

Town of Moultonborough, New Hampshire Hazard Mitigation Plan Update 2019

Prepared by the:

Moultonborough Hazard Mitigation Update Committee



Ossipee Mountain Road 10/23/2014

2013
Updated: August 2019

Town of Moultonborough, New Hampshire Hazard Mitigation Plan Update

2007

Revised: 2013

Revised: 2019

With Assistance from:

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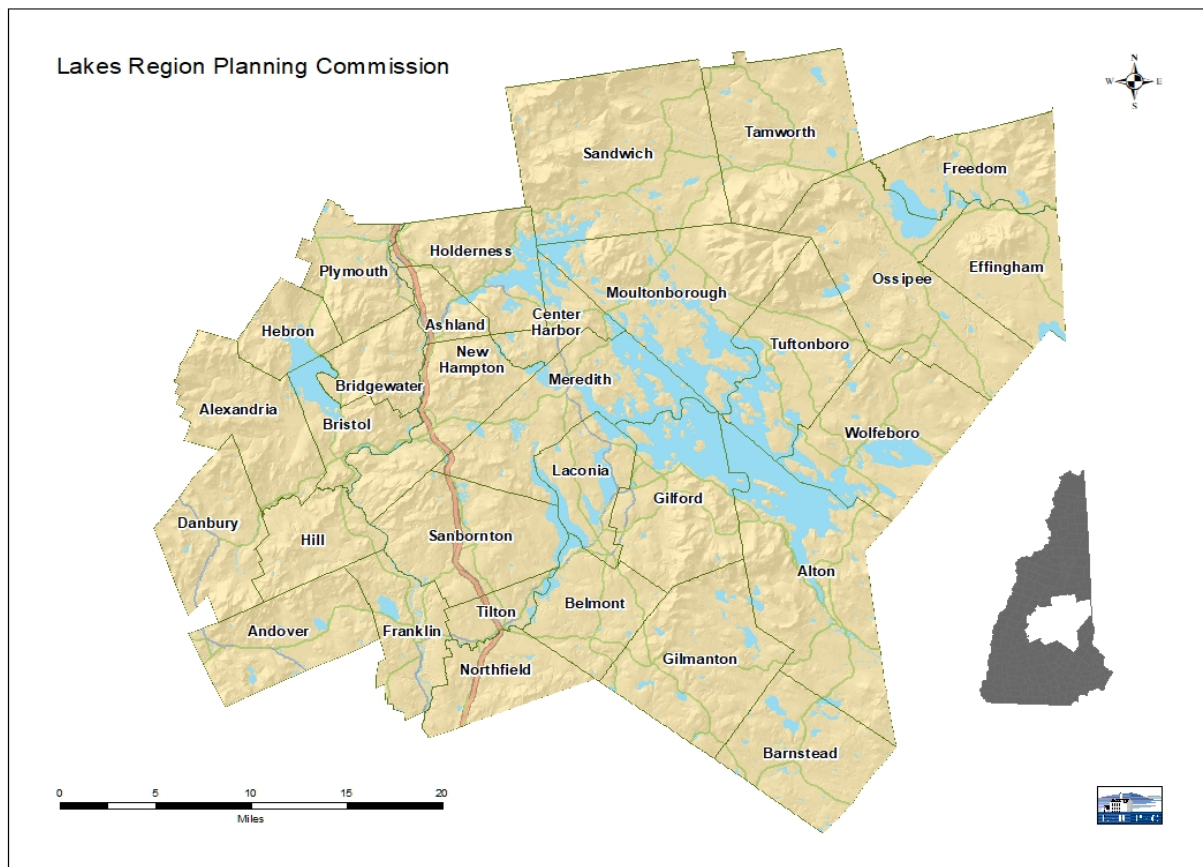
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EXECUTIVE SUMMARY

The *Moultonborough Hazard Mitigation Plan Update* (the Plan) serves as a means to reduce future losses from natural, technological, or human-caused hazard events before they occur. The Plan was developed by the Moultonborough 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 VI.

The Committee reviewed the hazards identified in the 2013 Plan, as well as the hazards listed in the *2018 State of New Hampshire Multi-Hazard Mitigation Plan*, and determined high and moderate natural, technological, and human-caused risks, based on a ranking system detailed in Chapter III. The High and Moderate risk hazards are shown below:

High Risk Hazards	Moderate Risk Hazards
Mass Casualty Incident	Extreme Temperatures
Conflagration	Lightning
High Wind Events (Thunderstorm, Downburst, Tornado)	Tropical and Post-Tropical Cyclones
Severe Winter Weather	Inland Flooding
	Drought

The Committee updated its list of Critical Facilities, and identified numerous existing programs related to hazard mitigation including the following:

Existing Plans, Regulations and Practices Supporting Hazard Mitigation	
Hazard Mitigation Plan 2007	Subdivision Regulations
Code Enforcement	Site Plan Review Regulations
Zoning Ordinance	Master Plan
Flood Plain Ordinance	School Emergency Operation Plan
Emergency Power Generation	Capital Improvement Planning
Mutual Aid Agreements	Emergency Response Training and Drills

Most of the Actions from the 2013 Plan have been completed. Some have been deferred to this Plan, and some were deleted or are no longer pertinent. In its effort to further reduce the vulnerability of the town to future hazards, the committee developed a list of 26 general and hazard-specific mitigation actions. These actions were prioritized based on local criteria. Discussions were held regarding how implementation might occur over the next five years. The results of these discussions are summarized in the Implementation Schedule for Mitigation Actions on page 56.

CHAPTER I: PLANNING PROCESS

A. BACKGROUND

Communities are required to have an approved hazard mitigation plan as a condition of receiving hazard mitigation assistance funding as well as some other federal funding programs. Such plans are locally developed and adopted and approved by the Federal Emergency Management Agency (FEMA). Funds from these grants are to be used for hazard mitigation projects and actions that will ultimately reduce and mitigate future losses from natural or human-caused events. The NH Department of Safety's Division of Homeland Security and Emergency Management (HSEM) makes funding available to assist communities with plan development and update. Communities are provided the opportunity to select a contractor. The plan development process generally followed the steps outlined in FEMA's Local Mitigation Planning Handbook (2013).

B. AUTHORITY

The town of Moultonborough 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 Moultonborough Hazard Mitigation Plan is a planning tool to be used by the town of Moultonborough, as well as other local, state, and federal government entities, in their efforts to reduce the negative effects from natural hazards. The Plan contains statements of policy as outlined in the Implementation Schedule for Mitigation Actions on page 55 and in Chapter VI: Plan Adoption and Monitoring. All other sections of this plan are support and documentation for informational purposes only and are not included as a statement of policy.

E. SCOPE OF PLAN

The scope of this Plan includes the identification of natural, technological, and human-caused hazards affecting the town of Moultonborough, as identified by the Committee.

F. METHODOLOGY

The Lakes Region Planning Commission (LRPC) corresponded with the Moultonborough Emergency Management Director (EMD) in February 2019 to initiate the hazard mitigation update process in the town of Moultonborough. The EMD established the Moultonborough Hazard Mitigation Planning Update Committee in April 2019 for the purpose of updating a long-range plan for hazard mitigation.

The Committee consisted of representatives from the departments of Fire, Public Works, the Town Planner, Code Enforcement Officer, Town Administrator, School Superintendent and School Business Administrator, and members of the Board of Selectmen. Residents of Moultonborough and representatives from neighboring towns were encouraged to attend and provide input. All meetings were open to the public. No members of the public attended meetings.

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 Town 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 J. Some information on development trends was gathered by the Town Planner. Data on property valuation was gathered through correspondence with the Town Assessor.

The Committee held meetings in April and May 2019. The following timeline shows the dates and corresponding Committee actions. The planning team reviewed sections of the plan, and LRPC provided updated information on hazards in New Hampshire. A sample public notice (Appendix C) and sample meeting agenda and notes (Appendix D) are included in the Appendix.

Committee Meetings

April 29, 2019: *Committee meeting:*
Ernest Davis Meeting Room at Moultonborough Town Hall
 Overview of update process and objectives
 Discussion of Hazards identified in 2018 State Plan and 2013 town Plan
 Committee ranking of hazards

May 10, 2019: *Committee meeting:*
Ernest Davis Meeting Room at Moultonborough Town Hall
 Review of Community Profile and Development Trends update
 Review of Critical Facilities Map and Assessment update
 Review of Current Plans, Policies update
 Status of the 2007 Mitigation Actions
 Update of Mitigation Goals
 Status of 2013 Mitigation Actions

May 31, 2019: *Committee meeting:*
Ernest Davis Meeting Room at Moultonborough Town Hall
 Discussion of 2019 Mitigation Actions

Public Involvement

The Moultonborough EMD invited a variety of Hazard Mitigation Planning stakeholders to join the Hazard Mitigation Planning Committee. The Committee was well represented by municipal officials, including members of the Board of Selectmen, and the Public Works, Assessing, Planning, and Code Enforcement departments. The Moultonborough School District Superintendent and Business

Administrator also participated in Committee meetings. Press releases and public notices encouraged local businesses, neighboring communities, and the public to attend meetings and offer comment (Appendix C). No comments were received from the public or neighboring towns during this review period.

G. ACKNOWLEDGMENTS

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

Joel Mudgett	<i>Chair, Moultonborough Board of Selectman</i>
Charles McGee	<i>Selectman, Moultonborough Board of Selectman</i>
Walter Johnson	<i>Town Administrator, Moultonborough</i>
David Bengtson	<i>Chief, Moultonborough Fire Department and Emergency Management Director (EMD), Moultonborough</i>
Josephine Belville	<i>Town Assessor, Moultonborough</i>
Chris Theriault	<i>Public Works Director, Moultonborough Department of Public Works</i>
Ron DeDucca	<i>Highway Foreman, Moultonborough Department of Public Works</i>
Robert Ward	<i>Town Planner, Moultonborough</i>
Steve Zalewski	<i>Code Enforcement Officer, Moultonborough</i>
Patrick Andrew	<i>Superintendent, Moultonborough School District</i>
Amanda Bergquist	<i>Business Administrator, Moultonborough School District</i>
Heidi Lawton	<i>Field Representative, NH Homeland Security and Emergency Management</i>
Susan Slack	<i>Principal Planner, Lakes Region Planning Commission</i>

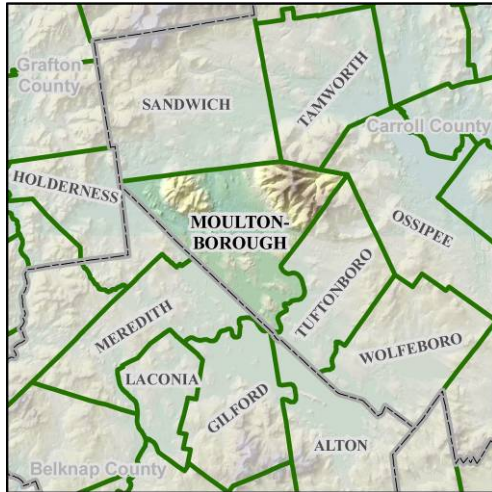
Additional information was provided by:

Jennifer Gilbert	<i>Floodplain Management Coordinator, NH Office of Strategic Initiatives</i>
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CHAPTER II: COMMUNITY PROFILE

A. GEOGRAPHY

The town of Moultonborough is located on the southwestern edge of Carroll County. It is bordered by Sandwich and Tamworth to the north, Holderness and Center Harbor to the east, Meredith, Gilford, and Alton to the south, and Tuftonboro and Ossipee to the east. The total area of Moultonborough is 75 square miles, 60 square miles of land and 15 square miles of water.¹



Rugged, wooded slopes dominate the northern portion of Moultonborough – from Red Hill to the Ossipee Range. Nearly 24 percent, or 8,798 acres, of the town's land area is characterized by slopes of 15 percent or higher. The Ossipee Mountains in the east rise to an elevation of 2,975 feet, at 2,020 feet, Red Hill is another area with steep slopes in the northwest section of town.

