power source.             |
|                                                      | Educate the public on the hazards of and the steps to reduce the impact of lightning strikes to humans and structures.                                                                                                | D                     | This is an ongoing maintenance practice. |
| Severe Wind (Tornado /Downburst)<br>High Wind Events | Eliminate tree hazards over public roads as needed.                                                                                                                                                                   | D                     | This is an ongoing maintenance practice. |
| Wild/Forest Fire<br>Wildfire                         | Develop Water Resource Protection Plan (WRPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.) | D                     | Insufficient funding.                    |
|                                                      | Continue to increase funds in the Wildfire Reserve Fund.                                                                                                                                                              | D                     | Ongoing maintenance                      |

## C. MITIGATION GOALS AND TYPES OF ACTIONS

### GOALS

In the 2019 Plan, the committee affirmed its support for the goals stated in the State HMP at the time. This included both general and hazard-specific local goals. In 2023 the New Hampshire State Hazard Mitigation Plan published six overarching goals to help align the plan with new focuses on equity, the impacts of climate change, and community lifelines. The Andover HMP Committee reviewed both sets of goals and adopted the following wording that incorporates elements of both sets of goals as they apply to Andover.

1. Improve the protection of all residents and workers in Andover and its visitors from all significant natural hazards, including the potential impacts from a changing climate, raise general awareness, and reduce the liability to the town for natural hazard events.
2. Through a coordinated and collaborative effort between federal, State, and local authorities, minimize loss and disruption of natural disasters on human life, emergency response capability, critical facilities, infrastructure, private property, economy, natural environment, historic treasures and cultural resources in the Town of Andover
4. Improve the Town of Andover's emergency preparedness and communication network and disaster response and recovery capability.
5. Identify, introduce and implement cost effective Hazard Mitigation measures to accomplish the Town's Goals and Objectives.
6. Work in cooperation with the State of New Hampshire's Hazard Mitigation Goals, including development of a Continuity of Operations / Government Plan and consideration of climate change in future planning.

The Goals will be achieved through:

- a. identifying and assessing hazards posing a risk to Andover and developing mitigation measures through a community outreach effort, including vulnerable populations.
- b. a coordinated and collaborative effort between federal, State, and local authorities along with other partners (private, NGOs, and VOADs\*) to implement appropriate and cost-effective hazard mitigation measures.
- c. public education about disaster preparedness and resilience and expanded awareness of the threats and hazards which face the town.
- d. strengthen Continuity of Operations and Continuity of Government to ensure continuation of essential services through training, outreach, and education.
- e. Reduce the impact of increased severe weather incidents (flooding, snow and ice storms).

\*NGO – Non-governmental Organization, VOAD - Voluntary Organizations Active in Disaster

**TYPES OF ACTIONS**

There are six **types of actions** that communities may take to reduce the likelihood that a hazard might impact the community. Below each **action type** are several examples of those actions.

**A. Actions that will keep things from getting worse - Prevention**

- a. Zoning – floodplain and steep slope overlays
- b. Open space preservation
- c. Subdivision and Site Plan Review
  - i. Impervious surface limits
  - ii. Stormwater management
- d. Capital Improvements Plan – limiting the extension of public infrastructure into hazard areas
- e. Building and Fire codes

**B. Actions that address individual buildings - Property Protection**

- a. Flood-proofing existing buildings
- b. Retrofitting existing buildings to reduce damage
- c. Relocating structures from hazard-prone areas
- d. Public procurement and management of land vulnerable to hazard damage

**C. Actions that will inform the public - Public education and awareness**

- a. Make hazard information and maps available to residents and visitors.
  - i. Paper or electronic
  - ii. Targeted at residents and businesses in hazard-prone areas
  - iii. Set up displays in public areas, or homeowners associations.
  - iv. Give educational programs in schools.
  - v. Make information available through newspapers, radio, TV.
- b. Ask businesses to provide hazard information to employees.
- c. Adopt a real estate disclosure requirement so that potential owners are informed of risks prior to purchase.

**D. Actions that will protect natural resources**

- a. Erosion and sediment control programs
- b. Wetlands protection programs
- c. Expand public open space
- d. Environmental restoration programs

**E. Actions that will protect emergency services before, during, and immediately after an event (Long-term continuity)**

- a. Protect warning system capability
- b. Protection or hardening of critical facilities such as fire stations or hospitals
- c. Protection of infrastructure, such as roads that are needed in emergency response

**F. Actions that will control the hazard – Structural projects**

- a. Diversion of stormwater away from developed areas
- b. Reservoirs to store drinking water

#### D. MITIGATION ACTIONS

Through a review of the risk assessment and local vulnerabilities, several Problem Statements were identified and refined by the Committee. Through discussion an updated list of mitigation strategies was developed to address these current problems. Hazards are listed alphabetically, and ID letters/numbers do not indicate any prioritization.

**Table V-3: Problem Statements and Potential Mitigation Actions**

| Project ID | Hazard                                     | Problem Statements                                                                                                                                  | Projects                                                                                                                                                                                                              |
|------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DF 1       | <b>Dam Failure</b>                         | Highland Lake Dam, if breached, could damage downstream culverts, bridges, roads and a couple of structures.                                        | Include the Highland Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                                                     |
| DF 2       | <b>Dam Failure</b>                         | Highland Lake Dam, if breached, could damage downstream culverts, bridges, roads and a couple of structures.                                        | Add signage for the 12" pipe on the east side of Bradley Lake Dam, located in the woods and vulnerable to vehicle load.                                                                                               |
| DF 3       | <b>Dam Failure</b>                         | Highland Lake Dam, if breached, could damage downstream culverts, bridges, roads and a couple of structures.                                        | Install erosion control (i.e. riprap) at the face of Bradley Lake dam.                                                                                                                                                |
| DF 4       | <b>Dam Failure</b>                         | Highland Lake Dam, if breached, could damage downstream culverts, bridges, roads and a couple of structures.                                        | Include the Bradley Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                                                      |
| D 1        | <b>Drought</b>                             | Private wells dry up during periods of drought.                                                                                                     | Replace the 20-year-old generator at the water treatment plant with a larger sized generator.                                                                                                                         |
| D 2        | <b>Drought</b>                             | An extended drought increases the probability of fires and may hinder fire suppression to those areas relying on dry-hydrants in local waterbodies. | Develop Water Resource Protection Plan (WRPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.) |
| EQ 1       | <b>Earthquake</b>                          | Critical facilities that are made of unreinforced masonry are susceptible to earthquake damage.                                                     | Identify and map the water system infrastructure.                                                                                                                                                                     |
| ET 1       | <b>Extreme Temperatures (Cold or Heat)</b> | There are functional needs populations without air-conditioning that may need assistance during prolonged periods of extreme heat.                  | Educate the general public and vulnerable populations on the steps to mitigate extreme heat, including establishing and promoting accessible warming & cooling centers in the community.                              |
| FE 1       | <b>Flooding or Erosion</b>                 | Heavy rains cause erosion and damage culverts, ditches and roads.                                                                                   | Inventory culverts, including the age and condition, using GPS and associated hardware & software. Culvert & Closed Drainage System (CCDS) inventory and assessment                                                   |

| Project ID | Hazard                                                                   | Problem Statements                                                                                                                          | Projects                                                                                                                                                                                                              |
|------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FE 2       | <b>Flooding<br/>or Erosion</b>                                           | Heavy rains cause erosion and damage culverts, ditches and roads.                                                                           | Replace and upgrade multiple culverts on Shaw Hill Road (from Keyser property to Raccoon Hill intersection)                                                                                                           |
| FE 3       | <b>Flooding<br/>or Erosion</b>                                           | Flooded, eroded, and closed roads impede emergency response and essential services.                                                         | Work with NHDOT to upgrade the bridge along US 4 (state) near Greencrow and Tucker Mtn Roads.                                                                                                                         |
| FE 4       | <b>Flooding<br/>or Erosion</b>                                           | Flooded, eroded, and closed roads impede emergency response and essential services.                                                         | Replace and upgrade multiple culverts on Valley Road, Bridge and Lawrence Streets.                                                                                                                                    |
| FE 5       | <b>Flooding<br/>or Erosion</b>                                           | Flooding can cause damage to public and private structures.                                                                                 | Continue to ensure town regulations meet the National Flood Insurance Program (NFIP) standards                                                                                                                        |
| PTC 1      | <b>Hurricane<br/>(Tropical &amp;<br/>Post-Tropical<br/>Cyclones)</b>     | Wind damage results in downed trees, wires and utilities which can impact emergency communications, electricity and information technology. | Install a repeater on the Fire Station to enhance police and fire radio communications.                                                                                                                               |
| PTC 2      | <b>Hurricane<br/>(Tropical &amp;<br/>Post-Tropical<br/>Cyclones)</b>     | Wind damage results in downed trees, wires and utilities which can impact emergency communications, electricity and information technology. | Install a generator at the Andover Police Department.                                                                                                                                                                 |
| L 1        | <b>Lightning</b>                                                         | Critical facilities are at risk to lightning strikes.                                                                                       | Purchase Uninterrupted Power Supply (UPS) for all town owned computer systems.                                                                                                                                        |
| L 2        | <b>Lightning</b>                                                         | People and structures may be at risk to lightning strikes and resulting fires.                                                              | Educate the public on the hazards of and the steps to reduce the impact of lightning strikes to humans and structures.                                                                                                |
| SW 1       | <b>Severe Wind<br/>(Tornado<br/>/Downburst)<br/>High Wind<br/>Events</b> | Wind damage may result in downed utilities which can negatively impact emergency communications.                                            | Eliminate tree hazards over public roads as needed.                                                                                                                                                                   |
| WFF 1      | <b>Wild/Forest<br/>Fire<br/>Wildfire</b>                                 | Conservation, timber, residential and forested areas are at risk to forest fire.                                                            | Develop Water Resource Protection Plan (WRPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.) |

| Project ID | Hazard                               | Problem Statements                                                                                                                                                                                   | Projects                                                                                                                  |
|------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| WFF 2      | <b>Wild/Forest Fire<br/>Wildfire</b> | Conservation, timber, residential and forested areas are at risk to forest fire.                                                                                                                     | Continue to increase funds in the Wildfire Reserve Fund.                                                                  |
| WFF 3      | <b>Wild/Forest Fire<br/>Wildfire</b> | Structures without fire breaks are at risk to forest fire.                                                                                                                                           | Provide wildfire education resources so that homeowners can take steps to protect these structures.                       |
| SWW 1      | <b>Severe Winter Weather</b>         | Ice storms and wind from blizzards and nor'easters results in downed utilities which can impact emergency communication, information technology, block roads, and result in prolonged power outages. | Work with NH Electric Coop and Eversource to keep trees cut back.                                                         |
| SWW 2      | <b>Severe Winter Weather</b>         | Ice storms and wind from blizzards and nor'easters results in downed utilities which can impact emergency communication, information technology, block roads, and result in prolonged power outages. | Purchase and install generator at the Andover Elementary School in order to operate the facility as a designated shelter. |
| SWW 3      | <b>Severe Winter Weather</b>         | Schools and individual residents (especially the elderly) are at risk due to lack of heat and water during power outages.                                                                            | Develop a Memorandum of Agreement between the School and the Town for use of facility as a shelter.                       |

The Committee identified the various costs and benefits associated with each action. The estimated cost represents what the town estimates it will cost in terms of dollars or staff hours to implement each action. Table V-4 shows the costs as well as the various benefits associated with each action. This table also includes notes whether the action addresses existing structures/infrastructure or future (new) structures/infrastructure. The ID letters are used simply for tracking purposes; they do not indicate any sort of prioritization. IDs with similar highlighting address similar problem statements.

**Table V-4: Actions indicating Hazard, Cost, Structure, Goal, and Type of Action**

| Project ID | Hazard             | Problem                                                                                                      | Mitigation Actions                                                                                | New/Existing | Estimated Cost | Potential Funding Source |
|------------|--------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------|----------------|--------------------------|
| DF 1       | <b>Dam Failure</b> | Highland Lake Dam, if breached, could damage downstream culverts, bridges, roads and a couple of structures. | Include the Highland Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years. | Existing     | 20 hrs.        | Staff Time               |

| Project ID | Hazard                          | Problem                                                                                                                                                                                             | Mitigation Actions                                                                                                                                                                                                      | New/ Existing | Estimated Cost  | Potential Funding Source |
|------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------|--------------------------|
| DF 4       | <b>Dam Failure</b>              | Bradley Lake Dam, if breached, could cause damage to downstream flood control dam (Hall Rd.) 3 roads, 3 bridges and impact source water supply to treatment plant and production of drinking water. | Include the Bradley Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                                                        | Existing      | 20 hours        | Staff Time               |
| D 1        | <b>Drought</b>                  | Private wells dry-up during periods of drought.                                                                                                                                                     | Develop system to meter, monitor and reimburse AVD for water distributed to drought-stricken residents.                                                                                                                 | Existing      | 100 hours       | Staff Time               |
| D 2*       | <b>Drought</b>                  | An extended drought increases the probability of fires and may hinder fire suppression to those areas relying on dry- hydrants in local water-bodies.                                               | Develop Resource Protection Plan (RPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.)          | New           | 100 hours       | Staff Time / OPD         |
| EQ 1       | <b>Earthquake</b>               | Critical facilities that are made of un-reinforced masonry are susceptible to earthquake damage.                                                                                                    | AVD is currently undertaking an Asset Management Planning exercise with support from NH-DES. Part of this activity is mapping water supply infrastructure and developing plans for maintenance and upgrading over time. | Existing      | \$ 3,000        | Town Budget              |
| ET 1       | <b>Extreme Cold and/or Heat</b> | There are functional needs populations without air-conditioning that may need assistance during prolonged periods of extreme heat.                                                                  | Educate the general public and vulnerable populations on the steps to mitigate extreme heat, including establishing and promoting accessible warming & cooling centers in the community.                                | Existing      | 20 hrs          | Staff Time               |
| FE 1       | <b>Flooding or Erosion</b>      | Heavy rains cause erosion and damage culverts, ditches and roads.                                                                                                                                   | Inventory culverts, including the age and condition, using GPS and associated hardware & software. Culvert & Closed Drainage System (CCDS) inventory and assessment                                                     | Existing      | \$ 10,000       | Town Budget              |
| FE 3       | <b>Flooding or Erosion</b>      | Flooded, eroded, and closed roads impede emergency response and essential services.                                                                                                                 | Work with NHDOT to upgrade the bridge along US 4 (state) near Plains and Fernvale Roads.                                                                                                                                | Existing      | 20 hours (town) | NHDOT & Staff Time       |
| FE 4       | <b>Flooding or Erosion</b>      | Flooded, eroded, and closed roads impede emergency response and essential services.                                                                                                                 | Replace and upgrade multiple culverts on Valley Road, Bridge, Currier, and Switch Streets.                                                                                                                              | New           | \$ 40,000       | Town Budget              |

| Project ID | Hazard                                                   | Problem                                                                                                                                   | Mitigation Actions                                                                                                                                                                                        | New/Existing | Estimated Cost       | Potential Funding Source |
|------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------|--------------------------|
| FE 5       | <b>Flooding or Erosion</b>                               | Flooding can cause damage to public and private structures.                                                                               | Continue to ensure town regulations meet the National Flood Insurance Program (NFIP) standards                                                                                                            | New          | 10 hours             | Staff Time               |
| H/TC 1     | <b>Hurricane (Tropical &amp; Post-Tropical Cyclones)</b> | Wind damage results in downed trees, wires and utilities which can impact emergency communications, electricity & information technology. | Install a repeater on the Fire Station to enhance police and fire radio communications.                                                                                                                   | Existing     | \$5,000              | Fire & Police budgets    |
| L 2        | <b>Lightning</b>                                         | People and structures may be at risk to lightning strikes and resulting fires.                                                            | Educate the public on the hazards of and the steps to reduce the impact of lightning strikes to humans and structures.                                                                                    | Existing     | 10 hours             | Staff Time               |
| SW 1       | <b>Severe Wind (Tornado /Downburst) High Wind</b>        | Wind damage may result in downed utilities which can negatively impact emergency communications.                                          | Eliminate tree hazards over public roads as needed.                                                                                                                                                       | Existing     | \$10,000 - \$25,000  | Town Budget              |
| WFF 1*     | <b>Wild/Forest Fire Wildfire</b>                         | Conservation, timber, residential and forested areas are at risk to forest fire.                                                          | Develop Source Water Protection Plan (SWPP) that identifies potential negative impacts from wild/forest fires in the Bradley Lake watershed and possible remedies for Bradley Lake Drinking Water Supply. | New          | 100 hours            | Staff Time / OPD         |
| WFF 2      | <b>Wild/Forest Fire Wildfire</b>                         | Conservation, timber, residential and forested areas are at risk to forest fire.                                                          | Continue to increase funds in the Wildfire Reserve Fund.                                                                                                                                                  | New          | \$5,000 annually     | Town Budget              |
| WFF 3      | <b>Wild/Forest Fire Wildfire</b>                         | Structures without fire breaks are at risk to forest fire.                                                                                | Provide wildfire education resources so that homeowners can take steps to protect these structures.                                                                                                       | Existing     | 20 hours             | Town Budget              |
| SWW 1      | <b>Severe Winter Weather</b>                             | Ice storms and wind from blizzards and nor'easters results in downed utilities which can impact result in prolonged power outages.        | Identify source of funding for replacement of FEMA supplied back-up generator -critical for water treatment operation during winter months (mandatory space heating requirement).                         | Existing     | \$50,000 - \$100,000 | AVD, Town Budget, grant  |
| SWW 2      | <b>Severe Winter Weather</b>                             | Ice storms and wind from blizzards and nor'easters may result in downed utilities which can impact result in prolonged power outages.     | Begin discussions regarding electrical "islanding" to have self-sufficiency in the event of a natural hazard.                                                                                             | Existing     | 10 hours             | Staff Time               |

## E. PRIORITIZATION OF ACTIONS

After considering the various merits and limitations of each project, the Committee prioritized the projects which had been identified. Committee members agreed to the standard STAPLEE prioritization tool to reflect the concerns of the community. The tool asks the committee to consider seven separate aspects for each Action. There was much discussion during this prioritization process and the final scores were reached through group consensus. Table V-5 shows the Actions and their scores. Total scores range from a high of 7 to a low of -7. See Appendix H for further details regarding the STAPLEE prioritization method and the detailed scores.

