

Town of Tuftonboro, New Hampshire Hazard Mitigation Plan Update 2022

Prepared by the:

Tuftonboro Hazard Mitigation Update Committee



July 2022

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Town of Tuftonboro, New Hampshire Hazard Mitigation Plan Update

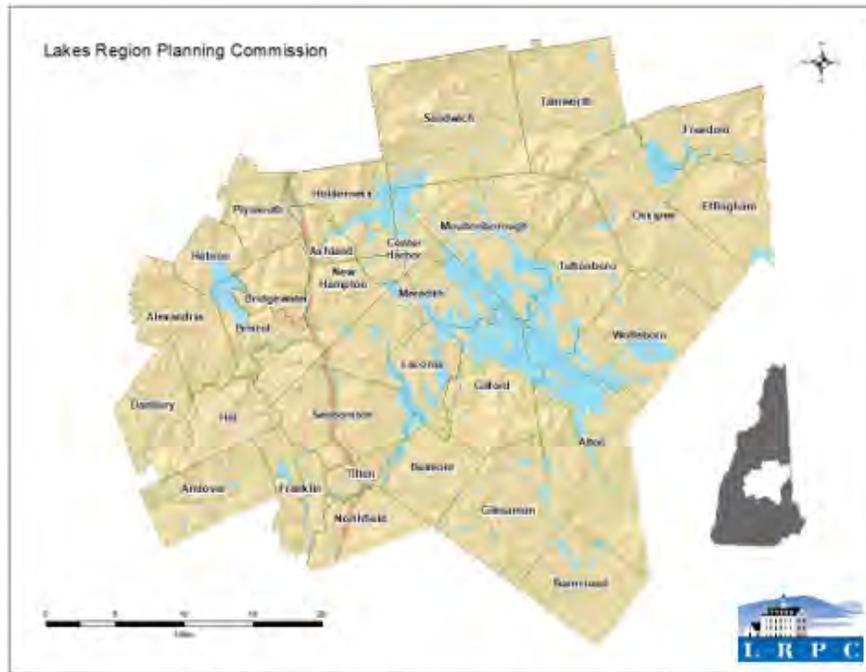
July 19, 2022

With Assistance from:
Lakes Region Planning Commission
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June 2022

Funding for this plan was provided by the NH Department of Safety, Homeland Security and Emergency Management, and with matching funds provided by the Lakes Region Planning Commission.



Lakes Region Planning Commission

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David Jeffers <i>Regional Planner</i>	Tracey Secula <i>Grants Administrator</i>		



FEMA

July 19, 2022

John Marcel, State Hazard Mitigation Planner
New Hampshire Department of Safety, Homeland Security and Emergency Management
33 Hazen Drive
Concord, New Hampshire 03303

Dear John Marcel:

As outlined in the FEMA-State Agreement for FEMA-DR-4457, your office has been delegated the authority to review and approve local mitigation plans under the Program Administration by States Pilot Program. Our Agency has been notified that your office completed its review of the Town of Tuftonboro, New Hampshire Hazard Mitigation Plan Update 2022 and approved it effective **July 19, 2022** through **July 18, 2027** in accordance with the planning requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the National Flood Insurance Act of 1968, as amended, and Title 44 Code of Federal Regulations (CFR) Part 201.

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

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

Thank you for your continued commitment and dedication to risk reduction demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please contact Jay Neiderbach at (617) 832-4926 or Josiah.Neiderbach@fema.dhs.gov.

Sincerely,

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PAUL F FORD

Paul F. Ford
Deputy Regional Administrator
DHS, FEMA Region I

PFF:jn

cc: Vanesa Urango, Chief of Mitigation and Planning Section, New Hampshire
Brian Eaton, Assistant Chief of Mitigation, New Hampshire

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EXECUTIVE SUMMARY

The *Tuftonboro Hazard Mitigation Plan Update* (the Plan) serves to reduce future losses from natural hazard events before they occur. The Plan was developed by the Tuftonboro 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 Chapter V.

The Committee agreed that some of the natural hazards identified in the 2015 Plan continue today; but the Committee's evaluation of possibility of future events, extent and impact of potential hazards resulted in a different assessment than 2015. The matrix below shows the natural hazards considered to be high or moderate risks.

Hazard Event	Overall Risk	Hazard Event	Overall Risk
Severe Winter Weather	High	Drought	Moderate
Infectious Diseases	High	Wildfires	Moderate
Lightning	High	Tropical & Post Tropical Cyclone	Moderate
High Wind Events	High	Extreme Temperatures	Moderate
Inland Flooding	High		

The Committee identified numerous programs related to hazard mitigation including the Town Master Plan, Zoning Ordinance, Site Plan and Subdivision Regulations, and Emergency Operations Plans.

Two of the Actions from the 2015 Plan are no longer pertinent and four Actions have been completed. Three Actions were partially completed and partially deferred. Eight Actions were deferred. In its effort to further reduce the vulnerability of the town to future hazards, the committee developed a list of two All Hazard actions and 17 hazard-specific mitigation actions. These actions were prioritized based on local criteria, reviewing both the benefits and the costs of such actions, and implementation suggested over the next five years. Some actions will be easy to implement, others will likely be more difficult to implement. The results of these considerations are summarized in the Implementation Schedule for Mitigation Actions in Chapter IV.

CHAPTER I: PLANNING PROCESS

A. BACKGROUND

In order 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 or human hazard events, FEMA has required that all communities 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 communities with plan development and update. Plan development utilized a process adapted from FEMA's *Local Mitigation Planning Handbook, (2013)*.

B. AUTHORITY

The town of Tuftonboro 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

The New Hampshire Department of Safety's Homeland Security and Emergency Management (NH HSEM) funded the Plan with matching funds from the Lakes Region Planning Commission.

D. PURPOSE

The Tuftonboro Hazard Mitigation Plan is a planning tool to be used by the town of Tuftonboro, as well as other local, state, and federal government entities, in their efforts to reduce the negative effects from natural and human-related hazards. The Plan contains statements of policy as outlined in the Implementation Schedule for Mitigation Actions and in Chapter V: 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.

E. SCOPE OF PLAN

The scope of this Plan includes the identification of natural hazards affecting the town of Tuftonboro, as identified by the Committee. Because there are also some human-caused and technological hazards that could impact Tuftonboro, they have also been incorporated in this plan.

F. METHODOLOGY

The Lakes Region Planning Commission (LRPC) corresponded with the Tuftonboro Emergency Management Director (EMD) in 2021 to initiate the hazard mitigation update process. The EMD established the Tuftonboro Hazard Mitigation Planning Update Committee in 2021 for the purpose of updating a long-range plan for hazard mitigation. The Committee consisted of representatives from the departments of Police, Fire, and Highway, and Emergency Management Director, a Selectman, the

code enforcement office, the planning board, and a representative of the school district. Public input was solicited through the update process via press releases and website postings. A member of the public attended one committee meeting. All meetings were open to the public.

Using the *Guide to Hazard Mitigation Planning for New Hampshire Communities*, the Committee developed the content of the Plan by following the process set forth in the handbook, and by referring to FEMA's *Local Multi-Hazard Mitigation Planning Guidance*. The planner and the committee reviewed and referenced a variety of plans, studies, reports, and technical information during the development of this Plan Update; a list of these resources can be found in Appendix I. Data on property valuation was gathered from the Tuftonboro MS-1 Report to the NH Department of Revenue Administration.

The Committee held meetings in April, May, and June in 2021. The following timeline shows the dates and corresponding Committee actions. The planning team reviewed various parts of the plan, and LRPC provided updated information on hazards in New Hampshire. Each section of the existing plan was revised and, in some cases, reformatted in order to develop a more comprehensive document.

Committee Meetings

- April 27, 2021:** *Introductory Committee Meeting:*
Tuftonboro Public Safety Building and Fire Station
 Overview of update process and objectives
 Discussion of Development Trends
 Identify Hazard Events since 2014
 Establishing next steps in the process
- May 18, 2021:** *Committee meeting:*
Tuftonboro Public Safety Building and Fire Station
 Review of Hazards and Critical Facilities
 Development Trends
 Risk Assessment
 Status of 2015 Hazard Mitigation Actions
- June 29, 2021:** *Committee meeting:*
Tuftonboro Public Safety Building and Fire Station
 Review Community Capabilities
 Review of Hazard Mitigation Goals
 Development and Prioritization of Hazard Mitigation Actions
- Winter/Spring, 2022:** *Development of Plan Update*

Public Involvement

The Tuftonboro EMD invited a variety of Hazard Mitigation Planning stakeholders to join the Hazard Mitigation Planning Committee and provide input. The Committee was represented by municipal officials, including a member of the Board of Selectmen. A school district representative and members of the public were encouraged to attend meetings through press releases and postings around town. One resident attended all three in-person meetings

Neighboring towns were also notified of the plan update and were invited to provide comments, offering an opportunity for area businesses, organizations, agencies, educational and health institutions comment on the plan update.

G. ACKNOWLEDGMENTS

Special thanks to those that assisted in the development of this Plan:

Adam Thompson	Tuftonboro EMD
Rhonda Thompson	Tuftonboro Fire Department Administrative Assistant
Caleb Pike	Tuftonboro Fire Captain
Guy Pike	Tuftonboro Board of Selectman
Andrew Shagoury	Tuftonboro Police Chief
Jack Parsons	Tuftonboro Code Enforcement Officer and Health Officer
Matt Young	Tuftonboro Planning Board
David Cash	Tuftonboro School representative
Doug Barker	Tuftonboro resident
Jim Bean	Road Agent

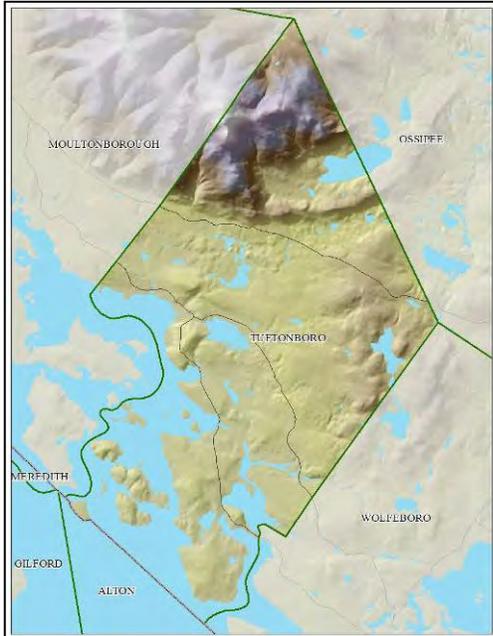
Susan Slack	Principal Planner, Lakes Region Planning Commission
Courtney Jordan	NH Homeland Security and Emergency Management, <i>Carroll County Representative</i>

Additional information was provided by:

Jennifer Gilbert	Floodplain Management Coordinator, NH Office of Planning and Development
Samara Ebinger	CFM Principal Planner, NH Office of Strategic Initiatives

CHAPTER II: COMMUNITY PROFILE

A. GEOGRAPHY



The town of Tuftonboro is located in the southwestern section of Carroll County. It is bordered by Wolfeboro to the southeast, Ossipee to the northeast, and Moultonborough to the northwest. The southwestern edge of town is formed by the shoreline of Lake Winnepesaukee, including half a dozen seasonally inhabited islands.

Tuftonboro's northern section is dominated by the Ossipee Mountains with elevations reaching 3,000 feet. A quarter of the land in Tuftonboro has slopes greater than 15%.

The town of Tuftonboro contains 40.6 square miles (82%) of land area and 8.8 square miles (18%) of inland water area. Lake Winnepesaukee is the most prominent surface water feature; others include Mirror Lake, Lower Beech Pond, Dan Hole Pond, Copp's Pond, and the Melvin River.

B. WEATHER CONDITIONS

Like many New England towns, Tuftonboro's temperatures and precipitation vary a great deal. January temperatures range from an average high of 30 degrees Fahrenheit to an average low of 8 degrees Fahrenheit. July temperatures range from an average high of 81 degrees Fahrenheit to an average low of 58 degrees Fahrenheit. The amount of precipitation is slightly lower in the winter months when compared to summer months. Tuftonboro averages about 65 inches of snow per year.¹

C. INFRASTRUCTURE AND SERVICES

A three-member Board of Selectmen governs the town of Tuftonboro. The Police Department consists of a full-time Police Chief and four officers. The town has a fulltime Fire Chief, a fulltime Fire Captain, and approximately 29 on-call firefighters and EMTs. The Fire Chief is also the Emergency Management Director. The Road Agent maintains 48 miles of road.

NH Routes 109, 109-A, and 171 run generally north-south from Tuftonboro to Moultonborough in the north, Wolfeboro in the south, and Ossipee in the southeast. Most town facilities are located along NH Route 109A. Huggins Hospital is located in Wolfeboro, 12 miles south of town. Additional hospitals are located in North Conway (33 miles) and Laconia (39 miles).

D. POPULATION, LAND USE, AND DEVELOPMENT TRENDS

According to the US Census, Tuftonboro's population increased by 3.35% between 2010 and 2020. In the 50 years since 1970, the town's population has doubled; however, most of that growth occurred prior to 1990. While this may appear to be a fast rate of change, in that same 40 years the population of many other small communities in Carroll County tripled in size.

Tuftonboro, NH Year-Round Population²

<i>Source</i>	<i>Census</i>				
Year	1980	1990	2000	2010	2020
Population	1500	1842	2148	2387	2467
% Changed	---	23%	17%	11%	3.35%

Like much of Carroll County, the average age of Tuftonboro's population continues to increase, with those in town tending to be slightly older than those in the rest of the county. This aging demographic can have implications in terms of the needs of the community and the resources available to the community. According to the 2020 US Census, Carroll County ranks first out of New Hampshire's 10 counties for percent of the population aged 18 and over (85% of the total population). That's an increase of 9.4% for that age category over 2010.

The 2020 Census reported that there were 2,514 housing units in Tuftonboro in 2019, an increase of 80 housing units since 2010. Because of the very seasonal nature of housing in Tuftonboro, it is important to acknowledge that the actual number of people residing in town can fluctuate quite a bit. According to the Committee none of the recent development has been in particularly vulnerable locations.

² Source: NH Office of Planning and Development Data Center, <https://www.nh.gov/osi/data-center/index.htm>

CHAPTER III: RISK ASSESSMENT

A. INVENTORY ASSETS

The list of critical infrastructures for the town of Tuftonboro was updated. The critical infrastructure list has five facility classifications, 1) Essential Services; 2) Emergency Shelter; 3) Structures and Services; 4) Populations to Protect, and 5) Other. The first category contains facilities essential in a hazard event, including the Emergency Operation Center. The second contains the emergency shelters. The third category is a list of facilities that have been identified by the Committee as facilities to protect in order to minimize additional risk from hazards. The fourth category contains special populations that may require additional attention in the event of a disaster and the final category includes town recreation areas and some of the town's historic resources. In some cases a facility may fall into multiple classifications because, as in many small communities, it serves multiple functions.

Tuftonboro: Critical Facilities & Values

NAME	ADDRESS	Owner	Structural Value	Notes
Essential Services				
Town Office and Police Station	240 Middle Road	Municipality	\$436,600	Town Office, Secondary EOC
Central Fire Station	189 Middle Road	Municipality	\$1,318,900	Primary EOC
Mirror Lake Fire Station	11 Tuftonboro Neck Road	Municipality	\$38,100	Vehicle storage
Melvin Village Fire Station	451 Gov. Wentworth Hghwy	Municipality	\$56,000	Vehicle storage
Tuftonboro Elementary School	205 Middle Road	GWRSD	\$1,638,100	Primary Shelter
Town Highway Garage	69 Sodom Road	Municipality	\$26,400	
Transfer Sration	20 Sargent's Crossing	Municipality	\$148,500	
State Highway Garage	328 Middle Road	NH DOT	\$176,700	
Structures and Services				
Town House	247 Middle Road	Municipality	\$197,100	Secondary Shelter
NH Electric Co-Op Substation	71 Ledge Hill Road	NHECoOp	\$9,804,400	
PSNH Transformer site	Mountain Road	PSNH	\$2,754,100	
Tuftonboro Free Library	221 Middle Road	Municipality	\$367,300	
Potential Emergency Shelters				
Camp Northwoods	144 Gov. Wentworth Hghwy	Boston YMCA	\$2,396,900	
Camp Merrow Vista	147 Canaan Road	American Youth Foundation	\$3,415,400	
Camp Belknap	172 Gov. Wentworth Hghwy	YMCA	\$371,500	
Camp Sentinel	26 Sentinel Lodge Road	NH Youth	\$892,500	
William Lawrence Camp	139 Federal Corners Road	William Lawrence Camp	\$935,700	
Sandy Island	Lake Winnepesaukee	Boston YMCA	\$1,986,400	
Apple Gate Garden	141 Mountain Road	Private	\$272,900	
Other				
Historical Society	449 Gov. Wentworth Hghwy	Historic Society	\$189,800	Historic
Union Wharf	19 Mile Bay	Municipality	\$19,100	Recreation Area - Boat dock
Melvin Wharf	Melvin Wharf Road	Municipality	\$7,400	Recreation Area - Boat dock

Town Beach	19 Mile Bay	Municipality	\$1,104,800	Recreation Area - Structure & land
Lake Road Pier	Lake Road	Municipality	\$554,400	Recreation Area - Land
Davis Field	205 Middle Road	Municipality	\$137,400	Recreation Area - Land
Lang Pond Beach (Mirror Lake)	Lang Pond Road	Municipality	\$40,900	Recreation Area - Land

B. IDENTIFYING HAZARDS

The town of Tuftonboro is prone to a variety of natural hazards. The Committee reviewed the hazards identified in the 2015 Plan. In that plan Severe Wind was the only high-risk natural hazard identified. Moderate risk natural hazards included Lightning, Severe Winter Weather, and Flooding. The committee supplemented the review of natural hazards by also discussing the technological and human-caused hazards identified in the *State of New Hampshire Multi-Hazard Mitigation Plan (2018)*, developed by the New Hampshire Department of Safety's Division of Homeland Security and Emergency Management. In the latest version of the *State of New Hampshire Multi-Hazard Mitigation Plan (2018)*, some hazards were grouped together, some names were refined, a couple hazards were added, and a couple were dropped from the state-wide list. Tornado, downburst, and thunderstorm have been grouped as "High Wind Event". Hurricane is now referred to as "Tropical & Post-Tropical Cyclone".