The remainder of land in town is characterized by hilly to rolling terrain, divided by wetlands, ponds, and lakes. The numerous ponds and wetlands extend from Squam Lake in the northwest, through Wakondah Pond and Lake Kanasatka, Berry, Garland, and Lees Ponds in the north, to Lake Winnepesaukee in the central and southern parts of town. Moultonborough contains the most shoreline of any town in New Hampshire at 89 linear miles. Aquifers are found in the central section of town beneath Berry, Garland and Lees Ponds. Rivers running through Moultonborough include the Squam River, Shannon Brook, Weed Brook, Halfway Brook, and Red Hill River. The majority of town lies in the Winnepesaukee watershed.

B. WEATHER CONDITIONS

Moultonborough'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. Annual precipitation totals average between 42 and 48 inches, where the distribution is slightly lower in the winter months when compared to summer months. Moultonborough averages about 66 inches of snow per year.²

C. PUBLIC UTILITIES

A five-member Board of Selectmen governs the town of Moultonborough. The Fire Department has three full-time members and 35 call members and includes 19 Emergency Medical Technicians (EMT). The full-time Fire Chief also serves as the Emergency Management Director. The Police

¹ *New Hampshire Community Profiles*, NH Employment and Security Office, <http://www.nhes.nh.gov/elmi/products/cp/profiles-htm/moultonborough.htm>, accessed July 19, 2012.

² <http://www.city-data.com/city/Moultonborough-New-Hampshire.html>, accessed October 1, 2012.

Department consists of a full-time Police Chief, 11 full-time officers, two part-time officers, and five support staff providing 24/7 coverage. The Public Works Director has 14 full-time and four seasonal who maintain 52 miles of town roads, run the Transfer Station, and maintain the town's facilities. The Lakes Region General Hospital is in Laconia, 12 miles southwest of Moultonborough, Speare Memorial Hospital is 18 miles to the northwest, and Huggins Hospital is 16 miles to the southeast. Additional hospitals are also located in Dover, Concord, and Lebanon.

NH Route 25 runs generally east-west and NH Route 109 runs generally north-south and they intersect in the Village area. NH Route 171 breaks off to the east from NH Route 109 and Moultonborough Neck Road is the sole access road to that portion of town. Most of the town's critical facilities are located along these roads.

Businesses and residences near the Center Harbor town line have access to the Bay Sewer District system. Approximately 750 residences are served by several community water systems; the rest of the town has individual wells. The town is served by NH Electric Cooperative. The Moultonborough Fire Department maintains 42 dry hydrants around town.

Huggins Hospital operates a family medical clinic in Moultonborough village.

D. LAND USE AND DEVELOPMENT TRENDS

According to the US Census, Moultonborough was among the fastest growing communities in the Lakes Region from 1980 to 1990. This trend continued through the 1990s as the town had the highest rate of population growth in the region. The 2010 report showed a modest drop in the year-round population, while the 2017 estimate indicates a very slight increase.

Moultonborough, NH Year-Round Population, 1980-2017

Year	1980	1990	2000	2010	2017*	2019** Seasonal
Population	2,206	2,956	4,480	4,044	4089	24,407
% Changed	---	34%	52%	- 10%	1%	---

*NH Office of Strategic Initiatives Estimate

**Town of Moultonborough Master Plan, Housing Chapter 2018

The 2000 Census reported that 55.7% of Moultonborough's homes were seasonal; in 2010 that rate was up to 60.5%; and, according to the 2018 Moultonborough Master Plan Housing Chapter, that figure increased to nearly 65%. Because of this very seasonal nature of housing in Moultonborough, it is important to acknowledge that the actual number of people residing in town can fluctuate quite a bit. The Committee felt that a more accurate representation of the population that the town serves is determined by breaking down the type of housing, for while a year-round household might accommodate 2 to 4 persons, a second home may have 5 to 10 people staying there for a few weeks at a time.

Moultonborough, NH Population

	Number of Units	Persons per Household	Persons
Year -round residential	1,799	2.4	4,317
Second homes residential	3,618	5.0	18,090
Seasonal (camps, campgrounds, motels)			2,000
TOTAL	5,499		24,407

While there is some variability, the Traffic Volume Reports for 2018 from the NH Department of Transportation indicate a slight increase in traffic volumes since 2007 along Moultonborough's major roadways. NH Route 25 has average Annual Daily Traffic counts in the range of 10,000 (east of Sheridan Road) to 15,000 (at Moultonborough Neck Road) vehicles per day; Moultonborough Neck Road carries about 6,215 vehicles per day, and NH Route 109 (south of the village) carries about 5,882 vehicles per day. As this is a projected average over the entire year, there are certainly many summer days when the volume of traffic on any one of these roads far exceeds these figures. To help improve traffic patterns and reduce the likelihood of some transportation incidents along state routes, the town Planning Department is utilizing Access Management techniques.

The town has enacted a steep slopes ordinance, and the floodplain management ordinance has been updated. New Digital Flood Insurance Rate Maps (DFIRM) for Carroll County were authorized in 2013.

Overall, the community's vulnerability to hazards has remained about the same since the 2013 Plan update; however, it is worth noting the steady increase in the percentage of seasonal homes among the total number of housing units in Moultonborough and the accompanying seasonal population swing that results. Communicating educational and regulatory information to seasonal residents presents challenges for mitigating the impacts of hazards.

CHAPTER III: RISK ASSESSMENT

A. IDENTIFYING HAZARDS

Moultonborough is prone to a variety of natural, technological, and human-caused hazards. The Committee reviewed the hazards identified in the 2013 Plan, which identified the following hazard events as the greatest threats to the town at that time.

Hazards Identified in the 2013 Moultonborough Hazard Mitigation Plan

Hazard Event	Overall Risk
High Wind (Tornado, Downburst)	High
Lightning	High
Severe Winter Weather	High
Motor Vehicle Incident with Hazardous Materials	Moderate
Epidemic	Moderate

The committee supplemented this by considering all of the hazards identified in the *2018 State of New Hampshire Multi-Hazard Mitigation Plan*, developed by the New Hampshire Department of Safety’s Division of Homeland Security and Emergency Management, for additional hazards that might affect the town.³ The following is a state-wide summary of the frequency and severity of these hazards.⁴

New Hampshire Hazards Profile

Statewide Risk Assessment – Rating Table

Threat/Hazard	Classification	Human Impact	Property Impact	Economic/ Business Impact	Average Impact Score	Probability of Occurrence	Overall Risk	Counties Most Vulnerable
Avalanches	Natural	1	1	1	1	2	2	Coos, Grafton, and Carroll
Coastal Flooding	Natural	3	6	6	5	3	15	Rockingham and Strafford
Inland Flooding	Natural	6	6	6	6	3	18	Statewide
Drought	Natural	1	3	3	2	2	4	Statewide
Earthquakes (>4.0)	Natural	1	3	1	2	1	2	Statewide
Extreme Temperatures	Natural	3	1	1	2	3	6	Statewide
High Wind Events	Natural	3	6	3	5	3	15	Statewide
Infectious Diseases	Natural	3	1	3	2	2	4	Statewide
Landslide	Natural	1	3	3	2	3	5	Statewide
Lightning	Natural	1	3	1	2	3	6	Statewide
Severe Winter Weather	Natural	6	6	6	6	3	18	Statewide
Solar Storms & Space Weather	Natural	3	1	3	2	1	2	Statewide
Tropical & Post-Tropical Cyclone	Natural	6	6	6	6	2	12	Statewide
Wildfire	Natural	1	1	1	1	2	2	Statewide
Aging Infrastructure	Technological	3	6	3	4	3	12	Statewide
Conflagration	Technological	6	6	6	6	2	12	Statewide
Dam Failure	Technological	3	3	3	3	2	6	Statewide
Known and Emerging Contaminants	Technological	6	6	3	5	3	15	Statewide
Hazardous Materials	Technological	1	3	3	2	3	6	Statewide
Long-Term Utility Outage	Technological	6	6	6	6	1	6	Statewide
Radiological	Technological	1	1	3	2	1	2	Statewide
Cyber Event	Human-caused	3	1	6	3	3	9	Statewide
Mass Casualty Incident	Human-caused	6	1	3	3	1	3	Statewide
Terrorism/Violence	Human-caused	6	3	3	3	3	9	Statewide
Transport Accident	Human-caused	3	3	3	3	3	9	Statewide

Impact Scoring

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

- 2- 34-66% Probability of occurring within 10 years (Medium)
- 3- 67%-100% Probability of occurring within 10 years (High)

Probability Scoring

- 1- 0-33% Probability of occurring within 10 years (Low)

³ https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf visited July 15, 2019.

⁴ https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf visited July 15, 2019.

Due to geography, coastal flooding was not considered locally pertinent. Historical information from internet sources about past hazard events in and near Moultonborough since 20013 were reviewed. The committee identified the hazards listed below as the most important hazards for the town of Moultonborough.

2019 Hazards of Concern: Moultonborough, NH

Mass Casualty	Severe Winter Weather	Tropical and Post-Tropical Storms
Conflagration	Extreme Temperatures	Drought
High Wind Events	Lightning	Inland Flooding

B. PROFILING HAZARD EVENTS

Each of the hazards that the Committee identified as likely affecting Moultonborough is profiled below. This section of the plan describes each of the hazards the Committee felt might impact Moultonborough. It describes the likely location of each hazard, the extent of the hazard, and the probability of an occurrence in Moultonborough. The extent is a description of “how bad the hazard could get,” and the probability of occurrence is based upon a review of occurrences since the 2013 Plan as well as earlier events.

A list of past hazard events is included in Appendix E. Information on other hazards the Committee determined were not as likely to affect Moultonborough is included in Appendix G.

The Committee defined Probability of Occurrence as:

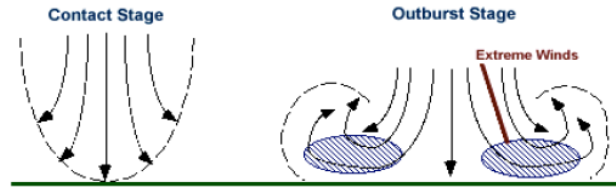
	Probability of Occurrence
Highly Likely	90 to 100% probability of occurrence in the next year or a recurrence interval of less than 1 year
Likely	10 to 90% probability of occurrence in the next year or a recurrence interval of 1 to 10 years
Occasional	1 to 10% probability of occurrence in the next year or a recurrence interval of 11 to 100 years
Unlikely	< 1% probability of occurrence in the next year or a recurrence interval of more than every 100 years

NATURAL HAZARDS

HIGH WINDS (TORNADO/DOWNBURST)

Location: 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 and other high wind events are 10 times more likely to occur than tornadoes. All areas of town are susceptible to damage from high winds.