Scoring: 1 = Highly effective of feasible, 0 = Neutral, -1 = Ineffective or not feasible

**Table V-5: Recommended Actions in Ranked Order**

| Project ID | Hazard                                                   | Mitigation Actions                                                                                                                                                                                                      | Total    |
|------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| DF 1       | <b>Dam Failure</b>                                       | Include the Highland Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                                                       | <b>7</b> |
| DF 4       | <b>Dam Failure</b>                                       | Include the Bradley Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                                                        | <b>7</b> |
| ET 1       | <b>Extreme Cold and/or Heat</b>                          | Educate the general public and vulnerable populations on the steps to mitigate extreme heat, including establishing and promoting accessible warming & cooling centers in the community.                                | <b>7</b> |
| FE 1       | <b>Flooding or Erosion</b>                               | Inventory culverts, including the age and condition, using GPS and associated hardware & software. Culvert & Closed Drainage System (CCDS) inventory and assessment                                                     | <b>7</b> |
| FE 5       | <b>Flooding or Erosion</b>                               | Continue to ensure town regulations meet the National Flood Insurance Program (NFIP) standards                                                                                                                          | <b>6</b> |
| H/TC 1     | <b>Hurricane (Tropical &amp; Post-Tropical Cyclones)</b> | Install a repeater on the Fire Station to enhance police and fire radio communications.                                                                                                                                 | <b>6</b> |
| L 2        | <b>Lightning</b>                                         | Educate the public on the hazards of and the steps to reduce the impact of lightning strikes to humans and structures.                                                                                                  | <b>6</b> |
| EQ 1       | <b>Earthquake</b>                                        | AVD is currently undertaking an Asset Management Planning exercise with support from NH-DES. Part of this activity is mapping water supply infrastructure and developing plans for maintenance and upgrading over time. | <b>5</b> |

| <b>Project ID</b> | <b>Hazard</b>                                                            | <b>Mitigation Actions</b>                                                                                                                                                                                      | <b>Total</b> |
|-------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| FE 3              | <b>Flooding<br/>or Erosion</b>                                           | Work with NHDOT to upgrade the bridge along US 4 (state) near Plains and Fernvale Roads.                                                                                                                       | <b>5</b>     |
| FE 4              | <b>Flooding<br/>or Erosion</b>                                           | Replace and upgrade multiple culverts on Valley Road, Bridge, Currier, and Switch Streets.                                                                                                                     | <b>5</b>     |
| WFF 3             | <b>Wild/Forest<br/>Fire<br/>Wildfire</b>                                 | Provide wildfire education resources so that homeowners can take steps to protect these structures.                                                                                                            | <b>5</b>     |
| D 2*              | <b>Drought</b>                                                           | Develop Resource Protection Plan (RPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.) | <b>4</b>     |
| SW 1              | <b>Severe Wind<br/>(Tornado<br/>/Downburst)<br/>High Wind<br/>Events</b> | Eliminate tree hazards over public roads as needed.                                                                                                                                                            | <b>4</b>     |
| WFF 2             | <b>Wild/Forest<br/>Fire<br/>Wildfire</b>                                 | Continue to increase funds in the Wildfire Reserve Fund.                                                                                                                                                       | <b>4</b>     |
| D 1               | <b>Drought</b>                                                           | Develop system to meter, monitor and reimburse AVD for water distributed to drought-stricken residents.                                                                                                        | <b>3</b>     |
| WFF 1*            | <b>Wild/Forest<br/>Fire<br/>Wildfire</b>                                 | Develop Source Water Protection Plan (SWPP) that identifies potential negative impacts from wild/forest fires in the Bradley Lake watershed and possible remedies for Bradley Lake Drinking Water Supply.      | <b>3</b>     |
| SWW 1             | <b>Severe<br/>Winter<br/>Weather</b>                                     | Identify source of funding for replacement of FEMA supplied back-up generator -critical for water treatment operation during winter months (mandatory space heating requirement).                              | <b>3</b>     |
| SWW 2             | <b>Severe<br/>Winter<br/>Weather</b>                                     | Begin discussions regarding electrical "islanding" to have self-sufficiency in the event of a natural hazard.                                                                                                  | <b>0</b>     |

## F. IMPLEMENTATION OF MITIGATION ACTIONS

There are many factors that influence how a town chooses to spend its energy and resources in implementing recommended actions. Factors include:

- Urgency
- How quickly an action could be implemented
- Likelihood that the action will reduce future emergencies
- Regulations required to implement the action
- Administrative burdens
- Time (both paid and volunteer)
- Funding availability
- Political acceptability of the action.

In the context of these factors, the Committee discussed the mitigation actions and relative level of priority, recognizing that some actions are of greater priority to different town departments. This implementation schedule is a matrix (Table V-6) indicating the estimated cost of implementation, potential funding sources, the parties responsible for bringing about these actions, and implementation time frame. The time frame used fits within the 5-year term of this plan (Short 1 yr, Medium 2-3 yr, Long 4-5 yr). These are listed in order of their Time Frame. To keep the plan current, the implementation schedule should be updated and re-evaluated on a regular basis as outlined in the monitoring section of this plan and a record of this process and progress documented in Appendix K.

**Table V-6: Implementation Schedule for Mitigation Actions by Time Frame**

| Project ID | Hazard      | Mitigation Actions                                                                                | Estimated Cost | Potential Funding Source | Responsible Party | Notes | Time Frame<br>S: 1 yr,<br>M: 2-3 yr,<br>L: 4-5 yr |
|------------|-------------|---------------------------------------------------------------------------------------------------|----------------|--------------------------|-------------------|-------|---------------------------------------------------|
| DF 1       | Dam Failure | Include the Highland Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years. | 20 hrs.        | Staff Time               | EMD               |       | M                                                 |
| DF 4       | Dam Failure | Include the Bradley Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.  | 20 hours       | Staff Time               | EMD               |       | M                                                 |

| Project ID | Hazard                                                   | Mitigation Actions                                                                                                                                                                                                      | Estimated Cost    | Potential Funding Source | Responsible Party | Notes                       | Time Frame<br>S: 1 yr,<br>M: 2-3 yr,<br>L: 4-5 yr |
|------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------|-------------------|-----------------------------|---------------------------------------------------|
| ET 1       | <b>Extreme Cold and/or Heat</b>                          | Educate the general public and vulnerable populations on the steps to mitigate extreme heat, including establishing and promoting accessible warming & cooling centers in the community.                                | 20 hrs            | Staff Time               | EMD               |                             | S                                                 |
| FE 1       | <b>Flooding or Erosion</b>                               | Inventory culverts, including the age and condition, using GPS and associated hardware & software. Culvert & Closed Drainage System (CCDS) inventory and assessment                                                     | \$ 10,000         | Town Budget              | RA                |                             | L                                                 |
| FE 5       | <b>Flooding or Erosion</b>                               | Continue to ensure town regulations meet the National Flood Insurance Program (NFIP) standards                                                                                                                          | 10 hours annually | Staff Time               | PB, BI, EMD       |                             | M                                                 |
| H/TC 1     | <b>Hurricane (Tropical &amp; Post-Tropical Cyclones)</b> | Install a repeater on the Fire Station to enhance police and fire radio communications.                                                                                                                                 | Funded.           | Funded.                  | EMD               | Funded.                     | S                                                 |
| L 2        | <b>Lightning</b>                                         | Educate the public on the hazards of and the steps to reduce the impact of lightning strikes to humans and structures.                                                                                                  | 10 hours          | Staff Time               | EMD               |                             | S                                                 |
| EQ 1       | <b>Earthquake</b>                                        | AVD is currently undertaking an Asset Management Planning exercise with support from NH-DES. Part of this activity is mapping water supply infrastructure and developing plans for maintenance and upgrading over time. | \$ 3,000          | Town Budget              | AVD               | Revised project description | M                                                 |
| FE 3       | <b>Flooding or Erosion</b>                               | Work with NHDOT to upgrade the bridge along US 4 (state) near Plains and Fernvale Roads.                                                                                                                                | 20 hours (town)   | NHDOT & Staff Time       | RA                |                             | L                                                 |
| FE 4       | <b>Flooding or Erosion</b>                               | Replace and upgrade multiple culverts on Valley Road, Bridge, Currier, and Switch Streets.                                                                                                                              | \$ 40,000         | Town Budget              | RA                | Bridge & 3' culvert         | L                                                 |

| Project ID | Hazard                                                      | Mitigation Actions                                                                                                                                                                                             | Estimated Cost       | Potential Funding Source | Responsible Party | Notes                    | Time Frame<br>S: 1 yr,<br>M: 2-3 yr,<br>L: 4-5 yr |
|------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|-------------------|--------------------------|---------------------------------------------------|
| WFF 3      | Wild/Forest Fire<br><i>Wildfire</i>                         | Provide wildfire education resources so that homeowners can take steps to protect these structures.                                                                                                            | 20 hours             | Town Budget              | Fire Chief        |                          | S                                                 |
| D 2*       | Drought                                                     | Develop Resource Protection Plan (RPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.) | 100 hours            | Staff Time / OPD         | AVD               | In process, grant funded | M                                                 |
| SW 1       | Severe Wind (Tornado /Downburst)<br><i>High Wind Events</i> | Eliminate tree hazards over public roads as needed.                                                                                                                                                            | \$10,000 - \$25,000  | Town Budget              | RA                |                          | L                                                 |
| WFF 2      | Wild/Forest Fire<br><i>Wildfire</i>                         | Continue to increase funds in the Wildfire Reserve Fund.                                                                                                                                                       | \$5,000 annually     | Town Budget              | Fire Chief        |                          | L                                                 |
| D 1        | Drought                                                     | Develop a system to meter, monitor and reimburse AVD for water distributed to drought-stricken residents.                                                                                                      | 100 hours            | Staff Time               | BoS, AVD          |                          | M                                                 |
| WFF 1*     | Wild/Forest Fire<br><i>Wildfire</i>                         | Develop Source Water Protection Plan (SWPP) that identifies potential negative impacts from wild/forest fires in the Bradley Lake watershed and possible remedies for Bradley Lake Drinking Water Supply.      | 100 hours            | Staff Time / OPD         | AVD               |                          | M                                                 |
| SWW 1      | Severe Winter Weather                                       | Identify source of funding for replacement of FEMA supplied back-up generator -critical for water treatment operation during winter months (mandatory space heating requirement).                              | \$50,000 - \$100,000 | AVD, Town Budget, grant  | AVD & BoS         |                          | M                                                 |
| SWW 2      | Severe Winter Weather                                       | Begin discussions regarding electrical "islanding" to have self-sufficiency in the event of a natural hazard.                                                                                                  | 10 hours             | Staff Time               | AVD & BoS         | New.                     | L                                                 |

## SECTION VI: PLAN ADOPTION AND MONITORING

### A. IMPLEMENTATION

The Andover Hazard Mitigation Plan Update Committee, established by the Emergency Management Directors/Selectboard, will meet annually to review the Plan and provide a mechanism for ensuring that an attempt is made to incorporate the actions identified in the plan into ongoing town planning activities. Essential elements of implementation require that all responsible parties for the various recommendations understand what is expected of them, and that they are willing to fulfill their role in implementation. It is therefore important to have the responsible parties clearly identified when the town adopts the final plan. Where appropriate it would be helpful to have any hazard mitigation activities identified in job descriptions.

Many of the actions in this plan rely on the town's operating budget along with grant funds available through FEMA, NH HSEM, state agencies, and other sources such as those listed in Appendix B. The EMDs will coordinate with the department heads to ensure that funds and staff time for these projects are available. The EMD and Hazard Mitigation Committee will work with the Selectmen to incorporate the various projects into subsequent budgets where appropriate. The EMDs will also coordinate with the NH HSEM Field Representative to ensure that the town applies for appropriate grant funds.

For those mitigation actions which involve updates to the Master Plan, Zoning, or the Subdivision or Site Plan Regulations or development of regulations or standards, members of the Hazard Mitigation Committee will work with the Planning Board to develop appropriate language.

When appropriate, an effort will be made to incorporate this plan into the Emergency Operations Plan. Within a year after the town officially adopts the 2025 update to the Hazard Mitigation Plan, an attempt will be made to have hazard mitigation strategies integrated into existing mechanisms and into all other ongoing town planning activities.

### B. PLAN MAINTENANCE & PUBLIC INVOLVEMENT

#### Plan Evaluation

To track progress and evaluate the mitigation strategies identified in Section V.F., the Andover Hazard Mitigation Planning Committee and the Selectboard will review the Hazard Mitigation Plan **every year (by the end of April) or after a major hazard event**. The **Emergency Management Director** is responsible for initiating this review and shall consult with members of the HMP Committee identified in this Plan. Responsible parties identified for specific mitigation actions will be asked to submit a status report of those actions in advance of the meeting. Tables A and B in Appendix K may be used for recording this plan evaluation. Meetings will entail the following actions:

Documentation of natural hazard events during the past year, local damages (and costs) associated with these events, costs associated with mitigation actions (and any match or reimbursement). Documentation could include a brief description, any associated costs and funding sources, as well as images.

Track progress toward implementation of the current mitigation plan based on status reports from responsible parties. Refer to Section V.B. for an applicable evaluation scale.

Assess the effectiveness of the plan at achieving the plan's stated purpose (Section I.D.) and goals (Section V.C.). Refer to Section V.A. for an applicable evaluation scale.

Other activities and discussions may include:

Review previous hazard events to discuss and evaluate major issues and possible mitigation for future events.

Assess how the mitigation strategies of the plan can be integrated with other Town plans and operational procedures, including the zoning ordinance and local Emergency Operations Plan.

### **Plan Update**

**The Emergency Management Director is also responsible for updating and resubmitting the plan to FEMA to be re-approved every five years.** The EMDs will convene a plan update committee in mid-2029 to begin updating this plan before it expires. The plan update process will follow the same planning process used in this plan update. If modifications have been made either to the FEMA Local Mitigation Planning Policy Guide or the NH State Hazard Mitigation Plan, these will be incorporated into the planning process. Administrative staff may be utilized to assist, especially with the public involvement process.

### **Public Participation**

For annual monitoring/evaluation process and for the five-year update, techniques that will be utilized for public involvement include:

- ❖ Provide invitations to municipal department heads as well as the Planning Board;
- ❖ Post notices of meetings at the Town Office and on the town website;
- ❖ Submit press releases for publication in the *Laconia Daily Sun* and other appropriate newspapers or media outlets.
- ❖ Additional steps to consider include conducting a public survey, holding an evening meeting, or providing for remote participation in meetings.

Entities to invite to future Hazard Mitigation monitoring/evaluation meetings and plan updates include the Emergency Management Directors of the neighboring communities of Danbury, Hill, Franklin, Salisbury, and Wilmot. Additionally, the Emergency Preparedness Planner from Capital Area Regional Health Network, social service providers such as Belknap-Merrimack CAP, and others working with socially vulnerable communities in Andover.

**C. SIGNED CERTIFICATE OF ADOPTION**

BOARD OF SELECTMEN  
A RESOLUTION ADOPTING THE  
ANDOVER, NH  
HAZARD MITIGATION PLAN UPDATE 2025

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

WHEREAS, the Town of Andover, NH has developed and received approval pending adoption 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 June 2024 and April 2025 regarding the development and review of the Andover, NH Hazard Mitigation Plan Update 2025; and

WHEREAS, the Plan specifically addresses hazard mitigation actions and Plan maintenance procedures for the Town of Andover, NH, and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that could impact the Town of Andover, NH, 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 Andover, NH eligible for funding to mitigate the impacts of future hazards; now therefore be it RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Andover, NH;
2. The respective officials identified in the mitigation actions of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the plan's mitigation action items shall be presented to the Selectboard by the Emergency Management Director.

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the town seal of the Town of Andover this

Date:

ANDOVER, NH SELECTBOARD

\_\_\_\_\_(Signature) \_\_\_\_\_ (Printed)

\_\_\_\_\_(Signature) \_\_\_\_\_ (Printed)

\_\_\_\_\_(Signature) \_\_\_\_\_ (Printed)

ATTEST:

\_\_\_\_\_(Signature) \_\_\_\_\_ (Printed)

## APPENDIX A: TECHNICAL RESOURCES

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|                                                                                                                                                                                                                                       |                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>NH Homeland Security and Emergency Management</b> .....                                                                                                                                                                            | 271-2231       |
| <a href="http://www.nh.gov/safety/divisions/HSEM/">http://www.nh.gov/safety/divisions/HSEM/</a>                                                                                                                                       |                |
| <b>Hazard Mitigation Section</b> .....                                                                                                                                                                                                | 271-2231       |
| <a href="http://www.nh.gov/safety/divisions/hsem/HazardMitigation/index.html">http://www.nh.gov/safety/divisions/hsem/HazardMitigation/index.html</a>                                                                                 |                |
| <b>Federal Emergency Management Agency</b> .....                                                                                                                                                                                      | (617) 223-4175 |
| <a href="http://www.fema.gov/">http://www.fema.gov/</a>                                                                                                                                                                               |                |
| FEMA, National Flood Insurance Program, Community Status Book                                                                                                                                                                         |                |
| <a href="http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book">http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book</a> |                |
| <b>Lakes Region Regional Planning Commission</b> .....                                                                                                                                                                                | 279-8171       |
| <a href="http://www.lakesrpc.org/">http://www.lakesrpc.org/</a>                                                                                                                                                                       |                |
| <b>NH Governor's Office of Energy and Planning</b> .....                                                                                                                                                                              | 271-2155       |
| <a href="http://www.nh.gov/oep/index.htm">http://www.nh.gov/oep/index.htm</a>                                                                                                                                                         |                |
| <b>New Hampshire Floodplain Management Program</b>                                                                                                                                                                                    |                |
| <a href="http://www.nh.gov/oep/programs/floodplainmanagement/index.htm">http://www.nh.gov/oep/programs/floodplainmanagement/index.htm</a>                                                                                             |                |
| <b>NH Department of Transportation</b> .....                                                                                                                                                                                          | 271-3734       |
| <a href="http://www.nh.gov/dot/index.htm">http://www.nh.gov/dot/index.htm</a>                                                                                                                                                         |                |
| <b>NH Department of Cultural Affairs</b> .....                                                                                                                                                                                        | 271-2540       |
| <a href="http://www.nh.gov/nhculture/">http://www.nh.gov/nhculture/</a>                                                                                                                                                               |                |
| <b>Division of Historical Resources</b> .....                                                                                                                                                                                         | 271-3483       |
| <a href="http://www.nh.gov/nhdhr/">http://www.nh.gov/nhdhr/</a>                                                                                                                                                                       |                |
| <b>NH Department of Environmental Services</b> .....                                                                                                                                                                                  | 271-3503       |
| <a href="http://www.des.state.nh.us/">http://www.des.state.nh.us/</a>                                                                                                                                                                 |                |
| <b>Dam Bureau</b> .....                                                                                                                                                                                                               | 271-63406      |
| <a href="http://www.des.state.nh.us/organization/divisions/water/dam/index.htm">http://www.des.state.nh.us/organization/divisions/water/dam/index.htm</a>                                                                             |                |
| <b>NH Municipal Association</b> .....                                                                                                                                                                                                 | 224-7447       |
| <a href="http://www.nhmunicipal.org/LGCWebsite/index.asp">http://www.nhmunicipal.org/LGCWebsite/index.asp</a>                                                                                                                         |                |
| <b>NH Fish and Game Department</b> .....                                                                                                                                                                                              | 271-3421       |
| <a href="http://www.wildlife.state.nh.us/">http://www.wildlife.state.nh.us/</a>                                                                                                                                                       |                |
| <b>NH Department of Natural and Cultural Resources</b> .....                                                                                                                                                                          | 271-2411       |
| <a href="https://www.dncr.nh.gov/">https://www.dncr.nh.gov/</a>                                                                                                                                                                       |                |
| <b>Division of Forests and Lands</b> .....                                                                                                                                                                                            | 271-2214       |
| <a href="http://www.nhdfl.org/">http://www.nhdfl.org/</a>                                                                                                                                                                             |                |
| <b>Natural Heritage Inventory</b> .....                                                                                                                                                                                               | 271-2215       |
| <a href="http://www.nhdfl.org/about-forests-and-lands/bureaus/natural-heritage-bureau/">http://www.nhdfl.org/about-forests-and-lands/bureaus/natural-heritage-bureau/</a>                                                             |                |
| <b>Division of Parks and Recreation</b> .....                                                                                                                                                                                         | 271-3255       |
| <a href="http://www.nhstateparks.org/">http://www.nhstateparks.org/</a>                                                                                                                                                               |                |