The Committee also reviewed historical information from state-wide databases and internet sources about past hazard events in and near Tuftonboro since 2015. Through this review of state-wide hazards, past regional and local events, and with discussion, the committee identified the hazards listed in in the table below as the most important hazards to the town of Tuftonboro. Landslide, avalanche, solar storms and space weather are listed as part of the statewide profile; however, the committee did not consider these as significant hazards for Tuftonboro. Landslide and avalanche are not likely due to topography and no records were found of these occurring in town.

Natural Hazards of Concern: Tuftonboro, NH

2021 Tuftonboro Natural Hazard Ranking			
HAZARD	TOTAL	RANK	RISK
Severe Winter Weather	32.00	1	HIGH
Infectious Diseases	28.00	2	HIGH
Lightning	28.00	3	HIGH
High Wind Events	24.00	4	HIGH
Inland Flooding	24.00	5	HIGH
Drought	8	6	MEDIUM
Wildfires	8	7	MEDIUM
Tropical & Post Tropical Cyclones	6.67	8	MEDIUM
Extreme Temperatures	5.33	9	MEDIUM
Earthquakes	2	10	LOW
Avalanches	1	11	LOW
Landslides	1	12	LOW
Solar Storms & Space Weather	1	13	LOW

Additionally, the Committee reviewed technological hazards and human-caused hazards because several of these are important to the town. Long-term utility outage, cyber event, mass casualty incident, and transportation accident were considered high risk hazards in Tuftonboro.

C. PROFILING HAZARD EVENTS

Each of the hazards that the Committee identified as likely affecting Tuftonboro is profiled below. This section of the plan **defines** each of the hazards the Committee felt might impact Tuftonboro. 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 Tuftonboro. These are listed in order of overall risk, as determined by the Committee. This Plan focuses on those events that pose at least a moderate risk to the town of Tuftonboro as determined by the Committee.

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

- *Magnitude* is 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 is usually around for days.

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

If a hazard event has occurred in the past that is listed under **history**, with a focus on those occurring since the last plan. If some parts of the community 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**.

Probability is a description of how likely it is that an event will occur in Tuftonboro within the next 25 years. The committee rated potential hazards on a four-point scale descriptive scale including unlikely, occasional, likely, to highly likely. These were based mainly on past occurrences in the town, region, and state.

The **impact** of a hazard is the potential degree of damage that could occur in Tuftonboro. To rate the impact of a hazard, committee members considered the damages and consequences that might result from an event, 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 below:

- Low: Limited structural damage, the town’s ability to respond is not compromised, 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 county 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 be likely be interrupted for days or weeks

Natural Hazards

Tuftonboro Hazards - 2021	Probability	Extent	Human Impact	Property Impact	Business Impact	Average Impact	Risk
Definition	Likelihood this will occur w/in 100 yrs	(Magnitude/Strength)	Probability of Death or Injury	Physical Loss or damage	Interruption of Service	Average of Human, Property, Business	Probability x Extent x Avg. Impact
Scale	1: Unlikely 2: Occasional 3: Likely 4: Highly Likely	1: Weak 2: Moderate 3: Severe 4: Extreme	1: Low 2: Moderate 3: High 4: Catastrophic	Low Medium High			
Avalanches	1	1	1	1	1	1.00	1.00
Drought	3	2	1	1	2	1.33	8.00
Earthquakes	2	1	1	1	1	1.00	2.00
Extreme Temperatures	2	2	2	1	1	1.33	5.33
High Wind Events (Torn./Downb.)	4	3	1	2	3	2.00	24.00
Infectious Diseases	4	3	3	1	3	2.33	28.00
Inland Flooding	4	3	1	3	2	2.00	24.00
Landslides	1	1	1	1	1	1.00	1.00
Lightning	4	3	2	3	2	2.33	28.00
Severe Winter Weather	4	3	2	3	3	2.67	32.00
Solar Storms & Space Weather	1	1	1	1	1	1.00	1.00
Tropical & Post-Tropical Cyclones	2	2	1	2	2	1.67	6.67
Wildfires	3	2	1	2	1	1.33	8.00

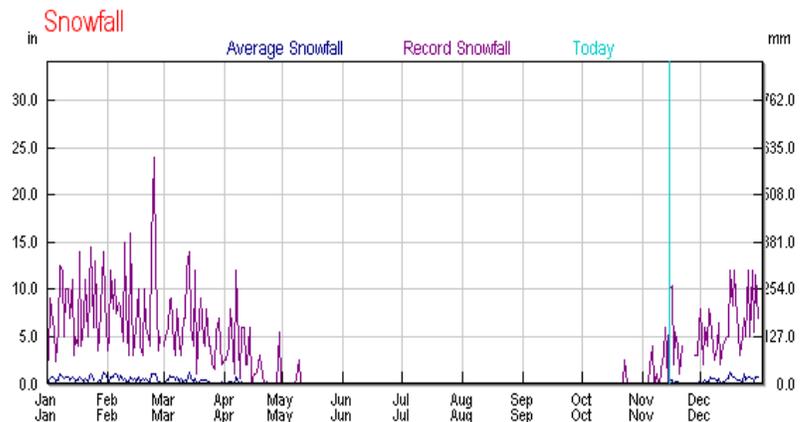
SEVERE WINTER WEATHER (SNOWSTORMS, ICE STORMS)

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

Extent: Severe

A heavy snowstorm can be defined as one which deposits four or more inches of snow in a twelve-hour period.³ Snowstorms are a common occurrence throughout the Lakes Region. Blizzards, which may dump 12" – 36" 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" of snow annually.⁴

Records indicate that Tuftonboro's average snowfall on any day from November through April is less than one inch. These records also show that most days from late December through February snowfalls of 10 inches or more have been seen and that during the month of February daily snowfalls of more than 15" have occurred several times since 1948.⁵



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 – 90 year return period for an event with a uniform ice thickness of between 0.75 and 1.25 inches. In 2008, just ten years later, however, New Hampshire was struck again by another severe ice storm.

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 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 twelve hours to three days, while the duration of hurricanes ranges from six to twelve 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

³ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html>,

⁴ *Northeast States Emergency Consortium*, <http://www.nesec.org/>,

⁵ Weather Underground, Seasonal Weather Averages,

<http://www.wunderground.com/NORMS/DisplayNORMS.asp?AirportCode=KLCI&SafeCityName=KLCI&StateCode=NH&Units=none>,

hour or greater and considerable amounts of falling or blowing snow that last for a duration of three hours or longer. The combination of winds and snow reduce visibility to less than a quarter mile.⁶

History of Severe Winter Weather Events

Hazard	Date	Location	EXTENT	IMPACT
			Magnitude	Description
Heavy Snow	1/2/2014	County Wide	6 to 14 inches	
Heavy Snow	2/5/2014	County Wide	6 to 12 inches	
Heavy Snow	2/13/2014	County Wide	6 to 14 inches	
Heavy Snow	2/18/2014	County Wide	6 to 14 inches	
Heavy Snow	3/19/2014	County Wide	6 to 18 inches	
Winter Storm	11/27/2014	State Wide	4 to 15 inches (10 to 15 in Belknap County)	
Heavy Snow	1/26/2015	County Wide	6 to 14 inches	
Heavy Snow	2/2/2015	County Wide	8 to 14 inches	
Heavy Snow	2/7/2015	County Wide	6 to 15 inches	
Heavy Snow	2/14/2015	County Wide	6 to 12 inches	
Heavy Snow	2/5/2016	County Wide	4 to 10 inches	
Heavy Snow	12/11/2016	County Wide	4 to 8 inches	
Heavy Snow	12/17/2016	County Wide	4 to 7 inches	
Heavy Snow	12/29/2016	County Wide	6 to 16 inches	
Heavy Snow	2/9/2017	County Wide	6 to 15 inches	
Heavy Snow	2/12/2017	County Wide	6 to 16 inches	
Heavy Snow	2/15/2017	County Wide	4 to 12 inches	
Heavy Snow	3/14/2017	County Wide	12 to 20 inches	Laconia officially observed at least three hours of blizzard conditions. (DR-4316)
Heavy Snow	3/31/2017	County Wide	6 to 12 inches	
Heavy Snow	4/1/2017	County Wide	6 to 12 inches	
Heavy Snow	12/22/2017	County Wide	3 to 10 inches	
Heavy Snow	1/4/2018	County Wide	10 to 15 inches	
Heavy Snow	2/7/2018	County Wide	6 to 10 inches	
Heavy Snow	2/17/2018	County Wide	2 to 9 inches	
Heavy Snow	3/7/2018	County Wide	10 to 18 inches	
Heavy Snow	3/13/2018	County Wide	12 to 24 inches	
Heavy Snow	11/20/2018	County Wide	6 to 10 inches	
Heavy Snow	1/19/2019	County Wide	6 to 10 inches	
Heavy Snow	1/29/2019	County Wide	5 to 7 inches	
Heavy Snow	12/1/2019	State Wide	5 to 12 inches	
Winter Storm	12/29/2019	State Wide	6 to 10 inches	
Heavy Snow	1/16/20	County Wide	5 to 7 inches	Heavy wet snow
Winter Storm	3/23/20	State Wide	5 to 7 inches	
Winter Weather	5/9/2020	County Wide	1 to 3 inches	Wet snow

⁶ “Winter storm terms,” http://www.fema.gov/hazard/winter/wi_terms.shtml,

The storm on March 14, 2017 hit Tuftonboro particularly hard. The Fire Department responded to numerous trees and wires down all over town.

Location: Severe winter weather occurs frequently in the northeast and the possibility exists for residents to have to withstand several days without power. It is felt that no one area of the town is at greater risk than another, but there are segments of the population that are more at risk. These include the elderly, people that are in need of 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: Highly Likely

Impact: Moderate

A couple of scales have been adopted recently 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)⁷ applies specifically to the northeastern United States. It groups high-impact snowstorms into five categories.

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

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 snows can cause damage to property, disrupt services, and make for unsafe travel, 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.

⁷ <https://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

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.

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 damages. The President declared this storm as a major disaster and the state received \$15 million in federal aid for recovery.⁸

Many of the roads in Tuftonboro are state roads, including most of the town's evacuation routes; maintenance of them falls to NH DOT. The town has a significant amount of roadway to maintain. The precipitation from some storms, especially multi-day nor'easters, can outpace the capacity of the equipment/staff of this crew. Town facilities are not particularly at risk to Severe Winter Weather. The potential for **impact** to the town is moderate.

All structures in Tuftonboro are susceptible to damage by winter weather events, whether through ice storms, blizzards, or the heavy, wet snow often associated with a nor'easter. Assuming 1% to 2% town-wide damage to buildings, winter weather could result in \$1,654,989 to \$3,309,979 in damages in any given year.

INFECTIOUS DISEASE

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: Severe

Experience with the Covid-19 pandemic dramatically changed how members of the Committee viewed the risk of infectious diseases as compared to the 2015 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 disease occurrence:⁹

⁸ <http://www.fema.gov/news/newsrelease.fema?id=48384>, visited January 25, 2011

⁹ <https://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section11.html>

- 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 in February 2007, so that communities can be prepared and respond to outbreaks.¹⁰ The school district has an up to date Emergency Operations Plan with policies for addressing epidemics.

History: 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. The 2012-13 flu season was much more severe in New Hampshire than any of the previous decade; 35 deaths occurred statewide, the most since 1997.¹¹ In 2016, the DHHS was notified and responded to a total of 102 outbreaks: 73 gastrointestinal illnesses (5 of which were foodborne), 23 respiratory illnesses, and 6 other types of illness. The Covid-19 pandemic began to impact the United States and New Hampshire in 2020, which delayed group meetings to update this plan.

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
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% ¹²
2020-21	COVID-19 or Coronavirus pandemic	Hospitals, schools, municipalities, & businesses have taken extra precautions, cancelled many events, and adjusted policies	Worldwide	Respiratory disease >69,000 cases in NH, with >1,116 deaths (Feb. 2021) 60 cases locally
Annually	Foodborne outbreaks	Ill individuals associated with outbreaks	Statewide	5-10 outbreaks per year

¹⁰ <http://www.dhhs.nh.gov/dphs/cdcs/avian/documents/pandemic-plan.pdf>

¹¹ NH Department of Health and Human Services <http://www.dhhs.nh.gov/media/pr/2013/01-jan/01112013flu.htm>

¹² CDC <https://www.cdc.gov/mmwr/volumes/67/wr/mm6706a2.htm>

Date	Description	Impacts	Location	Additional Info
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 good places for transmission to occur.

Probability of Occurrence: Occasional.

Epidemics do occur in Tuftonboro and other Lakes Region communities from time to time.

Impact: High

The concerns associated with an infectious disease include local capacity to respond to not only the residents of Tuftonboro but also any visitors. The cost of infectious diseases in Tuftonboro is difficult to calculate as any cost would primarily result from health care response. As we have learned from the COVID-19 pandemic, there are additional human and economic costs due to the slow down/shut down of many businesses in town and the region.

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.¹³

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.¹⁴

¹³ <http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hmp-chapter-3.pdf> accessed September 16, 2013.

¹⁴ NWS Definitions webpage, <http://graphical.weather.gov/definitions/defineLAL.html>. Accessed June 3, 2014.

Lightning Activity Level (LAL)	
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 of Lightning Events

Hazard	Date	Location	Magnitude/Description	Damage	Source
Lightning	7/4/2012	<u>BELKNAP – WEIRS BEACH</u>	3 Injuries	Two Men and a Woman struck by lightning	NOAA
Lightning	6/24/2013	<u>BELKNAP – WEST ALTON</u>	30 Injuries	Full Boy Scout troop struck by lightning	NOAA
Lightning	5/15/2020	<u>Meredith</u>	0 injury/fatality \$20K property	House struck by lightning	NOAA

There have not been any known impacts from lightning in Tuftonboro since the last plan update.

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

Probability of Occurrence: Likely.

In the Lakes Region, fewer than two lightning strikes occur per square kilometer annually.¹⁵ While this value is not particularly high compared with other parts of the country, the frequency of storms with lightning is a significant local concern, especially during the summer months.

Impact: Moderate

Power outages, whether associated with natural or human-made hazards like lightning, high winds, inland flooding, severe winter weather, transportation accidents, aging infrastructure, or cyber event have the potential to cause disruption to residents and the functioning of the town. There is back-up power for the EOC/Fire Department, and the Highway Garage. The elderly and disabled who rely on powered medical devices are at risk.

All structures in Tuftonboro are susceptible to damage by lightning and resulting fires. The town’s computer and communication systems could also be impacted by lightning. Assuming 1% town-wide damage to buildings, lightning could result in \$1,654,989 in damages in any given year.

¹⁵ *Northeast States Emergency Consortium*, <http://www.nesec.org/>

HIGH WIND EVENT (THUNDERSTORM/TORNADO/DOWNBURST)

Tuftonboro 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.¹⁶ **Straight-line winds** describes any thunderstorm wind that is not associated with rotation and is usually used to differentiate from tornadic winds. There are several sub-types of straight-line winds, 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.¹⁷



Image source: NH HSEM

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.¹⁸

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

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

In Tuftonboro, 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. 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 just

¹⁶ <http://www.nssl.noaa.gov/education/svrwx101/tornadoes/>

¹⁷ <http://www.nssl.noaa.gov/education/svrwx101/wind/types>

¹⁸ *Weather Glossary*. National Oceanic and Atmospheric Administration, <http://www.weather.gov/glossary/index.php?letter=d>, visited August 6, 2019.

missing Tuftonboro by around 20 miles. Since 2014 there have been 13 different reported high wind events in or near Tuftonboro. One was a waterspout that touched down off the shores of Center Harbor on July 24, 2014 (See Appendix G for more details). The extent of high wind events in Tuftonboro is considered severe.