Extent: 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.⁵ Downbursts fall into two categories based on their size:



- microbursts, which cover an area less than 2.5 miles in diameter
 - macrobursts, which cover an area at least 2.5 miles in diameter
- Image source: NH HSEM

Downed limbs and trees can make roads impassable and bring down power and telephone wires. Paradise Drive is the sole access road to the Balmoral subdivision. This is a particular issue along many private roads, where cutting back of trees does not occur as frequently as along municipal roads.



In Moultonborough, the major damage from downbursts or tornados comes from falling trees, which may take down power lines, block roads, or damage structures and vehicles. A wind event in Moultonborough on July 26, 1994 was classified as a macroburst. It affected an area one-half mile wide by 4 to 6 miles in length. This same storm produced wind damage typical of a micro/macroburst in nearby Meredith. An F2 tornado ripped through a 50-mile section of central NH in July 2008 from Epsom to Freedom, leading to requests for federal disaster declarations in several counties.⁶ It took down trees and electrical lines and did damage to buildings in parts of nearby Wolfeboro.

History:

Hazard	Date	Location	Remarks/Description	Source
Tornado	7/4/2014	Gilford, Center Harbor	A waterspout touched down on Lake Winnepesaukee briefly. No damage was reported.	NOAA
Tornado	7/30/2015	Warner	An EF0 touched down briefly in Warner. It snapped about 25 trees and tore a roof off a large storage building.	NOAA
Tornado	7/18/2016	Pittsburg	A tornado touched down with winds of about 75 mph and a maximum path width of about 200 yards. 100s of trees were snapped and wires down in multiple locations.	NOAA

NOAA reports three tornados in New Hampshire since 2013; no injuries or deaths were reported. In this same time period, there were more than 60 reports of thunderstorm/high wind (>40 mph) events in Carroll County with no deaths or injuries and \$1,000 in damages recorded. Four of these thunderstorm/high wind event reports came from Moultonborough (9/11/13, 7/3/14 (two),

⁵ *Weather Glossary*. National Oceanic and Atmospheric Administration, <http://www.weather.gov/glossary/index.php?letter=d>, visited March 8, 2011.
⁶ <http://www.fema.gov/news/newsrelease.fema?id=45525> visited March 8, 2011.

9/11/16) and one was reported over Lake Winnepesaukee (10/8/14). There were reports of downed trees and some power lines, but no injuries or structural damages were reported.

The Lakes Region is at risk of several types of natural events associated with high winds, including downbursts and tornadoes. The northeast is in a zone that should be built to withstand 160 mile an hour wind gusts.

Tornado/Downburst

Although tornadoes are locally produced, damage paths can be in excess of one mile wide and 50 miles long.⁷ The Fujita Scale is used to measure the intensity of a tornado (or downburst) by examining the damage caused in the aftermath, shown below.⁸

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)

Operational Enhanced Fujita (EF) Scale

The major damage from downbursts come from falling trees, which may take down power lines, block roads, or damage structures and vehicles. New Hampshire experienced three such events in the 1990s. One event occurred in Moultonborough on July 26, 1994 and was classified as a macroburst. It affected an area one-half mile wide by 4 to 6 miles in length.

The tornado/downburst risk for an individual community in New Hampshire is relatively low compared to many other parts of the country. Though the danger that these storms present may be high, the frequency of these storms is relatively low to moderate.



Downed trees and power lines from the July 24, 2008 tornado.

Probability of Occurrence: Highly Likely

⁷ FEMA Hazards: Tornadoes <http://www.fema.gov/business/guide/section3e.shtml>, visited February 8, 2011.

⁸ <http://www.tornadoproject.com/fscale/fscale.htm> visited March 8, 2011.

SEVERE WINTER WEATHER

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 region is at greater risk than another, but there are segments of the population that are more at risk. These include the elderly, people 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.

Extent:

A heavy snowstorm can be defined as one which deposits four or more inches of snow in a 12-hour period.⁹ 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.

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.

Snowstorms are a common occurrence throughout the Lakes Region. Blizzards may dump 12 to 36 inches or more of snow in a one- to three-day period. Though less frequent, blizzards can have a serious impact on structures, utilities, and services. The region typically receives greater than 66 inches of snow annually.¹⁰

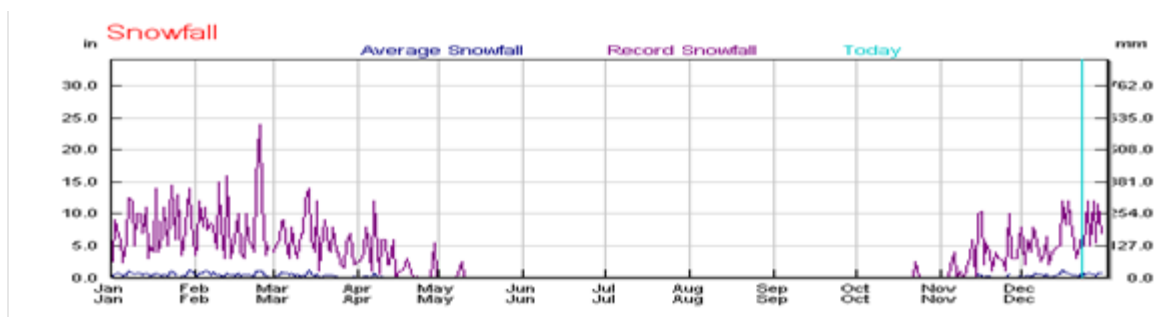
An ice storm coats trees, power lines, streets, vehicles, and roofs with a very slick and heavy coating of ice. The major threats to a community due to ice storms include structural damage due to heavy loads on roofs, interruptions of services such as electricity, fuel, water, and communications, as well as hazardous road conditions.

In the winter of 1998, a major ice storm crippled much of New Hampshire, including the Lakes Region, coating everything with as much as three inches of ice. This 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 U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory estimates a 40- to 90-year return period for an event with a uniform ice thickness of between 0.75 and 1.25 inches. Ten years later, however, New Hampshire was struck again by another severe ice storm. The December 2008 ice storm caused more damage than any other storm in the state's history. The President declared this storm as a major disaster and the state received \$15 million in federal aid for recovery.¹¹

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

¹⁰ *Northeast States Emergency Consortium*, <http://www.nesec.org/>, visited January 25, 2011.

¹¹ <http://www.fema.gov/news/newsrelease.fema?id=48384>, visited January 25, 2011



Average and Record Snowfalls for the Laconia, NH Airport¹²

In the winter months, the region may experience blizzard conditions. A blizzard is characterized by sustained winds or frequent gusts to 35 miles per 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.¹³ Note: The scale below is for the Regional Snowfall Index, which incorporates not only snowfall values but also the spatial extent of the storm and the population impacted¹⁴.

Snowfall Categories

CATEGORY	RSI VALUE	DESCRIPTION
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18.0+	Extreme

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. Infrastructure, including critical facilities, may be impacted by these events, and power outages, communications, and transportation disruptions (i.e., snow and/or debris-impacted roads, as well as hazards to navigation and aviation) are often associated with the event. In the winter months, the state may experience the additional coincidence of blizzard conditions with many of these events. A blizzard is characterized by sustained winds or frequent gusts to 35 miles per hour or greater and considerable amounts of falling or blowing snow that last for a duration of three hours or longer. The combination of winds and snow reduce visibility to less than a

¹² Laconia is the nearest official station in New Hampshire with historical records. Weather Underground, Season Weather Averages <https://www.wunderground.com/NORMS/DisplayNORMS.asp?AirportCode=KLCI&SafeCityName=Effingham&StateCode=NH&Units=none&IATA=LCL>.

¹³ "Winter storm terms," http://www.fema.gov/hazard/winter/wi_terms.shtm, visited February 8, 2011.

¹⁴ NOAA <https://www.ncdc.noaa.gov/snow-and-ice/rsi/>

quarter mile.¹⁵ The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods.

Downed limbs and wires and unplowed or untreated roads can severely limit emergency access to many residences. The potential for very cold temperatures and loss of power can quickly compound the issue. A severe ice storm struck central and southern New Hampshire and New England on December 11, 2008. Over 400,000 people were without power, some for over two weeks, and overall damages exceeded \$15 million.

History:

Hazard	Date	Location	Remarks/Description	Source
Snowstorm	2/8-/ 10/2013	Statewide	Total Public Assistance Grants Dollars obligated was \$6,153,471.49. Snowfall amounts were generally 18". Declared Disaster, DR-4105.	FEMA
Snowstorm	1/26- 1/28/2015	Statewide	Snowfall across the state ranged from 10 to 30 inches. Blizzard conditions led to coastal flooding and splash over. Total Public Assistance Grants Dollars obligated was \$4,939,214.76. Declared Disaster, DR 4209.	FEMA
Snowstorm	3/14- 3/15/2017	Statewide	Primary impact was damage to utilities. Two counties received public assistance totaling \$1,687,439.45. Declared Disaster, DR-4316.	FEMA
Blizzard	3/13- 3/14/2018	Statewide	Declared Disaster, DR-4371	HSEM
Nor'easter	4/27/2007	Statewide	Nor'easter caused flooding, damage in excess of \$25 million	FEMA
Ice Storm	12/11/2008	Statewide	State emergency declaration after major power and transportation disruption. Exceeding \$15 million in damages. Over 400,000 without power, 2 fatalities due to carbon monoxide poisoning.	NH HSEM

NOAA lists an additional 34 heavy snowstorms in Southern Carroll County since 2013 with nearly two dozen of them depositing a foot or more of snow. While these events did impact Moultonborough, no specific measurements related to Moultonborough were noted, nor were there deaths, injuries, or structural damages noted.

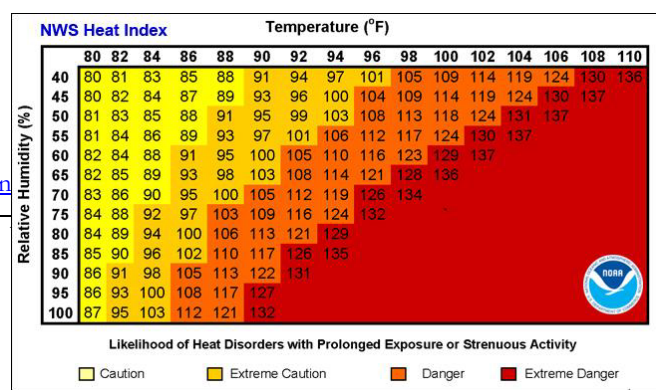
Probability of Occurrence: Highly Likely

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

¹⁵ "Winter storm terms," <http://www.fema.gov/hazard/win>



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. 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 presented is when the body loses heat faster than it can produce it. Wind acts to carry heat away from the body, therefore amplifying the body’s perceived temperature and reducing core temperature. Cold disorders can include frostbite and hypothermia.