|                                                                                               |                |
|-----------------------------------------------------------------------------------------------|----------------|
| <b>NH Department of Health and Human Services</b> .....                                       | 271-9389       |
| <a href="http://www.dhhs.state.nh.us/">http://www.dhhs.state.nh.us/</a>                       |                |
| <b>Northeast States Emergency Consortium, Inc. (NESEC)</b> .....                              | (781) 224-9876 |
| <a href="http://www.nesec.org/">http://www.nesec.org/</a>                                     |                |
| <b>US Department of Commerce</b> .....                                                        | (202) 482-2000 |
| <a href="http://www.commerce.gov/">http://www.commerce.gov/</a>                               |                |
| National Oceanic and Atmospheric Administration .....                                         | (202) 482-6090 |
| <a href="http://www.noaa.gov/">http://www.noaa.gov/</a>                                       |                |
| National Weather Service, Eastern Region Headquarters                                         |                |
| <a href="http://www.erh.noaa.gov/">http://www.erh.noaa.gov/</a>                               |                |
| National Weather Service, Tauton, Massachusetts .....                                         | (508) 824-5116 |
| <a href="http://www.erh.noaa.gov/er/box/">http://www.erh.noaa.gov/er/box/</a>                 |                |
| National Weather Service, Gray, Maine .....                                                   | (207) 688-3216 |
| <a href="http://www.erh.noaa.gov/er/gyx/">http://www.erh.noaa.gov/er/gyx/</a>                 |                |
| <b>US Department of the Interior</b>                                                          |                |
| <a href="http://www.doi.gov/">http://www.doi.gov/</a>                                         |                |
| US Fish and Wildlife Service .....                                                            | 225-1411       |
| <a href="http://www.fws.gov/">http://www.fws.gov/</a>                                         |                |
| US Geological Survey .....                                                                    | 225-4681       |
| <a href="http://www.usgs.gov/">http://www.usgs.gov/</a>                                       |                |
| US Geological Survey Real Time Hydrologic Data                                                |                |
| <a href="http://waterdata.usgs.gov/nwis/rt">http://waterdata.usgs.gov/nwis/rt</a>             |                |
| US Army Corps of Engineers .....                                                              | (978) 318-8087 |
| <a href="http://www.usace.army.mil/">http://www.usace.army.mil/</a>                           |                |
| <b>US Department of Agriculture</b>                                                           |                |
| <a href="http://www.usda.gov/wps/portal/usdahome">http://www.usda.gov/wps/portal/usdahome</a> |                |
| US Forest Service .....                                                                       | (202) 205-8333 |
| <a href="http://www.fs.fed.us/">http://www.fs.fed.us/</a>                                     |                |
| <b>Eversource</b> .....                                                                       | (800) 662-7764 |
| <a href="http://www.eversource.com/">http://www.eversource.com/</a>                           |                |
| <b>New Hampshire Electrical Cooperative</b> .....                                             | (800) 698-2007 |
| <a href="http://www.nhec.com/">http://www.nhec.com/</a>                                       |                |
| <b>Cold Region Research Laboratory</b> .....                                                  | 646-4187       |
| <a href="http://www.crrl.usace.army.mil/">http://www.crrl.usace.army.mil/</a>                 |                |
| <b>National Emergency Management Association</b> .....                                        | (859) 244-8000 |
| <a href="http://nemaweb.org">http://nemaweb.org</a>                                           |                |
| <b>National Aeronautics and Space Administration</b>                                          |                |
| <a href="http://www.nasa.gov/">http://www.nasa.gov/</a>                                       |                |
| NASA Optical Transient Detector – Lightning and Atmospheric Research                          |                |
| <a href="http://thunder.msfc.nasa.gov/">http://thunder.msfc.nasa.gov/</a>                     |                |

**National Lightning Safety Institute**

<http://lightningsafety.com/>

**The Tornado Project Online**

<http://www.tornadoproject.com/>

**National Severe Storms Laboratory**

<http://www.nssl.noaa.gov/>

**Plymouth State University Weather Center**

<http://vortex.plymouth.edu/>

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## APPENDIX B: MITIGATION FUNDING RESOURCES

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There are numerous potential sources of funding to assist with the implementation of mitigation efforts. Two lists of state and federal resources are provided below. Some of these may not apply or be appropriate for Andover. The NH Homeland Security and Emergency Management Community Liason Merrimack County can provide some assistance.

|                                                    |                                               |
|----------------------------------------------------|-----------------------------------------------|
| 404 Hazard Mitigation Grant Program (HMGP).....    | NH Homeland Security and Emergency Management |
| 406 Public Assistance and Hazard Mitigation .....  | NH Homeland Security and Emergency Management |
| Community Development Block Grant (CDBG) .....     | NH HSEM, NH OPD, also refer to LRPC           |
| Dam Safety Program .....                           | NH Department of Environmental Services       |
| Emergency Watershed Protection (EWP) Program ..... | USDA, Natural Resources Conservation Service  |
| Flood Mitigation Assistance Program (FMAP) .....   | NH Homeland Security and Emergency Management |
| Highway Safety Improvement Program.....            | NH Department of Transportation               |
| Mitigation Assistance Planning (MAP) .....         | NH Homeland Security and Emergency Management |
| NH Public Works Mutual Aid.....                    | UNH Technology Transfer (T2)                  |
| National Flood Insurance Program (NFIP) .....      | NH Office of Planning & Development           |
| Project Impact.....                                | NH Homeland Security and Emergency Management |
| Roadway Repair & Maintenance Program(s).....       | NH Department of Transportation               |
| Shoreland Protection Program .....                 | NH Department of Environmental Services       |
| Various Forest and Lands Program(s) .....          | NH Department of Division of Forests and Land |
| Wetlands Programs.....                             | NH Department of Environmental Services       |
| State Aid Bridge Program for Municipalities .....  | NH Department of Transportation (and LRPC)    |
| Contribution to Damage Losses (RSA 235:34) .....   | NH Department of Transportation               |

FEMA's Public Assistance (PA) grant program is authorized through the Stafford Act to provide federal assistance to government organizations and certain Private Nonprofit (PNP) organizations following a Presidential Disaster Declaration. This funding is provided at a 75%/25% cost share to allow government and certain PNP entities to respond and recover from major disasters or emergencies. The Public Assistance program returns damages to their pre-disaster condition. Through the PA program, FEMA provides supplemental assistance in the following categories:

- Emergency Work
  - o Debris Removal
  - o Emergency Protective Measures
- Permanent Work
- Roads and Bridges

- Water Control Facilities
- Public Buildings and Contents
- Public Utilities
- Parks, Recreational, and other facilities

Section 406 of the Stafford Act provides FEMA with the authority to fund cost-effective mitigation measures to repair, restore, or replace eligible damaged facilities, and allows for those structures to be rebuilt or repaired to better than pre-disaster conditions to make them less vulnerable to future hazards. Unlike other hazard mitigation grant programs, Section 406 mitigation is only available in the counties declared in the presidential declaration and only for eligible damaged facilities.<sup>12</sup>

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<sup>12</sup> NH State Hazard Mitigation Plan, 2023, p. 26.

**Federal Emergency Management Agency (FEMA)**

FEMA makes funds available for mitigation efforts to reduce future costs associated with hazard damage.

| <b>Mitigation Funding Sources Program</b> | <b>Details</b>                                                                                                                                                                                                                                                                   | <b>Notes</b>                               |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Flood Mitigation Assistance Program (FMA) | Provides funding to implement measures to reduce or eliminate the long-term risk of flood damage<br><a href="http://www.fema.gov/government/grant/fma/index.shtml">http://www.fema.gov/government/grant/fma/index.shtml</a>                                                      | States and localities                      |
| Hazard Mitigation Planning Grant (HMPG)   | Provides grants to implement long-term hazard mitigation measures after a major disaster declaration<br><a href="http://www.fema.gov/government/grant/hmpg/index.shtml">http://www.fema.gov/government/grant/hmpg/index.shtml</a>                                                | Open                                       |
| National Flood Insurance Program (NFIP)   | Enables property owners to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages<br><a href="http://www.fema.gov/business/nfip/">http://www.fema.gov/business/nfip/</a> | States, localities, and individuals        |
| Pre-Disaster Mitigation Program (PDM)     | Provides funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event<br><a href="http://www.fema.gov/government/grant/pdm/index.shtml">http://www.fema.gov/government/grant/pdm/index.shtml</a>                                 | States, localities, and tribal governments |

**Environmental Protection Agency (EPA)**

The EPA makes funds available for water management and wetlands protection programs that help mitigate future costs associated with hazard damage.

| <b>Mitigation Funding Sources Program</b> | <b>Details</b>                                                                                                                                                                                                                                                                     | <b>Notes</b>                                                    |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Clean Water Act Section 319 Grants        | Grants for water source management programs including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and regulation.<br><a href="http://www.epa.gov/OWOW/NPS/cwact.html">http://www.epa.gov/OWOW/NPS/cwact.html</a> | Funds are provided only to designated state and tribal agencies |
| Clean Water State Revolving Funds         | State grants to capitalize loan funds. States make loans to communities, individuals, and others for high-priority water-quality activities.<br><a href="http://www.epa.gov/owow/wetlands/initiative/srf.html">http://www.epa.gov/owow/wetlands/initiative/srf.html</a>            | States and Puerto Rico                                          |

|                                    |                                                                                                                                                                                                                                                                                                                                                          |             |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Wetland Program Development Grants | Funds for projects that promote research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution.<br><a href="http://www.epa.gov/owow/wetlands/initiative/#financial">http://www.epa.gov/owow/wetlands/initiative/#financial</a> | See website |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|

### Floodplain, Wetland and Watershed Protection Programs

US Army Corps of Engineers (USACE) and the U.S. Fish and Wildlife Service offer funding and technical support for programs designed to protect floodplains, wetlands, and watersheds.

| Mitigation Funding Sources Program                                       | Details                                                                                                                                                                                                                                                                | Notes                                 |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| USACE Planning Assistance to States (PAS)                                | Fund plans for the development and conservation of water resources, dam safety, flood damage reduction and floodplain management.<br><a href="http://www.lre.usace.army.mil/planning/assist.html">http://www.lre.usace.army.mil/planning/assist.html</a>               | 50 percent non-federal match          |
| USACE Flood Plain Management Services (FPMS)                             | Technical support for effective floodplain management.<br><a href="http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&amp;MyCategory=126">http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&amp;MyCategory=126</a>                                              | See website                           |
| USACE Environmental Laboratory                                           | Guidance for implementing environmental programs such as ecosystem restoration and reuse of dredged materials.<br><a href="http://el.erdc.usace.army.mil/index.cfm">http://el.erdc.usace.army.mil/index.cfm</a>                                                        | See website                           |
| U.S. Fish & Wildlife Service Coastal Wetlands Conservation Grant Program | Matching grants to states for acquisition, restoration, management or enhancement of coastal wetlands.<br><a href="http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home">http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home</a>                | States only. 50 percent federal share |
| U.S. Fish & Wildlife Service Partners for Fish and Wildlife Program      | Program that provides financial and technical assistance to private landowners interested in restoring degraded wildlife habitat.<br><a href="http://ecos.fws.gov/partners/viewContent.do?viewPage=home">http://ecos.fws.gov/partners/viewContent.do?viewPage=home</a> | Funding for volunteer-based programs  |

### Bureau of Land Management

The Bureau of Land Management (BLM) has two technical assistance programs focused on fire mitigation strategies at the community level.

| Mitigation Funding Sources Program          | Details                                                                                                                                                                                                                                                                                                                                                   | Notes       |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Community Assistance and Protection Program | Focuses on mitigation/prevention, education, and outreach. National Fire Prevention and Education teams are sent to areas across the country at-risk for wildland fire to work with local residents.<br><a href="http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html">http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html</a> | See website |
| Firewise Communities Program                | Effort to involve homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire before a fire starts.<br><a href="http://www.firewise.org/">http://www.firewise.org/</a>                                                                                | See website |

### Housing and Urban Development

The Community Development Block Grants (CDBG) administered by HUD can be used to fund hazard mitigation projects.

| Mitigation Funding Sources Program        | Details                                                                                                                                                                                                                                                                                                                       | Notes                                                            |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Community Development Block Grants (CDBG) | Grants to develop viable communities, principally for low and moderate income persons. CDBG funds available through Disaster Recovery Initiative.<br><a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/">http://www.hud.gov/offices/cpd/communitydevelopment/programs/</a>                                | Disaster funds contingent upon Presidential disaster declaration |
| Disaster Recovery Assistance              | Disaster relief and recovery assistance in the form of special mortgage financing for rehabilitation of impacted homes.<br><a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm">http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm</a>                      | Individuals                                                      |
| Neighborhood Stabilization Program        | Funding for the purchase and rehabilitation of foreclosed and vacant property in order to renew neighborhoods devastated by the economic crisis.<br><a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/">http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/</a> | State and local governments and non-profits                      |

### U.S. Department of Agriculture

There are multiple mitigation funding and technical assistance opportunities available from the USDA and its various sub-agencies: the Farm Service Agency, Forest Service, and Natural Resources Conservation Service.

| Mitigation Funding Sources Program                    | Details                                                                                                                                                                                                                                                                                          | Notes                                       |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| USDA Smith-Lever Special Needs Funding                | Grants to State Extension Services at 1862 Land-Grant Institutions to support education-based approaches to addressing emergency preparedness and disasters.<br><a href="http://www.csrees.usda.gov/funding/rfas/smith_lever.html">http://www.csrees.usda.gov/funding/rfas/smith_lever.html</a>  | Population under 20,000                     |
| USDA Community Facilities Guaranteed Loan Program     | This program provides an incentive for commercial lending that will develop essential community facilities, such as fire stations, police stations, and other public buildings.<br><a href="http://www.rurdev.usda.gov/rhs/cf/cp.htm">http://www.rurdev.usda.gov/rhs/cf/cp.htm</a>               | Population under 20,000                     |
| USDA Community Facilities Direct Loans                | Loans for essential community facilities.<br><a href="http://www.rurdev.usda.gov/rhs/cf/cp.htm">http://www.rurdev.usda.gov/rhs/cf/cp.htm</a>                                                                                                                                                     | Population of less than 20,000              |
| USDA Community Facilities Direct Grants               | Grants to develop essential community facilities.<br><a href="http://www.rurdev.usda.gov/rhs/cf/cp.htm">http://www.rurdev.usda.gov/rhs/cf/cp.htm</a>                                                                                                                                             | Population of less than 20,000              |
| USDA Farm Service Agency Disaster Assistance Programs | Emergency funding and technical assistance for farmers and ranchers to rehabilitate farmland and livestock damaged by natural disasters.<br><a href="http://www.fsa.usda.gov/">http://www.fsa.usda.gov/</a>                                                                                      | Farmers and ranchers                        |
| USDA Forest Service National Fire Plan                | Funding for organizing, training, and equipping fire districts through Volunteer, State and Rural Fire Assistance programs. Technical assistance for fire related mitigation.<br><a href="http://www.forestsandrangelands.gov/">http://www.forestsandrangelands.gov/</a>                         | See website                                 |
| USDA Forest Service Economic Action Program           | Funds for preparation of Fire Safe plans to reduce fire hazards and utilize byproducts of fuels management activities in a value-added fashion.<br><a href="http://www.fs.fed.us/spf/coop/programs/eap/">http://www.fs.fed.us/spf/coop/programs/eap/</a>                                         | 80% of total cost of project may be covered |
| USDA Natural Resources Conservation Service           | Emergency Watershed Protection Support Services: Funds for implementing emergency measures in watersheds in order to relieve imminent hazards to life and property created by a natural disaster.<br><a href="http://www.nrcs.usda.gov/programs/ewp/">http://www.nrcs.usda.gov/programs/ewp/</a> | See website                                 |

|                                                                                       |                                                                                                                                                                                                                                                                                              |             |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| USDA Natural Resources Conservation Service Watershed Protection and Flood Prevention | Funds for soil conservation; flood prevention; conservation, development, utilization and disposal of water; and conservation and proper utilization of land.<br><a href="http://www.nrcs.usda.gov/programs/watershed/index.html">http://www.nrcs.usda.gov/programs/watershed/index.html</a> | See website |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|

### Health and Economic Agencies

Alternative mitigation programs can be found through health and economic agencies that provide loans and grants aimed primarily at disaster relief.

### Federal Loans and Grants for Disaster Relief

| Mitigation Funding Sources Program                                                                | Details                                                                                                                                                                                                                                                                                      | Notes                                                                       |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Department of Health & Human Services Disaster Assistance for State Units on Aging (SUAs)         | Provide disaster relief funds to those SUAs and tribal organizations who are currently receiving a grant under Title VI of the Older Americans Act.<br><a href="http://www.aoa.gov/doingbus/fundopp/fundopp.asp">http://www.aoa.gov/doingbus/fundopp/fundopp.asp</a>                         | Areas designated in a Disaster Declaration issued by the President          |
| Economic Development Administration (EDA) Economic Development Administration Investment Programs | Grants that support public works, economic adjustment assistance, and planning. Certain funds allocated for locations recently hit by major disasters.<br><a href="http://www.eda.gov/AboutEDA/Programs.xml">http://www.eda.gov/AboutEDA/Programs.xml</a>                                    | The maximum investment rate shall not exceed 50 percent of the project cost |
| U.S. Small Business Administration Small Business Administration Loan Program                     | Low-interest, fixed rate loans to small businesses for the purpose of implementing mitigation measures. Also available for disaster damaged property.<br><a href="http://www.sba.gov/services/financialassistance/index.html">http://www.sba.gov/services/financialassistance/index.html</a> | Must meet SBA approved credit rating                                        |

## APPENDIX C: PUBLICITY AND INFORMATION

Committee meetings were announced on the webpages of and Lakes Region Planning Commission and the town of Andover. Press releases like the one below were sent to the *Laconia Daily Sun* and statewide *Concord Monitor* prior to the Committee meetings. Several informational handouts and the 2019 Hazard Mitigation Plan were distributed to the committee and available at all meetings.