History of High Wind Events

Hazard	Date	Location	Magnitude	Description
High Wind	7/3/2014	BELKNAP – NEW HAMPTON	50 kts.	Thunderstorm Wind
Tornado	7/4/2014	BELKNAP - Gilford	EF0	Waterspout spotted on Lake Winnepesaukee – No damage
Tornado	7/24/2014	BELKNAP - CENTER HARBOR	EF0	Waterspout spotted on Lake Winnepesaukee – No damage
High Wind	7/28/2014	BELKNAP - LACONIA	50 kts.	Thunderstorm Wind
High Wind	10/08/2014	BELKNAP – MEREDITH	50 kts.	Thunderstorm Wind
High Wind	6/7/2016	BELKNAP – LACONIA AIRPORT	50 kts.	Thunderstorm Wind
High Wind	6/7/2016	BELKNAP – WEIRS BEACH	50 kts.	Thunderstorm Wind
High Wind	7/1/2016	BELKNAP – MEREDITH	50 kts.	Thunderstorm Wind
High Wind	7/23/2016	BELKNAP – LACONIA, SANBORNTON	50 kts.	Thunderstorm Wind
High Wind	10/30/2017	Belknap	61 kts.	50-60 mph winds/ 2 to 5 inches of rain
High Wind	8/3/2018	BELKNAP – Tilton, Belmont, Gilmanton	50-70 kts.	Thunderstorm Wind
High Wind	8/7/2018	BELKNAP – LACONIA AIRPORT, MEREDITH	50-60 kts.	Thunderstorm Wind
High Wind	6/6/2020	Sanbornton, Tilton, Laconia	50 kts.	Thunderstorm Wind, Downed trees led to home damages (\$105K)

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: Likely

Impact: High

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.



From Tropical Storm Irene - September 2011 (Tuftonboro)

Damage can occur to most structures in town as a result of downed trees in any high wind event, including the commonly occurring 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. The **potential impact** to the town due to high winds is high.

All structures in Tuftonboro are susceptible to damage by high wind events, whether through thunderstorms, downburst, or tornado. Assuming 2% to 5% town-wide damage to buildings, high winds could result in \$3,309,979 to \$8,274,946 in damages in Tuftonboro in any given year.

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 Tuftonboro does not have a major river that floods. The town does, however, have a number of streams that can flood quickly, impacting property.

Flooding is most commonly 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.

Tuftonboro participates in the National Flood Insurance Program (NFIP) through the administration of its floodplain ordinance by the Selectmen and Code Enforcement Officer. This includes correspondence with the NH Floodplain Coordinator regarding specific issues and periodically updating the town's floodplain ordinance. By actively participating in the NFIP property owners are able to purchase flood insurance through the FEMA program.

The town joined the program on June 15, 1976 through emergency entry, and regular entry occurred on May 4, 1989. The original Flood Insurance Rate Maps (FIRM) were published by FEMA on May 4, 1989; these were updated (adopted March 19, 2013) and are available in digital form (DFIRM) at <http://msc.fema.gov/portal>. The Flood Insurance Study (FIS) for Carroll County was also adopted by the town on March 19, 2013.

The town's Level C Floodplain Ordinance was last amended on March 19, 2013. The Code Enforcement Officer is responsible for maintaining floodproofing and elevation certificates. Information regarding floodplains, floodproofing, and flood insurance are provided with all building permit applications. The NH Floodplain Coordinator considers the town officials to be knowledgeable regarding floodplains and the town compliant with floodplain administration.

There are currently 16 structures with flood insurance policies in force through the NFIP with a total insurance value of \$4,780,000 (average of \$298,750 per structure). Five of the NFIP-insured structures are in "A" (High Risk) Zones, while 11 are in the B, C, or X (Low Risk) Zones. Since 1976 there have been zero losses paid out in Tuftonboro.¹⁹

¹⁹ NFIP State Coordinator, NH Office of Energy and Planning, July, 2013.

Over the past several decades, the Planning Board, Land Use staff, and Code Enforcement Officer have sought and received assistance from the NH Floodplain Manager, in the form of Community Assistance Calls and Visits and General Technical Assistance from the NH Floodplain Manager.

Several road segments are prone to flooding or washout. No critical facilities are susceptible to flooding.

Historically, the state's two largest floods occurred in 1936 and 1938. The 1936 flood was associated with snow melt and heavy precipitation. The 1938 flooding 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 '60s. They continue to be operated by the US Army Corps of Engineers.²⁰

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

Flooding in the Lakes Region is most commonly associated with structures and properties located within a floodplain. There are numerous rivers and streams within the region and significant changes in elevation, leading to some fast-moving water. The region also has a great deal of shoreline, making it exposed to rising water levels as well. Although historically, there have not been many instances of shoreline flooding, the potential always exists for a major flood event to occur.

Recent rain events have proven this is becoming an increasing concern as additional development is contributing to flood hazards. As areas are covered with impervious surfaces, less water is allowed to infiltrate, evaporate, or be transpired by vegetative growth and more of it runs off directly into surface drainages and water bodies. This increases the likelihood of flash floods and substantial overland flow. Of greatest concern are the waterfront properties on the lakes, ponds, and associated tributaries.

Culvert improvements and roadwork have been conducted throughout the region as a result of localized flooding events. Of particular concern in the region are areas of steep slopes and soils with limited capacity to accept rapid volumes of rainwater. Roads and culverts in close proximity to these conditions are most at risk of localized flooding.

Extent: Moderate

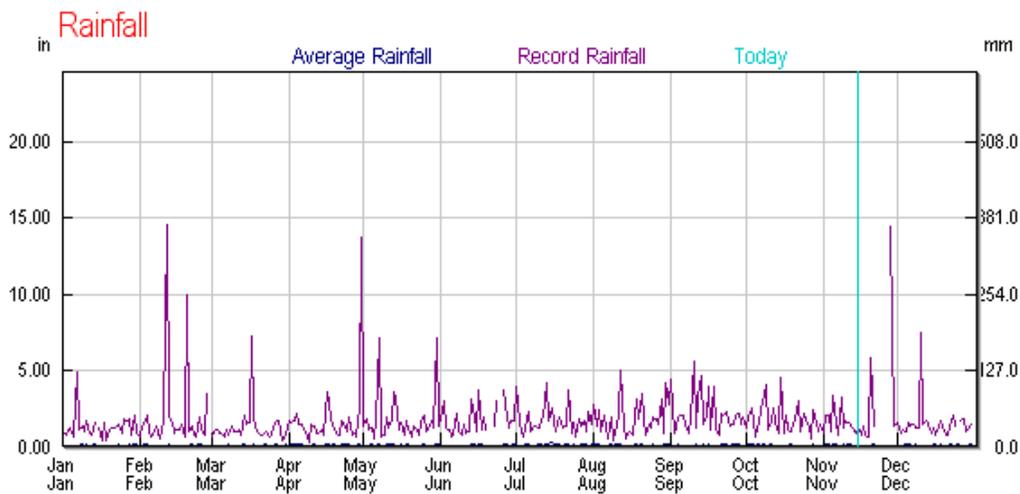
Tuftonboro has about 70 acres of identified floodplain. There aren't many areas that constitute floodplains, primarily due to the lack of major rivers. Tuftonboro's is one of eight towns with frontage on Lake Winnepesaukee and makes up about 10% of the Lake Winnepesaukee Watershed. There are no US Geological Survey (USGS) stream gauges in Tuftonboro or any of the waterbodies entering the town. The nearest gauge is in Tilton on the Winnepesaukee River, the outlet to Lake Winnepesaukee²¹

²⁰ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html> date visited: January 18, 2011

²¹ USGS <https://waterwatch.usgs.gov/?m=real&r=nh>.

Thunderstorms can pop up quickly, dropping sudden bursts of rainfall upon the landscape. Often the rain soaks into the soil but if it happens very quickly, the water will run off into streams. Where drainage is inadequate, this sort of flooding can be amplified because the water has nowhere to go and backs up or overflows. Rainfall from tropical depressions or hurricanes can overwhelm the drainage systems due to the duration of the event, saturating the soil over a period of several days. The graph below of WeatherUnderground.com records stretching back to 1948 show that while the rainfall in Tuftonboro averages less than half an inch per day, daily totals of five inches or more have been documented on nearly 20 separate dates and more than 10 inches of rain on three separate dates.

Average and Record Daily Rainfall near Tuftonboro, NH²² Table 8:



History of Flooding Events

			EXTENT	IMPACT		
Hazard	Date	Location	Magnitude/ Description	Damage	Notes	Source
Flash Flood	6/30/2013	<u>BELKNAP - LAKEPORT</u>	1 to 3 inches in less than three hours			NOAA
Flash Flood	6/19/2017	<u>BELKNAP – LACONIA & GILFORD</u>	2 to 3 inches in three hours	\$45 K		NOAA
Severe Storm & Flooding	10/29 – 11/1/2017	<u>Belknap, Carroll, Coos, Grafton, & Sullivan Co.</u>	Uprooted trees and heavy rains downed power lines leading to roughly 290K power outages		Presidentially Declared Disaster DR-4355	NH HSEM

There were no known instances of flooding with impact to Tuftonboro since the last plan update.

Location: Several town road segments see flooding in heavy rainstorms, mainly due to undersized culverts and the need for drainage system improvements.

²² Weather Underground, Seasonal Weather Averages, <http://www.wunderground.com/NORMS/DisplayNORMS.asp?AirportCode=KLCI&SafeCityName=KLCI&StateCode=NH&Units=none>,

Probability of Occurrence: Highly Likely

Brief thunderstorms occur frequently throughout the summer while a hurricane or tropical depression might occur once a year with several days of rain.

Impact: Moderate

Assuming a total of 1%-2% chance of damage to these bridges, flooding could result in \$24,270 - \$48,539 in damage to these bridges any given year. Damages to other structures might be as high as \$1,654,989 - \$3,309,979.

DROUGHT

Drought occurs when less than the normal amount of water is available for extended periods of time. It is 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 in a region that occurs slowly due to below-average precipitation over an extended period, resulting in low stream flows, low surface water, and low groundwater levels.²³ According to NOAA, the climatological community has defined four types of droughts to address their cause(s), timeframe, and effects²⁴:

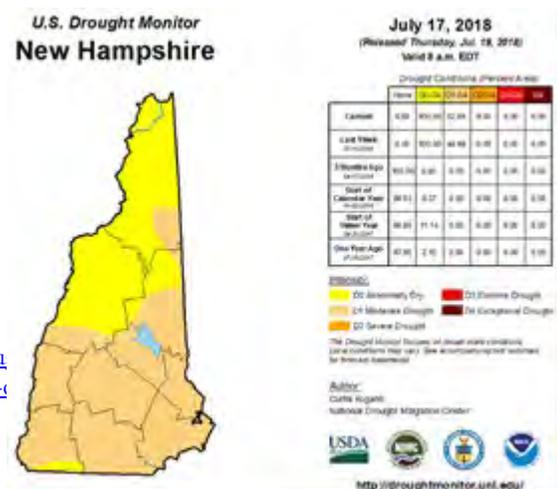
- **Meteorological Drought:** Occurs when dry weather patterns dominate an area, resulting in a lack of precipitation
- **Hydrological Drought:** Occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels—usually after many months of meteorological drought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

Extent: Weak

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

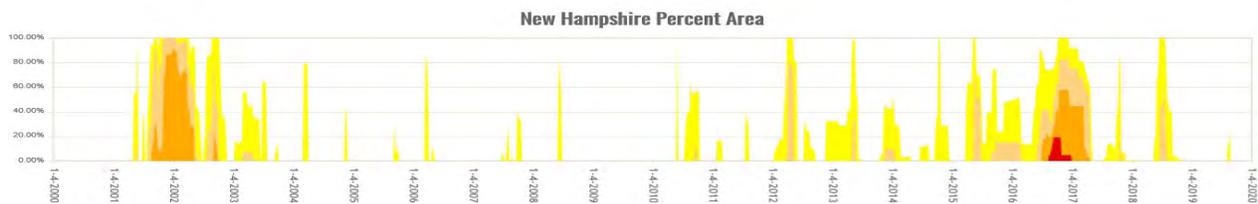


²³ <https://www.des.nh.gov/organization/divisions/water/dam/drou>

²⁴ <https://www.ncdc.noaa.gov/monitoring-references/dyk/drought->

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 Monitor²⁵ 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 – 1936, 1939 – 1944, 1947 – 1950, 1960 – 1969, and 2001 – 2002. While much of the country experienced drought conditions in 2012, New Hampshire received adequate precipitation.²⁶ Moderate drought conditions existed in New Hampshire during parts of 2015, 2016 and into April of 2017. In 2020 Belknap experienced a moderate drought.



Location: Being a state-wide or regional event, drought would affect most areas of the community. Those with shallow wells would likely be affected first.

Probability of Occurrence: Likely

Impact: Moderate

Those with shallow wells would be most affected. Due to limited reliance on agriculture in Tuftonboro, limited number of shallow wells, and capacity to supply emergency water, the impact of a drought on Tuftonboro would be minimal; there would be no direct impact to structures. It was noted that many boats had to be pulled out of the lakes early in 2020 due to lower water levels. This may have some impacts on the recreational economy.

Due to geography and topography, landslide and avalanche were not considered to be hazards likely to have any effect on Tuftonboro and were thus not considered in the plan. Earthquakes were also not considered as Committee members determined the very infrequent earthquakes were seen as weak in terms of extent and low in terms of impact.

WILDFIRE

A 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 the 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.²⁷

²⁶ US Drought Monitor <http://droughtmonitor.unl.edu/>. Accessed September 4, 2019.

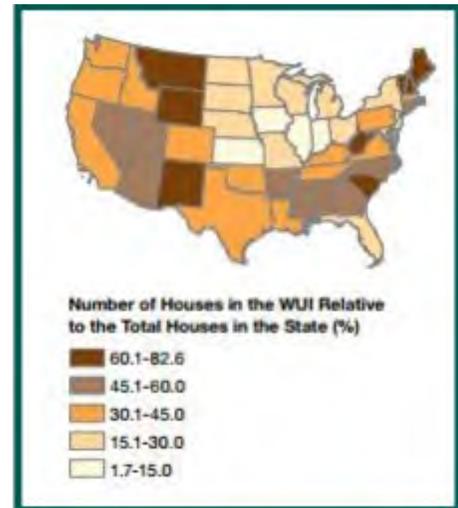
²⁷ https://www.nwccg.gov/glossary/a-z#letter_w

Extent: Moderate

New Hampshire has about 500 wild land fires each year; most of these burn less than half an acre. Much of the Lakes Region (and Tuftonboro) 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:**

From 2014-2018 there have been 724 wildfires statewide amounting to 2,007 acres burned. 2016 saw 351 of those wildfires alone. Carroll County only saw one wildfire in 2018, amounting to less than one acre.

Location: Portions of northern and eastern Tuftonboro are heavily wooded; a fire could occur anywhere.

Probability of Occurrence: Likely

Impact: Moderate

In the western section of town firefighters have limited access to potential wildfire areas, especially due to steep slopes but fires in this section would have limited impact on structures. Access to water resources has been improved in recent years, as recommended in the local Water Resources Management Plan. As a result, in 2019 the town's ISO (Insurance Services Office) fire rating was improved to 04-4Y.

Due to the heavily wooded nature of the town, all properties in town have the potential to be impacted by a wildland fire. Assuming 1%-2% town-wide damage to buildings, a wildfire could result in \$1,654,989 to \$3,309,979 in damages in any given year.

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 – 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 flares up over the tropics. 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 possess the 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 storm surge.

Extent: Moderate

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.²⁸ 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
1	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.
2	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.

²⁸ http://www.fema.gov/hazard/hurricane/hu_about.shtm, visited January 25, 2011.

Category	Characteristics
3	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.
4	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).
5	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/aboutsshs.shtml>

According to NOAA, while 2010 was one of the busiest hurricane seasons on record, 2013 was one of the least active hurricane seasons. New Hampshire has not experienced a severe hurricane directly since 1938.

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.²⁹ 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.

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. The town has not experienced a tropical or post-tropical cyclone since 2014.

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

Probability of Occurrence: Occasional

Impact: High

²⁹ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html>, visited January 25, 2011.

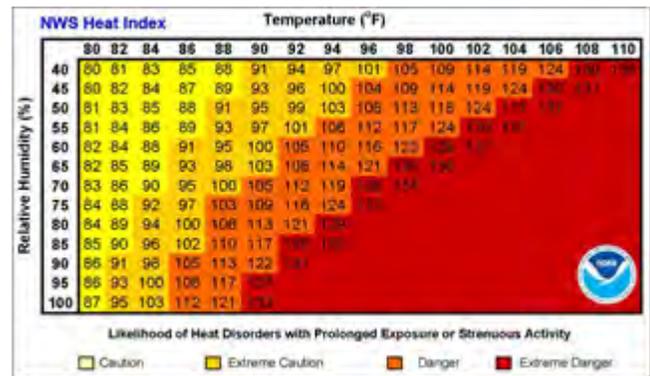
Hurricanes in the Lakes Region could produce heavy rain and strong winds that could lead to flooding and damage to property and infrastructure. Tropical and post-tropical cyclones can cause the same damage that high wind events cause, with the added hazard of possible flooding.

All structures in Tuftonboro 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 \$3,309,979 to \$8,274,946 in damages in Tuftonboro in any given year.