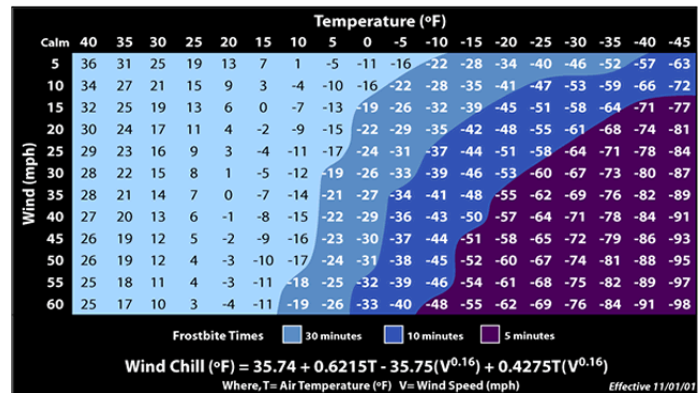
Frostbite occurs when uncovered skin and extremities are exposed to extreme cold and the body tissue is either injured or killed. Hypothermia is when the body is unable to heat itself at the rate it is being cooled and the body’s core temperature drops below normal values. A normal core body temperature is 98.6°F: mild hypothermia occurs when core body temperature drops between 90 and 95°F; 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.

Location:

Extreme temperatures can occur anywhere throughout the town of Moultonborough. Exposure to the combination of cold and wind could be enhanced at higher, more exposed elevations.

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.¹⁶

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

Moultonborough has experienced regular extreme hot and cold temperatures annually since the last plan update.

Probability of Occurrence: Likely

LIGHTNING

Location: Lightning can strike anywhere in town. Tall objects tend to be most susceptible to lightning strikes.

Extent: Moderate

¹⁶ 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.

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.¹⁷ Exactly where and when lightning will strike is unknown. These giant sparks of electricity can result in fire, damage to electronic equipment, injury/death to people.

The National Weather Service utilized 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.¹⁸

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.

The discharge of lightning causes an intense sudden heating of air. The air rapidly expands when heated, then contracts as it cools, causing a shock wave that we hear as thunder. This shock wave is sometimes powerful enough to damage windows and structures. Lightning damages cost the insurance industry more than \$5 billion annually in the United States.¹⁹

In the Lakes Region, however, fewer than two lightning strikes occur per square kilometer annually.²⁰ 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. The Committee is concerned that lightning might ignite a fire or damage emergency communications systems.

History: In the spring of 2012 the Public Safety Building was hit by lightning, resulting in the need to replace numerous computer systems. Two lightning events occurred since 2013 that merited documentation. In June 2013 there was a strike at a scout camp in nearby Gilmanton (Belknap County), sending two dozen people to local hospitals; no deaths or serious injuries occurred. There was also a lightning strike in nearby Madison (Carroll County), resulting in two injuries. Although lightning has occurred each summer in Moultonborough since 2013, there have not been any reports of damage, death, or injury in town since then.

¹⁷ <http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hmp-chapter-3.pdf> accessed September 16, 2013.

¹⁸ NWS Definitions webpage, <http://graphical.weather.gov/definitions/defineLAL.html>. Accessed June 3, 2014.

¹⁹ National Lightning Safety Institute webpage, http://www.lightningsafety.com/nlsi_lls/nlsi_annual_usa_losses.htm visited February 8, 2011.

²⁰ Northeast States Emergency Consortium, <http://www.nesec.org/> visited January 25, 2011.

Hazard	Date	Location	Remarks/Description	Source
Lightning	6/24/2013	West Alton	Large hail and wet microbursts were main concerns. 30 people were injured by lightning at a Boy Scout camp in nearby Gilmanton.	NOAA
Lightning	7/18/2013	Melvin Village	Wind damage and heavy rain were the main concerns as the storm moved through the region. Lightning struck two sailboats causing them to catch fire and sink in Lake Winnepesaukee.	NOAA

COUNTY	LOCATION	DATE	EVENT TYPE	DEATHS	INJURIES	PROPERTY DAMAGE
BELKNAP CO.	WEIRS BEACH	7/4/2012	Lightning	0	3	0.00K
BELKNAP CO.	WEST ALTON	6/24/2013	Lightning	0	30	0.00K
CARROLL CO.	MELVIN VLG	7/18/2013	Lightning	0	0	20.00K
CARROLL CO.	EAST MADISON	7/2/2014	Lightning	0	2	0.00K

Probability of Occurrence: Likely.

TROPICAL AND POST-TROPICAL CYCLONES

Tropical and Post-Tropical Cyclones are localized, very intense low-pressure wind systems, forming over tropical oceans with winds of hurricane force. 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, it poses the threat of becoming one
- Tropical Disturbance: A cluster of showers and thunderstorms that flares up over the tropics. Usually 100 to 300 miles in diameter and generally moves westward.
- Tropical Storm: Sustained wind levels are between 34 knots and 64 knots (39 to 74 MPH)
- Hurricane: A tropical cyclone that 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. 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.

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

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.²¹ Hurricanes are measured by the Saffir-Simpson Hurricane Scale: a 1-5 rating

²¹ http://www.fema.gov/hazard/hurricane/hu_about.shtm, visited January 25, 2011.

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.
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.²² 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.²³ Hurricane Bob, a category 2 storm, in 1991,

²² http://www.noaa.gov/news/stories/2010/20101129_hurricanesseason.html visited January 25, 2011 and http://www.noaa.gov/news/stories/2013/20131125_endofhurricanesseason.html.

²³ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html>, visited January 25, 2011.

was declared a major federal disaster in New Hampshire and is recorded as a severe storm in the state's history.²⁴

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. There was little impact to Moultonborough from these events.

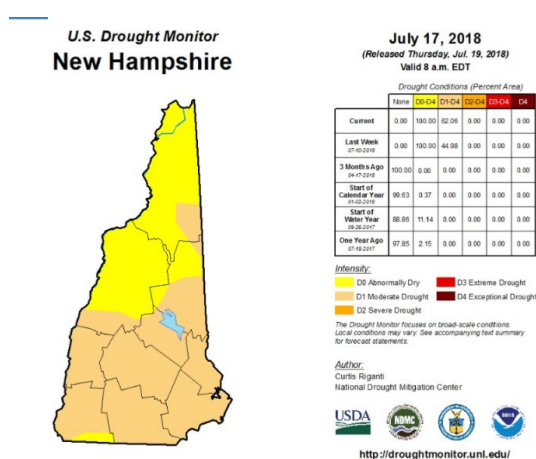
Probability of Occurrence: Likely

DROUGHT

Location: Drought is a regional hazard, affecting broad sections of the state at any given time. The effects of a drought are felt locally based on local water resources and individual water uses.

Extent: Moderate

Drought occurs when less than the normal amount of water is available for extended periods of time. 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 levels of rain or snow, 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.



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, and Emergency. The US Drought Monitor²⁵ uses a five-level drought intensity scale ranging from Abnormally Dry to Exceptional Drought.

History: Six extended droughts have occurred in New Hampshire in the past century: 1929–1936, 1939–1944, 1947–1950, 1960–1969, and 2001–2002.²⁶ Moderate drought conditions existed in New Hampshire during parts of 2015 and 2016, continuing for nearly a year and ending in April 2017.²⁷ Moultonborough experienced these moderate drought conditions since the last update but the impacts have been minimal.

Probability of Occurrence: Occasional

INLAND FLOODING

²⁴ <http://www.fema.gov/news/event.fema?id=2118> visited January 25, 2011

²⁵ US Drought Monitor <http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?NH>.

²⁶ <http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>.

²⁷ <https://www.drought.gov/drought/states/new-hampshire>

Definition: 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 most commonly associated with structures and properties located within a floodplain.

Location: There are a few road segments and one segment of lakeshore that are prone to flood. Digital Flood Insurance Rate Maps (DFIRM) developed in 2012 for Moultonborough show the flood boundaries in the event of a 1 percent flood, which is defined as a having a 1 percent chance of flooding each year and is sometimes referred to as 100-year flood. There is a large, mainly undeveloped area on Moultonborough Neck that floods on occasion, limiting access to the ends of a couple of roads. There are also a couple of areas in the Balmoral subdivision that readily flood, cutting off a number of homes from emergency services (these are private roads and there is no other ready means of access).

Extent: In Moultonborough, despite the large areas of surface water and low slopes relative to the region, there are relatively few low-lying areas susceptible to flooding. A few homes at the end of Kim's Alley experience minor flooding when the water level of Lake Winnepesaukee is high. Most of the concerns are associated either with flooding on low-lying roads, which limits emergency access (Sunrise Drive and Robin Lane), or road erosion associated with steep slopes (Ossipee Park Road, Bodge Hill Road).

History:

Hazard	Date	Location	Remarks/Description	Source
Flood	6/26-7/3/2013	Grafton, Sullivan, Cheshire	The total Public Assistance was \$5,903,017.87. Declared Disaster, DR-4139	FEMA
Flood	7/1-7/2/2017	Coos, Grafton	The total Public Assistance \$699,661.26. Flood stages ranged from 9.00ft to 13.00ft. Declared Disaster, DR-4329.	FEMA
Flood	10/29 - 11/1/2017	Coos, Grafton, Carroll, Belknap, Merrimack, Sullivan	The total Public Assistance was \$365,851.11. Flood stages ranged from 8.00ft to 13.00ft. Declared Disaster, DR-4355.	FEMA, NOAA
Flood	3/2-3/8/2018	Rockingham	Declared Disaster, DR-4370.	HSEM

Since 2013 four flood events around the state were designated as Declared Disaster events, including one in Carroll County in 2017. Occasional minor flooding has occurred in Moultonborough on low-lying roads (Sunrise Drive, Robin Lane).

Probability of Occurrence: Occasional

TECHNOLOGICAL AND HUMAN-CAUSED HAZARDS

Mass Casualty

A mass casualty is any large number of casualties, usually the result of a single incident and produced in a relatively short period of time, that exceeds the local emergency service's capabilities. A mass casualty could impact fire and police departments, regardless of their size. Mass casualties could be incidents such as a military aircraft accident, hurricane, flood, earthquake, or armed attack, including an active shooter, but could also involve multiple victims injured as a result of a motor vehicle accident on a local highway. A mass casualty could occur anywhere in Moultonborough.²⁸

Probability of Occurrence: Occasional

Conflagration

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



Alton Bay Christian Conference Center,
2009

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

Committee members expressed concern about the numerous boat marinas located in a concentrated area in Moultonborough. They all store hundreds of boats and have supplies of fuel and other flammable materials.

Probability of Occurrence: Occasional

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. Moultonborough 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

²⁸ 2018 State of New Hampshire All-Hazard Mitigation Plan, p. 182

the community, mutual aid resources regionally, public awareness and education, and emergency response training.

CHAPTER IV: VULNERABILITY ASSESSMENT

A. INVENTORY ASSETS

The list of critical infrastructure for the town of Moultonborough was updated by the Committee and the values updated by the Town Assessor. The critical infrastructure list below is divided into four categories, 1) Essential Services; 2) Emergency Shelters; 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 Centers. The second contains the emergency shelters within the town. 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 to hazards. The fourth category contains special populations that may require additional attention in the event of a disaster. In Moultonborough the fifth category includes the historic village area.