The screenshot shows a web browser window with the URL <https://www.lakesrpc.nh.gov/Pages/Index/228297/hazard-mitigation>. The page features a navigation menu on the left with categories like Household Hazardous Waste, Housing, Land Use, Natural Resources (highlighted), Regional Plans, Regional Purchasing, Solid Waste, Transportation, and Watershed Management. The main content area includes a link to "Click here for more information about NFIP" and a link to "Check your town's status: <http://www.fema.gov/cis/NH.pdf>". Below this is an "Announcement" dated June 7, 2024, titled "Town of Andover Hazard Mitigation Plan Meeting". The announcement text states: "The Andover Hazard Mitigation Plan Committee is beginning the process of updating its 2019 Hazard Mitigation Plan. The committee is represented by a variety of local interests including the Fire, Police, EMS, and Highway departments, along with the Planning and Select Boards, a school representative and residents. The group will review the various hazards that put Andover at risk as well as the development of recommendations to protect the safety and well-being of town residents." It further details the meeting on June 12 at 4:00 PM at the Andover Fire Station, 169 Main Street, and encourages attendance. It also mentions the importance of Hazard Mitigation Planning in reducing disaster losses and the review of the 2019 Plan. The announcement concludes by providing contact information for Anthony Booth, Andover Emergency Management Director, at [EMD@andover-nh.gov](mailto:EMD@andover-nh.gov) or David Jeffers, Regional Planner, at 279-5341, and notes that the 2019 Andover Hazard Mitigation Plan can be found below.

**LAKES REGION PLANNING COMMISSION**

June 7, 2024

103 Main Street, Suite #3  
 Meredith, NH 03253  
 tel (603) 279-8171  
 fax (603) 279-0200  
[www.lakesrpc.org](http://www.lakesrpc.org)

**For Immediate Release**

Contact: David Jeffers, 279-5341, [djeffers@lakesrpc.nh.gov](mailto:djeffers@lakesrpc.nh.gov)

**Town of Andover Hazard Mitigation Plan Meeting**

The Andover Hazard Mitigation Plan Committee is beginning the process of updating its 2019 Hazard Mitigation Plan. The committee is represented by a variety of local interests including the Fire, Police, EMS, and Highway departments, along with the Planning and Select Boards, a school representative and residents. The group will review the various hazards that put Andover at risk as well as the development of recommendations to protect the safety and well-being of town residents.

The committee will meet on June 12 at 4:00 PM at the Andover Fire Station, 169 Main Street. Residents of Andover and representatives from neighboring communities are encouraged to attend.

Hazard Mitigation Planning is as important to reducing disaster losses as are appropriate regulations and land use ordinances. The most significant areas of concern for Andover are being reviewed and evaluated through this process; in the 2019 Plan these included winter weather, severe winds, hurricane, flood, and lightning.

With the update to the Hazard Mitigation Plan, town leaders will be able to evaluate the status of current plans, policies, and actions then develop and prioritize actions to reduce the impacts of these and other hazards. Community leaders want the town to be a disaster resistant community and believe that updating the Hazard Mitigation Plan will bring Andover one step closer to that goal.

For more information, please contact Anthony Booth, Andover Emergency Management Director Anthony Booth [EMD@andover-nh.gov](mailto:EMD@andover-nh.gov) or David Jeffers, Regional Planner, Lakes Region Planning Commission at 279-5341. The 2019 Andover Hazard Mitigation Plan can be found at <https://www.lakesrpc.nh.gov/Pages/Index/228297/hazard-mitigation>.

**I**

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ALEXANDRIA • ANDOVER • ASHLAND • BARNSTEAD • BELMONT • BRIDGEWATER • BRISTOL • CENTER HARBOR • DANBURY  
 EFFINGHAM • FRANKLIN • FREEDOM • GILFORD • GILMANTON • HEBRON • HILL • HOLDERNESS • LACONIA • MEREDITH •  
 MOULTONBOROUGH  
 NEW HAMPTON • NORTHFIELD • OSSISPEE • PLYMOUTH • SANBORNTON • SANDWICH • TAMWORTH • TILTON • TUSTONBORO •

## Information

### Hazard Mitigation:

*"Hazard Mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards"*

### Questions to address:

- Where are potential hazards?
- What are the risks?
- What are we already doing?
- Where are the gaps?
- What actions can be taken?
- What actions are feasible?
- What are our priorities?
- How will these actions be implemented?
- How will the plan be monitored?

# Local Hazard Mitigation Planning

## What is a Hazard Mitigation Plan?

In cooperation with the NH Bureau of Emergency Management (BEM), the Lakes Region Planning Commission (LRPC) is working with several of its member communities each year to develop local Hazard Mitigation Plans.



The Hazard Mitigation Plans are designed to address each particular community's vulnerability to natural and man-made hazards. The local plan serves as a means to reduce future losses from hazard events before they occur. This local initiative is guided by a community-based Hazard Mitigation Planning Committee, with the LRPC providing technical support. The structure for plan development is provided through the *Guide to Hazard Mitigation Planning for New Hampshire Communities* which ensures that the community has considered the content of the State of New Hampshire Hazard Mitigation (409) Plan.

## MITIGATION PROCESS

- IDENTIFY HAZARDS
- PROFILE HAZARD EVENTS
- INVENTORY ASSETS
- ESTIMATE LOSSES
- PRIORITIZE ACTION STEPS
- ADOPT THE PLAN
- IMPLEMENTATION

## Why create a plan?

Development of a local Hazard Mitigation Plan is a chance for the community to assess the hazards that have the potential to threaten residents and their property. It also gives the community an opportunity to identify at-risk populations as well as resources within the community that might be at risk. The committee can then explore a variety of steps that might be put into place to help the community reduce damage and loss.

Having a Hazard Mitigation Plan in place, enables many communities to allocate their resources more effectively. It can also be a useful tool for leveraging additional sources of funding in the event of a disaster.

### *Federal Emergency Management Agency (FEMA) Requirement:*

In order for communities to be eligible for the full spectrum of mitigation program funding, local hazard mitigation plans must be approved by FEMA. The staff of LRPC attend semi-annual hazard mitigation meetings and training programs that are designed to expedite the approval process.

Lakes Region Planning Commission  
103 N. Main St., Suite #3  
Meredith, NH 03253

(603) 279-8171 - phone  
(603) 279-0200 - fax



## Frequently asked questions

### • What will a Hazard Mitigation Plan cost?

Since this project is funded by the NH Bureau of Emergency Management, the only cost to the community is the dedication of committee members' time and energy.

### • How is a Hazard Mitigation Plan different from an Emergency Action Plan?

Although there is some overlap, these are different plans, each serving a different function in helping a community to minimize the potential for damage and loss in a community.

Emergency Action Plans (EAP) identifies potential hazard events and the resources available to address them; it also addresses how a community responds to an emergency.

A Hazard Mitigation Plan (HMP) also identifies potential hazard events and community resources. However, an HMP looks at the situation in terms of prevention instead of response. Gaps in coverage, programs, and structural needs are analyzed and specific mitigation steps are recommended and potential funding sources are identified.

### • Is this a community plan, a state plan, or a federal plan?

The state of New Hampshire does require that each community develop an HMP. Once a plan is approved by FEMA and adopted by the community, should there be a need for Federal Mitigation money, more funding would be available. However, local public involvement is required. The local Emergency Management Director or a committee of citizens should help in plan development; there should also be several public presentations where citizens can make recommendations, provide input, and participate in development of the plan. In the end, the Board of Selectmen need to approve the plan.



Alton dam breach, 1996



## The Essentials

At a minimum, each local Hazard Mitigation Plan should contain the following sections:

- An evaluation of the potential hazards within the community
- A description and analysis of local, state, and federal hazard mitigation policies, programs, and capabilities to mitigate the identified hazards in the area
- Goals, objectives, strategies and actions to reduce long-term vulnerability to hazards
- An evaluation of the costs and benefits of the recommended mitigation projects.



### Building stronger and safer

Hazard mitigation planning is the process state, local and tribal governments use to identify risks and vulnerabilities associated with natural disasters and to develop long-term strategies for protecting people and property in future hazard events. The process results in a mitigation plan that offers a strategy for breaking the cycle of disaster damage, reconstruction and repeated damage and a framework for developing feasible and cost-effective mitigation projects. Under the Disaster Mitigation Act of 2000 (Public Law 106-390), State, local and Tribal governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance.

### Reducing risks through mitigation planning

A hazard mitigation plan is a long-term strategy for reducing disaster losses. The planning process promoted by the Disaster Mitigation Act of 2000 is as important as the resulting plan because it encourages jurisdictions to integrate mitigation with day-to-day decision-making regarding land-use planning, floodplain management, site design and other functions.

### Mitigation planning elements

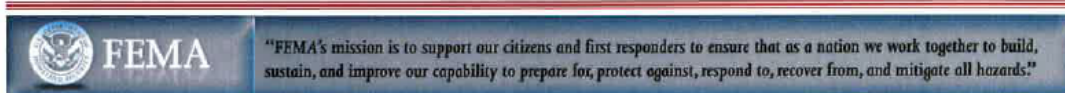
- **Public involvement** – In addition to government agencies involved in incident management, floodplain management and economic development, the planning process usually involves a range of stakeholders, including representatives of neighborhood groups, civic organizations, academia, environmental groups, the business community and individual citizens. Involving stakeholders is essential to determining the

most vulnerable populations and facilities in the community and to assuring community wide support for the plan.

- **Risk assessment** – A risk assessment is the process of identifying natural hazards and risks associated with them, including threats to public health and safety, property damage and economic loss. The assessment answers the fundamental question, “What would happen if a natural disaster occurred?” and provides a factual basis for the mitigation activities proposed in the strategy. The assessment includes a description of the type, location and extent of natural hazards; the jurisdiction’s vulnerability to the hazards; and the type and numbers of buildings, infrastructure and critical facilities located in identified hazard areas.
- **Mitigation strategy** – Based on the risk assessment, State, local and Tribal governments develop mitigation goals and objectives and a strategy for mitigating disaster losses. The strategy sets forth an approach for implementing activities that are cost-effective, technically feasible and environmentally sound.

### Hazard mitigation plan required to receive HMGP Project Grants

Local jurisdictions are required by federal law to have a FEMA-approved hazard mitigation plan in order to receive Pre-Disaster Mitigation (PDM) or Hazard Mitigation Grant Program (HMGP) project grant funding. However, in extraordinary circumstances, HMGP funds can be awarded to communities that agree to develop a hazard mitigation plan within 12 months of receiving the project grant. Every State has a FEMA-approved hazard mitigation plan, though many local jurisdictions still do not.



## Fact Sheet

### State and Local Mitigation Planning



#### Mitigation Examples

History shows that the physical, financial and emotional losses caused by disasters can be reduced significantly through mitigation planning. Mitigation focuses attention and resources on solving a particular problem (such as reducing repetitive flood losses) and thereby produces successive benefits over time. Through implementation of local floodplain ordinances, for example, it is estimated that \$1.1 billion in flood damages are prevented annually.

Mitigation includes a broad range of activities designed to protect homes, schools, public buildings and critical facilities. Examples include the following types of projects:

- Adopting and enforcing more stringent building codes, flood-proofing requirements, seismic design standards, or wind-bracing requirements for new construction or the retrofit of existing buildings.
- Exceeding the National Flood Insurance Program (NFIP) floodplain management regulations by elevating structures above the base flood elevation (BFE) in high-risk areas.
- Adopting stricter development regulations and zoning ordinances that steer development away from areas subject to flooding, storm surge, or coastal erosion.
- Retrofitting public buildings, schools and critical facilities, such as police and fire stations, to withstand hurricane-strength winds or ground shaking from earthquakes.
- Using public funds to acquire damaged homes or businesses in flood-prone areas, demolish or relocate the structures and use the property for open space, wetlands, or recreational uses.
- Building community shelters and "safe rooms" to help protect people in public buildings and schools in hurricane- and tornado-prone areas.

#### Planning tool available for government agencies

FEMA has developed a number of planning tools to help government agencies develop mitigation plans. These include how-to guides, CD ROMs and online information about organizing a planning team, involving stakeholders, conducting risk assessments, evaluating potential mitigation measures, conducting benefit-cost analyses and other planning issues.

#### For more information

Please visit: <http://www.fema.gov/plan/mitplanning/index>.

For state name disaster recovery, visit [www.fema.gov](http://www.fema.gov) or your state Web-site.



"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

## APPENDIX D: MEETINGS, AGENDAS, PARTICIPATION, and SURVEY

Invitations to participate in meetings were sent to committee members, neighboring EMDs, various state agencies, and stakeholders including those who work with socially vulnerable communities.

This section also contains copies of the Committee meeting agendas and a summary of participation. All Committee meetings were held in the Andover Fire Station and were open to the public. Agendas were developed by the LRPC planner who also facilitated the meetings. At each meeting there was an opportunity for public input.

### Invitation

RE: Andover HMP meeting - Oct. 17

David Jeffers  
To: David Jeffers  
Bcc: Lindsay.Richardson@graniteuw.org; Isadora.Rodriguez-Legendre@ddc.nh.gov; mbagley@gsil.org; info@ablenh.org; mberg@csni.org; tblonski@nh-cc.org; nhcoa@nh.gov; Damian Santana; contactus@capbm.org; info@lrccs.org; Chief Ford (townofhillfire@comcast.net); danburynhfd@gmail.com

Attachments: 0.Agenda04.20241017.pdf (197 KB), 21.STAPLEE Criteria.24.pdf (73 KB), 17.18.Prob&MitActions.STAPLEE.And.pdf (202 KB)

Hello,

The Andover HMP Committee will be meeting next **Thursday October 17 at 4:00 PM** in the Andover Fire Station.

The meeting agenda is attached. Some additional materials will follow in the next few days.

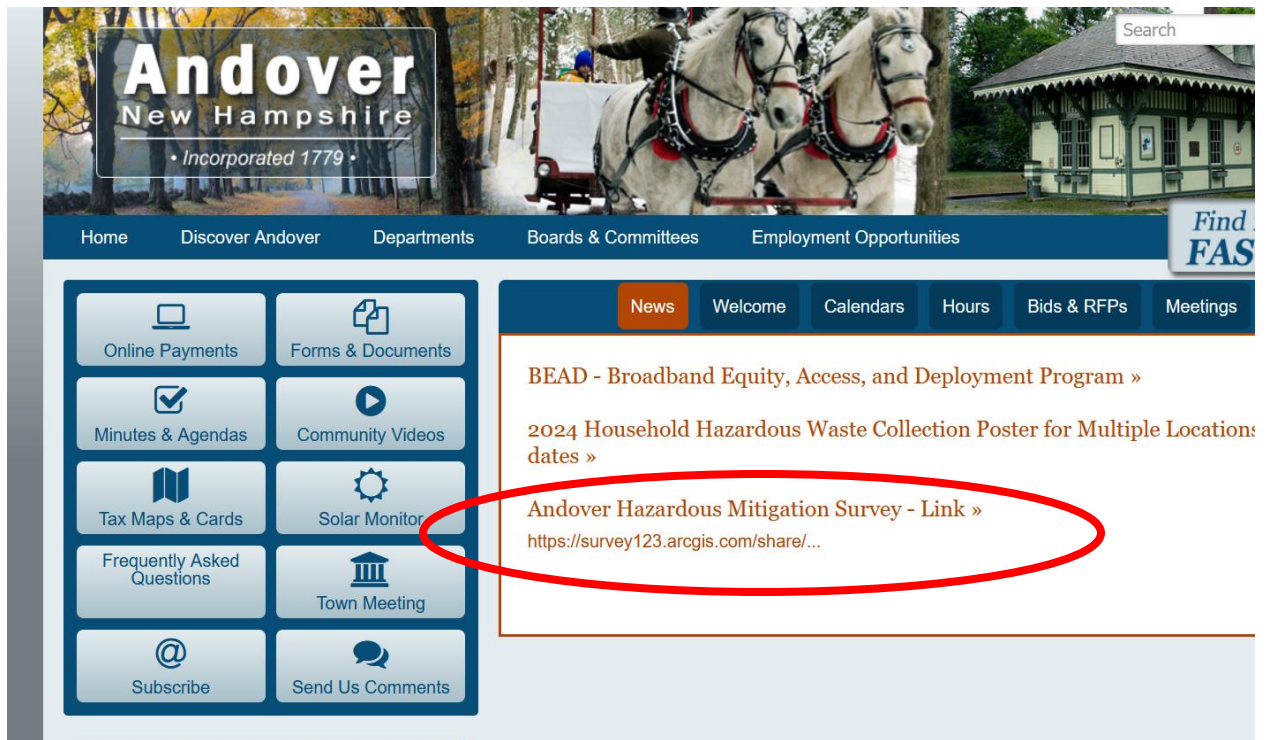
Note: If you are seeking examples of additional mitigation actions, you might want to refer to [FEMA's Mitigation Ideas](#) book.

We hope that you can join us.

Dave

David Jeffers  
Regional Planner  
Lakes Region Planning Commission  
603.279.5341  
103 Main Street Suite #3  
Meredith, NH 03253





**Andover Hazard Mitigation Plan Update**

June 12, 2024 4:00 PM

Andover Fire Station

169 Main Street

Andover, NH

**Meeting 1 - AGENDA**

1. Introductions
2. Mitigation planning vs. emergency response planning
3. Changes to Plan Development
  - a. FEMA Guidance/Checklist (2022)
  - b. State HMP (2023)
4. Process
  - a. Plan Update Process
  - b. Methods for Gathering Information
  - c. Community Outreach & Opportunities for Public Input\*
5. Information – Changes since last plan
  - a. Natural hazards
    - i. History of events
    - ii. Locations
    - iii. Impacts
  - b. Critical Facilities
  - c. Development Trends
  - d. Community Capabilities
6. Schedule for Meetings
7. Public Input

A copy of the 2019 Andover HMP can be found at  
<https://www.lakesrpc.nh.gov/Pages/Index/228297/hazard-mitigation>.

\*A brief on-line survey has been created to get feedback from the public. It can be accessed with this link <https://arcs.is/1en8iv0> or by scanning this QR Code with a phone or tablet. Please share with residents and encourage them to complete this survey.

**FEMA**

### Mitigation vs. preparedness/response

The focus of this process is mitigation, which is an action taken to reduce or eliminate long-term risk to hazards.

Mitigation is different from preparedness, which is an action taken to improve emergency response or operational preparedness.

### Major changes to FEMA Guidelines & Checklist

The 2022 FEMA Guidelines & Checklist place emphasis on several specific areas.