EXTREME TEMPERATURES

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

Extreme Heat events occur as a result 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.



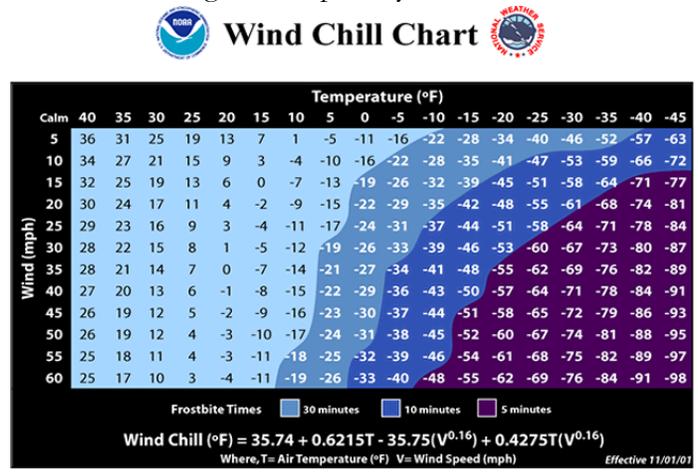
Extreme Cold events are caused by the southern transport of arctic airmasses into the Northeast. This effect is exacerbated when there are winds present that effectively lower the temperature that is perceived by the human body, known as the wind chill. The risk comes from when the body is losing heat 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 90-95°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: NWS issues a wind chill watch when dangerously cold wind chill values are *possible*. As with a warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least a half a tank of gas and update your winter survival kit.
- Wind Chill Advisory: NWS issues a wind chill advisory when seasonably cold wind chill values but not extremely cold values are expected or occurring. Be sure you and your loved ones dress appropriately and cover exposed skin when venturing outdoors. A Wind Chill Advisory is issued for New Hampshire 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.³⁰



History:

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 rd through July 5 th , with high temperatures ranging from 101-102°F in Concord on these days. ¹¹⁶ 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. ¹¹⁷
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. ¹¹⁸

Tuftonboro has experienced regular extreme hot and cold temperatures annually since the last plan update but nothing out of the normal range.

³⁰ Adapted from *State of NH Multi-Hazard Mitigation Plan Update 2018* https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf.

Location:

Extreme temperatures can occur anywhere throughout the town of Tuftonboro.

Probability of Occurrence: Occasional**Impact:** Low to 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. Frostbite occurs when uncovered skin and extremities are exposed to extreme cold and body tissue is either injured or killed. Hypothermia occurs 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 and 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. Committee members expressed particular concern for vulnerable populations, including the elderly. It was noted that residents tend not to take advantage of warming and cooling shelters, preferring to "take care of things themselves".

While most of the impact from extreme temperatures is to people and animals, there can also be structural impacts, especially from freezing and expansion of water in pipes and the resulting damages. Assuming 1% to 2% town-wide damage to buildings, winter weather could result in \$1,654,989 to \$3,309,979 in damages in any given year.

Human-Caused & Technological Hazards

The committee supplemented the evaluation of Natural Hazards with consideration of some of the Human-Caused and Technological hazards identified in the *State of New Hampshire Multi-Hazard Mitigation Plan (2018)*, developed by the New Hampshire Department of Safety's Division of Homeland Security and Emergency Management, focusing on those that might have the most relevance for the town of Tuftonboro. They are listed below. Only those with a high-risk potential for Tuftonboro are described further.

Tuftonboro 2021 Human-Caused and Tech Hazards	Probability	Extent	Human Impact	Property Impact	Business Impact	Average Impact	Risk
Definition	Likelihood this will occur w/in 100 yrs	(Magnitude/Strength)	Probability of Death or Injury	Physical Loss or damage	Interruption of Service	Average of Human, Property, Business	Probability x Extent x Avg. Impact
Scale	1: Unlikely 2: Occasional 3: Likely 4: Highly Likely	1: Weak 2: Moderate 3: Severe 4: Extreme	1: Low 2: Moderate 3: High 4: Catastrophic	Low Medium High			
Aging Infrastructure	3	2	1	1	2	1.33	8.00
Conflagration	3	2	2	2	1	1.67	10.00
Dam Failure	2	2	1	1	2	1.33	5.33
Hazardous Materials	2	2	1	3	2	2.00	8.00
Known and Emerging Contaminants	3	2	1	2	2	1.67	10.00
Long Term Utility Outage	4	3	1	2	3	2.00	24.00
Radiological	1	1	1	1	1	1.00	1.00
Cyber Event	3	3	1	3	3	2.33	21.00
Mass Casualty Incident	2	3	3	2	3	2.67	16.00
Terrorism/ Violence	1	1	1	1	1	1.00	1.00
Transport Accident	4	2	2	2	1	1.67	13.33

LONG-TERM UTILITY OUTAGE

A long-term utility outage is a prolonged absence of any type of public utility that is caused by infrastructure failure, cyber-attack, supply depletion, distribution disruption, water source contamination, or a natural, human caused or technological disaster.³¹

Extent: Severe

For the purpose of this plan a long-term utility outage is classified as one that lasts a month or more or an outage that causes extreme impacts.

Recent History

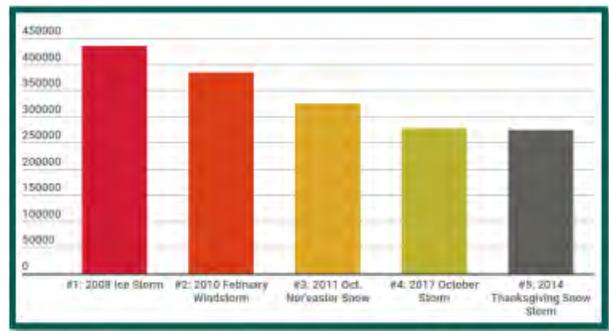
Date	Description	Impacts	Location	Additional Info
January 2014	Fred Fuller	The Fred Fuller oil company was unable to make deliveries to numerous customers	Statewide	Residents began to run out of fuel and were not able to fill their needs.
Oct 29 – Nov 4, 2017	Severe Rain and Wind	Low pressure system merged with Tropical Storm Phillippe	Statewide	Uprooted trees and heavy rains downed power lines leading to roughly 290K power outages.

Location: The entire town of Tuftonboro is at risk for this hazard in terms of trees coming down on wires.

Probability of Occurrence: Highly Likely

Impact: Moderate

Loss of power and communications has a great impact on municipal and emergency functions.



Top 5 power outages in New Hampshire history. Data provided by NH HSEM. Figure courtesy of NHPR.

CYBER EVENT

The Department of Homeland Security (DHS) defines a cyber incident as an event occurring on or conducted through a computer network that actually or imminently jeopardizes the confidentiality, integrity, or availability of computers, information or communications systems or networks, physical or virtual infrastructure controlled by computers or information systems, or information resident thereon.³²

Extent: Severe

The National Cybersecurity and Communications Integration center (NCCIC) classifies a cyber incident using a scoring system of zero to 100 using the following factors: Functional Impact

- Observed Activity
- Location of Observed Activity

³¹ State Multi-Hazard Mitigation Plan https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf

³² State Multi-Hazard Mitigation Plan 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. 177

- Actor Characterization
- Information Impact
- Recoverability
- Cross-Sector Dependency
- Potential Impact

History Tuftonboro has not recorded a cyber event, but approximately 75 cyber incidents affecting New Hampshire’s public sector were reported in 2017-2018.

Location Any location connected to the internet in the town of Tuftonboro is at risk to a cyber event. Tuftonboro is reliant on technology for regular municipal functions as well as emergency response. The locations that could pose the largest impact are the public offices of Tuftonboro along with critical communications infrastructure.

Probability: Likely

Impact: Moderate

The primary impact of a cyber event would be on emergency, municipal, and business services.

MASS CASUALTY INCIDENT

The state’s Multi-Hazard Mitigation Plan (2018) refers to a Mass Casualty Incident as any large number of casualties produced in a relatively short period of time, usually as the result of a single incident such as a military aircraft accident, hurricane, flood, earthquake, or armed attack that exceeds local logistic support capabilities.³³

Extent: Severe

The definition of this type of event is one that exceeds the local logistical support capabilities. With the limited staff available that threshold could be reached fairly quickly in Tuftonboro.

According to FEMA’s Fire/Emergency Medical Services Department, since the Columbine High School shooting in 1999 up through 2013 there were a reported 250 deaths connected to an active shooter/mass casualty incident.³⁴ This number has shown an exponential increase in the past five-year period with 2017 seeing over 725 mass casualty event deaths alone with fifty of those occurring at a live show in Las Vegas.³⁵

History: No mass casualty incidents have been recorded in Tuftonboro, but in the recent years there have been a few in New Hampshire.

³³ State Multi-Hazard Mitigation Plan https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf

³⁴ State Multi-Hazard Mitigation Plan https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf

³⁵ <https://www.fbi.gov/about/partnerships/office-of-partner-engagement/active-shooter-incidents-graphics>

Date	Event	Location	Information
February 2014	Explosion	New Hampshire Ball Bearings Inc. Peterborough, NH	Firefighters from the surrounding area responded to a industrial explosion critically injuring two and seriously injuring four.
August 2017	Hospital Contamination	Exeter Hospital at Exeter, New Hampshire	Numerous staff members reported feeling dizzy and nauseous. Causing surrounding towns to get involved and closing parts of the hospital for decontamination.

Location: Public gathering places, schools, hospitals, and similar locations in Tuftonboro and the surrounding area are vulnerable to a mass casualty incident.

Probability of Occurrence: Occasional

Impact: Moderate

By definition a mass casualty incident will have an catastrophic impact on humans. The impact on property and business service would be low.

TRANSPORTATION ACCIDENT

A transport accident is any accident that occurs during transportation, including passenger vehicles, tractor trailers, airplanes and other modes of transportation.

Extent: Moderate

Several state highways run through Tuftonboro, including NH 109. NH 109A and NH 171, and average traffic volume is pretty moderate, although higher during the summer season.

History: New Hampshire has an annual average of 117 fatal transportation related fatalities.

Location: NH 109. NH 109A, and NH 171 were seen as the most likely areas for transportation accidents.

Probability of Occurrence: Occasional

Impact: Low

The primary impact of a transportation incident would be on response capabilities of emergency services. No quantitative calculations of impact were made as part of this plan. While any vehicular accident has the potential for injury and even death, the impact of a vehicular accident on its own is relatively small. The impacts of such an event increase when multiple accidents occur, when they occur along evacuation routes, or they occur in conjunction with other hazards. Damage to structures would likely be minimal and the **impact** on the town would be moderate.

D. Summary of Risk

A matrix was created to determine an overall hazard risk assessment rating. Each criterion (Probability of occurrence, Extent, 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 4, 3, 2, and 1, with 4 as high and 1 as low. The overall risk rating associated with each hazard was determined by multiplying the three factors. For

Natural Hazards, a total score of 24 or more was deemed to be High Risk, a total of more than 5 but less than 24 was deemed to be Medium Risk, and a score of less than 5 was deemed Low Risk.

For Human-Caused and Technological Hazards, a score above 10 was deemed High Risk, a score of 8 to 10 was deemed Medium Risk, and a score of less than 8 was deemed Low Risk. The Plan focuses on those Natural Hazard events that pose at least a moderate risk to the town of Tuftonboro and on Human-Caused and Technological hazards that pose a high risk, as determined by the Committee.

<p>Probability of Future Events</p> <ul style="list-style-type: none"> • Unlikely: <10% probability of occurrence in the next year or a recurrence interval of more than every ten years • Occasional: 10 - 25% probability of occurrence in the next year or a recurrence interval of three to ten years • Likely: 25 - 80% probability of occurrence in the next year or a recurrence interval of two to three years • Highly Likely: 80-100% probability of occurrence in the next year or a recurrence interval of nearly every year
<p style="text-align: center;">Extent - How bad could it get?</p> <ul style="list-style-type: none"> • 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.
<p>Impact - Human, Property, Business</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>

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.

Summary

It is cost prohibitive to make the built environment resistant to the most devastating natural hazards that could occur, though reasonable measures can be taken to minimize loss of life and property damage. Tuftonboro may be affected by an unavoidable extraordinary circumstance such as a violent earthquake, but historically, events of this magnitude have been infrequent. Those natural events that are common to the northeast also have common elements of concern for public safety. These include the potential for long-term power outages, the potential need for short-term sheltering facilities, and the availability of equipment and trained personnel. Key to loss prevention in these relatively common event scenarios is pre-event planning that critically assesses communications within the community, mutual aid resources regionally, public awareness and education, and emergency response training.

CHAPTER IV: MITIGATION STRATEGIES

A. CURRENT PLANS, POLICIES, AND REGULATIONS

Many local programs have the effect of mitigating disasters; some of these have been in effect for years, others have been implemented as a result of the 2015 Hazard Mitigation Plan. A review of existing mitigation strategies was conducted and included review of pertinent documents including the zoning ordinance, subdivision regulations, site plan regulations, and discussion with Committee members. The review of existing capabilities utilized these categorizations:

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**.*

Existing Protections and Policies

Protection	Description	Comments	Effectiveness
Master Plan	Guiding document for land use planning. It serves to guide the overall character, physical form, growth, and development of the community. It is the foundation upon which the town's zoning and regulations are based. RSA 674:2	This is developed by the Planning Board with public input and is referred to by the Board frequently.	G/E
Capital Improvement Plan	The Tuftonboro CIP is an outline of anticipated expenditures for capital projects over at least six years. It links local infrastructure investments with master plan goals, land use ordinances, and economic development. RSA 674:5	The town's first CIP was developed in 2007. Threshold - \$10,000 and lifespan of at least two years.	G/E
Local Emergency Operations Plan	The town maintains an LEOP. This plan identifies the capabilities and response procedures of the town in response to an emergency.	Recently updated	E

Protection	Description	Comments	Effectiveness
Water Resources Plan for Rural Fire Protection	Inventories, assesses, and maps local water resources for fire protection (fire ponds, cistern, dry hydrants) and recommends any additional actions to enhance force protection.	This is referenced as subdivision or site plan proposals are reviewed for fire protection.	G
Building Codes and Inspector	The town utilizes the NH Building Code and Life Safety Code, which incorporates the IBC, IPC, and NFPA. This ensures that new structures meet basic safety standards.	Having a full-time Code Enforcement Officer is an effective means of assuring that standards are met.	E
Fire Dept. ISO rating	Insurance rating system. It is based on factors such as firefighting resources, staffing, and response time. Impacts insurance rates for home and business owners. The lower the number, the better the rating.	6/8B, 10 on the islands. The first number is for structures within 1,000' of a hydrant or large cistern. The new Fire Station lowered the rating in town.	G
Site Plan Regulations	Site Plan Review by the Planning Board is required of all non-residential and multi-family (two or more units) housing development. RSA 674:43	Fire Department reviews and comments.	G
Zoning Ordinance	Zoning involves regulating the size, location, and use of structures for the purpose of promoting the health, safety, and general welfare of the community. RSA 674:16	Ordinance is reviewed and potential amendments considered annually.	G
Subdivision Regulations	Regulation of subdivision guides municipal development, protecting residents from poorly designed areas. New development must mesh efficiently with the municipal pattern of infrastructure, essential services, and vehicular access. RSA 674:35	Subdivision Regulations are consistent with the Master Plan	G
Floodplain Ordinance	The minimum requirements of the National Flood Insurance Program (NFIP) have been adopted as part of Tuftonboro's Zoning Ordinance. This regulates all new and substantially improved structures in in the 1% (or 100-year) floodplain, requiring floodproofing actions on any permitted development.	Requirement for participation in the National Flood Insurance Program (NFIP).	G
Flood Insurance Rate Maps (FIRM)	Maps developed by FEMA delineating boundaries of various flood-prone areas, including the 1% Annual (100-year) Floodplain.	Maps are occasionally updated by FEMA and exist in digital format (DFIRMs) http://msc.fema.gov/portal .	G

Protection	Description	Comments	Effectiveness
Elevation Certificates	Elevation Certificates are maintained and on file with the town's Code Enforcement Officer. These certify the elevation of flood-prone structures as identified on the FIRM.	Because of the limited floodplain area, few structures in town require an Elevation Certificate.	G
Regional Planning	In New Hampshire communities may be members of region planning commissions and receive assistance with land use planning.	Tuftonboro is a member of LRPC and receives assistance with land use, transportation, environmental planning along with GIS mapping assistance.	G
Maintenance programs to reduce risk	Tree trimming, clearing drainage systems	DPW funds are budgeted for annual tree trimming. Drain clearing by DPW annually in spring and before heavy storms.	Tree - G Drain - G
Mutual Aid Agreements	Agreements with nearby communities to receive or provide assistance in emergency/call situations. Usually written agreements updated on a regular basis.	Fire - Yes, Police - Yes, DPW - No	G, G, G
Emergency Warning System	Town has Reverse 911, as well as cable TV and emergency vehicles with PA systems that can be used to notify the public.	Efforts need to be made to fill in gaps in sign-ups for Reverse 911	F/G
Septic Code	The NH Department of Environmental Services (DES) regulates septic design and installation. This helps protect drinking water quality.	None	G
Road Design Standard	The Tuftonboro Subdivision Regulations include road design standards that control the amount and retention of stormwater runoff. They also insure site access by emergency vehicles	These standards only address new road construction. Some driveways and pre-existing roads are difficult for emergency vehicles to access.	G
Bridge Maintenance Program	The state maintains state bridges and every other year inspects all bridges.	There are no red-listed State bridges in town, and no red-listed municipal bridges	G

Protection	Description	Comments	Effectiveness
Storm Drain/ Culvert Maintenance	The Tuftonboro Road Agent and State DOT clean the drainage basins once a year and after major flooding events. Culverts are repaired as needed.	Some culvert updates have been made.	G
State Dam Program	The NH Department of Environmental Services (DES) inspects dams and maintains state dams.	This continues to be a role/responsibility of the state.	E
Wetlands Protection	The Zoning Ordinance contains a Wetlands Conservation District.	None	G
Hazardous Materials Team	There are no substantial Hazardous Materials facilities that warrant a Hazardous Materials Plan. There is a regional HazMat response team that serves the town.	The team that serves Tuftonboro is called the Carroll County HazMat Team.	G
Public Education Programs	Tuftonboro Police and Fire Departments conduct public outreach at school and several community activities.	Address protecting home and health.	G
Public Health Plan and Network	The Public Health Emergency Preparedness Response Plan (PHEPRP) establishes methods and procedures for local regional, and state emergency planning agencies to respond to public health emergencies.	Coordinated through Carroll County Regional Public Health Network.	G
HazMat in Transport	Coordinate and train with Carroll County HazMat Team as well as maintain appropriate supplies to be able to handle initial spill response.	Regular training, coordination, and resupply are required to maintain efficacy.	G
Cyber Security Breach	Communicate and coordinate with regional, state, and national partners to keep abreast of malicious activities and maintain the integrity of the town’s electronic data and communications capacity.	Requires diligent coordination and dedication of resources.	G

B. STATUS OF 2015 ACTIONS

Some mitigation actions from the 2015 Hazard Mitigation Plan have either been completed or are no longer applicable due to changes in local circumstances. The status of the mitigation actions recommended in the 2015 plan is indicated below as either, Completed, Deleted, or Deferred. Unfinished portions of Mitigation Actions from 2015 are listed as Deferred. Deferred Actions (or deferred portions of Actions) were carried forward to be considered as new Mitigation Actions. The town has used operating budgets and Capital Reserve accounts to help pay for most of its hazard mitigation expenses.