Critical Facilities

CLASSIFICATION	TYPE	NAME	2018 Value
EOC & Essential Services	Fire/Police Dept	Moultonborough Safety Bldg.	Part of Town Hall Complex
Emergency Shelter / Populations to Protect	Educational	Moultonborough Academy	\$7,696,300
Essential Services / Back-up EOC	Administration	Town Hall Complex	\$6,569,600
Essential Services	Electric Services	NHEC-Power Substation	\$119,100
Essential Services	Fire Department	Moultonborough Neck Station	\$415,500
Essential Services	Public Works	Highway Garages	\$609,200
Essential Services	Telephone	FairPoint Communications	\$2,869,500
Populations to Protect	Day-Care	Imaginations... A Child's Place	\$241,300
Populations to Protect	Elderly Housing	West Wynde Community	\$638,800
Populations to Protect	Seasonal Summer Camp	Camp Quinebargue	\$1,499,738
Populations to Protect	Seasonal Summer Camp	Camp Robindel	\$6,368,900
Populations to Protect	Seasonal Summer Camp	Camp Tecumseh	\$5,881,791
Populations to Protect	Seasonal Summer Camp	Camp Winaukee	\$6,265,887
Populations to Protect	Seasonal Summer Camp	Deer Hill Camp	\$1,338,085
Populations to Protect	Seasonal Summer Camp	Geneva Point Center	\$11,132,400
Structures & Services	Commercial	Commercial District	
Structures & Services	Landfill/Transfer Station	Town Landfill	\$534,300
Structures & Services	Marina	Trexler's Marina	\$1,949,900

Structures & Services	Marina	MYVY LLC- (Ambrose Cove Marina)	\$2,014,800
Structures & Services	Unique Feature	Castle in the Clouds	\$2,033,300
Structures & Services	Airport	Moultonborough Airport	\$71,400
Historic Area	Historic Resources	Downtown Historic District	
Essential Services	Electric Services/Solar farm	NHEC substation on Moultonboro Neck Road	\$29,912,700
Essential Services	Electric Services	NHEC substation on Gov. Wentworth Highway (Rte. 109)	\$81,400
Essential Services	Utility	Lakes Region Water	\$1,976,189
Essential Services	Utility	Bay Sewerage System	\$535,300
Structures & Services	Community	Town of Moultonborough Lions Club	\$475,400

^Note - Assessment includes all poles and conduits in town.

* Note - Castle in the Clouds previously was owned by Lakes Region Conservation Trust and included all the land. It now is buildings only owned by Castle Preservation Society.

The *Potential Hazards and Critical Facilities Map* (Appendix F) identifies the location of the critical facilities in relation to mapped hazard areas.

B. IMPACT OF HAZARDS

The impact of a hazard is the potential degree of damage that could occur in Moultonborough. This incorporates the assessed value of each critical facility and the vulnerability of these facilities and various populations and places to protect. To rate the impact of the hazards deemed High- and Medium-Risk for Moultonborough, committee members considered the damages and consequences that might result from an event, as defined below:

	Impact of Hazard
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 on are likely to be interrupted for days or weeks
High	It is quite likely that injuries or deaths will result from this hazard. There will be damage to multiple properties. Essential services and other services that residents and visitors depend on are likely to be interrupted for days
Moderate	There is some likelihood that injuries or deaths will result from this hazard. There will likely be damage to land and property and interruption to essential services and other services that residents and visitors depend on for hours or days
Low	There is little likelihood that injuries or deaths 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 will not be interrupted

Mass Casualty

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. A tractor-trailer incident on Ossipee Park Road or at its junction with NH Route 171 could impact several vehicles, temporarily limit access to the water bottling plant, or block travel along a portion of the state highway. A major transportation accident along NH Route 25 can tie up traffic and could result in delays in some emergency services. While a couple of the town's critical facilities, the Public Safety Complex and Moultonborough Central School are located along NH Route 25, damage to structures would likely be minimal and the impact on the town would be low, although a mass casualty that involved an active shooter or terrorist incident would have a higher impact on the community.

Average Impact: Moderate

Conflagration

Conflagration would invoke a considerable degree of damage to compactly developed areas of the town, including Moultonborough's historic village area.

Average Impact: Moderate

High Wind Events

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 current building code standards, could be at risk.

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 structural damage, and can down utility lines and block roads. This is particularly the case along private roadways that may only get limited cutback of vegetation.

Average Impact: Low to Moderate



Tuftsboro - September 2011

Severe Winter Weather

Major roads, Populations to Protect, Emergency Response Facilities, Essential Services, and flat-roofed buildings are all susceptible to damage from heavy snow or ice 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.

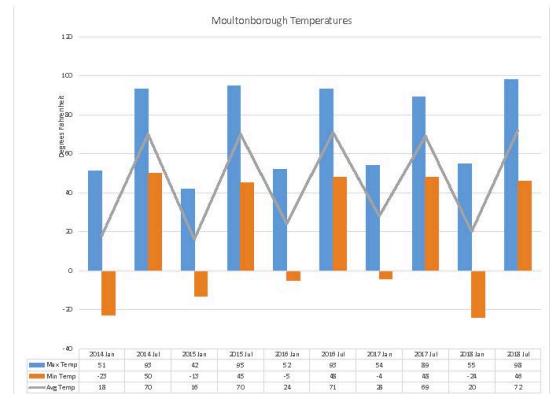
The first priority of the Moultonborough DPW is to clear and treat all municipal roads. The precipitation from some storms can outpace the capacity of the equipment of local businesses contracted to maintain private road.

Average Impact: Low to Moderate

Extreme Temperatures

Extreme cold is likely to have greater impact in Moultonborough than extreme heat. Extreme cold can be accompanied by severe winter weather, exacerbating conditions. Extreme cold can cause injury and even death from frostbite and hypothermia. Frozen water pipes can damage buildings.

Average Impact: Low to Moderate



Lightning

Power outages, whether associated with natural or human-caused hazards have the potential to cause great disruption to residents and the functioning of the town. There is back-up power for most municipal facilities. The Town Hall (Secondary EOC) does not have facility-wide surge protection. The elderly and disabled who rely on powered medical devices are at risk. According to Fire Department records, more than 60% of homeowners who have registered with the Code Red notification program use cell phones as their primary method of contact. It was also noted that more and more of the communication, coordination, and security functions of the town's departments and facilities rely upon electronic systems. Lightning can have a direct impact on the town's critical facilities (Public Safety Complex, Town Hall, Moultonborough Neck Fire Station).

Average Impact: Low

Tropical and Post-Tropical Cyclones

While most facilities in town have the potential to be impacted in some fashion, direct structural impact would most likely affect the those in floodplains, along steep hillsides, or facing expanses of open water. Emergency services might be compromised due to heavy rain or downed trees.

Higher category hurricanes are rare in central New Hampshire, but they could occur. More commonly these storms impact the area as tropical storms. In August 2011, the remnants of Hurricane Irene produced high winds and torrential rain that lead to road closures due to several factors including flooding, downed power lines, and downed trees.

Average Impact: Low

Drought

All of Moultonborough's residential and commercial properties rely on wells for water supply. In addition to individual homeowners, the impact of drought would be felt by several agricultural and landscape businesses in Moultonborough. An extended period without precipitation, including lack of snowfall, could elevate the risk for wildfire and tree blowdowns; an extreme drought would threaten water supply and aquifer levels. Because the impact of drought in Moultonborough is likely to affect

individual property owners and agricultural businesses, rather than cause structural damage, the cost is difficult to calculate and would primarily result from diminished water supply and an associated fire risk.

Average Impact: Low to Medium

Inland Flooding

The town of Moultonborough joined FEMA's National Flood Insurance Program (NFIP) on March 1, 2000 and actively participates in floodplain management compliance through the administration of its floodplain ordinance. The Digital Flood Insurance Rate Maps (DFIRM) for Carroll County were updated in 2013, and the town's Floodplain Ordinance was revised in coordination with NH Office of Strategic Initiatives (NH OSI) and adopted by town voters. The Code Enforcement Officer is responsible for enforcing the ordinance. Compliance is managed through the town's floodplain permit process, and is incorporated into the town's subdivision and site plan review regulations. The town maintains floodproofing and elevation certificates. Letters of Map Amendment and Letters of Map Change are posted on the town's website. Moultonborough's Land Use Department and Code Enforcement Officer encourage property owners to utilize the floodplain map layer with digitized tax maps that are made available on the town's website.

The floodplains in Moultonborough are scattered around town. There are currently 32 buildings with flood insurance policies in force (insurance value \$8,533,100). All are residential buildings. Since 1977 there have been three losses paid out for a total of \$49,658. There have been no repetitive losses in Moultonborough.²⁹

Because of the geography of Moultonborough, damage from flowing water is not a major concern; the concerns of the Committee instead focus on the fact that approximately 60 homes can end up with limited access to emergency services due to water coming over a couple of private roadways.

Erosion along a short section of Ossipee Park Road could result in a delivery vehicle accident and interruption of business for the Castle in the Clouds/CG Roxane water bottling facility.

Average Impact: Low

C. ESTIMATING POTENTIAL LOSSES

The 2019 assessed value of the critical facilities is included in the Critical Facilities table in Section A and totals \$91,230,790. This does not, however, include the contents of buildings and does not necessarily reflect the cost of full replacement. Also not reflected in this assessment is the value of built infrastructure such as streets, bridges, curbs, sidewalks, drainage, and utility transmission lines. These values can also be used to determine potential loss estimates if a natural, technological, or human-caused hazard damages part of or an entire facility. Many of the critical facilities listed are privately owned but represent service that the Committee considered essential in mitigating vulnerability to hazards.

The 2019 assessed value of all of the structures in Moultonborough is \$1,471,556,000. The value of the 5,724 residential structures in town totals \$1,380,576,075. The value of the 145 commercial structures in Moultonborough is \$58,622,725 and the value of the 54 tax-exempt structures (including the structures such as the Public Safety Building and Town Hall) is \$32,777,200. Using these figures

²⁹ NH Office of Strategic Initiatives (NH OSI), August 2018.

and acknowledging that there is wide variation on the value of individual structures throughout town, the average value of residential structures in Moultonborough is \$241,117, of commercial buildings is \$404,295, and of exempt buildings is \$606,985.

While the year-round population of Moultonborough is just under 4,100 residents, at seasonal peaks the population likely ranges up to six times that number (see Chapter II Community Profile).

Inland Flooding

Thirty-two residential properties in Moultonborough are covered by flood insurance, 1 in the AE Zone, 7 in the A Zone (1% chance of an annual flood); the remaining properties are in the B, C, and X Zones (less than 1% chance of an annual flood). No commercial/industrial properties are covered. This is less than 1 percent of the properties in town with structures. The insured value of these properties is nearly \$8.5 million. Between 100 and 200 people could be at risk due to flooding. If there is a 1% chance of each of these properties flooding each year, then each year there is the potential that flooding could result in \$119,942 in damages and put 1 to 2 people at risk.

High Wind Events

All structures in Moultonborough are susceptible to damage by high wind events, whether through thunderstorms, downburst, tornado, or cyclones. Assuming 1% to 5% town-wide damage to buildings, high winds could result in \$10,714,320 to \$53,571,600 in damages.

Severe Winter Weather

All structures in Moultonborough 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 5% town-wide damage to buildings, winter weather could result in \$10,714,320 to \$53,571,600 in damages.

Lightning

All structures in Moultonborough 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 \$10,714,320 in damages.