- Natural Hazards as opposed to Human-caused or Technological
- Efforts to include the concerns of under-represented populations
- Consideration of the impacts of a changing climate

### Plan Update Process

- a. Hazard Identification
- b. Risk Analysis
- c. Identify Problems
- d. Identify Mitigation Actions
- e. Prioritize Mitigation Actions
- f. Address Implementation
- g. Draft Plan
- h. Review & Adoption

### Community Capabilities

- Planning & Regulatory
- Administrative and Technical
- Financial
- Education & Outreach
- National Flood Insurance Program (NFIP)

## Participants

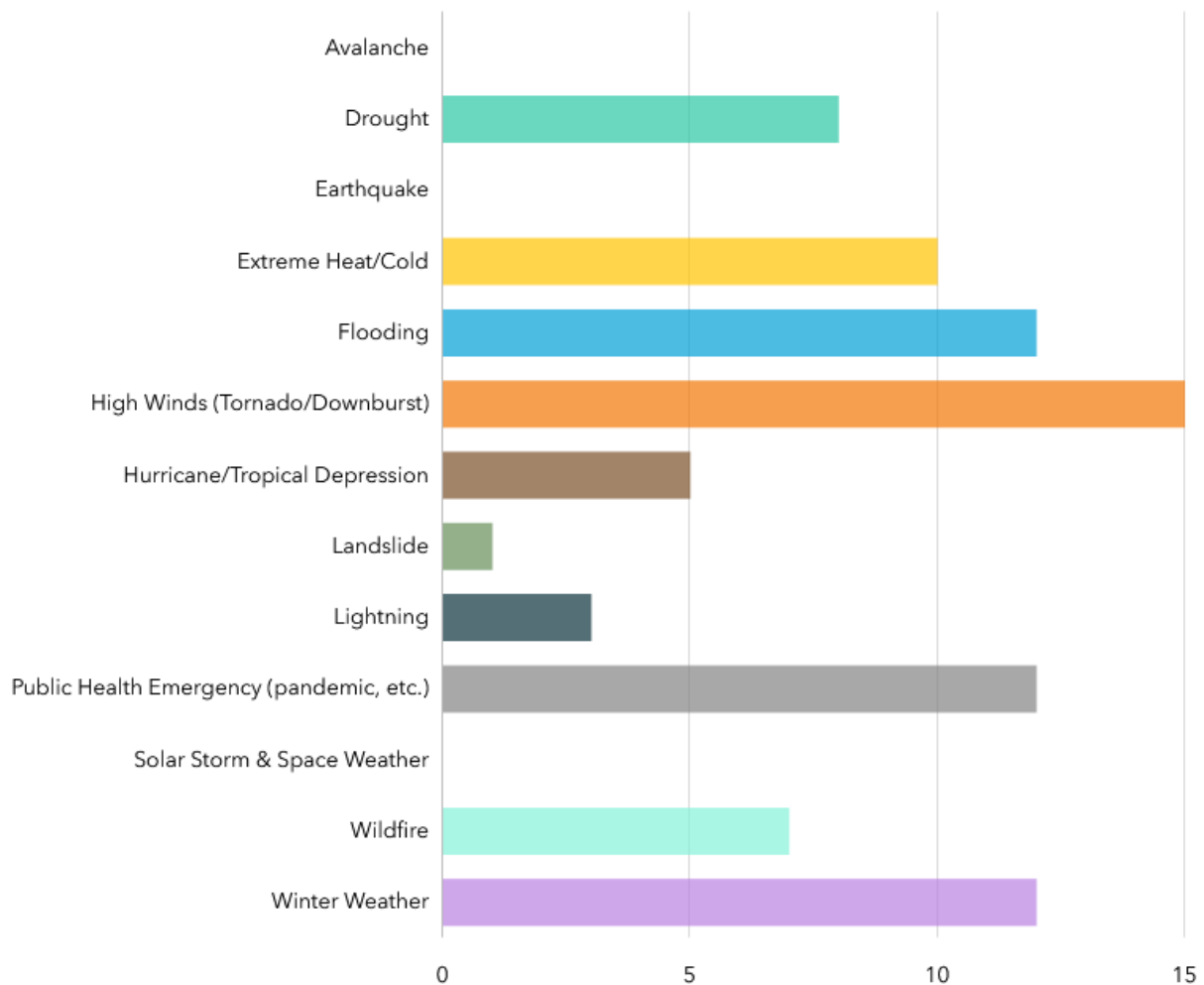
|         | 6/12/24    | 7/17/24    | 9/5/24     | 10/17/24   |                          |                      |          |                                         |                              |
|---------|------------|------------|------------|------------|--------------------------|----------------------|----------|-----------------------------------------|------------------------------|
| Purpose | Meeting #1 | Meeting #2 | Meeting #3 | Meeting #4 | Homework /Correspondence | Review & BoS Meeting | Adoption | Title                                   | Name                         |
|         | 1.5        | 1.0        | 2.0        | 2.0        | 6.0                      |                      |          | EMD                                     | Anthony Booth                |
|         | 1.5        | 1.0        | 2.0        |            | 2.0                      |                      |          | Police                                  | Joseph Mahoney               |
|         |            |            | 2.0        | 2.0        | 2.0                      |                      |          | Fire                                    | Steven Barton                |
|         |            |            |            | 2.0        |                          |                      |          | Public Works/Highway/Road Agent         | Kevin Duval                  |
|         | 1.5        | 1.0        |            |            | 1.0                      |                      |          | EMS                                     | Andrew Perkins               |
|         | 1.5        |            |            |            | 2.0                      |                      |          | Selectboard, Town Administrator         | Scott Hilliard               |
|         |            | 1.0        | 2.0        | 2.0        | 2.0                      |                      |          | Planning Board Chair                    | Ken Wells                    |
|         |            |            |            |            | 2.0                      |                      |          | School representative                   | Kelley George, Principal AES |
|         | 1.5        | 1.0        | 2.0        | 2.0        | 2.0                      |                      |          | Local Resident                          | Scott Kidder                 |
|         | 1.5        | 1.0        | 2.0        |            | 2.0                      |                      |          | Fire Dept./Local Resident               | Rene Lefebvre                |
|         | 1.5        | 1.0        |            | 2.0        | 1.0                      |                      |          | Budget Committee Chair/Planning Board   | Donna Crisp Duclos           |
|         |            |            |            |            | 1.0                      |                      |          | Proctor Academy                         | Kurt Meir                    |
|         |            |            | 2.0        | 2.0        | 1.0                      |                      |          | Andover Village District (Water)        | Jeffery Dickinson            |
|         |            |            |            |            |                          |                      |          |                                         |                              |
|         |            |            |            |            |                          |                      |          |                                         |                              |
|         | 1.5        |            |            |            |                          |                      |          | NH HSEM, Merrimack Co. Community Liason | Jill Piwoski                 |
|         | 1.5        | 1.0        | 2.0        | 2.0        |                          |                      |          | Lakes Region Planning Commission        | David Jeffers                |

## Public Input - Survey

In addition to postings and press releases requesting public input at meetings, members of the public were also encouraged to complete an on-line survey to provide input to the hazard mitigation planning process. Twenty-eight responses were received and shared with the committee at meetings as local risk was considered and problems/mitigation actions discussed.

The questions and responses are below.

1. Which of these hazards are of greatest concern to you? (Select up to four from the list.)

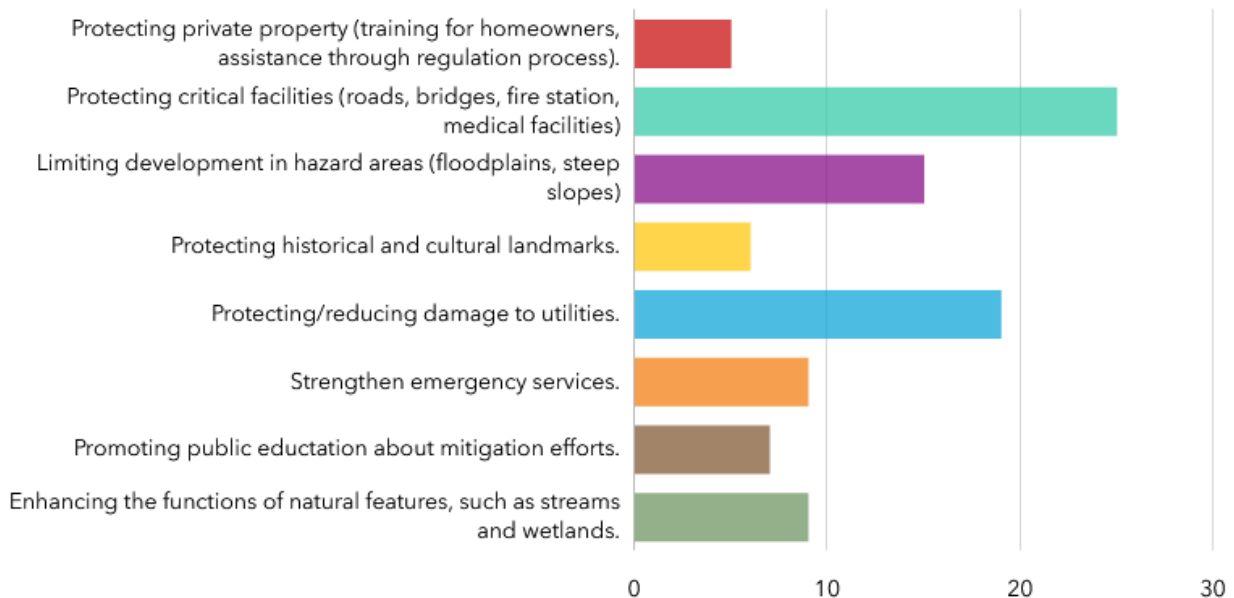


2. Which road(s) or areas are you most concerned about in Andover when severe weather occurs? (List the road segment or area of town. Why are you concerned?)

- All of them.
- Chase Hill Road
- Currier Road
- Dirt roads. Steeper hill roads. Both can be washed out more easily.
- Doesn't impact me, but always here how the dirt roads in town get rutty Blueberry, Moody & Tucker Mt to name the worst ones
- elbow pond road (keeps washing out)

- Flaghole Road
- Main Street between North Street and MeadowLark Lane because there is no detour around it and it's a main road across town
- not so much a specific area in Andover but concern for the general ability for residents or for town support in the event of need for drinking water, extreme weather events and wildfires.
- Rt 11
- Rt 11/4 between North Street and Meadowlark Lane. This is the main route between east and west part of town and there is no real alternative route except the rail trail.
- Rt 4. near Fenvale, Tucker Mt, Racoon hill, Sam hill Road
- The 2 State Highways, because they are most vital
- THE SIDE STREETS!!! They are severely neglected and given poor quality care.
- Tucker Mountain and East Andover in general
- Tucker Mountain Rd
- Tuckerman man, raccoon hill

3. Natural Hazards can have a significant impact on a community but planning for (or mitigating) these events can help lessen the impacts. (Please select the four mitigation strategies from the list below that you think would be most appropriate to use in Andover.)

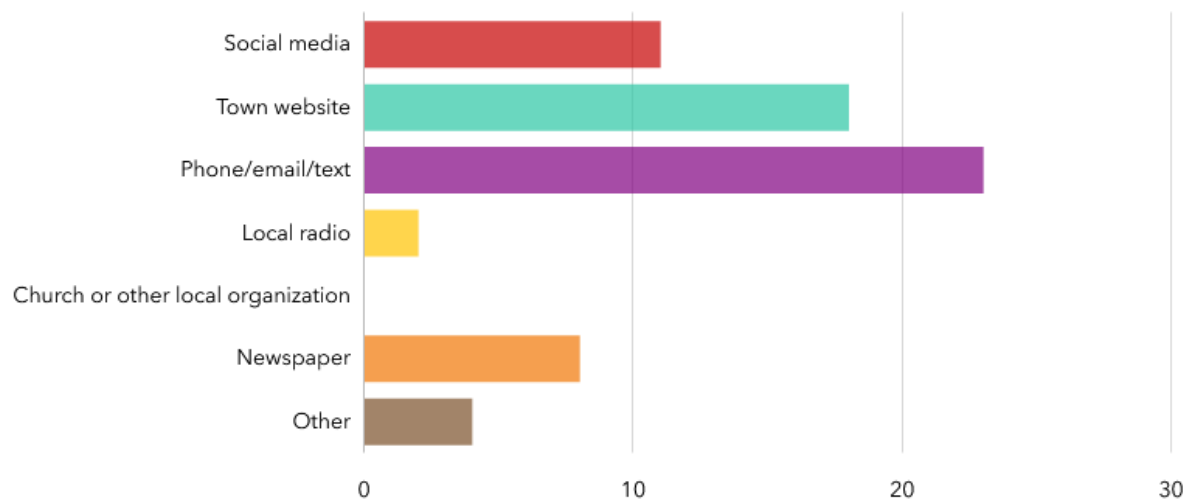


4. Can you describe any hazard events that impacted Andover, especially ones that occurred in the last five years? (Up to three events).

- Any time there is bad weather the internet goes down the town needs better cell coverage (towers) to handle cell service as homes use newer technology to run off wifi thus updating infrastructure cell towers
- Currier Road flooding, 2023, No impact to homes
- Flooding rt 4

- Flooding, damaging old bridges that were not designed to handle current extreme weather. Rte4 bridge at plains Rd. 2) smoke from distant wildfires and high temperatures are hazards to our elderly, who live in places unequipped to protect them.
- Flooding... beavers causing flooding... more than half of our two-acre property wash washed out thanks to flooding caused by failure to mitigate beavers. ONeil drive
- Ice storm and loss of power, Town wide, took a long time to mobilize road clearing and surface treatment
- Last Fall / Winters road wash outs. Flooding on Rt causing traffic to have to be detour through a residential neighborhood
- Microburst took down utility poles on Main Street and closed the road for a while to get it cleaned up.
- not on your list of strategies - emergency plan known by residents for emergency shelter, water, medical help. I think we have been pretty lucky as a town and events have been small and handled well by emergency service and local utilities, but education to public on how we should deal in a broader emergency would be good.
- Numerous power outages from downed trees during storms.
- Oct 2018 storm caused roads to be closed due to wash outs
- Power outage due to winter weather
- Road closure due to major accident or flooding on Route 11 and Route 4. Detours bad at night in driving rain when visibility poor.
- The winter storm of 2020

5. What are the best methods for you to receive information about how to make your business, home, and members of your household safer from hazards?



## APPENDIX E: HAZARD EVENTS PRIOR TO 2019

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### High winds

**July 6, 1999:** Severe thunderstorm winds caused damage statewide as downed trees blocked roads and caused power outages. The winds also damaged several buildings. In Sanbornton, a 60-foot pine tree fell on a car killing the driver. An F2 tornado touched down in Pittsfield, moved through Barnstead, and then into Strafford before lifting off the ground, snapping and uprooting hundreds of trees, and damaging several homes. In Lebanon, a 50 x 70 ft section of the City Hall's copper roof was peeled back by the wind. In Hanover, a portion of a roof at Dartmouth College was blown off by the wind. In Claremont, the wind ripped the roof off a bandstand. The wind left 80,000 customers without electrical service statewide. Numerous trees were reported down in towns throughout the state and numerous roads throughout the state were closed.

**December 26, 2000:** A strong low pressure system over Newfoundland produced gusty, northwest winds over the Lakes Region. The gusty winds downed trees and limbs causing widely scattered power outages. A downed tree damaged a mobile home in Bridgewater. Another downed tree disrupted traffic on Route 3 in Laconia. Peak wind gusts were measured at 48 mph in Concord and 41 mph in Laconia.

**October 15, 2003:** A strong low pressure system moving northeast along the Saint Lawrence River Valley caused damaging winds over northern, central, and southeastern New Hampshire. The high winds downed trees and limbs causing property damage and scattered power outages. Downed trees damaged buildings and vehicles and blocked roads. Power outages affected 21,000 customers. Peak wind gusts were measured at 50 mph in Laconia and 47 mph in Rochester.

**November 13, 2003:** A strong low pressure system moving northeast from northern Maine to the Canadian Maritimes brought high winds to northern, central, and southeast New Hampshire. The high winds downed trees onto power lines causing widespread power outages. At the peak of the event early Friday morning, power outages affected 25,200 customers in more than 100 communities.

**June 9, 2004:** Severe thunderstorm winds resulted in trees down in Andover.

**February 16, 2006:** A very strong cold front raced across New Hampshire and western Maine on Friday, the 17th of February. Wind gusts of 60 mph or more were common with and following the frontal passage. Widespread damage occurred throughout the state with the majority of the destruction due to falling trees. Several roofs were also damaged or blown off. Total damage amounted to \$348,000. In addition, 70,000 homes and businesses were left without power.

**July 17, 2012:** A cold front slowly sagging south through northern New England was the focus for showers and thunderstorms. An associated shortwave provided significant directional and speed shear for the development of some super cells as the front slowly pushed south during the evening hours of July 17th. Wind damage was the main result of these storms as several bowing line segments moved through northern and central New Hampshire. A small waterspout touched down on Newfound Lake near Bridgewater. A severe thunderstorm downed a tree on a house at Green Crow lumber in Andover.

**June 24, 2013:** A hot and humid airmass was in place over the forecast area on the afternoon of

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June 24th. Convection developed early in the afternoon over eastern New York and western New England and shifted east into the favorable environment across New Hampshire and western Maine through the evening hours. Very weak shear and high precipitable water resulted in pulse type convection with large hail and wet microbursts the main threats. Thirty people were injured by lightning at a Boy Scout Camp near Gilmanton. A thunderstorm downed small limbs and produced 0.75 inch hail near Andover. November 24, 2013: Strong winds developed behind an arctic cold front during the afternoon of the 24th. Winds gusted to between 40 and 50 mph across much of New Hampshire. Snapped trees and branches caused power outages throughout the region. Power companies reported that about 30,000 customers lost electrical service. In Laconia, one tree company worker was struck and killed by a tree as he was working to remove another tree from a roadway. In Concord where winds gusted to 58 mph, a large fiber communications cable fell across I-93 blocking the interstate highway for three hours. Several areas in Andover lost power for up to 24 hours.

**July 23, 2016:** A strong shortwave and associated cold front were pushing southeast through the region on the afternoon of the 23rd. Good heating ahead of the front propelled CAPEs into the 1500 to 3000 range and combined with increasing uni-directional shear to produce numerous severe cells and more organized line segments. Numerous reports of wind damage were received during the afternoon and evening hours across southern and central New Hampshire. A severe thunderstorm downed power lines at the intersection of Plains Road and Currier Road in Andover.

**July 10, 2018:** A microburst hit central portions of town including Elbow Pond Road, Morrill Hill and Main Street. Widespread trees and wires down along these roads. Utility poles broke and tore the electric box off at Town Office. Most electric power was restored during the day, except Elbow Pond Road was out for about a week.