Status of Mitigation Actions from the 2015 Hazard Mitigation Plan

ID	Mitigation Action	Status 2022	Effective-ness	Comment
1A	Identify the best solution to improve emergency response communications coverage. This may involve a new repeater, upgraded technology, and partnering with Carroll County.	Completed	Good	None
1B	Once the best solution has been identified to improve emergency response communications coverage (technology, location, partner), implement it.	Deferred	Untested	None
3A	Study downstream impacts on Sodom Road drainage.	Deferred	Untested	Study not undertaken. Bridge over Melvin River was repaired and removed from state's red-listed municipal bridges list.
3B	Implement recommendations of the Sodom Road study to enhance drainage.	Deferred	Untested	Study not undertaken
4	Upgrade culverts on Canaan Road.	Completed /Deferred	Good	One culvert was replaced
5	Replace culverts and conduct ditch work along Lang Pond Road	Completed	Good	None

ID	Mitigation Action	Status 2022	Effective- ness	Comment
6	Raise the roadbed on Brown Road to accommodate larger culverts.	Completed /Deferred	Good	Some culverts were replaced
7	Raise the roadbed on Curtis Road to accommodate larger culverts.	Deferred	Untested	None
9	Establish wetlands setback regulations and a method of enforcement.	Deferred	Untested	None
10A	Install cisterns/dry hydrants as indicated in the Tuftonboro Water Resources Plan for Rural Fire Protection.	Completed /Deferred	Good	Some dry hydrants installed
10B	Develop and fund a Capital Reserve Program for cisterns and dry hydrants.	Deferred		None
11	Upgrade two culverts along Union Wharf Road to reduce flooding.	Deferred	Untested	None
12	Repair or replace the municipal red-listed bridge on New Road over the Melvin River	Deleted	Untested	None
13	Add surge protection and lightning rods to critical facilities.	Deleted	Poor	None

ID	Mitigation Action	Status 2022	Effective-ness	Comment
14	Conduct more public education regarding home renovations and the impacts of changes (such as improved insulation leading to greater snow loads)	Completed	Good	Undertaken as part of building permit process
15	Repair or replace the municipal red-listed bridge on Sodom Road over the Melvin River.	Completed	Good	Bridge repairs were made in 2021; bridge was removed from state’s municipal bridge red-list
16	Repair or replace bridge on Tuftonboro Neck Road	Deferred	Untested	On State Bridge Aid waiting list (possibly 2030)

C. MITIGATION GOALS AND TYPES OF ACTIONS

The overall goals of Tuftonboro's Hazard Mitigation Plan Update have not changed substantially since the adoption of the 2009 Plan, which included support for the mitigation goals stated in the *State of New Hampshire Hazard Mitigation Plan* maintained by the NH Division of Homeland Security and Emergency Management (HESM). Tuftonboro's Hazard Mitigation Goals are:

- I. Minimize loss of life, injury, and damage to property, the economy, and the environment from natural hazards.
- II. Build and enhance local mitigation capabilities to ensure individual safety, reduce damage to public buildings and ensure continuity of emergency services.
- III. Maintain Tuftonboro's natural and human-made systems that protect the community from natural hazards.
- IV. Protect Tuftonboro's natural and cultural resources.
- V. Minimize and prevent damage to public and private buildings and infrastructure, and reduce economic losses.
- VI. Address challenges posed by climate change as they pertain to increasing risks in Tuftonboro's infrastructure and natural environment.

There is a strong emphasis in the town on Outreach and Education, in part because so many of the areas of concern are private property. The town continually evaluates and seeks appropriate new technologies to achieve these goals.

There are several types of actions that towns may take to reduce the likelihood that a hazard might impact the community. These include:

- Local Plans and Regulations
- Structure and Infrastructure Projects
- Natural Systems Protection
- Education and Awareness Programs

D. POTENTIAL ACTIONS

The Committee held two meetings to discuss potential mitigation actions. Members expressed the belief that, in general, community members are aware of natural hazards and steps to avoid damage, injury, and loss of property, and that actions that aid in public outreach and education, along with some infrastructure improvements are high priorities. The table below lists the problems and actions along with the hazard(s) that they address and notes whether the action addresses existing structures/infrastructure or future (new) structures/infrastructure (N/E), as well as which goal(s) they address and the type of mitigation action each represents. The ID numbers are used simply for tracking purposes; they do not indicate any sort of prioritization. Note: the goals and their numbers are listed in the previous section.

Problems and Proposed Actions indicating Hazard, Structure, Goal, and Types of Action

Hazard	ID	Problem Statement	Tuftonboro: Proposed Actions	Comment	Mitig./Prep.	N/E	Goal	Type
All Hazards	1	Due to the topography of the town, there are numerous areas that do not have good radio coverage. Better radio coverage would provide for safer and more efficient use of manpower and equipment.	Coordinate implementation of potential solutions to improve communications coverage (technology, location, and partner), with partners including Carroll County Dispatch.	The County is working towards upgrading its infrastructure to address this issue. Their improvements and timeline will impact this action.	Preparation	E	I, II	Response-Commun.
Infectious Diseases	2	The experience of the coronavirus pandemic may require updating public health communications information	Review emergency alerting system in coordination with All Health Hazards Region #8 to determine if updates are needed.	AHHR #8 has an Emergency Call Tree and tests it monthly.	Preparation	n/a	I, II	Response-Commun.
Inland Flooding, Tropical & Post-Tropical	3A	Flooding and washouts occur on sections of the road, impacting its use and compromising the roadway.	Study downstream impacts on Sodom Road drainage	Upgrading culverts may resolve this problem but may also lead to additional impacts downstream.	Mitigation	E	I, II, III, V, VI	Struct./Infrastruct.
Inland Flooding, Tropical & Post-Tropical	3B	Flooding and washouts occur on sections of the road, impacting its use and compromising the roadway.	Implement the recommendations of the Sodom Road study to enhance drainage.	Sodom Road bridge repairs were made in 2021; bridge is no longer red-listed.	Mitigation	E	I, II, III, V, VI	Struct./Infrastruct.
Inland Flooding, Tropical & Post-Tropical	4	Flooding and washouts occur on sections of the road, impacting its use and compromising the roadway.	Upgrade remaining culverts on Canaan Road	There is no alternate access route to this area (a dozen homes and one summer camp).	Mitigation	E	I, II, III, V, VI	Struct./Infrastruct.

Hazard	ID	Problem Statement	Tuftonboro: Proposed Actions	Comment	Mitig./Prep.	N/E	Goal	Type
Inland Flooding, Tropical & Post-Tropical	5	Flooding and washouts occur on sections of the road, impacting its use and compromising the roadway.	Make improvements to Brown Road to accommodate additional larger culverts	Crosses Beech River between Upper and Lower Beech Ponds.	Mitigation	E	I, II, III, V, VI	Struct./ Infrastruct.
Inland Flooding, Tropical & Post-Tropical	6	Flooding and washouts occur on sections of the road, impacting its use and compromising the roadway.	Raise the roadbed on Curtis Road to accommodate larger culverts	Three homes on this road.	Mitigation	E	I, II, III, V, VI	Struct./ Infrastruct.
Wildfire, Drought	7	Homeowners can take steps to better protect their properties against fire, especially those in more remote sections of town (least accessible to firefighters).	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to lightning strikes and fire, such as FireWise materials on website.	Although homeowners haven't been interested in this program, continued outreach and education are worthwhile due to increased risks resulting from climate change	Mitigation	E	I, V, VI	Educ. & Aware.
Inland Flooding	8	Ensuring that buildings are constructed a sufficient distance from areas that are prone to being wet can reduce damage to the structure and contents.	Establish wetlands setback regulations and a method of enforcement.	There is a financial impact on homeowners	Mitigation	n/a	III, IV, VI	Local Plans & Regs.
Wildfire	9A	If there is not an appropriate water supply nearby, structures and people are at greater risk in a fire event.	Install cisterns/dry hydrants as indicated in the Tuftonboro Water Resources Plan for Rural Fire Protection.	Part of the subdivision/site plan review process for new development but is a town expense for installations & maintenance in pre-existing developments.	Preparation	Some N, some E	V, VI	Struct./ Infrastruct.
Wildfire	9B	If there is not an appropriate water supply nearby, structures and people are at greater risk in a fire event.	Develop and fund a Capital Reserve Program for cisterns and Dry Hydrants.	This would fund installation, upgrade, and maintenance of infrastructure to protect existing structures.	Preparation	E	V, VI	Struct./ Infrastruct.
Inland Flooding, Tropical & Post-Tropical	10	Poor drainage and underlying ledge are prime factors in water infiltration and pavement failure	Make improvements to Ledge Hill Road including drainage and new culverts	Patching and repaving in the past have not addressed underlying issues	Mitigation	E	I, II, III, V, VI	Struct./ Infrastruct.
Inland Flooding, Tropical & Post-Tropical	11	Flooding and washouts occur on sections of the road, impacting its use and compromising the roadway.	Upgrade two culverts along Union Wharf Rd. to reduce flooding.	Connector between two state Routes.	Mitigation	E	I, II, III, V, VI	Struct./ Infrastruct.

Hazard	ID	Problem Statement	Tuftonboro: Proposed Actions	Comment	Mitig./Prep.	N/E	Goal	Type
Severe Winter Weather	12	Renovation of older homes (improving roof insulation) can sometimes lead to increased snow loads, through less melting of snow.	Conduct more public education regarding home renovations and the impacts of changes (such as improved insulation leading to greater snow loads).	Adjust outreach as updates are made to State Building Code.	Mitigation	E	I, V	Educ. & Aware.
All Hazards	13	Residents, motorists may not be aware of flooding, road closures, and other emergency situations.	Develop public outreach to encourage residents to sign up for NH Alerts	Informing residents of flooding, road closures, and other emergency situations can save lives.	Mitigation	n/a	I, II, V	Educ. & Aware.
Mass Casualty	14	A mass casualty event could happen in Tuftonboro, which is reliant on others for support. Training, communications, and some first response equipment is important to maintaining this high level of preparedness.	Ensure that proper equipment and training is available in case of a mass casualty event	While the town is well prepared, a mass casualty event can easily overwhelm a small town.	Preparedness	n/a	II, V	Educ. & Aware.
High Wind Events	15	High winds can damage property anywhere in town (especially downed trees and wires). Many are not aware of the steps they can take to protect their property.	Improve communication & outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to damage from high winds, especially from downed trees and wires and improve emergency preparedness.	None	Mitigation	E	I, II, III, V	Educ. & Aware.
Cyber Event	16	Vital municipal functions are increasingly vulnerable to cyber attack	Work with State of New Hampshire to develop cyber security resources	The town of Peterborough recently lost more than \$2 million of taxpayer money due to cyber attacks	Preparedness	E	II	Educ. & Aware.
High Wind, Severe Winter Weather, Lightning, Long-term Utility Outage	17	High wind events, severe winter weather and lightning can all lead to downed trees and power lines	Schedule debris mitigation prior to storms by cutting back tree hazards	None	Mitigation	E	I, V	Struct./ Infrastruct

The cost of implementing each action was estimated either in terms of dollars or staff hours. Cost was also a factor in the evaluation process. After considering the Pros and Cons of each project, the Committee prioritized the various projects which had been identified utilizing the STAPLEE method, with potential scores ranging from -7 to 7 (See Appendix G for details). The table below shows the Actions ordered by their overall score, which range from a low of 2 to a high of 5.

Prioritized Recommended Actions

ID	Recommended Action	Estimated Cost	Potential Funding	STAPLEE
1	Upgrade remaining culverts on Canaan Road	\$10,000 - \$99,000	Operating Budget, HSEM grants	5
2	Make improvements to Ledge Hill Road including drainage and new culverts	\$10,000 - \$99,000	Operating Budget, HSEM grants	5
3	Make improvements to Brown Road to accommodate additional larger culverts	\$100,000 or more	Operating Budget, HSEM grants	5
4	Raise the roadbed on Curtis Road to accommodate larger culverts	\$100,000 or more	Operating Budget, HSEM grants	5
5	Upgrade two culverts along Union Wharf Rd. to reduce flooding.	\$10,000 - \$99,000	Operating Budget, HSEM grants	5
6	Review emergency alerting system in coordination with All Health Hazards Region #8 to determine if updates are needed.	Staff time under 200 hours; under \$10,000	Operating Budget, HSEM grants	5
7	Study downstream impacts on Sodom Road drainage	\$10,000 - \$99,000	Operating Budget	5
8	Install cisterns/dry hydrants as indicated in the Tufonboro Water Resources Plan for Rural Fire Protection.	\$100,000 or more	Operating Budget	5

ID	Recommended Action	Estimated Cost	Potential Funding	STAPLEE
9	Implement the recommendations of the Sodom Road study to enhance drainage.	\$100,000 or more	Operating Budget, HSEM grants	4
10	Ensure that proper equipment and training is available in case of a mass casualty event	Staff time under 200 hours; under \$10,000	Operating Budget	4
11	Work with State of New Hampshire to develop cyber security resources	Staff time under 200 hours; under \$10,000	Operating Budget	4
12	Develop and fund a Capital Reserve Program for cisterns and Dry Hydrants.	\$100,000 or more	TownMeeting warrant article	4
13	Develop public outreach to encourage residents to sign up for NH Alerts	Staff time under 200 hours; under \$10,000	Operating Budget	3
14	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to lightning strikes and fire, such as FireWise materials on website.	Staff time under 200 hours; under \$10,000	Fire Dept. Budget; Operating Budget	3
15	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to damage from high winds, especially downed trees and wires, and improve emergency preparedness.	Staff time under 200 hours; under \$10,000	Fire Dept. Budget; Operating Budget	3

ID	Recommended Action	Estimated Cost	Potential Funding	STAPLEE
16	Establish wetlands setback regulations and a method of enforcement.	Staff time under 200 hours; under \$10,000	Operating Budget	3
17	Coordinate implementation of potential solutions to improve communications coverage (technology, location, and partner), with partners including Carroll County Dispatch.	More than \$100,000; staff time	Operating Budget; HESM grant; other grants	2
18	Conduct more public education regarding home renovations and the impacts of changes (such as improved insulation leading to greater snow loads).	Staff time; under \$10,000	Operating budget	2
19	Schedule debris mitigation prior to storms by cutting back tree hazards	Staff time; under \$10,000	Operating Budget; Highway Dept budget	2

E. 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 utilized the STAPLEE method (Section D above and Appendix H) as a guide to reach consensus regarding their relative level of priority, recognizing that some actions are of greater priority to different town departments. This implementation schedule contains a matrix below indicating the estimated financial cost of implementation, potential funding sources, the parties responsible for bringing about these actions, and implementation time frame. Though a number of recommended mitigation actions received high scores, the time frame for which the actions are executed depend upon staff time and budgetary limitations. 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.