Mass Casualty

A hazardous materials accident would not likely impact structures; rather the impact would be environmental. The Moultonborough Master Plan notes that a reduction in water quality could lead to \$25 million of lost income to the Lakes Region (30 communities).

The primary impact of a transportation incident would be in terms of injury and loss of human life. A secondary impact would be the associated stoppage or detour of traffic. This is especially important if this occurs during another hazard event on an evacuation route or if there are no alternate routes. A transportation incident would not likely impact structures. It is impossible to calculate damages associated with an active shooter or terrorism incident.

Wildfire

Due to the heavily wooded nature of the town, all properties in town have the potential to be impacted by a wildfire. However, approximately 76 properties on Long Island are far more exposed to wildfire conditions than any other area of town. The table below indicates that these properties represent approximately 1.4% of the number of residential structures in Moultonborough or

\$13,755,757 in structural value. Between 182 and 380 residents in this area are at risk to wildfire in this area.

Potential Losses - Wildland Fire

Number of Structures			Value of Structures			Number of People - Year-Round			Number of People - Seasonal		
in town	in Hazard Area	% in Hazard Area	\$ in town	\$ in Hazard Area	% in Hazard Area	# in town	# in Hazard Area	% in Hazard Area	# in town	# in Hazard Area	% in Hazard Area
5,869	76	1.29%	\$1,471,556,000	\$19,055,760	1.29%	4,317	182	4.21%	18,495	380	2.05%

Dam Failure

The primary impact of a dam failure would be on NH Route 25 at the Lake Kanasatka dam; water would travel approximately 1,500 ft before entering Lake Winnepesaukee. There is one structure that might be impacted by a dam failure. The impact on structures from a dam failure is estimated at less than \$200,000.

D. SUMMARY OF RISK

The Committee assessed overall hazard risk by rating several factors. Each criterion (probability of occurrence, extent, and impact) was given a rating to show which hazards are the greatest threat to the community, based on historic events and local knowledge, danger and destruction, the town's ability to respond, and economic and environmental issues. The overall risk rating associated with each hazard was determined by multiplying the three factors. This resulted in risk ratings ranging from 1 to 14 (based on the Risk Assessment table on page 30). Based on the total Risk rating, each hazard was determined to be High (totaling 12 or more), Medium (totaling 5 to 12), or Low Risk (totaling less than 5).

HAZARD	TOTAL	RANK	RISK	TYPE
Mass Casualty	14.0	1	HIGH	Human-Caused
Conflagration	14.0	2	HIGH	Technological
High Wind Events	13.33	3	HIGH	Natural
Severe Winter Weather	12.0	4	HIGH	Natural
Extreme Temperatures	10.0	5	MEDIUM	Natural
Lightning	6.0	6	MEDIUM	Natural
Tropical & Post Tropical Cyclones	6.0	7	MEDIUM	Natural
Drought	5.33	8	MEDIUM	Natural
Inland Flooding	5.33	9	MEDIUM	Natural
Hazardous Materials	4.0	10	LOW	Technological
Dam Failure	2.0	11	LOW	Technological
Landslides	2.0	12	LOW	Natural
Wildfires	2.0	13	LOW	Natural
Avalanche	1.0	14	LOW	Natural
Earthquakes	1.0	15	LOW	Natural
Infectious Disease	1.0	16	LOW	Natural
Solar Storms & Space Weather	1.0	17	LOW	Natural

This Plan focuses on hazard events that pose a High or Medium risk to the town of Moultonborough (see risk assessment table below).

Risk Assessment

Moultonborough Hazards - 2019	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	1: Low 2: Moderate 3: High 4: Catastrophic	1: Low 2: Moderate 3: High 4: Catastrophic	1: Low 2: Moderate 3: High 4: Catastrophic	Low Medium High
Avalanches	1	1	1	1	1	1.00	1.00
Drought	2	2	1	1	2	1.33	5.33
Earthquakes	1	1	1	1	1	1.00	1.00
Extreme Temperatures	3	2	1	2	2	1.67	10.00
High Wind Events (Torn./Downb.)	4	2	1	2	2	1.67	13.33
Infectious Diseases	1	1	1	1	1	1.00	1.00
Inland Flooding	2	2	1	2	1	1.33	5.33
Dam Failure	1	2	1	1	1	1.00	2.00
Landslides	2	1	1	1	1	1.00	2.00
Lightning	3	2	1	1	1	1.00	6.00
Severe Winter Weather	4	3	1	1	1	1.00	12.00
Solar Storms & Space Weather	1	1	1	1	1	1.00	1.00
Tropical & Post-Tropical Cyclones	3	2	1	1	1	1.00	6.00
Wildfires	2	1	1	1	1	1.00	2.00
Hazardous Materials	2	2	1	1	1	1.00	4.00
Mass Casualty Incident	2	3	3	2	2	2.33	14.00
Conflagration	2	3	2	3	2	2.33	14.00

It should be noted that the ranking of individual hazards for the purposes of planning discussion does not 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.

CHAPTER V: MITIGATION STRATEGIES

A. CURRENT PLANS, POLICIES, AND REGULATIONS

The planning decisions that affect community growth patterns have evolved over the years as the population and demographics in Moultonborough have changed. Many local programs have the effect of mitigating disasters; some of these have been in effect for years, others have been more recently implemented. A review of existing mitigation strategies was conducted and included review of pertinent documents including the zoning ordinance, subdivision regulations, site plan regulations, emergency management plan, and discussion with Committee members. The following strategies detail existing plans and regulations related to hazard mitigation.

Existing Protections and Policies

Existing Protection	Description	Area Covered	Responsible Party
Zoning Ordinance	Floodplain Development limitations	Town	Planning Board
	Participate in NFIP		
	FIRM maps are developed		
	Shoreland Protection through the state's SWQPA.		
	Require access for FD & emergency responders on all property		
	Telecom Towers – require access for public safety		
Subdivision Regulations	Steep Slopes ordinance	Town	Planning Board
	[6.2] Easements for Utility Access & Public Service		
	[6.3] Flood Hazard Areas		
	[6.5] Documentation of Impacts		
	[7.1 D] Lots - Suitability		
	[7.1 E.5] Lots – Adequacy - Fire		
	[7.3] Public thoroughfare protection from access points through access management		
	[7.4 A] Drainage & provisions of Public Service		
Radio Communications	Stormwater Management Plan is required	Region – partial coverage due to mountains	Police Chief
	4 cell towers (Red Hill, Glidden Road, Moultonboro Neck Road, NH Route 25)		
Sewer/Water Service	Lakes Region Mutual Fire Aid for supplementary communications	Village District	Selectmen
	Bayside Water & Sewer		
Septic Systems	Zoning: 1 acre minimum	Town	Health Officer
	Town allows alternative septic systems – per DES standards		
Fire Department	Participate in Lakes Region Mutual Aid.	Town/Region	Fire Chief
	The F.D. reviews site plans and performs final inspections for oil burners, wood stoves, and fireplaces.		
	There is a monthly officers meeting to discuss response, tabletop exercises, and to review their pre-determined response cards.		

Existing Protection	Description	Area Covered	Responsible Party
Fire Department	Moultonborough F.D. is a member of the Central NH Haz Mat Team.	Town/Region	Fire Chief
	88% of F.D. has operational certification for Haz Mat Responders [operations & decontamination]; goal is 100% certification.		
	Full-time FD Chief		
	3 full-time officers, 33 call firefighters		
	Inspection/Maintenance Plan for equipment		
	100% officers NIMS/ICS Certified		
	3 FD Boats with equipment		
	Trails mapped - LR Conservation Trust (http://www.lrct.org/), Moultonborough Snowmobile Club (http://moultonborosmc.org/)		
	Logging roads mapped		
	Capital Reserve Fund for FD [not adequate]		
	Explorer Program [14-20 yr. old] – 4 active in 2007		
	Adequate radios for FD volunteers		
Dry Hydrants	Cisterns exist at major subdivisions greater than three units	Town	Fire Chief
	FD conducts inspection & upkeep		
Police Department	Full-time PD Chief	Town	Police Chief
	12 full-time officers, 2 part-time, 5 support staff		
	Choices program		
	Capital Reserve Fund for PD		
	P.D. participates in mutual aid.		
	50% of P.D. is NIMS/ICS certified.		
	20-30% operational certification for Haz Mat, goal is 100%.		
	The P.D. is staffed 24/7 with minimum flex (2 people on duty) 18-20 hours per week. Dispatch is staffed M-F 16 hours and Saturday 10 hours. The state police fill in during the dispatch down time.		
	The P.D. and F.D. have BioChem suits and gas masks.		
	Replacement schedule for gear, weapons, equipment, radios		
PD Explorer Program [14-20 yr. old] – 8 active 2007			
Highway Department	Full-time Director of Public Works Department	Town	Road Agent
	6 full-time staff		
	C.I.P.		
	Town maintenance plan – annually cleans catch basins in ditch lines and spillways. Have identified problem areas – beaver, backup, drainage issues, etc.		
	Have Debris Management Training		
Goal is to have 100% certified in HazMat awareness, NIMS & ICS.			
Emergency Operations Plans	EOP – updated 2016 School Emergency Plan, 2018	Town/ Moultonborough Academy and Moultonborough Central School	Emergency Management Director/ School Superintendent

Existing Protection	Description	Area Covered	Responsible Party
Building Codes and Inspector	Inspects fireplaces, electrical systems	Town	Code Enforcement Officer
	Adopted state building codes (IBC)		
Backup power	Generators	Moultonborough Academy	Emergency Management Director
		Safety Building	
		Moultonborough Neck FD	
		Town Hall	
		Hwy Dept.	
Transfer Station	5 staff	Town	Facilities Supervisor
	Open 5 days a week		
Shelters	Moultonborough Academy	Town	Emergency Management Director
	Large generator		
	Shelter Team		
	Have an agreement with Red Cross for shelter supplies		
Emergency Event	Safety committee trained	Region	District Safety Committee
	Traffic Safety committee		
	Each Dept. responds to type of emergency event.		
Communication	Code Red Communications System established	Town	EMD

B. STATUS OF 2013 ACTIONS

The committee noted that most of the mitigation strategies from the 2013 Hazard Mitigation Plan have been completed, four actions have been deferred, and one was deleted as impractical. The status of the mitigation actions recommended in the 2013 plan is indicated in the following table as either, Completed, Deleted, or Deferred. Deferred Actions (or deferred portions of Actions) were carried forward to be considered as new Mitigation Actions, and some Completed Actions are included as ongoing actions.