### **Flooding Events**

**March 11-21, 1936:** Double flood; first due to rains and snowmelt; second, due to large rainfall.

**Sept. 21, 1938:** Hurricane. Stream stages similar to those of March 1936 and exceeded 1936 stages in the Upper Contoocook River.

**August 10, 1986:** FEMA DR-771-NH: Severe summer storms with heavy rains, tornadoes; flash flood and severe winds.

**April 16, 1987:** Severe Storms & Flooding. FEMA DR-789-NH

**August 7-11, 1990:** FEMA DR-876-NH: A series of storm events from August 7-11, 1990 with moderate to heavy rains produced widespread flooding in New Hampshire.

**August 19, 1991:** FEMA DR-917-NH: Hurricane Bob struck New Hampshire causing extensive damage in Rockingham and Stafford counties, but the effects were felt statewide.

**March 22, 2001:** The coastal storm that brought heavy snow to northern and central New Hampshire dropped 2 to 5 inches of rain in the southern part of the state. Small rivers and streams overflowed their banks. Melting snow also contributed to the runoff problem. Storm drains were overburdened causing some sewer systems to back up. Many washouts were also reported as the water flowed down the shoulders of the roads due to the high snow banks.

**April 3, 2005:** A low pressure system moving slowly northeast from through the Mid- Atlantic States spread rain into New Hampshire during the afternoon of April 2. Heavy rain continued through the 3rd as the storm continued to move slowly northeast. Rainfall amounts ranged from

1 to 3 inches across the area with Pinkham Notch receiving 3.61 inches. The rain, in combination with snowmelt, produced numerous road washouts throughout the area and resulted in about 945 thousand dollars in damage.

**October 9-15, 2005 (Columbus Day Flood):** The interaction between a cold frontal boundary and the remnants of Tropical

Storm Tammy resulted in tremendous amount of rainfall throughout most of central and southern New Hampshire. Rainfall ranged from just under 2 inches in far northern New Hampshire to 9 inches at Gilford in Belknap County.

**May 13-15, 2006 (Mother's Day Flood):** Low pressure developed south of New England and remained nearly stationary from the 12th to the 15th resulting in over 12 inches of rain in some locations in a 72-hour period. Homes and businesses were damaged extensively. Many roads were washed out and impassable. Some bridges were damaged or destroyed. Several evacuations and rescues took place during the flood event. Two dams on the Salmon Falls River were being monitored as it was feared they may fail.



**April 17, 2007:** Flooding and damages were countywide. An area of low pressure intensified rapidly as it moved slowly from the southeastern United States on the morning of Sunday, April 15th to near New York City by the morning of Monday, April 16th. Andover EOC was opened April 16 – April 18th and staffed. Damage was town-wide. Over a dozen roads were closed or barely passable. In addition



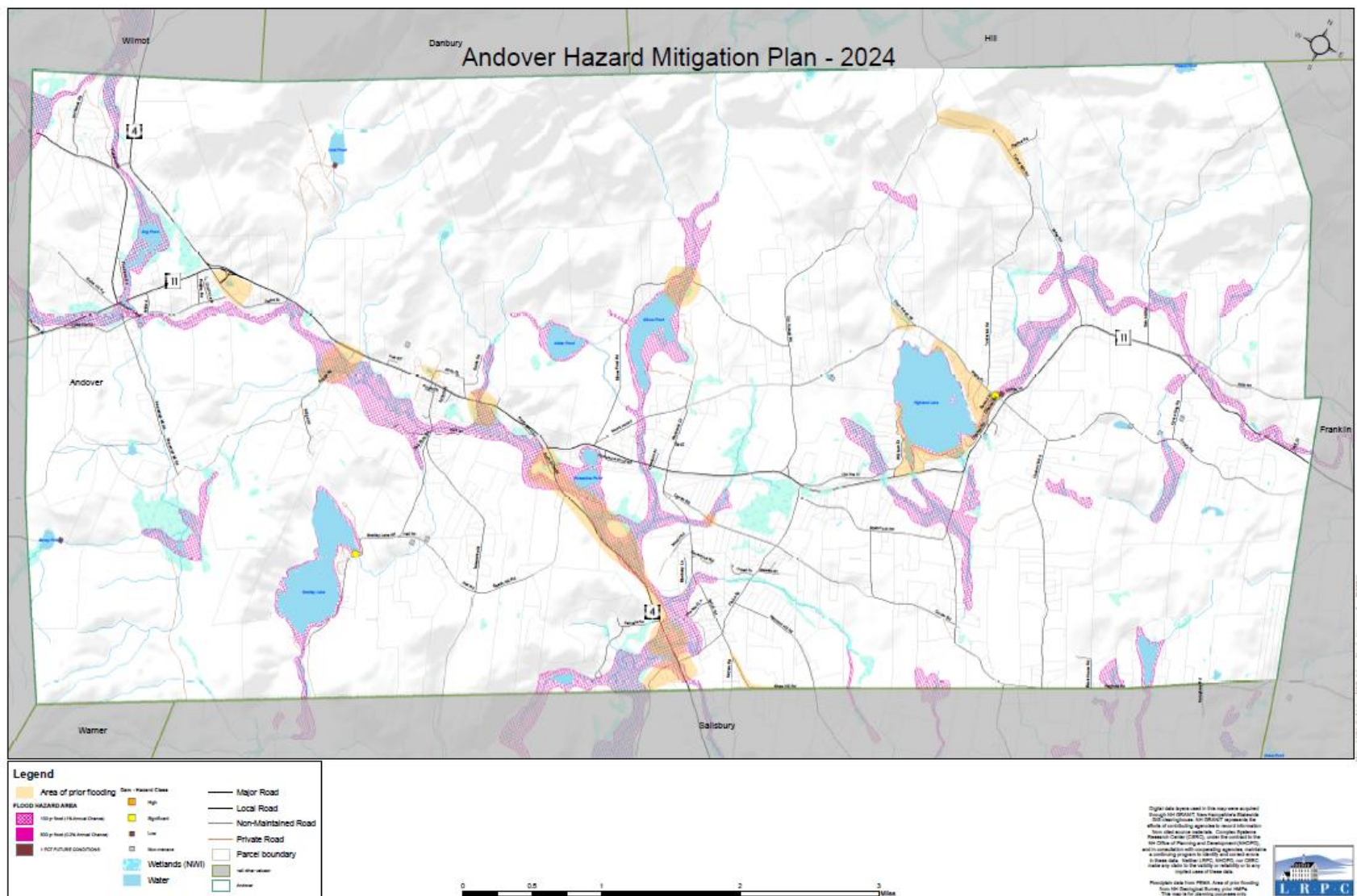
**September 3, 2011:** Tropical Storm Irene brought over 4 inches of rain to areas throughout New Hampshire. The eye of the storm traveled further west than predicted, up the Connecticut River valley, resulting in lower rainfall amounts than originally predicted for the Andover area.

**June 30, 2013:** A stalled frontal boundary was the focus for thunderstorms producing very heavy rainfall on the afternoon of June 30th. 1 to 3 inches of rain fell in less than 3 hours causing rapid rises on streams in Sullivan, Merrimack, and Belknap Counties. Numerous road washouts were reported in all three counties. A thunderstorm produced 1.5 to 3 inches of rain near New London sending several area streams over their banks. There was washout damage to Shaw Hill Road in Andover.

**October 30, 2017 (FEMA Declare Disaster #4355):** An area of low pressure over the southeastern United States on the morning of Sunday, October 29th, intensified rapidly Sunday night and Monday, October 30, as it moved northward and moisture and energy from the remnants of Tropical Storm Philippe merged with the storm. The combined system brought high winds to much of New Hampshire Sunday night into Monday morning, with the highest winds in southern and central sections of the State. In addition, heavy rain accompanied the high winds over New Hampshire leading to both flash flooding and main-stem river flooding. The highest rainfall amounts were observed in the White Mountains. While the high winds and heavy rain ended during the morning of the 30th, flooding persisted into the late afternoon of November 1st. Rainfall amounts generally ranged from 2 to 5 inches across New Hampshire. Most of this rain fell within a 10-hour period from late Sunday evening through early Monday morning. By Wednesday evening, November 1st, all flooding had subsided. Power restoration efforts in the hardest hit areas across New Hampshire persisted for much of the week. In spite of the light amount of damage in Andover, the Fire Department had a busy night answering wires down calls, trees across the road and at least one flooded basement. Power was out for up to 24 hours in Town. Maple Street in East Andover was closed for many hours due to a large tree that had fallen across the road taking down power lines with it. The stress on the lines caused a power pole to snap and fall over across the road. The Town received FEMA Disaster funds for \$4,660 for Road and Bridge emergency repair. In addition, the Town was awarded \$183,193 in FEMA funds for the repair of the Elbow Pond Culvert.



## APPENDIX F: POTENTIAL HAZARDS MAP



## APPENDIX G: SUPPLEMENTARY INFORMATION (Hazards & Prep/Response Actions )

This section provides statewide or regional information regarding hazards. Some information is about hazards mentioned in the NH Hazard Mitigation Plan. Other information either provides context or extra detail which supplements the locally important information addressed in Section III.

### Flooding due to Dam Failure

Dam failure results in rapid loss of water that is normally held back by a dam. These types of floods can be extremely dangerous and pose a threat to both life and property. Dam classifications in New Hampshire are based on the degree of potential damages that a failure or disoperation of the dam is expected to cause. The classifications are designated as non-menace, low hazard, significant hazard, and high hazard and are summarized in greater detail in Table G-1.

The designations for these dams relate to damage that would occur if a dam were to break, not the structural integrity of the dam itself. In the Lakes Region, the Town of Alton was impacted by an earthen dam failure on March 12, 1996. Although listed in the NH Hazard Mitigation Plan as a significant hazard, it did result in the loss of one life.

**Table G-1: New Hampshire Dam Classifications<sup>13</sup>**

| Classification     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Non-Menace         | A dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property, provided the dam is: <ul style="list-style-type: none"> <li>• Less than six feet in height if it has a storage capacity greater than 50 acre-feet; or</li> <li>• Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |
| 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 any of the following: <ul style="list-style-type: none"> <li>• No possible loss of life.</li> <li>• Low economic loss to structures or property.</li> <li>• 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.</li> <li>• The release of liquid industrial, agricultural, or commercial wastes, septage, or contaminated sediment if the storage capacity is less than two-acre-feet and is located more than 250 feet from a water body or water course.</li> <li>• Reversible environmental losses to environmentally-sensitive sites.</li> </ul> |
| 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 any of the following: <ul style="list-style-type: none"> <li>• No probable loss of lives.</li> <li>• Major economic loss to structures or property.</li> <li>• Structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                       |

<sup>13</sup> NH DES Fact Sheet WD-DB-15 "Classification of Dams in New Hampshire", <http://des.nh.gov/organization/commissioner/pip/factsheets/db/documents/db-15.pdf>. Accessed October 1, 2012.

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | <ul style="list-style-type: none"> <li>Major environmental or public health losses, including one or more of the following:</li> <li>Damage to a public water system, as defined by RSA 485:1-a, XV, which will take longer than 48 hours to repair.</li> <li>The release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more.</li> <li>Damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| High Hazard | <p>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 a result of:</p> <ul style="list-style-type: none"> <li>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.</li> <li>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 dam failure is greater than one foot.</li> <li>Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services.</li> <li>The release of a quantity and concentration of material, which qualify as “hazardous waste” as defined by RSA 147-A:2 VII.</li> <li>Any other circumstance that would more likely than not cause one or more deaths.</li> </ul> |

## Wildfire

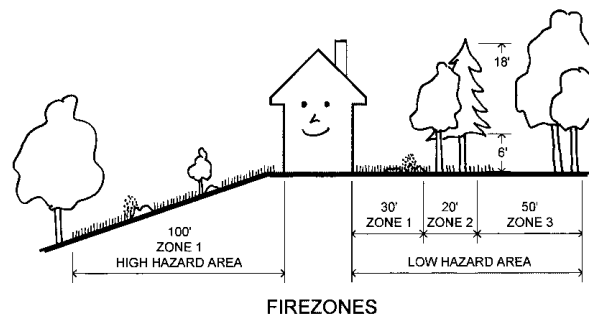
Several areas in the region are relatively remote in terms of access and firefighting abilities. Of greatest concern are those areas characterized by steep slopes and vast woodlands, with limited vehicular access. These areas include the Ossipee, Squam, Belknap, and Sandwich Mountain Ranges.

As these once remote areas begin to see more development (the urban wildfire interface), care should be taken to ensure that adequate fire protection and buffers are established.

Techniques include increased buffers between wooded areas and residential buildings, requirements for cisterns or fire ponds, a restriction on the types of allowable building materials such as shake roofs, and special considerations for landscaping. While historically massive wildfires have been western phenomena, each year hundreds of woodland acres burn in New Hampshire.

The greatest risk exists in the spring when the snow has melted and before the tree canopy has developed, and in the late summer – early fall. Appropriate planning can significantly reduce a community’s vulnerability to wildfires. There are four-zone suggestions from the Firewise community program that could be potentially helpful for Andover’s homeowners.<sup>14</sup>

**ZONE 4** is a natural zone of native or naturalized vegetation. In this area, use



<sup>14</sup> <http://www.firewise.org> accessed September 21, 2012.

selective thinning to reduce the volume of fuel. Removing highly flammable plant species offers further protection while maintaining a natural appearance.

**ZONE 3** is a low fuel volume zone. Here selected plantings of mostly low-growing and fire-resistant plants provide a decreased fuel volume area. A few well-spaced, fire resistant trees in this zone can further retard a fire's progress.

**ZONE 2** establishes a vegetation area consisting of plants that are fire resistant and low growing. An irrigation system will help keep this protection zone green and healthy.

**ZONE 1** is the protection area immediately surrounding the house. Here vegetation should be especially fire resistant, well irrigated and carefully spaced to minimize the threat from intense flames and sparks.

### Conflagration

Conflagration is an extensive, destructive fire in a populated area that endangers lives and affects multiple buildings. Historically, many New Hampshire towns were settled in areas along waterways in order to power the mills. Often the town centers were at a low point in the topography, resulting in dense residential development on the steeper surrounding hillsides. Hillsides provide a natural updraft that makes firefighting more difficult. In particular, structural fires spread more readily in hillside developments because burning buildings pre-heat the structures that are situated above them.



Alton Bay Christian Conference Center,  
2009

Within the Lakes Region the city of Laconia was the site of one of the most devastating structural fires to occur in the state of New Hampshire. The 1903 Great Lakeport Fire consumed more than 100 homes; two churches, two factories, a large mill, a power plant, and a fire station. Wolfeboro's history includes a significant fire in the winter of 1956. This event is recognized as the last block fire in town and is considered a small conflagration. On April 12, 2009 the Alton Bay Christian Conference Center complex caught fire, resulting in an 11-alarm fire and destroying more than 40 structures.

**Preparation or Response Actions**

| <b>Project ID</b> | <b>Hazard</b>         | <b>Mitigation Actions</b>                                                                                                 | <b>Estimated Cost</b> | <b>Potential Funding Source</b> | <b>Responsible Party</b> |
|-------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------|--------------------------|
| SWW 3             | Severe Winter Weather | Work with NH Electric Coop and Eversource to keep trees cut back.                                                         | 20 hours              | Town Budget                     | EMD                      |
| SWW 4             | Severe Winter Weather | Purchase and install generator at the Andover Elementary School in order to operate the facility as a designated shelter. | \$50K - \$100K        | School & Town Budgets, Grants   | School Board & EMD       |
| SWW 5             | Severe Winter Weather | Develop a Memorandum of Agreement between the School and the Town for use of facility as a shelter.                       | 20 hours              | School & Town Budgets           | School Board & EMD       |

## APPENDIX H: PRIORITIZATION DETAILS

As the Committee began the process of prioritizing these actions, the group utilized the standard STAPLEE project prioritization. The committee reviewed each mitigation action in the standard STAPLEE categories (**Social, Technical, Administrative, Political, Environmental, and Economic**). Below is the STAPLEE Criteria Sheet used by the Committee. It was noted that the 'Economic' category could include the cost of the project, potential outside funding sources, and the potential impacts on the local economy. Detailed project scores follow.

### STAPLEE Criteria

Committee members are asked to consider both the costs and benefits of implementing identified mitigation actions. The starting point is to consider all actions as positive steps towards making the community a safer place. Any of the STAPLEE criteria that would hinder the action from moving to implementation should be noted. When evaluating the mitigation actions, the following questions are designed to help identify potential obstacles to implementation for each criterion.

#### Social

- ☐ Will the action unfairly affect any one segment of the population?
- ☐ Will it disrupt established neighborhoods or adversely affect cultural resources?
- ☐ Is it compatible with present and future community values?

#### Technical

- ☐ Is the proposed action technically feasible?
- ☐ Will it reduce losses in the long term with minimal secondary impacts?

#### Administrative

- ☐ Does the community have the capability to implement the action? (staff, technical expertise, funding)
- ☐ Can the community provide the necessary maintenance?
- ☐ Can it be accomplished in a timely manner?

#### Political

- ☐ Is there local/regional support for this sort of mitigation activities or program?

#### Legal

- ☐ Does the community have the authority to implement the action?
- ☐ Is enabling legislation necessary? (ordinance, resolution, etc.)

#### Environmental

- ☐ Are there likely to be positive or negative impacts to the environment if this action is implemented?
- ☐ Does the action comply with local, state, and federal environmental regulations?
- ☐ Is it consistent with community environmental goals?

#### Economic

- ☐ Can the cost of this action be managed by the community? (operating budget or capital improvements)
- ☐ Are state/federal grant programs applicable?
- ☐ Will this reduce costs, for example improving insurance ratings?
- ☐ How does this action fit in with existing economic development plans?
- ☐ Is it likely that this action will result in economic benefits for the community?

Note: Some HMP Committees choose not to use the "Political" category for rating. Some committees choose to combine the "Economic" and "Costs" categories.

This table shows the detailed scoring of the Mitigation Actions by the Andover Hazard Mitigation Committee. For each action, the benefits and costs of implementing the action (under each of the seven categories) were considered and scored 1, 0, (-1) with a 'one' meaning that the benefits were greater than the costs in a particular category, a 'minus one' indicating that the costs outweighed the benefits, and a 'zero' meaning that while there are costs associated with the project, they are balanced out by the benefits. The seven category scores were summed for an overall project total. The maximum total score was 7, the minimum was -7. Actual results ranged from 7 to 0. These ratings were arrived at through committee discussion and group consensus.