Implementation Schedule for Mitigation Actions

ID	Recommended Action	Hazard	Responsible Party	Time Frame
1	Upgrade remaining culverts on Canaan Road	Inland Flooding, Tropical & Post-Tropical	Highway Dept/ BOS	Ongoing/ Long Term 4+ years

ID	Recommended Action	Hazard	Responsible Party	Time Frame
2	Make improvements to Ledge Hill Road including drainage and new culverts	Inland Flooding, Tropical & Post-Tropical	Highway Dept./BoS	Short Term 1 to 2 years
3	Make improvements to Brown Road to accommodate additional larger culverts	Inland Flooding, Tropical & Post-Tropical	Highway Dept./BoS	Long Term 4+ years
4	Raise the roadbed on Curtis Road to accommodate larger culverts	Inland Flooding, Tropical & Post-Tropical	Highway Dept./BoS	Long Term 4+ years
5	Upgrade two culverts along Union Wharf Rd. to reduce flooding.	Inland Flooding, Tropical & Post-Tropical	Highway Dept./BoS	Mid-Term 2 to 4 years
6	Review emergency alerting system in coordination with All Health Hazards Region #8 to determine if updates are needed.	Infectious Diseases	EMD	Short Term 1 to 2 years
7	Study downstream impacts on Sodom Road drainage	Inland Flooding, Tropical & Post-Tropical	BoS/ Highway Dept.	Mid-Term 2 to 4 years
8	Install cisterns/dry hydrants as indicated in the Tuftonboro Water Resources Plan for Rural Fire Protection.	Wildfire	Fire/EMD/BoS	Long Term 4+ years
9	Implement the recommendations of the Sodom Road study to enhance drainage.	Inland Flooding, Tropical & Post-Tropical	BoS/Highway Dept.	Long Term 4+ years

ID	Recommended Action	Hazard	Responsible Party	Time Frame
10	Ensure that proper equipment and training is available in case of a mass casualty event	Mass Casualty	EMD/Fire/PD	Ongoing/ Long Term 4+ years
11	Work with State of New Hampshire to develop cyber security resources	Cyber Events	Admin/BoS/ EMD, PD	Short Term 1 to 2 years
12	Develop and fund a Capital Reserve Program for cisterns and Dry Hydrants.	Wildfire	Admin/BoS/ FD	Mid-Term 2 to 4 years
13	Develop public outreach to encourage residents to sign up for NH Alerts	All Hazards	EMD	Ongoing/ Long Term 4+ years
14	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to damage from high winds, especially from downed trees and wires	High Wind Events, Tropical & Post-Tropical	EMD	Ongoing/ Long Term 4+ years
15	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to lightning strikes and fire, such as FireWise materials on website.	Wildfire	EMD	Ongoing/ Long Term 4+ years
16	Establish wetlands setback regulations and a method of enforcement.	Inland Flooding	PB	Short Term 1 to 2 years
17	Coordinate implementation of potential solutions to improve communications coverage (technology, location, and partner), with partners including Carroll County Dispatch.	All Hazards	EMD/BoS	Long Term 4+ years

ID	Recommended Action	Hazard	Responsible Party	Time Frame
18	Conduct more public education regarding home renovations and the impacts of changes (such as improved insulation leading to greater snow loads).	Severe Winter Weather	EMD/Code Enforcement	Short Term 1 to 2 years
19	Schedule debris mitigation prior to storms by cutting back tree hazards	High Wind, Severe Winter Weather, Lightning, Long-term Utility Outage	BoS/Highway Dept	Ongoing/ Long Term 4+ years

CHAPTER V: PLAN ADOPTION AND MONITORING

A. IMPLEMENTATION

The Tuftonboro Hazard Mitigation Plan Update Committee, established by the EMD and Board of Selectmen, 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, which may also include the use of Capital Reserve Funds along with grant funds available through FEMA, the US Environmental Protection Agency (EPA), and other sources such as those listed in Appendix B. The Emergency Management Director will coordinate with department heads, the Budget Committee, and Selectmen to ensure that funds and staff time for these projects are available. The EMD will also coordinate with the NH HSEM Field Representative to ensure that the town applies for appropriate grant funds.

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 2022 update to the Hazard Mitigation Plan, an attempt will be made to have hazard mitigation strategies integrated into these existing mechanisms and into all other ongoing town planning activities.

B. PLAN MAINTENANCE & PUBLIC INVOLVEMENT

The Tuftonboro Hazard Mitigation Planning Committee and the Selectboard, in order to track progress and update the mitigation strategies identified in Chapter IV sections D and E, will review the Tuftonboro Hazard Mitigation Plan annually or after a hazard event. The Emergency Management Director is responsible for initiating this review and needs to consult with members of the Tuftonboro Committee identified in this Plan. Changes will be made to the Plan to accommodate projects that have failed, are no longer consistent with the timeframe identified, are no longer consistent with the town's priorities, or lack funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, will be reviewed during the monitoring and update of this Plan to determine feasibility of future implementation. In keeping with the process of adopting the Plan, a public meeting will be held to receive public comment on the Plan.

Maintenance and updating will be held during the annual review period and the final product adopted by the Selectboard. The Committee will meet annually as part of this plan maintenance. The Emergency Management Director is also responsible for updating and resubmitting the plan to FEMA to be re-approved every five years. The EMD will convene a plan update committee in the early 2027 to begin updating this plan before it expires.

A. SIGNED CERTIFICATE OF ADOPTION

**Certificate of Adoption – Town of Tuftonboro
A resolution adopting the Tuftonboro Hazard Mitigation Plan Update 2022**

Plan dated: 2022

Conditionally approved: July 15, 2022

WHEREAS, the town of Tuftonboro received funding from the NH Division of Homeland Security and Emergency Management through a FEMA Pre-Disaster Mitigation Grant and assistance from the Lakes Region Planning Commission for the preparation of the Tuftonboro Hazard Mitigation Plan Update 2022; and

WHEREAS, several public planning meetings were held between April and June 2021; and

WHEREAS, the Tuftonboro Hazard Mitigation Plan Update 2022 contains several potential future projects to mitigate hazard damage in the town of Tuftonboro and,

WHEREAS, a duly noticed public meeting was held by the Selectmen on July 15, 2022 to formally approve and adopt the Tuftonboro Hazard Mitigation Plan Update 2022.

NOW, THEREFORE BE IT RESOLVED that the Tuftonboro Board of Selectmen adopts the Tuftonboro Hazard Mitigation Plan Update 2022.

ADOPTED AND SIGNED this day of July 15, 2022

TUFTONBORO BOARD OF SELECTMEN

William (Chip) Albee, Chair

Guy Pike, Selectman

Robert (Bob) Murray Selectman

Town Seal or Notary:

Date: 7/15/2022



On behalf of the Hazard Mitigation Committee, the Emergency Management Director, under direction of the Selectboard, will be responsible for ensuring that town's departments and the public have adequate opportunity to participate in the planning process during the Plan's annual review and during any Hazard Mitigation Committee meetings. Administrative staff may be utilized to assist with the public involvement process.

For each committee meeting, and the annual update process, techniques that will be utilized for public involvement include:

- ❖ Provide notification to the Select Board for budgeting purposes;
- ❖ Provide invitations to municipal department heads;
- ❖ Post notices of meetings at the Town Hall, Fire Station, Library, and on the town website;
- ❖ Submit press releases for publication in the *Granite State News*, *Tuftonboro Times*, and *Conway Daily Sun*, and other appropriate newspapers or media outlets.

Entities to invite to future Hazard Mitigation plan updates include the Emergency Management Directors of the neighboring communities of Wolfeboro, Moultonborough, and Ossipee.

C. SIGNED CERTIFICATE OF ADOPTION

**Certificate of Adoption – Town of Tuftonboro
A resolution adopting the Tuftonboro Hazard Mitigation Plan Update 2022**

Plan dated: 2022

Conditionally approved: [DATE]

WHEREAS, the town of Tuftonboro received funding from the NH Division of Homeland Security and Emergency Management through a FEMA Pre-Disaster Mitigation Grant and assistance from the Lakes Region Planning Commission for the preparation of the Tuftonboro Hazard Mitigation Plan Update 2022; and

WHEREAS, several public planning meetings were held between April and June 2021; and

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WHEREAS, a duly noticed public meeting was held by the Selectmen on [DATE] to formally approve and adopt the Tuftonboro Hazard Mitigation Plan Update 2022.

NOW, THEREFORE BE IT RESOLVED that the Tuftonboro Board of Selectmen adopts the Tuftonboro Hazard Mitigation Plan Update 2022.

ADOPTED AND SIGNED this day of [DATE].

TUFTONBORO BOARD OF SELECTMEN

William (Chip) Albee, Chair

Guy Pike, Selectman

Robert (Bob) Murray Selectman

Town Seal or Notary:

Date: _____

APPENDIX A: TECHNICAL RESOURCES

NH Homeland Security and Emergency Management 271-2231
<http://www.nh.gov/safety/divisions/HSEM/>

Hazard Mitigation Section..... 271-2231
<http://www.nh.gov/safety/divisions/hsem/HazardMitigation/index.html>

Federal Emergency Management Agency (617) 223-4175
<http://www.fema.gov/>

FEMA, National Flood Insurance Program, Community Status Book
<http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>

NH Regional Planning Commissions:

Central NH Regional Planning Commission 796-2129
<http://www.cnhrpc.org/>

Lakes Region Regional Planning Commission..... 279-8171
<http://www.lakesrpc.org/>

Nashua Regional Planning Commission 883-0366
<http://www.nashuarpc.org/>

North Country Council..... 444-6303
<http://www.nccouncil.org/>

Rockingham Regional Planning Commission 778-0885
<http://www.rpc-nh.org/>

Southern New Hampshire Regional Planning Commission..... 669-4664
<http://www.snhpc.org/>

Southwest Regional Planning Commission 357-0557
<http://www.swrpc.org/>

Strafford Regional Planning Commission..... 742-2523
<http://www.trafford.org/>

Upper Valley Lake Sunapee Regional Planning Commission..... 448-1680
<http://www.uvlsrc.org/>

NH Governor’s Office of Strategic Initiative..... 271-2155
<http://www.nh.gov/osi/index.htm>

New Hampshire Floodplain Management Program
<http://www.nh.gov/oep/planning/programs/fmp/index.htm>
 News and Events page, including training opportunities
<http://www.nh.gov/oep/planning/programs/fmp/news-events.htm>

NH Department of Transportation..... 271-3734
<http://www.nh.gov/dot/index.htm>

NH Department of Cultural Affairs 271-2540
<http://www.nh.gov/nhculture/>

Division of Historical Resources..... 271-3483
<http://www.nh.gov/nhdhr/>

NH Department of Environmental Services 271-3503
<http://www.des.state.nh.us/>

Dam Bureau..... 271-3406
<http://www.des.state.nh.us/organization/divisions/water/dam/index.htm>

NH Municipal Association	224-7447
http://www.nhmunicipal.org/LGCWebsite/index.asp	
NH Fish and Game Department	271-3421
http://www.wildlife.state.nh.us/	
NH Department of Resources and Economic Development	271-2591
http://www.dred.state.nh.us/	
Division of Forests and Lands.....	271-2214
http://www.nhdf.org/	
Natural Heritage Inventory.....	271-2215
http://www.nhdf.org/about-forests-and-lands/bureaus/natural-heritage-bureau/	
Division of Parks and Recreation.....	271-3255
http://www.nhstateparks.org/	
NH Department of Health and Human Services	271-9389
http://www.dhhs.state.nh.us/	
Northeast States Emergency Consortium, Inc. (NESEC)	(781) 224-9876
http://www.nesec.org/	
US Department of Commerce	(202) 482-2000
http://www.commerce.gov/	
National Oceanic and Atmospheric Administration.....	(202) 482-6090
http://www.noaa.gov/	
National Weather Service, Eastern Region Headquarters	
http://www.erh.noaa.gov/	
National Weather Service, Tauton, Massachusetts.....	(508) 824-5116
http://www.erh.noaa.gov/er/box/	
National Weather Service, Gray, Maine.....	(207) 688-3216
http://www.erh.noaa.gov/er/gyx/	
US Department of the Interior	
http://www.doi.gov/	
US Fish and Wildlife Service.....	225-1411
http://www.fws.gov/	
US Geological Survey.....	225-4681
http://www.usgs.gov/	
US Geological Survey Real Time Hydrologic Data	
http://waterdata.usgs.gov/nwis/rt	
US Army Corps of Engineers.....	(978) 318-8087
http://www.usace.army.mil/	
US Department of Agriculture	
http://www.usda.gov/wps/portal/usdahome	
US Forest Service.....	(202) 205-8333
http://www.fs.fed.us/	
New Hampshire Electrical Cooperative	(800) 698-2007
http://www.nhec.com/	
Cold Region Research Laboratory	646-4187
http://www.crrel.usace.army.mil/	

National Emergency Management Association (859) 244-8000
<http://nemaweb.org>

National Aeronautics and Space Administration
<http://www.nasa.gov/>

NASA Optical Transient Detector – Lightning and Atmospheric Research
<http://thunder.msfc.nasa.gov/>

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/>

APPENDIX B: MITIGATION FUNDING RESOURCES

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 Tuftonboro. The NH Homeland Security and Emergency Management Field Representative for Carroll 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 OSI, also refer to RPC
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
Pre-Disaster Mitigation Assistance Planning (MAP)	NH Homeland Security and Emergency Management
Mutual Aid for Public Works.....	NH Municipal Association, UNH Technology Transfer
National Flood Insurance Program (NFIP)	NH Office of Strategic Initiatives
Power of Prevention Grant by NESEC.....	NH Homeland Security and Emergency Management
Project Impact	NH Homeland Security and Emergency Management
Roadway Repair & Maintenance Program(s)	NH Department of Transportation
Shoreline Protection Program	NH Department of Environmental Services
Various Forest and Lands Program(s).....	NH Department of Resources & Economic Development
Wetlands Programs.....	NH Department of Environmental Services
State Aid Bridge Program for Communities	NH Department of Transportation
Contribution of Damage Losses (RSA 235:34)	NH Department of Transportation

Federal Mitigation Funding Sources

Federal Emergency Management Agency

Program	Details	Notes
Flood Mitigation Assistance Program (FMA)	Provides funding to implement measures to reduce or eliminate the long-term risk of flood damage http://www.fema.gov/government/grant/fma/index.shtm	States and localities
Hazard Mitigation Grant Program (HMGP)	Provides grants to implement long-term hazard mitigation measures after a major disaster declaration http://www.fema.gov/government/grant/hmgp/index.shtm	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 http://www.fema.gov/business/nfip/	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 http://www.fema.gov/government/grant/pdm/index.shtm	States, localities and tribal governments

Environmental Protection Agency

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

Mitigation Funding Sources Program	Details	Notes
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. http://www.epa.gov/OWOW/NPS/cwact.html	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. http://www.epa.gov/owow/wetlands/initiative/srf.html	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. http://www.epa.gov/owow/wetlands/initiative/#financial	See website

National Oceanic and Atmosphere Administration (NOAA)

NOAA is the major source for mitigation funding related to coastal zone management and other coastal protection projects.

Mitigation Funding Sources Program	Details	Notes
Coastal Services Center Cooperative Agreements	Funds for coastal wetlands management and protection, natural hazards management, public access improvement, reduction of marine debris, special area management planning, and ocean resource planning. http://www.csc.noaa.gov/funding/	May only be used to implement and enhance the states' approved Coastal Zone Management programs
Coastal Services Center Grant Opportunities	Formula and program enhancement grants for implementing and enhancing Coastal Zone Management programs that have been approved by the Secretary of Commerce. http://www.csc.noaa.gov/funding/	Formula grants require non-federal match
Coastal Zone Management Program	The Office of Ocean and Coastal Resource Management (OCRM) provides federal funding and technical assistance to better manage our coastal resources. http://coastalmanagement.noaa.gov/funding/welcome.html	Funding is reserved for the nation's 34 state and territory Coastal Zone Management Programs
Marine and Coastal Habitat Restoration	Funding for habitat restoration, including wetland restoration and dam removal. http://www.nmfs.noaa.gov/habitat/recovery/	Funding available for state, local and tribal governments and for- and non-profit organizations.

Floodplain, Wetland and Watershed Protection Programs

USACE and the U.S. Fish and Wildlife Service offer funding and technical support for programs designed to protect floodplains, wetlands, and watersheds.