Status of Mitigation Actions from the 2013 Hazard Mitigation Plan

ID	2013 Mitigation Action	Hazard Type	Status 2019	Comment
A	Conduct regular ditch maintenance to mitigate the flow of water alongside Bodge Hill Road.	Inland Flooding	Completed	Ongoing
B	Work with homeowner associations, especially in Balmoral and along Moultonborough Neck to trim and cut back vegetation, reducing the likelihood of blockage.	High Wind Events, Severe Winter Weather	Completed	Ongoing
C	Work with private road associations throughout town to educate and meet minimum road standards for the private roads. These standards include things such as road widths, road base, and clear zones.	Severe Winter Weather	Completed	Ongoing
D	Take steps to raise the profile in the State's Ten-Year Plan of NH Route 25 intersections at Sheridan Road and in the Village. Recommended improvements include signage, signaling, and road/intersection	Hazardous Materials	Completed	
E	Engage in a conversation with the homeowners' associations (along Sunrise Drive and Robin Lane) regarding maintenance of roads and drainage.	Inland Flooding	Completed	Ongoing
F	Provide education and outreach to homeowners regarding floodproofing their property.	Inland Flooding	Completed	
G	Keep duplicate emergency information records at Town Hall.	All Hazards	Completed	
H	Conduct erosion repair on the steep slopes of Ossipee Park Road. Install a bituminous curb to concentrate water to a closed drainage system.	Inland Flooding	Project underway; anticipated completion Fall 2019	
I	Staff will bring regulations to the Planning Board for consideration requiring underground cables for new development.	All Hazards	Completed	
J	Investigate the construction of a runaway truck ramp on Ossipee Park Road.	Mass Casualty	Deleted	Impractical due to costs
K	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 1 - Conduct a propagation study (with soft estimate for implementation).	All Hazards	Deferred	Important, but still in progress

ID	2013 Mitigation Action	Hazard Type	Status 2019	Comment
L	Investigate protection of the following critical facilities against power surges: Public Safety Building, Town Hall, Public Works, and Moultonborough Neck Fire Station.	Lightning	Completed	
M	Understand the dam emergency plan and maintain communication with the owners (NH DES).	Inland Flooding, Dam Failure	Completed	
N	Create and implement dry hydrant maintenance plan.	Conflagration Wildfire	Completed	
O	Final FIRMs will be shown on the town GIS as a new layer when released in 2013.	Inland Flooding	Completed	
P	Develop an understanding and working relationship to partner with the private water utility to share information regarding contingency plans.	All Hazards	Completed	
Q	Obtain access to additional traffic response equipment and trailer capability (up to four) to serve as message boards along main roads.	All Hazards	Completed	
R	Staff will bring draft regulations for driveway standards on steep slopes to the Board of Selectmen for consideration.	Inland Flooding, Landslides	Deferred	
S	Develop an understanding and working relationship to partner with the sewer utility to share information regarding contingency plans.	All Hazards	Completed	
T	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 2 - Work towards implementation of recommendations of the Step 1 Study (contingent upon funding).	All Hazards	Deferred	Important, but still in progress
U	Work with homeowner associations, especially along Moultonborough Neck to develop gated Emergency Access Routes.	High Wind Events, Severe Winter Weather	Completed	
V	Reach out to the homeowner's associations, especially on Long Island to promote and implement the practices of the Firewise Communities program.	Wildfire	Completed	

C. MITIGATION GOALS AND TYPES OF ACTIONS

The *2018 State of New Hampshire All-Hazard Mitigation Plan* is prepared and maintained by the New Hampshire Division of Homeland Security and Emergency Management (NH HSEM). The 2018 version of the plan sets forth the following Overarching Goals for the State of New Hampshire³⁰:

- Minimize loss and disruption of human life, property, the environment, and the economy due to natural, technological, and human-caused hazards through a coordinated and collaborative effort between federal, State, and local authorities to implement appropriate hazard mitigation measures
- Enhance protection of the general population, citizens, and guests of the State of New Hampshire before, during, and after a hazard event through public education about disaster preparedness and resilience, and expanded awareness of the threats and hazards which face the State
- Promote continued comprehensive hazard mitigation planning at the State and local levels to identify, introduce, and implement cost effective hazard mitigation measures
- Address the challenges posed by climate change as they pertain to increasing the risk and impacts of the hazards identified within this plan
- Strengthen Continuity of Operations and Continuity of Government across the State and local levels to ensure continuation of essential services

The overall goals of Moultonborough's Hazard Mitigation Plan Update have not changed substantially since the adoption of the 2007 Plan.

Goal I: Community and Resource Protection

Reduce the potential impact of natural, technological, and human-caused disasters on the town's residents and visitors, as well as its critical facilities, property, economy, and natural resources, while improving the emergency communication, alert, and response systems.

Goal II: Outreach and Education

Improve public awareness of the impacts of potential hazards and hazard preparedness, while increasing the public's involvement in emergency response and recovery.

Goal III: Coordination and Communication

Ensure plans are in place to address various emergency situations and that regular communication occurs between various departments and with local, regional, and state officials; thereby ensuring that those involved are aware of their responsibilities.

³⁰ 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. 19, accessed July 15, 2019.

Goal IV: Damage Prevention

Minimize the damage and public expense which might be caused to public and private buildings and infrastructure due to natural, technological, and human-caused hazards and discourage future development in those areas of town where substantial exposure to hazards exists.

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; there is a need for property owners and associations to work with the town to ensure that services can reach all who are in need.

By reviewing the various potential hazards and the potential impacts that these might have on the community, a number of specific Problem Statements were identified. These are the basis for several hazard-specific goals:

- Help homeowners maintain their infrastructure (roads) so that emergency access is possible.
- Help homeowners protect their property against flooding
- Protect and maintain the town's infrastructure and reduce the risk of damage from fire.
- Protect the health and safety of residents and help homeowners protect their property by reducing the risk of fire.
- Protect the residents, property, and the local environment from the release of hazardous materials.

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

1. Actions that will keep things from getting worse - Prevention

- a. Driveway regulations on steep slopes
- b. Open space preservation
- c. Subdivision and Site Plan Review
 - i. Impervious surface limits
- d. Capital Improvements Plan – limiting the extension of public infrastructure into hazard areas
- e. Building and Fire codes

2. Actions that address individual buildings - Property Protection

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

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

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

- 4. Actions that will protect natural resources**
 - a. Erosion and sediment control programs
 - b. Wetlands protection programs
 - c. Expand public open space
 - d. Environmental restoration programs

- 5. Actions that will protect emergency services before, during, and immediately after an event (long-term continuity)**
 - a. Protect warning system capability
 - b. Protection or hardening of critical facilities such as fire stations or hospitals
 - c. Protection of infrastructure, such as roads that are needed in emergency response

- 6. Actions that will control the hazard – Structural projects**
 - a. Diversion of stormwater away from developed areas
 - b. Reservoirs to store drinking water

D. POTENTIAL ACTIONS

Through a review of the risk assessment and local vulnerabilities, a number of Problem Statements were identified and refined by the Committee. Brainstorming sessions yielded an updated list of mitigation strategies to address these current problems. Table 15 lists the problems and actions sorted out by the hazard(s) that they address and notes whether the action addresses existing structures/infrastructure or future (new) structures/infrastructure as well as which overall goal(s) they address and the type of mitigation action each represents. The ID numbers were used simply for tracking purposes; they do not indicate any sort of prioritization.

Overall Goal Key: CRP – Community and Resources Protection OE – Outreach & Education
 C&C – Coordination & Communication DP – Damage Prevention

Mitigation Actions by Hazard Type – Structure, Goal, Type

ID	Hazard	Problem	Recommended Action	New/ Existing	Goal	Type
5	All hazards	In the rare case that the Primary EOC is compromised, making emergency information records inaccessible, limited information would be available.	Keep duplicate emergency information records at Town Hall.	E	C & C	Long-term Continuity
6	All hazards	There are some areas of town (Bean Road, Harvard Camp Road, and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 1 - Conduct a propagation study (with soft estimate for implementation).	E	C & C	Long-term Continuity
6A	All hazards	There are some areas of town (Bean Road, Harvard Camp Road, and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 2 - Work towards implementation of recommendations of the Step 1 Study (contingent upon funding).	E	C & C	Long-term Continuity

ID	Hazard	Problem	Recommended Action	New/ Existing	Goal	Type
2	All hazards	More than 20,000 people may be without electronic communications throughout town, especially during a wind or ice event.	Continue use of 2 traffic response equipment and trailer capability as message boards along main roads.	E	C & C	Public Education & Awareness
15	All hazards	If Lakes Region Water is compromised, approximately 750 residences will be without water. This could happen with any hazard event.	Maintain working relationship with the private water utility to share information regarding contingency plans.	E	C & C	Public Education & Awareness
16	All hazards	If Bay District Sewer system is compromised, an unknown number of residences and businesses will be without sewage services. This could happen with any hazard event.	Maintain working relationship with the sewer utility to share information regarding contingency plans.	E	C & C	Public Education & Awareness
13	All Hazards	Lack of information and readiness can exacerbate the risk of hazards	Encourage residents and town employees to subscribe to Code Red system		OE	Public Education & Awareness
12	Conflagration and Wildfire	The town has 42 dry hydrants throughout town that require maintenance; many are on private property.	Implement dry hydrant maintenance plan on ongoing basis.	E	CRP	Long-term Continuity
11	Conflagration and Wildfire	Approximately 175 residences on the NW side of Long Island are vulnerable to wildfire due to geography, fuel supply, and limited access.	Reach out to the homeowner's associations, especially on Long Island to promote and implement the practices of the FireWise Communities program.	E	O & E, DP	Property Protection
9	Flood	Properties at the end of Kim's Alley along the lake flood when lake levels rise. Other properties in low-lying areas can experience damage during a heavy rain.	Provide education and outreach to homeowners regarding flood proofing their property.	E	O & E	Public Education & Awareness

ID	Hazard	Problem	Recommended Action	New/ Existing	Goal	Type
25	Flood, erosion	Town roads and homes in steep areas are threatened by erosion. Additionally, access by emergency vehicles can be compromised by heavy or frequent rainfall.	Staff will bring draft regulations for driveway standards on steep slopes to the Board of Selectmen for consideration.	N	DP, CRP	Prevention
8	Flood, washout	Roads could be compromised by heavy or frequent rainfall.	Conduct regular ditch maintenance to mitigate the flow of water alongside roadways.	E	DP	Long-term Continuity
1	Flooding, washout	Sections of Ossipee Park Road have steep side slopes; the road could be compromised by heavy/frequent rainfall. This is the primary road for tractor-trailers making deliveries to and from Castle Springs Water Bottling.	Conduct erosion repair on the steep slopes of Ossipee Park Road. Install a bituminous curb to concentrate water to a closed drainage system.	E	DP	Structural Project
23	Flooding, washout	Sunrise Drive and Robin Lane cross flood-prone areas and have undersized drainage; access to properties at the end of the road (approximately 50) can be limited by heavy or frequent rainfall.	Engage in a conversation with the homeowners' associations (along Sunrise Drive and Robin Lane) regarding maintenance of roads and drainage.	E	O & E	Public Education & Awareness
20	Flooding/ Dam failure	The Class B state dam at Lake Kanasatka; has a Dam Emergency Plan.	Maintain communication with owners (NHDES) as Dam Emergency Plan is updated.	E	C & C	Public Education & Awareness
22	High Winds And Severe Winter Weather	Downed limbs and trees can block roads and during heavy snowstorms many private road contractors aren't able to clear smaller roads. Several areas of town have limited road access, including Paradise Drive and Moultonborough Neck Road.	Work with and educate private homeowner associations throughout town on vegetation trimming and recommended minimum road standards, including width, base, and clear zones.	E	O & E	Public Education & Awareness
19	High Winds And Severe Winter Weather	Downed trees and limbs cause property damage and power outages, and can block roads	Work with utility companies to identify trees that need trimming and removal		DP	Prevention