**Scoring: 1 = Highly effective or feasible, 0 = Neutral, -1 = Ineffective or not feasible**

| Project ID | Hazard                   | Problem                                                                                                                                                                                             | Mitigation Actions                                                                                                                                                                       | Social | Technical | Administrative | Political | Legal | Cost | Environmental | Total |
|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|----------------|-----------|-------|------|---------------|-------|
| DF 1       | Dam Failure              | Highland Lake Dam, if breached, could damage downstream culverts, bridges, roads and a couple of structures.                                                                                        | Include the Highland Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                        | 1      | 1         | 1              | 1         | 1     | 1    | 1             | 7     |
| DF 4       | Dam Failure              | Bradley Lake Dam, if breached, could cause damage to downstream flood control dam (Hall Rd.) 3 roads, 3 bridges and impact source water supply to treatment plant and production of drinking water. | Include the Bradley Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                         | 1      | 1         | 1              | 1         | 1     | 1    | 1             | 7     |
| ET 1       | Extreme Cold and/or Heat | There are functional needs populations without air-conditioning that may need assistance during prolonged periods of extreme heat.                                                                  | Educate the general public and vulnerable populations on the steps to mitigate extreme heat, including establishing and promoting accessible warming & cooling centers in the community. | 1      | 1         | 1              | 1         | 1     | 1    | 1             | 7     |
| FE 1       | Flooding or Erosion      | Heavy rains cause erosion and damage culverts, ditches and roads.                                                                                                                                   | Inventory culverts, including the age and condition, using GPS and associated hardware & software. Culvert & Closed Drainage System (CCDS) inventory and assessment                      | 1      | 1         | 1              | 1         | 1     | 1    | 1             | 7     |
| FE 5       | Flooding or Erosion      | Flooding can cause damage to public and private structures.                                                                                                                                         | Continue to ensure town regulations meet the National Flood Insurance Program (NFIP) standards                                                                                           | 1      | 1         | 0              | 1         | 1     | 1    | 1             | 6     |

| Project ID | Hazard                                                       | Problem                                                                                                                                               | Mitigation Actions                                                                                                                                                                                                      | Social | Technical | Administrative | Political | Legal | Cost | Environmental | Total |
|------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|----------------|-----------|-------|------|---------------|-------|
| H/TC 1     | <b>Hurricane<br/>(Tropical &amp; Post-Tropical Cyclones)</b> | Wind damage results in downed trees, wires and utilities which can impact emergency communications, electricity and information technology.           | Install a repeater on the Fire Station to enhance police and fire radio communications.                                                                                                                                 | 1      | 1         | 0              | 1         | 1     | 1    | 1             | 6     |
| L 2        | <b>Lightning</b>                                             | People and structures may be at risk to lightning strikes and resulting fires.                                                                        | Educate the public on the hazards of and the steps to reduce the impact of lightning strikes to humans and structures.                                                                                                  | 1      | 1         | 0              | 1         | 1     | 1    | 1             | 6     |
| EQ 1       | <b>Earthquake</b>                                            | Critical facilities that are made of un-reinforced masonry are susceptible to earthquake damage.                                                      | AVD is currently undertaking an Asset Management Planning exercise with support from NH-DES. Part of this activity is mapping water supply infrastructure and developing plans for maintenance and upgrading over time. | 1      | 0         | 1              | 1         | 1     | 0    | 1             | 5     |
| FE 3       | <b>Flooding<br/>or Erosion</b>                               | Flooded, eroded, and closed roads impede emergency response and essential services.                                                                   | Work with NHDOT to upgrade the bridge along US 4 (state) near Plains and Fernvale Roads.                                                                                                                                | 0      | 0         | 1              | 1         | 1     | 1    | 1             | 5     |
| FE 4       | <b>Flooding<br/>or Erosion</b>                               | Flooded, eroded, and closed roads impede emergency response and essential services.                                                                   | Replace and upgrade multiple culverts on Valley Road, Bridge, Currier, and Switch Streets.                                                                                                                              | 1      | 1         | 1              | 1         | 1     | -1   | 1             | 5     |
| WFF 3      | <b>Wild/Forest<br/>Fire<br/>Wildfire</b>                     | Structures without fire breaks are at risk to forest fire.                                                                                            | Provide wildfire education resources so that homeowners can take steps to protect these structures.                                                                                                                     | 1      | 1         | 0              | 1         | 1     | 0    | 1             | 5     |
| D 2*       | <b>Drought</b>                                               | An extended drought increases the probability of fires and may hinder fire suppression to those areas relying on dry- hydrants in local water-bodies. | Develop Resource Protection Plan (RPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.)          | 1      | 1         | -1             | 1         | 1     | 0    | 1             | 4     |

| Project ID | Hazard                                                   | Problem                                                                                                                               | Mitigation Actions                                                                                                                                                                                        | Social | Technical | Administrative | Political | Legal | Cost | Environmental | Total |
|------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|----------------|-----------|-------|------|---------------|-------|
| SW 1       | <b>Severe Wind (Tornado /Downburst) High Wind Events</b> | Wind damage may result in downed utilities which can negatively impact emergency communications.                                      | Eliminate tree hazards over public roads as needed.                                                                                                                                                       | 1      | 1         | 1              | 1         | 0     | -1   | 1             | 4     |
| WFF 2      | <b>Wild/Forest Fire Wildfire</b>                         | Conservation, timber, residential and forested areas are at risk to forest fire.                                                      | Continue to increase funds in the Wildfire Reserve Fund.                                                                                                                                                  | 1      | 1         | 1              | 0         | 1     | -1   | 1             | 4     |
| D 1        | <b>Drought</b>                                           | Private wells dry-up during periods of drought.                                                                                       | Develop a system to meter, monitor and reimburse AVD for water distributed to drought-stricken residents.                                                                                                 | 1      | 1         | -1             | 1         | 1     | -1   | 1             | 3     |
| WFF 1*     | <b>Wild/Forest Fire Wildfire</b>                         | Conservation, timber, residential and forested areas are at risk to forest fire.                                                      | Develop Source Water Protection Plan (SWPP) that identifies potential negative impacts from wild/forest fires in the Bradley Lake watershed and possible remedies for Bradley Lake Drinking Water Supply. | 1      | 1         | -1             | 1         | 1     | -1   | 1             | 3     |
| SWW 1      | <b>Severe Winter Weather</b>                             | Ice storms and wind from blizzards and nor'easters results in downed utilities which can impact result in prolonged power outages.    | Identify source of funding for replacement of FEMA supplied back-up generator -critical for water treatment operation during winter months (mandatory space heating requirement).                         | 1      | 0         | 0              | 1         | 1     | -1   | 1             | 3     |
| SWW 2      | <b>Severe Winter Weather</b>                             | Ice storms and wind from blizzards and nor'easters may result in downed utilities which can impact result in prolonged power outages. | Begin discussions regarding electrical "islanding" to have self-sufficiency in the event of a natural hazard.                                                                                             | 1      | -1        | -1             | 1         | 0     | -1   | 1             | 0     |

## **APPENDIX I: EXISTING PLANS, STUDIES, REPORTS, AND TECHNICAL INFORMATION**

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Andover Hazard Mitigation Plan, 2019

Andover Master Plan, 2013

Andover Zoning Ordinance, 2023

Andover Subdivision Regulations, 2018

Andover Site Plan Regulations, 2017

Andover MS-1, 2022 – local structural valuation

Andover Police and EMS Facebook pages

Homeland Security & Emergency Management, New Hampshire Department of Safety  
- *New Hampshire State Hazard Mitigation Plan, 2023 Update*

NH Department of Transportation Traffic Volume (TDMS),

<https://nhdot.public.ms2soft.com/tcds/tsearch.asp?loc=Nhdot&mod=TCDS>

NH Division of Forests and Lands, <https://www.nh.gov/nhdfl/>

National Flood Insurance Program through NH Office of Planning and Development

<https://www.nh.gov/osi/planning/programs/fmp/index.htm>

[FEMA's Map Changes Viewer](#)

National Oceanic and Atmospheric Administration website, <http://www.ncdc.noaa.gov/>

Census 2020 and American Community Survey

FEMA Community Information System

FEMA Flood Map Service Center - <https://msc.fema.gov/portal/home>

## APPENDIX J: FEMA WEBLIOGRAPHY

### DISASTERS AND NATURAL HAZARDS INFORMATION

|                                                                                                                              |                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| FEMA-How to deal with specific hazards                                                                                       | <a href="http://www.ready.gov/natural-disasters">http://www.ready.gov/natural-disasters</a>                                                             |
| Natural Hazards Center at the University of Colorado                                                                         | <a href="http://www.colorado.edu/hazards">http://www.colorado.edu/hazards</a>                                                                           |
| National Oceanic and Atmospheric Administration (NOAA): Information on various projects and research on climate and weather. | <a href="http://www.websites.noaa.gov">http://www.websites.noaa.gov</a>                                                                                 |
| National Climatic Data Center active archive of weather data.                                                                | <a href="http://lwf.ncdc.noaa.gov/oa/ncdc.html">http://lwf.ncdc.noaa.gov/oa/ncdc.html</a>                                                               |
| Northeast Snowfall Impact Scale                                                                                              | <a href="http://www.erh.noaa.gov/rnk/Newsletter/Fall%202007/NESIS.htm">http://www.erh.noaa.gov/rnk/Newsletter/Fall%202007/NESIS.htm</a>                 |
| Weekend Snowstorm Strikes The Northeast Corridor Classified As A Category 3"Major"Storm                                      | <a href="http://www.publicaffairs.noaa.gov/releases2006/feb06/noaa06-023.html">http://www.publicaffairs.noaa.gov/releases2006/feb06/noaa06-023.html</a> |

### FLOOD RELATED HAZARDS

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

### FIRE RELATED HAZARDS

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

### GEOLOGIC RELATED HAZARDS

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| USGS Topographic Maps                                 | <a href="http://topomaps.usgs.gov/">http://topomaps.usgs.gov/</a>                                                                               |
| Building Seismic Safety Council                       | <a href="http://www.nibs.org/?page=bssc">http://www.nibs.org/?page=bssc</a>                                                                     |
| Earthquake hazard history by state                    | <a href="http://earthquake.usgs.gov/earthquakes/states/">http://earthquake.usgs.gov/earthquakes/states/</a>                                     |
| USGS data on earthquakes                              | <a href="http://earthquake.usgs.gov/monitoring/deformation/data/download/">http://earthquake.usgs.gov/monitoring/deformation/data/download/</a> |
| USGS Earthquake homepage                              | <a href="http://quake.wr.usgs.gov">http://quake.wr.usgs.gov</a>                                                                                 |
| National Cooperative Geologic Mapping Program (NCGMP) | <a href="http://ncgmp.usgs.gov/">http://ncgmp.usgs.gov/</a>                                                                                     |

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| Landslide Overview Map of the Conterminous United States                                                                               | <a href="http://landslides.usgs.gov/learning/nationalmap/">http://landslides.usgs.gov/learning/nationalmap/</a>                                                                                 |
| Kafka, Alan L. 2008. Why Does the Earth Quake in New England? Boston College, Weston Observatory, Department of Geology and Geophysics | <a href="http://www2.bc.edu/~kafka/Why_Quakes/why_quakes.html">http://www2.bc.edu/~kafka/Why_Quakes/why_quakes.html</a>                                                                         |
| Map and Geographic Information Center, 2010, "Connecticut GIS Data", University of Connecticut                                         | <a href="http://magic.lib.uconn.edu/connecticut_data.html">http://magic.lib.uconn.edu/connecticut_data.html</a>                                                                                 |
| 2012 Maine earthquake                                                                                                                  | <a href="http://www.huffingtonpost.com/2012/10/17/main-earthquake-2012-new-england_n_1972555.html">http://www.huffingtonpost.com/2012/10/17/main-earthquake-2012-new-england_n_1972555.html</a> |

**WIND-RELATED HAZARDS**

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| ATC Wind Speed Web Site                                   | <a href="http://www.atcouncil.org/windspeed/index.php">http://www.atcouncil.org/windspeed/index.php</a>                       |
| U.S. Wind Zone Maps                                       | <a href="http://www.fema.gov/safe-rooms/wind-zones-united-states">http://www.fema.gov/safe-rooms/wind-zones-united-states</a> |
| Tornado Project Online                                    | <a href="http://www.tornadoproject.com/">http://www.tornadoproject.com/</a>                                                   |
| National Hurricane Center                                 | <a href="http://www.nhc.noaa.gov">http://www.nhc.noaa.gov</a>                                                                 |
| Community Hurricane Preparedness Tutorial                 | <a href="http://meted.ucar.edu/hurricane/chp/hp.htm">http://meted.ucar.edu/hurricane/chp/hp.htm</a>                           |
| National Severe Storms Laboratory, 2009, "Tornado Basics" | <a href="http://www.nssl.noaa.gov/primer/tornado/tor_basics.html">http://www.nssl.noaa.gov/primer/tornado/tor_basics.html</a> |

**GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND MAPPING**

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| The National Spatial Data Infrastructure & Clearinghouse (NSDI) and Federal Geographic Data Committee (FGDC) Source for information on producing and sharing geographic data                                                                                       | <a href="http://www.fgdc.gov">http://www.fgdc.gov</a>                                                 |
| The OpenGIS Consortium Industry source for developing standards and specifications for GIS data                                                                                                                                                                    | <a href="http://www.opengis.org">http://www.opengis.org</a>                                           |
| Northeast States Emergency Consortium (NESEC): Provides information on various hazards, funding resources, and other information                                                                                                                                   | <a href="http://www.nesec.org">http://www.nesec.org</a>                                               |
| US Dept of the Interior Geospatial Emergency Management System (IGEMS) provides the public with both an overview and more specific information on current natural hazard events. It is supported by the Department of the Interior Office of Emergency Management. | <a href="http://igems.doi.gov/">http://igems.doi.gov/</a>                                             |
| FEMA GeoPlatform: Geospatial data and analytics in support of emergency management                                                                                                                                                                                 | <a href="http://fema.maps.arcgis.com/home/index.html">http://fema.maps.arcgis.com/home/index.html</a> |

**DETERMINING RISK AND VULNERABILITY**

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| HAZUS                                               | <a href="http://www.hazus.org">http://www.hazus.org</a>                                                                                                                                                                                                                                         |
| FEMA Hazus Average Annualized Loss Viewer           | <a href="http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cb8228309e9d405ca6b4db6027df36d9&amp;extent=-139.0898,7.6266,-48.2109,62.6754">http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cb8228309e9d405ca6b4db6027df36d9&amp;extent=-139.0898,7.6266,-48.2109,62.6754</a> |
| Vulnerability Assessment Tutorial: On-line tutorial | <a href="http://www.csc.noaa.gov/products/nchaz/html/">http://www.csc.noaa.gov/products/nchaz/html/</a>                                                                                                                                                                                         |

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| for local risk and vulnerability assessment                             | <a href="#">mitigate.htm</a>                                                                                            |
| Case Study: an example of a completed risk and vulnerability assessment | <a href="http://www.csc.noaa.gov/products/nchaz/html/case.htm">http://www.csc.noaa.gov/products/nchaz/html/case.htm</a> |

**DATA GATHERING**

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| National Information Sharing Consortium (NISC): brings together data owners, custodians, and users in the fields of homeland security, public safety, and emergency management and response. Members leverage efforts related to the governance, development, and sharing of situational awareness and incident management resources, tools, and best practices | <a href="http://nisconsortium.org/">http://nisconsortium.org/</a>                                                                                                                                       |
| The Hydrologic Engineering Center (HEC), an organization within the Institute for Water Resources, is the designated Center of Expertise for the US Army Corps of Engineers                                                                                                                                                                                     | <a href="http://www.hec.usace.army.mil/">http://www.hec.usace.army.mil/</a>                                                                                                                             |
| National Water & Climate Center                                                                                                                                                                                                                                                                                                                                 | <a href="http://www.wcc.nrcs.usda.gov/">http://www.wcc.nrcs.usda.gov/</a>                                                                                                                               |
| WinTR-55 Watershed Hydrology                                                                                                                                                                                                                                                                                                                                    | <a href="http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?&amp;cid=stelprdb1042901">http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?&amp;cid=stelprdb1042901</a> |
| USACE Hydrologic Engineering Center (HEC)                                                                                                                                                                                                                                                                                                                       | <a href="http://www.hec.usace.army.mil/software/">http://www.hec.usace.army.mil/software/</a>                                                                                                           |
| Stormwater Manager's Resource Center SMRC                                                                                                                                                                                                                                                                                                                       | <a href="http://www.stormwatercenter.net">http://www.stormwatercenter.net</a>                                                                                                                           |
| USGS Current Water Data for the Nation                                                                                                                                                                                                                                                                                                                          | <a href="http://waterdata.usgs.gov/nwis/rt">http://waterdata.usgs.gov/nwis/rt</a>                                                                                                                       |
| USGS Water Data for the Nation                                                                                                                                                                                                                                                                                                                                  | <a href="http://waterdata.usgs.gov/nwis/">http://waterdata.usgs.gov/nwis/</a>                                                                                                                           |
| Topography Maps and Aerial photos                                                                                                                                                                                                                                                                                                                               | <a href="http://www.terraserver.com/view.asp?tid=142">http://www.terraserver.com/view.asp?tid=142</a>                                                                                                   |
| National Register of Historic Places                                                                                                                                                                                                                                                                                                                            | <a href="http://www.nps.gov/nr/about.htm">http://www.nps.gov/nr/about.htm</a>                                                                                                                           |
| National Wetlands Inventory                                                                                                                                                                                                                                                                                                                                     | <a href="http://www.fws.gov/wetlands/">http://www.fws.gov/wetlands/</a>                                                                                                                                 |
| ICLUS Data for Northeast Region                                                                                                                                                                                                                                                                                                                                 | <a href="http://www.epa.gov/ncea/global/iclus/inclus_nca_northeast.htm">http://www.epa.gov/ncea/global/iclus/inclus_nca_northeast.htm</a>                                                               |

**SUSTAINABILITY/ADAPTATION/CLIMATE CHANGE**

|                                                                                                                                                           |                                                                                                                                                                                                                                                                                                         |
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| Planning for a Sustainable Future: the Link Between Hazard Mitigation and Livability                                                                      | <a href="http://www.fema.gov/media-library-data/20130726-1454-20490-3505/fema364.pdf">http://www.fema.gov/media-library-data/20130726-1454-20490-3505/fema364.pdf</a>                                                                                                                                   |
| Why the Emergency Management Community Should be Concerned about Climate Change: A discussion of the impact of climate change on selected natural hazards | <a href="http://www.cna.org/sites/default/files/research/WEB%2007%2029%2010.1%20Climate%20Change%20and%20the%20Emergency%20Management%20Community.pdf">http://www.cna.org/sites/default/files/research/WEB%2007%2029%2010.1%20Climate%20Change%20and%20the%20Emergency%20Management%20Community.pdf</a> |
| NOAA RISA for the Northeast (Regional Integrated Sciences and Assessments)                                                                                | <a href="http://ccrun.org/home">http://ccrun.org/home</a>                                                                                                                                                                                                                                               |
| Resilient Sustainable Communities: Integrating Hazard Mitigation& Sustainability into Land Use                                                            | <a href="http://www.earth.columbia.edu/sitefiles/file/education/documents/2013/Resilient-Sustainable-Communities-Report.pdf">http://www.earth.columbia.edu/sitefiles/file/education/documents/2013/Resilient-Sustainable-Communities-Report.pdf</a>                                                     |
| U.S. EPA                                                                                                                                                  | <a href="http://www.epa.gov/climatechange/">http://www.epa.gov/climatechange/</a>                                                                                                                                                                                                                       |
| NOAA National Ocean Service (NOS)                                                                                                                         | <a href="http://oceanservice.noaa.gov/">http://oceanservice.noaa.gov/</a>                                                                                                                                                                                                                               |
| The Northeast Climate Research Center (NRCC) folks were heavily involved in climate data in the NCA,                                                      | <a href="http://www.nrcc.cornell.edu/">http://www.nrcc.cornell.edu/</a>                                                                                                                                                                                                                                 |