Funding and Technical Assistance for Wetlands and Floodplains 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. http://www.lre.usace.army.mil/planning/assist.html	50 percent non-federal match
USACE Flood Plain Management Services (FPMS)	Technical support for effective floodplain management. http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&MyCategory=126	See website
USACE Environmental Laboratory	Guidance for implementing environmental programs such as ecosystem restoration and reuse of dredged materials. http://el.erdc.usace.army.mil/index.cfm	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. http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home	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. http://ecos.fws.gov/partners/viewContent.do?viewPage=home	Funding for volunteer-based programs

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. http://www.hud.gov/offices/cpd/communitydevelopment/programs/	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. http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm	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. http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/	State and local governments and non-profits

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. http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html	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. http://www.firewise.org/	See website

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 Agency 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. http://www.csrees.usda.gov/funding/rfas/smith_lever.html	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. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population under 20,000
USDA Community Facilities Direct Loans	Loans for essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population of less than 20,000
USDA Community Facilities Direct Grants	Grants to develop essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	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. http://www.fsa.usda.gov/	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. http://www.forestsandrangelands.gov/	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. http://www.fs.fed.us/spf/coop/programs/eap/	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. http://www.nrcs.usda.gov/programs/ewp/	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. http://www.nrcs.usda.gov/programs/watershed/index.html	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 Agency 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. http://www.aoa.gov/doingbus/fundopp/fundopp.asp	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. http://www.eda.gov/AboutEDA/Programs.xml	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. http://www.sba.gov/services/financialassistance/index.html	Must meet SBA approved credit rating

Research Grants

The United States Geological Survey (USGS) and the National Science Foundation (NSF) provide grant money for hazard mitigation-related research efforts.

Hazard Mitigation Research Grants Agency Program	Details	Notes
National Science Foundation (NSF) Decision, Risk, and Management Sciences Program (DRMS)	Grants for small-scale, exploratory, high-risk research having a severe urgency with regard to natural or anthropogenic disasters and similar unanticipated events. http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&org=SES	See website
U.S. Geological Survey (USGS) National Earthquake Hazards Reduction Program	The purpose of NEHRP is to provide products for earthquake loss reduction to the public and private sectors by carrying out research on earthquake occurrence and effects. http://www.usgs.gov/contracts/nehpr/	Community with a population under 20,000

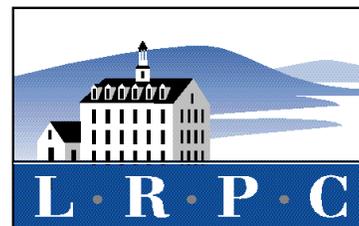
APPENDIX C: PUBLICITY AND MEETING INFORMATION

Committee meetings were announced through press releases in local newspapers and posting of meeting announcements and the agenda in town. Press releases similar to the one below were sent to the weekly *Granite State News* newspaper prior to the Committee meetings, and notices were posted on the town's website. Officials from neighboring towns were also informed of the Plan update and invited to share comments, Fact Sheets and Agendas were provided, and Notes of committee meetings were kept. Examples are included below:

04/20/2021

LAKES REGION PLANNING COMMISSION

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



For Immediate Release

Contact: Adam L Thompson, 603-569-3381, firechief@tuftonboro.org

Tuftonboro Hazard Mitigation Plan Committee to Meet

The Tuftonboro Hazard Mitigation Plan Committee has begun the process of updating its 2015 Hazard Mitigation Plan and will meet on Tuesday, April 27, 2021 at 189 Middle Road at 2 pm.

Residents of Tuftonboro and representatives from neighboring towns are encouraged to provide input.

The committee is represented by a variety of local interests including representatives from the Fire, Police, Highway Department, planning board, code enforcement/health officer, selectmen's representative, citizens and business owners.

The group will focus on the natural hazards that may put Tuftonboro at risk and development of recommendations to protect the safety and well-being of town residents and visitors.

Hazard mitigation planning is as important to reducing disaster losses. The most significant areas of concern for Tuftonboro will be reviewed and evaluated through this update process. In the 2015 Hazard Mitigation Plan these included severe wind, severe winter weather, lightning, and hazardous materials transport.

As the plan is updated, town leaders will be able to evaluate the status of current plans, policies, and actions and then develop and prioritize actions to reduce the impacts of these and other hazards.

The goal is for Tuftonboro to be a disaster resistant community, and updating the Hazard Mitigation Plan will bring Tuftonboro a step closer to that goal.

For more information, please contact Emergency Management Director and Fire Chief Adam Thompson at firechief@tuftonboro.gov or Susan Slack, Principal Planner, Lakes Region Planning Commission at sslack@lakesrpc.org.

Sample invitation to Neighboring Towns

The Town of Tuftonboro is in the process of updating its Hazard Mitigation Plan. This Plan is a tool used by the Town and other local, state and federal governments to reduce the effects of natural and other hazards. Our towns and organizations share common hazards that don't recognize governmental boundaries. Therefore, we welcome your participation in the planning process to update the Tuftonboro's Hazard Mitigation Plan.

We encourage you to attend the first Committee meeting on **DATE** at **10 am/pm** at the Public Safety Building on Route 171 in Tuftonboro. If you are unable to attend this meeting you may access a copy of the planning documents and/or comment on hazard mitigation issues by contacting me at firechief@tuftonboro.org or emailing Susan Slack, Principal Planner, Lakes Region Planning Commission, at sslack@lakesrpc.org.

We look forward to hearing your ideas on how to mitigate future hazards for the community.

Thank you,
Chief Adam Thompson
Town of Tuftonboro

ALL HAZARDS MITIGATION MINUTES

Date: 05/18/2021

Time: 2:00 pm

Facilitator: Susan Slack

In Attendance

A. Thompson, A Shagoury, C Pike, D Barker, M. Young, S. Slack, D. Cash G. Pike, R Thompson

Approval of Minutes

The minutes from prior month were passed out for every one to review.

Review

Susan started the meeting with the compilation of the natural and human caused, technological hazards from prior meeting. Discussion was held on this and will need to do a mitigation for items ranked high. Further review of the 2015 mitigation plan was done and items were marked as completed, deleted or in process.

New Items;

Discussion around new projects was held perhaps work on dry areas in town for new dry hydrants and/or cisterns. The areas of the "Narrows" or 171(Mountain Road). Actively look to have ponds put in. Also, will keep the in-kind spreadsheet up to date and email to Susan prior to next meeting,

Next meeting scheduled for 6/8/2021 @ 2:pm

Respectfully Submitted,

Rhonda L Thompson

Tuftonboro Hazard Mitigation Plan Update Committee

June 29, 2021 2 PM
Fire Station
189 Middle Rd, Center Tuftonboro, NH 03816



FEMA



AGENDA

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

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

1. Introductions
2. Mitigation
 - a. Update Mitigation Goals – p. 36 of 2015 Plan
 - b. Review status of 2015 Mitigation Actions
 - c. Develop new proposed Mitigation Actions
 - d. Establish method of prioritizing Mitigation Actions
3. Public Input
4. Next Steps
 - a. Cost-Benefit analysis of proposed Mitigation Actions – p. 83-84 of 2015 Plan
 - b. Prioritize Implementation of new Mitigation Actions – p 42-45 of 2015 Plan
 - c. Plan Monitoring and Public Involvement – p 46-47 and 86-88 of 2015 Plan

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

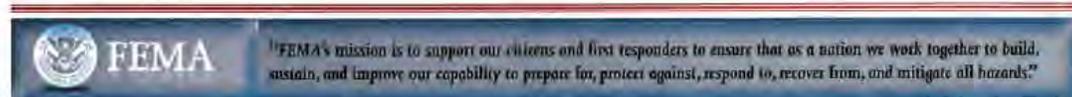
- Public involvement – In addition to government agencies involved in incident management, floodplain management and economic development, the planning process usually involves a range of stakeholders, including representatives of neighborhood groups, civic organizations, academia, environmental groups, 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 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: MEETING PARTICIPATION

All Committee meetings were held in the Tuftonboro Central Fire Station. Agendas were developed by the LRPC planner and meetings were chaired by the Emergency Management Director.

Members of the public were free to participate in the full discussion during each meeting, one resident attended and participated. Committee participants were:

Adam Thompson	Tuftonboro Fire Chief & EMD
Andrew Shagoury	Tuftonboro Police Chief
Caleb Pike	Tuftonboro Fire Captain
Doug Barker	Tuftonboro resident
Rhonda Thompson	Tuftonboro FD Admin Asst
Guy Pike	Tuftonboro Selectman
Jack Parsons	Tuftonboro Code Enforcement and Health Officer
Matt Young	Tuftonboro Planning Board
Jim Bean	Tuftonboro Road Agent
David Cash	Tuftonboro School Representative
Susan Slack	LRPC Principal Planner
Courtney Jordan	NH HSEM Field Representative

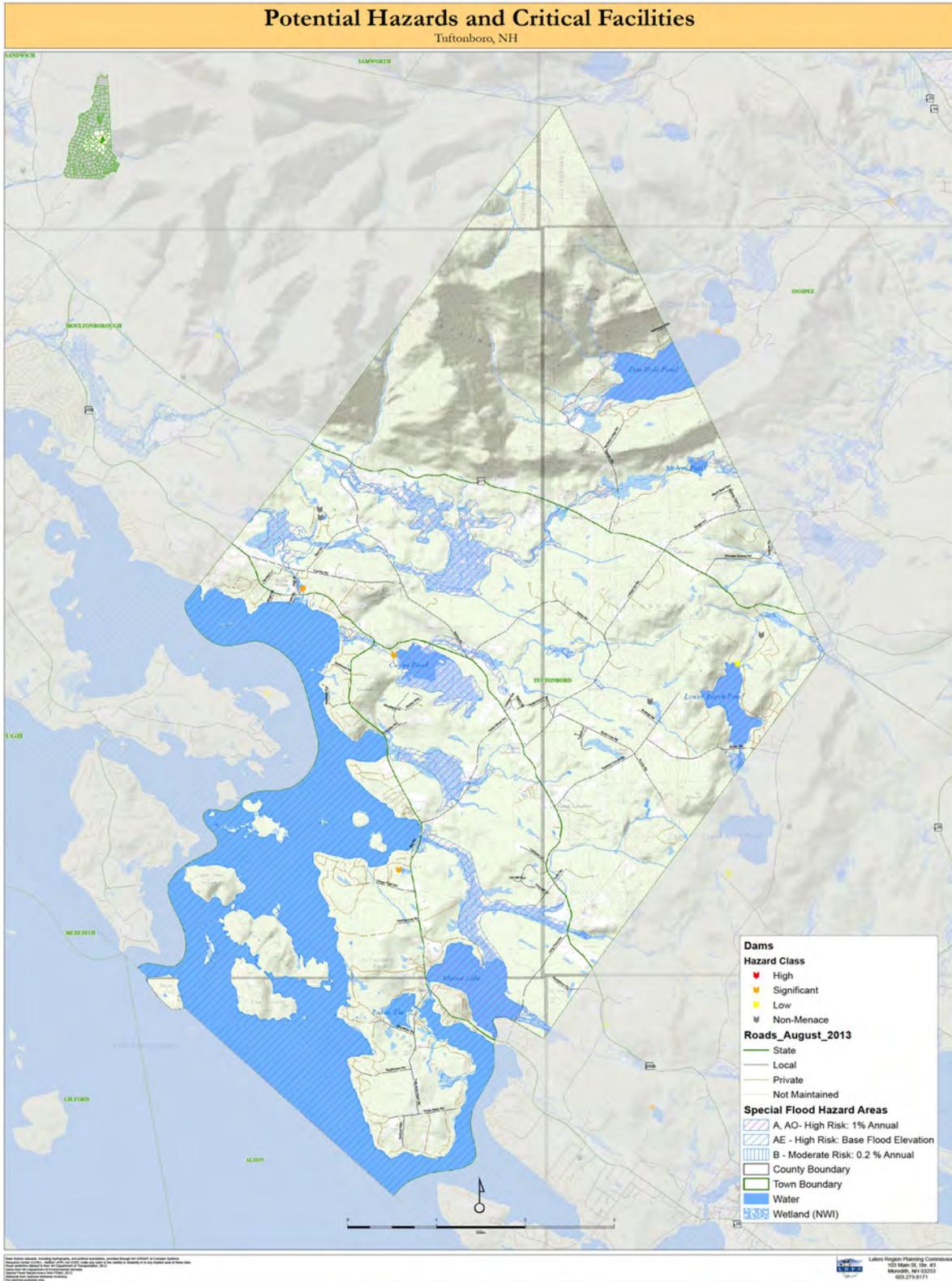
APPENDIX E: HAZARD EVENTS PRIOR TO 2012

Hazard	Date	Location	EXTENT	PROBABILITY	IMPACT		Notes	Source
			Magnitude/ Description	Period of Recurrence	Damages			
Drought	1929-36	Statewide	Regional	10 to >25 yr				Heavy Snow
Drought	1939-44	Statewide	Moderate	10 to >25 yr				Heavy Snow
Drought	1947-50	Statewide	Moderate	10 to >25 yr				Heavy Snow
Drought	1960-69	Statewide	Longest recorded continuous spell of less than normal precipitation.	>25 yr				Heavy Snow
Drought	8/1/1999	Statewide	Fire danger in the moderate to severe category; about 515 acres had burned.		Wells ran dry and crops wilted.		Nine of NH's ten counties were declared disaster	Heavy Snow
Earthquake	12/20/1940	Ossipee	5.2 Richter, 19 km away from Center Harbor					Heavy Snow
Earthquake	12/24/1940	Ossipee	5.5 Richter, 19 km away from Center Harbor					Heavy Snow
Earthquake	1/19/1982	Center Harbor	4.7 Richter, 25 km away					Heavy Snow
Earthquake	10/25/1986	Center Harbor	3.9 Richter, 36 km away		Three chimneys fractured			Heavy Snow
Extreme Temperature	1/1/1999	STATEWIDE						Heavy Snow
Wind chill temperatures near 35 degrees below zero.								Heavy Snow
Extreme Temperature	1/13/1999	Statewide	Wind chill temperatures ranged from about 35 to 40 degrees below zero.					Winter Storm
Fire	4/6/1923	Waterville Valley	3500 acres burned				Wildfire	Heavy Snow
Fire	4/30/1947	Freedom	1225 acres burned				Wildfire	Heavy Snow
Heavy Snow	12/21/2008	<u>BELKNAP</u>	15 inches				NOAA	Heavy Snow
Heavy Snow	1/18/2009	<u>BELKNAP</u>	12 inches				NOAA	Heavy Snow
Winter Storm	1/28/2009	<u>BELKNAP</u>					NOAA	Winter Storm
Heavy Snow	2/18/2009	<u>BELKNAP</u>	9 inches				NOAA	Heavy Snow
Heavy Snow	2/22/2009	<u>BELKNAP</u>	9 inches				NOAA	Heavy Snow

Hazard	Date	Location	EXTENT	PROBABILITY	IMPACT			Source
			Magnitude/ Description	Period of Recurrence		Damages	Notes	
Heavy Snow	3/1/2009	BELKNAP	7 inches				NOAA	Heavy Snow
Winter Storm	12/9/2009	BELKNAP					NOAA	Winter Storm
Heavy Snow	1/17/2010	BELKNAP	8 inches				NOAA	Heavy Snow
Nor'easter	2/3/10 – 3/3/10	Statewide	Snow and ice	330,000 without power	\$2 M	Presidential Disaster	FEMA ³⁶	Nor'easter
Heavy Snow	12/26/2010	BELKNAP	12 inches				NOAA	Heavy Snow
High Wind	7/15/2007	BELKNAP			High Wind	7/15/2007	BELKNAP	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
High Wind	8/16/2007	BELKNAP			High Wind	8/16/2007	BELKNAP	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
High Wind	9/27/2007	BELKNAP			High Wind	9/27/2007	BELKNAP	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
High Wind	6/22/2008	BELKNAP			High Wind	6/22/2008	BELKNAP	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
High Wind	7/18/2008	BELKNAP			High Wind	7/18/2008	BELKNAP	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
High Wind	7/19/2008	BELKNAP - Alton, Belmont			High Wind	7/19/2008	BELKNAP - Alton, Belmont	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
Tornado	7/24/2008	BELKNAP			Tornado	7/24/2008	BELKNAP	
EF2		\$561 K		NOAA	EF2		\$561 K	
High Wind	8/7/2008	BELKNAP			High Wind	8/7/2008	BELKNAP	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
High Wind	8/10/2008	BELKNAP			High Wind	8/10/2008	BELKNAP	
50 kts.			Thunderstorm Wind	NOAA	50 kts.			Thunderstorm Wind
Hail	6/5/2007	BELKNAP - Center Harbor, Alton	Hail	6/5/2007	BELKNAP - Center Harbor, Alton	Hail	6/5/2007	BELKNAP - Center Harbor, Alton
1.00 in.	NOAA		1.00 in.	NOAA		1.00 in.	NOAA	
Hail	7/9/2007	BELKNAP - Sanb., Laconia, Gilford	Hail	7/9/2007	BELKNAP - Sanb., Laconia, Gilford	Hail	7/9/2007	BELKNAP - Sanb., Laconia, Gilford
1.25 in.	NOAA		1.25 in.	NOAA		1.25 in.	NOAA	
Hail	7/15/2007	BELKNAP	Hail	7/15/2007	BELKNAP	Hail	7/15/2007	BELKNAP
0.88 in.	NOAA		0.88 in.	NOAA		0.88 in.	NOAA	
Hail	6/22/2008	BELKNAP - Meredith	Hail	6/22/2008	BELKNAP - Meredith	Hail	6/22/2008	BELKNAP - Meredith
1.25 in.	NOAA		1.25 in.	NOAA		1.25 in.	NOAA	

Hazard	Date	Location	EXTENT	PROBABILITY	IMPACT			Source
			Magnitude/ Description	Period of Recurrence		Damages	Notes	
Hail	7/2/2008	BELKNAP	Hail	7/2/2008	BELKNAP	Hail	7/2/2008	BELKNAP
0.75 in.	NOAA		0.75 in.	NOAA		0.75 in.	NOAA	
Hail	7/18/2008	BELKNAP	Hail	7/18/2008	BELKNAP	Hail	7/18/2008	BELKNAP
0.75 in.	NOAA		0.75 in.	NOAA		0.75 in.	NOAA	
Hail	7/19/2008	BELKNAP	Hail	7/19/2008	BELKNAP	Hail	7/19/2008	BELKNAP
0.88 in.	NOAA		0.88 in.	NOAA		0.88 in.	NOAA	
Hail	8/10/2008	BELKNAP - Laconia, Meredith, Gilford	Hail	8/10/2008	BELKNAP - Laconia, Meredith, Gilford	Hail	8/10/2008	BELKNAP - Laconia, Meredith, Gilford
Flood	6/27/2009	<u>BELKNAP</u>			\$50 K	Flash Flood	NOAA	Flood
Flood	7/26/2011	<u>BELKNAP</u>				Flash Flood	NOAA	Flood
Flood	8/28/2011	<u>BELKNAP</u>	3 - 6 inches of rain		1 death, 1 injury, \$25 K	Tropical Storm Irene	NOAA	Flood
Flood	4/16/2007	<u>BELKNAP</u>			\$700K			
Flood	8/7/2008	<u>BELKNAP Ashland, W. Center Harbor, New Hampton, Meredith, Laconia</u>	6 inches of rain in 3 hours	Damage to homes, cars, road washouts	1 death, 2 injuries, \$3.0 M	Flash Flood		
Flood	8/10/2008	<u>BELKNAP - Laconia, Gilford, Meredith</u>	3 inches of rain	Stream flooding				
Lightning	9/27/2007	<u>BELKNAP</u>			\$200 K	Downed trees in Center Harbor	NOAA	
Lightning	8/7/2008	<u>BELKNAP</u>		Structural fire in Laconia	\$60 K		NOAA	NOAA

APPENDIX F: CRITICAL FACILITIES & POTENTIAL HAZARDS MAP



APPENDIX G: STAPLEE RESULTS

The standard tool for project prioritization was utilized – the STAPLEE Method, with a score of 1 being positive, 0 neutral, and -1 was for projects perceived to have a negative impact or obstacles for that particular category.