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| below. They have a wealth of historic climate data and weather information, trends, etc.          |                                                                                                                                                                                                                                           |
| Community and Regional Resilience: Perspectives from hazards, disasters, and emergency management | <a href="http://www.resilientus.org/library/FINAL_CUTTER_9-25-08_1223482309.pdf">http://www.resilientus.org/library/FINAL_CUTTER_9-25-08_1223482309.pdf</a>                                                                               |
| National Fish, Wildlife and Plants Climate Adaptation Strategy                                    | <a href="http://www.wildlifeadaptationstrategy.gov">www.wildlifeadaptationstrategy.gov</a>                                                                                                                                                |
| ICLEI Local Governments for Sustainability                                                        | <a href="http://www.icleiusa.org/">http://www.icleiusa.org/</a>                                                                                                                                                                           |
| Kresge Foundation Survey                                                                          | <a href="http://www.kresge.org/news/survey-finds-communities-northeast-are-trying-plan-for-changes-climate-need-help-0">http://www.kresge.org/news/survey-finds-communities-northeast-are-trying-plan-for-changes-climate-need-help-0</a> |
| New England's Sustainable Knowledge Corridor                                                      | <a href="http://www.sustainableknowledgecorridor.org/site/">http://www.sustainableknowledgecorridor.org/site/</a>                                                                                                                         |
| The Strategic Foresight Initiative (SFI)                                                          | <a href="http://www.fema.gov/pdf/about/programs/oppa/findings_051111.pdf">http://www.fema.gov/pdf/about/programs/oppa/findings_051111.pdf</a>                                                                                             |
| Northeast Climate Choices                                                                         | <a href="http://www.climatechoices.org/ne/resources_ne/nereport.html">http://www.climatechoices.org/ne/resources_ne/nereport.html</a>                                                                                                     |
| Northeast Climate Impacts Assessment                                                              | <a href="http://www.northeastclimateimpacts.org/">http://www.northeastclimateimpacts.org/</a>                                                                                                                                             |
| Draft National Climate Assessment Northeast Chapter released early 2013                           | <a href="http://ncadac.globalchange.gov/">http://ncadac.globalchange.gov/</a>                                                                                                                                                             |
| Northeast Chapter of the National Climate Assessment of 2009:                                     | <a href="http://www.globalchange.gov/images/cir/pdf/northeast.pdf">http://www.globalchange.gov/images/cir/pdf/northeast.pdf</a>                                                                                                           |
| NEclimateUS.org                                                                                   | <a href="http://www.neclimateus.org">http://www.neclimateus.org</a>                                                                                                                                                                       |
| ClimateNE                                                                                         | <a href="http://www.climate-northeast.com">www.climate-northeast.com</a>                                                                                                                                                                  |
| Scenarios for Climate Assessment and Adaptation                                                   | <a href="http://scenarios.globalchange.gov/">http://scenarios.globalchange.gov/</a>                                                                                                                                                       |
| Northeast Climate Science Center                                                                  | <a href="http://necsc.umass.edu/">http://necsc.umass.edu/</a>                                                                                                                                                                             |
| FEMA Climate Change Adaptation and Emergency Management                                           | <a href="https://www.llis.dhs.gov/content/climate-change-adaptation-and-emergency-management-0">https://www.llis.dhs.gov/content/climate-change-adaptation-and-emergency-management-0</a>                                                 |
| Climate Central                                                                                   | <a href="http://www.climatecentral.org">http://www.climatecentral.org</a>                                                                                                                                                                 |
| EPA State and Local Climate and Energy Program                                                    | <a href="http://www.epa.gov/statelocalclimate/index.html">http://www.epa.gov/statelocalclimate/index.html</a>                                                                                                                             |

**PLANNING**

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| American Planning Association                               | <a href="http://www.planning.org">http://www.planning.org</a>       |
| PlannersWeb - Provides city and regional planning resources | <a href="http://www.plannersweb.com">http://www.plannersweb.com</a> |

**OTHER FEDERAL RESOURCES**

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

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| Rural Economic and Community Development: Technical assistance to rural areas and smaller communities in rural areas on financing public works projects.                                                                                                                       | <a href="http://www.rurdev.usda.gov">www.rurdev.usda.gov</a>                           |
| Farm Service Agency: Manages the Wetlands Reserve Program (useful in open space or acquisition projects by purchasing easements on wetlands properties) and farmland set aside programs                                                                                        | <a href="http://www.fsa.usda.gov">www.fsa.usda.gov</a>                                 |
| National Weather Service: Prepares and issues flood, severe weather and coastal storm warnings. Staff hydrologists can work with communities on flood warning issues; can give technical assistance in preparing flood-warning plans.                                          | <a href="http://www.weather.gov">www.weather.gov</a>                                   |
| Economic Development Administration (EDA): Assists communities with technical assistance for economic development planning                                                                                                                                                     | <a href="http://www.osec.doc.gov/eda/default.htm">www.osec.doc.gov/eda/default.htm</a> |
| National Park Service: Technical assistance with open space preservation planning; can help facilitate meetings and identify non-structural options for floodplain redevelopment.                                                                                              | <a href="http://www.nps.gov">www.nps.gov</a>                                           |
| Fish and Wildlife Services: Can provide technical and financial assistance to restore wetlands and riparian habitats.                                                                                                                                                          | <a href="http://www.fws.gov">www.fws.gov</a>                                           |
| Department of Housing & Urban Development                                                                                                                                                                                                                                      | <a href="http://www.hud.gov">www.hud.gov</a>                                           |
| Small Business Administration: SBA can provide additional low-interest funds (up to 20% above what an eligible applicant would qualify for) to install mitigation measures. They can also loan the cost of bringing a damaged property up to state or local code requirements. | <a href="http://www.sba.gov/disaster">www.sba.gov/disaster</a>                         |
| Environmental Protection Agency                                                                                                                                                                                                                                                | <a href="http://www.epa.gov">www.epa.gov</a>                                           |

#### OTHER RESOURCES

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| New England States Emergency Consortium (NESEC): NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Resources are available on earthquake preparedness, mitigation, and hurricane safety. | <a href="http://www.nesec.org">www.nesec.org</a>        |
| Association of State Floodplain Managers (ASFPM): ASFPM has developed a series of technical and topical research papers, and a series of Proceedings from their annual conferences.                                                                                           | <a href="http://www.floods.org">www.floods.org</a>      |
| National Voluntary Organizations Active in Disaster (VOAD) is a non-profit, nonpartisan membership organization that serves as the forum where                                                                                                                                | <a href="http://www.nvoad.org">http://www.nvoad.org</a> |

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| organizations share knowledge and resources throughout the disaster cycle—preparation, response, recovery and mitigation. |  |
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**FEMA RESOURCES**

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| Federal Emergency Management Agency (FEMA)                                                                                                                                               | <a href="http://www.fema.gov">www.fema.gov</a>                                                                                                                                                                                            |
| National Mitigation Framework                                                                                                                                                            | <a href="http://www.fema.gov/national-mitigation-framework">http://www.fema.gov/national-mitigation-framework</a>                                                                                                                         |
| Federal Insurance and Mitigation Administration (FIMA)                                                                                                                                   | <a href="http://www.fema.gov/fima">http://www.fema.gov/fima</a>                                                                                                                                                                           |
| Community Rating System (CRS)                                                                                                                                                            | <a href="http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-rating-system">http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-rating-system</a> |
| FEMA Building Science                                                                                                                                                                    | <a href="http://www.fema.gov/building-science">http://www.fema.gov/building-science</a>                                                                                                                                                   |
| National Flood Insurance Program (NFIP)                                                                                                                                                  | <a href="http://www.fema.gov/national-flood-insurance-program">http://www.fema.gov/national-flood-insurance-program</a>                                                                                                                   |
| Floodplain Management & Community Assistance Program                                                                                                                                     | <a href="http://www.fema.gov/floodplain-management">http://www.fema.gov/floodplain-management</a>                                                                                                                                         |
| Increased Cost of Compliance (ICC): ICC coverage provides up to \$30,000 for elevation and design requirements to repeatedly or substantially damaged property.                          | <a href="http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage">http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage</a>                                         |
| National Disaster Recovery Framework                                                                                                                                                     | <a href="http://www.fema.gov/national-disaster-recovery-framework">http://www.fema.gov/national-disaster-recovery-framework</a>                                                                                                           |
| Computer Sciences Corporation: contracted by FIMA as the NFIP Statistical Agent, CSC provides information and assistance on flood insurance to lenders, insurance agents and communities | <a href="http://www.csc.com">www.csc.com</a>                                                                                                                                                                                              |
| Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan: A Guidebook for Local Governments                                                            | <a href="https://www.fema.gov/ar/media-library/assets/documents/89725">https://www.fema.gov/ar/media-library/assets/documents/89725</a>                                                                                                   |
| Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning                                                                                       | <a href="http://www.fema.gov/media-library/assets/documents/4317">http://www.fema.gov/media-library/assets/documents/4317</a>                                                                                                             |

**Mitigation Best Practices Portfolio** <http://www.fema.gov/mitigation-best-practices-portfolio>

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| FEMA Multi-Hazard Mitigation Planning Website                                                                        | <a href="http://www.fema.gov/multi-hazard-mitigation-planning">http://www.fema.gov/multi-hazard-mitigation-planning</a> |
| FEMA Resources Page                                                                                                  | <a href="http://www.fema.gov/plan/mitplanning/resources.shtm">http://www.fema.gov/plan/mitplanning/resources.shtm</a>   |
| Local Mitigation Plan Review Guide                                                                                   | <a href="http://www.fema.gov/library/viewRecord.do?id=4859">http://www.fema.gov/library/viewRecord.do?id=4859</a>       |
| Local Mitigation Planning Handbook complements and liberally references the Local Mitigation Plan Review Guide above | <a href="http://www.fema.gov/library/viewRecord.do?id=7209">http://www.fema.gov/library/viewRecord.do?id=7209</a>       |
| HAZUS                                                                                                                | <a href="http://www.fema.gov/protecting-our-communities/hazus">http://www.fema.gov/protecting-our-communities/hazus</a> |
| Mitigation Ideas: A Resource for Reducing Risk to                                                                    | <a href="http://www.fema.gov/library/viewRecord.do?id=">http://www.fema.gov/library/viewRecord.do?id=</a>               |

|                                                                                                      |                                                                                                                   |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Natural Hazards                                                                                      | <a href="#">6938</a>                                                                                              |
| Integrating Hazard Mitigation Into Local Planning:<br>Case Studies and Tools for Community Officials | <a href="http://www.fema.gov/library/viewRecord.do?id=7130">http://www.fema.gov/library/viewRecord.do?id=7130</a> |
| IS-318<br>Mitigation Planning for Local and Tribal<br>Communities<br>Independent Study Course        | <a href="http://training.fema.gov/EMIWeb/IS/is318.asp">http://training.fema.gov/EMIWeb/IS/is318.asp</a>           |

**APPENDIX K: MONITOR, EVALUATE, & UPDATE****Table A: Periodic Hazard Mitigation Plan Review Record** (Assessing overall plan effectiveness: Poor, Fair, Good, Excellent)

| Meeting Schedule<br>(dates) | Tasks Accomplished                                                                                                                                                         | How well is plan<br>achieving stated<br>purpose and goals? | Lead Parties | Public Involvement<br>(citizens, neighboring<br>communities) |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------|--------------------------------------------------------------|
| April, 2026                 | <input type="checkbox"/> Documentation<br><input type="checkbox"/> Track implementation<br><input type="checkbox"/> Assess effectiveness<br><input type="checkbox"/> Other |                                                            |              |                                                              |
| April, 2027                 | <input type="checkbox"/> Documentation<br><input type="checkbox"/> Track implementation<br><input type="checkbox"/> Assess effectiveness<br><input type="checkbox"/> Other |                                                            |              |                                                              |
| April, 2028                 | <input type="checkbox"/> Documentation<br><input type="checkbox"/> Track implementation<br><input type="checkbox"/> Assess effectiveness<br><input type="checkbox"/> Other |                                                            |              |                                                              |
| April, 2029                 | <input type="checkbox"/> Documentation<br><input type="checkbox"/> Track implementation<br><input type="checkbox"/> Assess effectiveness<br><input type="checkbox"/> Other |                                                            |              |                                                              |

**Table B: Project Implementation Checklist** (Action Status: C-Completed, X – Delete, D – Deferred)

| Project ID | Hazard                                                   | Mitigation Actions                                                                                                                                                                       | Potential Funding Source | Responsible Party | Time Frame<br>S: 1 yr,<br>M: 2-3 yr,<br>L: 4-5 yr | Status April 2026 | Status April 2027 | Status April 2028 | Status April 2029 |
|------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|---------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| ET 1       | <b>Extreme Cold and/or Heat</b>                          | Educate the general public and vulnerable populations on the steps to mitigate extreme heat, including establishing and promoting accessible warming & cooling centers in the community. | Staff Time               | EMD               | S                                                 |                   |                   |                   |                   |
| H/TC 1     | <b>Hurricane (Tropical &amp; Post-Tropical Cyclones)</b> | Install a repeater on the Fire Station to enhance police and fire radio communications.                                                                                                  | Funded.                  | EMD               | S                                                 |                   |                   |                   |                   |
| L 2        | <b>Lightning</b>                                         | Educate the public on the hazards of and the steps to reduce the impact of lightning strikes to humans and structures.                                                                   | Staff Time               | EMD               | S                                                 |                   |                   |                   |                   |
| WFF 3      | <b>Wild/Forest Fire Wildfire</b>                         | Provide wildfire education resources so that homeowners can take steps to protect these structures.                                                                                      | Town Budget              | Fire Chief        | S                                                 |                   |                   |                   |                   |
| DF 1       | <b>Dam Failure</b>                                       | Include the Highland Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                        | Staff Time               | EMD               | M                                                 |                   |                   |                   |                   |
| DF 4       | <b>Dam Failure</b>                                       | Include the Bradley Lake Emergency Action Plan (EAP) to the EOP and test the EAPs every 2 years.                                                                                         | Staff Time               | EMD               | M                                                 |                   |                   |                   |                   |
| FE 5       | <b>Flooding or Erosion</b>                               | Continue to ensure town regulations meet the National Flood Insurance Program (NFIP) standards                                                                                           | Staff Time               | PB, BI, EMD       | M                                                 |                   |                   |                   |                   |

| Project ID | Hazard                       | Mitigation Actions                                                                                                                                                                                                      | Potential Funding Source | Responsible Party | Time Frame<br>S: 1 yr,<br>M: 2-3 yr,<br>L: 4-5 yr | Status April 2026 | Status April 2027 | Status April 2028 | Status April 2029 |
|------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|---------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| EQ 1       | Earthquake                   | AVD is currently undertaking an Asset Management Planning exercise with support from NH-DES. Part of this activity is mapping water supply infrastructure and developing plans for maintenance and upgrading over time. | Town Budget              | AVD               | M                                                 |                   |                   |                   |                   |
| D 2*       | Drought                      | Develop Resource Protection Plan (RPP) that identifies potential pollution sources and remedies for Bradley Lake Drinking Water Supply (i.e. land acquisition, regulations, point source identification, etc.)          | Staff Time / OPD         | AVD               | M                                                 |                   |                   |                   |                   |
| D 1        | Drought                      | Develop a system to meter, monitor and reimburse AVD for water distributed to drought-stricken residents.                                                                                                               | Staff Time               | BoS, AVD          | M                                                 |                   |                   |                   |                   |
| SWW 1      | Severe Winter Weather        | Identify source of funding for replacement of FEMA supplied back-up generator -critical for water treatment operation during winter months (mandatory space heating requirement).                                       | AVD, Town Budget, grant  | AVD & BoS         | M                                                 |                   |                   |                   |                   |
| WFF 1*     | Wild/Forest Fire<br>Wildfire | Develop Source Water Protection Plan (SWPP) that identifies potential negative impacts from wild/forest fires in the Bradley Lake watershed and possible remedies for Bradley Lake Drinking Water Supply.               | Staff Time / OPD         | AVD               | M                                                 |                   |                   |                   |                   |
| FE 1       | Flooding<br>or Erosion       | Inventory culverts, including the age and condition, using GPS and associated hardware & software. Culvert & Closed Drainage System (CCDS) inventory and assessment                                                     | Town Budget              | RA                | L                                                 |                   |                   |                   |                   |
| FE 3       | Flooding<br>or Erosion       | Work with NHDOT to upgrade the bridge along US 4 (state) near Plains and Fernvale Roads.                                                                                                                                | NHDOT & Staff Time       | RA                | L                                                 |                   |                   |                   |                   |

| Project ID | Hazard                                                                   | Mitigation Actions                                                                                            | Potential Funding Source | Responsible Party | Time Frame<br>S: 1 yr,<br>M: 2-3 yr,<br>L: 4-5 yr | Status April 2026 | Status April 2027 | Status April 2028 | Status April 2029 |
|------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|---------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| FE 4       | <b>Flooding<br/>or Erosion</b>                                           | Replace and upgrade multiple culverts on Valley Road, Bridge, Currier, and Switch Streets.                    | Town Budget              | RA                | L                                                 |                   |                   |                   |                   |
| SW 1       | <b>Severe Wind<br/>(Tornado<br/>/Downburst)<br/>High Wind<br/>Events</b> | Eliminate tree hazards over public roads as needed.                                                           | Town Budget              | RA                | L                                                 |                   |                   |                   |                   |
| WFF 2      | <b>Wild/Forest<br/>Fire<br/>Wildfire</b>                                 | Continue to increase funds in the Wildfire Reserve Fund.                                                      | Town Budget              | Fire Chief        | L                                                 |                   |                   |                   |                   |
| SWW 2      | <b>Severe<br/>Winter<br/>Weather</b>                                     | Begin discussions regarding electrical "islanding" to have self-sufficiency in the event of a natural hazard. | Staff Time               | AVD & BoS         | L                                                 |                   |                   |                   |                   |