The seven category scores for each project were added up. Under this system, the maximum possible score is 7, the minimum is -7. The actual scores ranged from 2 to 5.

ID	Hazard	Recommended Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
1	All Hazards	Coordinate implementation of potential solutions to improve communications coverage (technology, location, and partner), with partners including Carroll County Dispatch.	0	1	1	0	1	-1	0	2
2	Infectious Diseases	Review emergency alerting system in coordination with All Health Hazards Region #8 to determine if updates are needed.	1	1	1	1	1	0	0	5
3A	Inland Flooding, Tropical & Post-Tropical	Study downstream impacts on Sodom Road drainage	1	1	1	0	0	1	1	5
3B	Inland Flooding, Tropical & Post-Tropical	Implement the recommendations of the Sodom Road study to enhance drainage.	0	1	1	0	0	1	1	4
4	Inland Flooding, Tropical & Post-Tropical	Upgrade remaining culverts on Canaan Road	1	1	1	0	0	1	1	5

ID	Hazard	Recommended Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	Inland Flooding, Tropical & Post-Tropical	Make improvements to Brown Road to accommodate additional larger culverts	1	1	1	0	0	1	1	5
6	Inland Flooding, Tropical & Post-Tropical	Raise the roadbed on Curtis Road to accommodate larger culverts	1	1	1	0	0	1	1	5
7	Inland Flooding, Tropical & Post-Tropical	Make improvements to Ledge Hill Road including drainage and new culverts	1	1	1	0	0	1	1	5
8	Wildfire, Drought	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to lightning strikes and fire, such as FireWise materials on website.	1	1	0	0	0	0	1	3
9	Inland Flooding	Establish wetlands setback regulations and a method of enforcement.	1	0	1	0	0	0	1	3
10A	Wildfire	Install cisterns/dry hydrants as indicated in the Tuftonboro Water Resources Plan for Rural Fire Protection.	1	1	1	0	0	1	1	5
10B	Wildfire	Develop and fund a Capital Reserve Program for cisterns and Dry Hydrants.	0	1	1	0	1	0	1	4
11	Inland Flooding, Tropical & Post-Tropical	Upgrade two culverts along Union Wharf Rd. to reduce flooding.	1	1	1	0	9	1	1	5

ID	Hazard	Recommended Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
12	Severe Winter Weather	Conduct more public education regarding home renovations and the impacts of changes (such as improved insulation leading to greater snow loads).	1	0	0	0	0	0	1	2
13	All Hazards	Develop public outreach to encourage residents to sign up for NH Alerts	1	0	1	0	0	0	1	3
14	Mass Casualty	Ensure that proper equipment and training is available in case of a mass casualty event	0	1	1	1	0	0	0	4
15	High Wind Events	Improve communication & outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to damage from high winds, especially from downed trees and wires and improve emergency preparedness.	1	1	1	0	0	0	0	3
16	Cyber Event	Work with State of New Hampshire to develop cyber security resources	0	1	1	0	1	1	0	4
17	High Wind, Severe Winter Weather, Lightning, Long-term Utility Outage	Schedule debris mitigation prior to storms by cutting back tree hazards	0	0	1	0	0	1	0	2

APPENDIX H: MONITOR, EVALUATE, & UPDATE

Table A: Periodic Hazard Mitigation Plan Review Record

Meeting Schedule (dates)	Tasks Accomplished	How well (or not-so-well) is implementation progressing?	Lead Parties	Public Involvement (citizens, neighboring communities)

Table B: Project Implementation Checklist

ID	Recommended Action	Hazard	Responsible Party	Time Frame	2023	2024	2025	2026
1	Upgrade remaining culverts on Canaan Road	Inland Flooding, Tropical & Post-Tropical	Highway Dept/BOS	Ongoing/ Long Term 4+ years				
2	Make improvements to Ledge Hill Road including drainage and new culverts	Inland Flooding, Tropical & Post-Tropical	Highway Dept/BOS	Short Term 1 to 2 years				
3	Make improvements to Brown Road to accommodate additional larger culverts	Inland Flooding, Tropical & Post-Tropical	Highway Dept/BOS	Long Term 4+ years				
4	Raise the roadbed on Curtis Road to accommodate larger culverts	Inland Flooding, Tropical & Post-Tropical	Highway Dept./BoS	Long Term 4+ years				
5	Upgrade two culverts along Union Wharf Road to reduce flooding	Inland Flooding, Tropical & Post-Tropical	Highway Dept./BoS	Mid-Term 2 to 4 years				
6	Review emergency alerting system in coordination with All Health Hazards Region #8 to determine if updates are needed	Infectious Diseases	EMD	Short Term 1 to 2 years				
7	Study downstream impacts on Sodom Road drainage	Inland Flooding, Tropical & Post-Tropical	Highway Dept./BoS	Mid-Term 2 to 4 years				
8	Install cisterns/dry hydrants as indicated in the Tuftonboro Water Resources Plan for Rural Fire Protection	Wildfire	EMD, BOS	Long Term 4+ years				

ID	Recommended Action	Hazard	Responsible Party	Time Frame	2023	2024	2025	2026
9	Implement the recommendations of the Sodom Road study to enhance drainage	Inland Flooding, Tropical & Post Tropical	Highway Dept., BoS	Long Term 4+ years				
10	Ensure that proper equipment and training is available in case of a mass casualty event	Mass Casualty	EMD, Fire, PD	On-going/ Long Term 4+ years				
11	Work with State of New Hampshire to develop cyber security resources	Cyber Event	Admin, BOS, EMD, PD	Short Term 1 to 2 years				
12	Develop and fund a Capital Reserve Program for cisterns and dry hydrants	Wildfire	Admin, BOS, EMD, FD	Short Term 1 to 2 years				
13	Develop public outreach to encourage residents to sign up for NH Alerts	All Hazards	EMD	On-going/ Long Term 4+ years				
14	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to damage from high winds, especially from downed trees and wires	High Wind Events; Tropical & Post-Tropical	EMD	On-going/ Long Term 4+ years				
15	Improve communication and outreach to property owners regarding steps they can take to reduce the vulnerability of their properties to lightning strikes and fire, such as FireWise materials on website	Wildfire, Drought	EMD	On-going/ Long Term 4+ years				

ID	Recommended Action	Hazard	Responsible Party	Time Frame	2023	2024	2025	2026
16	Establish wetlands setback regulations and a method of enforcement	Inland Flooding	PB/Code Enforcement	Short Term 1 to 2 years				
17	Coordinate implementation of potential solutions to improve communications coverage (technology, location, and partner), with partners including Carroll County Dispatch	All Hazards	EMS, BOS	Long Term 4+ years				
18	Conduct more public education regarding home renovations and the impacts of changes (such as improved insulation leading to greater snow loads)	Severe Winter Weather	EMD, Code Enforcement	Short Term I to 2 years				
19	Schedule debris mitigation prior to storms by cutting back tree hazards	High Wind, Severe Winter Weather; Lightning, Long-term Utility Outage	BOS, Highway Dept.	On-going/ Long Term 4+ years				

APPENDIX I: FEMA MITIGATION PLANNING WEBLIOGRAPHY

DISASTERS AND NATURAL HAZARDS INFORMATION

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

FLOOD RELATED HAZARDS

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

FIRE RELATED HAZARDS

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

GEOLOGIC RELATED HAZARDS

USGS Topographic Maps	http://topomaps.usgs.gov/
Building Seismic Safety Council	http://www.nibs.org/?page=bssc
Earthquake hazard history by state	http://earthquake.usgs.gov/earthquakes/states/
USGS data on earthquakes	http://earthquake.usgs.gov/monitoring/deformation/data/download/
USGS Earthquake homepage	http://quake.wr.usgs.gov
National Cooperative Geologic Mapping Program (NCGMP)	http://ncgmp.usgs.gov/
Landslide Overview Map of the Conterminous United States	http://landslides.usgs.gov/learning/nationalmap/
Kafka, Alan L. 2008. Why Does the Earth Quake in New England? Boston College, Weston Observatory, Department of Geology and Geophysics	http://www2.bc.edu/~kafka/Why_Quakes/why_quakes.html
Map and Geographic Information Center, 2010,	http://magic.lib.uconn.edu/connecticut_data.html

"Connecticut GIS Data", University of Connecticut	
2012 Maine earthquake	http://www.huffingtonpost.com/2012/10/17/main-earthquake-2012-new-england_n_1972555.html

WIND-RELATED HAZARDS

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

GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND MAPPING

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

DETERMINING RISK AND VULNERABILITY

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

DATA GATHERING

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

SUSTAINABILITY/ADAPTATION/CLIMATE CHANGE

Planning for a Sustainable Future: the Link Between Hazard Mitigation and Livability	http://www.fema.gov/media-library-data/20130726-1454-20490-3505/fema364.pdf
Why the Emergency Management Community Should be Concerned about Climate Change: A discussion of the impact of climate change on selected natural hazards	http://www.cna.org/sites/default/files/research/WEB%2007%2029%2010.1%20Climate%20Change%20and%20the%20Emergency%20Management%20Community.pdf
NOAA RISA for the Northeast (Regional Integrated Sciences and Assessments)	http://ccrun.org/home
Resilient Sustainable Communities: Integrating Hazard Mitigation& Sustainability into Land Use	http://www.earth.columbia.edu/sitefiles/file/education/documents/2013/Resilient-Sustainable-Communities-Report.pdf
U.S. EPA	http://www.epa.gov/climatechange/
NOAA National Ocean Service (NOS)	http://oceanservice.noaa.gov/
The Northeast Climate Research Center (NRCC) folks were heavily involved in climate data in the NCA, below. They have a wealth of historic climate data and weather information, trends, etc.	http://www.nrcc.cornell.edu/
Community and Regional Resilience: Perspectives from hazards, disasters, and emergency management	http://www.resilientus.org/library/FINAL_CUTTER_9-25-08_1223482309.pdf
National Fish, Wildlife and Plants Climate Adaptation Strategy	www.wildlifeadaptationstrategy.gov
ICLEI Local Governments for Sustainability	http://www.icleiusa.org/
Kresge Foundation Survey	http://www.kresge.org/news/survey-finds-communities-northeast-are-trying-plan-for-changes-climate-need-help-0
New England's Sustainable Knowledge Corridor	http://www.sustainableknowledgecorridor.org/site/
The Strategic Foresight Initiative (SFI)	http://www.fema.gov/pdf/about/programs/oppa/findings_051111.pdf

Northeast Climate Choices	http://www.climatechoices.org/ne/resources_ne/nereport.html
Northeast Climate Impacts Assessment	http://www.northeastclimateimpacts.org/
Draft National Climate Assessment Northeast Chapter released early 2013	http://ncadac.globalchange.gov/
Northeast Chapter of the National Climate Assessment of 2009:	http://www.globalchange.gov/images/cir/pdf/northeast.pdf
NEclimateUS.org	http://www.neclimateus.org
ClimateNE	www.climateinortheast.com
Scenarios for Climate Assessment and Adaptation	http://scenarios.globalchange.gov/
Northeast Climate Science Center	http://necsc.umass.edu/
FEMA Climate Change Adaptation and Emergency Management	https://www.llis.dhs.gov/content/climate-change-adaptation-and-emergency-management-0
Climate Central	http://www.climatecentral.org
EPA State and Local Climate and Energy Program	http://www.epa.gov/statelocalclimate/index.html

PLANNING

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

OTHER FEDERAL RESOURCES

U.S. Army Corps of Engineers: Provides funding for floodplain management planning and technical assistance and other water resources issues.	www.nae.usace.army.mil
Natural Resources Conservation Service: Technical assistance to individual land owners, groups of landowners, communities, and soil and water conservation districts.	www.nrcs.usda.gov
NOAA Coastal Services Center	http://www.csc.noaa.gov/
Rural Economic and Community Development: Technical assistance to rural areas and smaller communities in rural areas on financing public works projects.	www.rurdev.usda.gov
Farm Service Agency: Manages the Wetlands Reserve Program (useful in open space or acquisition projects by purchasing easements on wetlands properties) and farmland set aside programs	www.fsa.usda.gov
National Weather Service: Prepares and issues flood, severe weather and coastal storm warnings. Staff hydrologists can work with communities on flood warning issues; can give technical assistance in preparing flood-warning plans.	www.weather.gov
Economic Development Administration (EDA): Assists communities with technical assistance for economic development planning	www.osec.doc.gov/eda/default.htm
National Park Service: Technical assistance with open space preservation planning; can help facilitate meetings and identify non-structural options for floodplain redevelopment.	www.nps.gov

Fish and Wildlife Services: Can provide technical and financial assistance to restore wetlands and riparian habitats.	www.fws.gov
Department of Housing & Urban Development	www.hud.gov
Small Business Administration: SBA can provide additional low-interest funds (up to 20% above what an eligible applicant would qualify for) to install mitigation measures. They can also loan the cost of bringing a damaged property up to state or local code requirements.	www.sba.gov/disaster
Environmental Protection Agency	www.epa.gov

OTHER RESOURCES

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

FEMA RESOURCES

Federal Emergency Management Agency (FEMA)	www.fema.gov
National Mitigation Framework	http://www.fema.gov/national-mitigation-framework
Federal Insurance and Mitigation Administration (FIMA)	http://www.fema.gov/fima
Community Rating System (CRS)	http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-rating-system
FEMA Building Science	http://www.fema.gov/building-science
National Flood Insurance Program (NFIP)	http://www.fema.gov/national-flood-insurance-program
Floodplain Management & Community Assistance Program	http://www.fema.gov/floodplain-management
Increased Cost of Compliance (ICC): ICC coverage provides up to \$30,000 for elevation and design requirements to repeatedly or substantially damaged property.	http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage
National Disaster Recovery Framework	http://www.fema.gov/national-disaster-recovery-framework
Computer Sciences Corporation: contracted by FIMA	www.csc.com

as the NFIP Statistical Agent, CSC provides information and assistance on flood insurance to lenders, insurance agents and communities	
Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan: A Guidebook for Local Governments	https://www.fema.gov/ar/media-library/assets/documents/89725
Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning	http://www.fema.gov/media-library/assets/documents/4317

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

FEMA Multi-Hazard Mitigation Planning Website	http://www.fema.gov/multi-hazard-mitigation-planning
FEMA Resources Page	http://www.fema.gov/plan/mitplanning/resources.shtm
Local Mitigation Plan Review Guide	http://www.fema.gov/library/viewRecord.do?id=4859
Local Mitigation Planning Handbook complements and liberally references the Local Mitigation Plan Review Guide above	http://www.fema.gov/library/viewRecord.do?id=7209
HAZUS	http://www.fema.gov/protecting-our-communities/hazus
Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards	http://www.fema.gov/library/viewRecord.do?id=6938
Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials	http://www.fema.gov/library/viewRecord.do?id=7130
IS-318 Mitigation Planning for Local and Tribal Communities Independent Study Course	http://training.fema.gov/EMIWeb/IS/is318.asp

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