ID	Hazard	Problem	Recommended Action	New/ Existing	Goal	Type
18	High Winds And Severe Winter Weather	Downed trees and limbs cause property damage and power outages, and block roads	DPW to remove compromised and dead trees in regular course of road improvements	E	DP	Prevention
7	Extreme Temperatures And Severe Winter Weather	Heavy snow and ice and extreme cold and heat can damage property and cause frostbite, hypothermia, and heat-induced illness and even death	Reach out to residents and visitors with information on preparing for inclement weather, including storing fuel and food, and checking on neighbors and vulnerable populations		OE	Public Education & Awareness
14	Extreme Temperatures	Vulnerable populations, including children, seniors, and those with chronic illness or disabilities, and others are at risk of injury or death due to extreme heat or cold, and power outages	Reach out to residents and visitors with information on availability and locations of heating and cooling centers, including schools, recreation building, library, and public safety building		OE	Public Education & Awareness
10	Lightning	Operation of the town's critical Facilities is essential during hazard events	Regular monitoring and maintenance of grounding and surge protection equipment to mitigate against loss of function of Critical Facilities	E	DP	Prevention
17	Lightning	Residents and visitors attending large public gatherings, particularly during peak seasons, may be vulnerable to lightning strikes	EMD to issue weather notices for planning public events		DP	Prevention

ID	Hazard	Problem	Recommended Action	New/ Existing	Goal	Type
4	Mass Casualty	People in public buildings, such as employees and others at town hall, students and employees in schools, worshippers at places of worship, can be vulnerable to violent acts	Planning and training exercises, including regional drills, to mitigate vulnerabilities to active shooter and similar incidents	E	DP	Prevention
21	Mass Casualty	Peak summer season means high volume of boating traffic on area lakes, including night-time boating, with multiple boaters on board each vessel	Work with Marine Patrol to advocate for better warnings of unseen ledges and rocks in the water		DP	Prevention
24	Mass Casualty	The Village center is compact and densely developed with an important state highway as the main street; peak seasonal traffic and speeding vehicles increase the potential for serious accidents and injuries	Develop traffic calming measures to increase safety for motorists, bicyclists and pedestrians	E	DP	Prevention
3	Mass Casualty	Several organizations and entities in town hold events that attract large crowds, such as ice races on area ponds and large gatherings at Castle in the Clouds	Staff to develop and bring to the Selectmen for approval a Special Events Permit Ordinance designed to mitigate the potential for accidents and injuries		DP	Prevention

The Committee identified the various costs and benefits associated with each action. The estimated cost represents what the town estimates it will cost in terms of dollars or staff hours to implement each action. The table below shows the estimated costs associated with each action.

Mitigation Actions by Hazard Type – Estimated Cost & Pros/Cons

ID	Hazard	Problem	Recommended Action	Estimated Cost	Comment	Pros	Cons
5	All hazards	In the rare case that the Primary EOC is compromised, making emergency information records inaccessible, limited information would be available.	Keep duplicate emergency information records at Town Hall.	10 hours Staff Time		Would enhance the transition from Primary to Secondary EOC.	Sensitive information needs to be kept secure and information needs to be kept up to date.
6	All hazards	There are some areas of town (Bean Road, Harvard Camp Road and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 1 - Conduct a propagation study (with soft estimate for implementation).	\$10,000	Have met federal 2013 Interoperability requirements. Gaps still exist; currently unacceptable communications.	Improved reliability, coordination, and response of emergency personnel.	Entails legal, technological, and cost hurdles.
6A	All hazards	There are some areas of town (Bean Road, Harvard Camp Road, and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 2 - Work towards implementation of recommendations of the Step 1 Study (contingent upon funding).	Unknown – This depends upon the findings of Step 1 (Project #6)			
2	All hazards	More than 20,000 people may be without electronic communications throughout town, especially during a wind or ice event.	Continue use of 2 traffic response equipment and trailer capability to serve as message boards along main roads.	\$60,000	CodeRed is a useful tool for communicating with residents and visitors.	Works on the main arterial roadways	Can be expensive and may get only limited use. Consider rentals or sharing.

ID	Hazard	Problem	Recommended Action	Estimated Cost	Comment	Pros	Cons
15	All hazards	If Lakes Region Water is compromised, approximately 750 residences will be without water. This could happen with any hazard event.	Maintain working relationship with the private water utility to share information regarding contingency plans.	± 10 hours Staff Time	Monitor the requirements of the Public Utilities Commission. Arrangements should include non-potable water.	Town will be better able to respond to residents' questions if service is compromised.	
16	All hazards	If Bay District Sewer system is compromised, an unknown number of residences and businesses will be without sewage services. This could happen with any hazard event.	Maintain working relationship with the sewer utility to share information regarding contingency plans.	± 10 hours Staff Time	Unplanned releases have occurred (Lakeshore Drive). The town does not know the number of homes and businesses connected to the system. The infrastructure runs along town rights-of-way.	Town will be better able to respond to residents' questions if service is compromised.	
13	All hazards	Lack of information and readiness can exacerbate the risk of hazards	Encourage residents and town employees to subscribe to Code Red alert system	± 10 hours Staff Time		Piggy-back on State system	
12	Fire	The town has 50 dry hydrants throughout town that require maintenance; many are on private property.	Implement dry hydrant maintenance plan.	15 hours Staff Time + \$15,000/year (\$75,000)	Wording is under review by Town Counsel.	Enables a better maintained system.	Need agreements with private landowners.

ID	Hazard	Problem	Recommended Action	Estimated Cost	Comment	Pros	Cons
11	Fire	Approximately 175 residences on the NW side of Long Island are vulnerable to wildfire due to geography, fuel supply, and limited access.	Reach out to the homeowner's associations, especially on Long Island to promote and implement the practices of the FireWise Communities program.	± 80 hours Staff Time		A low-cost effort that can reduce the area's vulnerability to costly fire. Could reduce the CRS rating.	
9	Flood	Properties at the end of Kim's Alley along the lake flood when lake levels rise. Other properties in low-lying areas can experience damage during a heavy rain.	Provide education and outreach to homeowners regarding flood proofing their property.	± 16 hours Staff Time		Low cost outreach.	
25	Flood, erosion	Town roads and homes in steep areas are threatened by erosion. Additionally, access by emergency vehicles can be compromised by heavy or frequent rainfall.	Staff will bring draft regulations for driveway standards on steep slopes to the Board of Selectmen for consideration.	± 20 hours Staff Time		Mitigates the impacts of erosion on town roads. Reduce the need for town to do work on private driveways.	A recent effort referencing state guidelines recently encountered much resistance.
8	Flood, washout	Roads could be compromised by heavy or frequent rainfall.	Conduct regular ditch maintenance to mitigate the flow of water alongside roadways.	\$1,000/year plus staff and equipment (\$5,000)			

ID	Hazard	Problem	Recommended Action	Estimated Cost	Comment	Pros	Cons
1	Flood, washout	Sections of Ossipee Park Road have steep side slopes; the road could be compromised by heavy/frequent rainfall. This is the primary road for tractor-trailers making deliveries to and from Castle Springs Water Bottling.	Conduct erosion repair on the steep slopes of Ossipee Park Road. Install a bituminous curb to concentrate water to a closed drainage system.	\$85,000	The road was rebuilt in 2008. Erosion occurred here in 2011. Funds are in the current budget.	Reduces damage to municipal infrastructure. Reduces the likelihood of a vehicular accident.	Cost
23	Flood, washout	Sunrise Drive and Robin Lane cross flood-prone areas and have undersized drainage; access to properties at the end of the road (approximately 50) can be limited by heavy or frequent rainfall.	Engage in a conversation with the homeowners' associations (along Sunrise Drive and Robin Lane) regarding maintenance of roads and drainage.	Outreach - 10 hours/year (50 hours) Staff Time	These are private roads.	Improvements by the associations could reduce the risk of residents being isolated. Low cost outreach.	
20	Flood/ Dam failure	The Class B state dam at Lake Kanasatka does have a Dam Emergency Plan.	Maintain communication with the owners (NH DES) as Dam Emergency Plan is updated.	5 hours/year (25 hours) Staff Time	Not a threat to life or property, except NH Route 25.		
22	High Winds and Severe Winter Weather	Downed limbs and trees can block roads, and during heavy snowstorms many private road contractors aren't able to clear smaller roads. Several areas of town have limited road access, including Paradise Drive and Moultonborough Neck Road.	Work with and educate private homeowner associations throughout town on vegetation trimming and recommended minimum road standards, including width, base, and clear zones	± 50 hours/year (±250 hours) Staff Time	Numerous private, dead-end roads.	Could improve emergency response times.	

ID	Hazard	Problem	Recommended Action	Estimated Cost	Comment	Pros	Cons
19	High Winds and Severe Winter Weather	Downed limbs and trees can cause property damage and power outages and can block roads.	Work with utility companies to identify trees that need trimming or removal.	± 20 hours Staff Time		Can prevent property damage, power outages	
18	High Winds and Severe Winter Weather	Downed limbs and trees can cause property damage and power outages and can block roads.	DPW to remove compromised and dead trees in regular course of road improvements	± 20 hours Staff Time		Can prevent power outages, blocked roads during emergencies	
7	Extreme Temperatures and Severe Winter Weather	Heavy snow and ice, and extreme cold and heat, can damage property and cause frostbite, hypothermia, and heat-induced illness and even death	Reach out to residents and visitors with information on preparing for inclement weather, including storing fuel and food, and checking on neighbors and vulnerable populations	± 20 hours Staff Time		Public awareness and readiness can prevent illness and injury, and reduce emergency response incidents	
14	Extreme Temperatures	Vulnerable populations, including children, seniors, and those with chronic illness or disabilities, and others are at risk of injury or death due to extreme heat or cold, and power outages	Reach out to residents and visitors with information on availability and locations of heating and cooling centers, including schools, recreation building, library, and public safety building	± 20 hours Staff Time		Public awareness can prevent illness and injury	
10	Lightning	All town electronics, including the communications network are vulnerable to damage from lightning.	Regular monitoring and maintenance of grounding and surge protection equipment to mitigate against loss of function of Critical Facilities	± 20 hours Staff Time	PD had to replace most of its electronics in 2013 due to a lightning strike.	Maintains continuity of information and communication systems.	

ID	Hazard	Problem	Recommended Action	Estimated Cost	Comment	Pros	Cons
17	Lightning	Residents and visitors attending large public gatherings, particularly during peak seasons, may be vulnerable to lightning strikes	EMD to issue weather notices for planning public events	± 20 hours Staff Time			
4	Mass Casualty	People in public buildings, such as employees and others at town hall or the library, or students and employees in schools, and worshipers in places of worship, can be vulnerable to violent acts	Planning and training exercises, including regional drills, to mitigate vulnerabilities to active shooter and similar incidents	± 20 hours Staff Time		Training and preparation can prevent or reduce the likelihood of injury or death	
21	Mass Casualty	Peak summer season means high volume of boating traffic on area lakes, including night-time boating, with multiple boaters on board each vessel	Work with Marine Patrol to advocate for better warnings of unseen ledges and rocks in the water	± 20 hours Staff Time			
24	Mass Casualty	The Village center is compact and densely developed with an important state highway as the main street; peak seasonal traffic and speeding vehicles increase the potential for serious accidents and injuries	Develop traffic calming measures to increase safety for motorists, bicyclists and pedestrians	± 20 hours Staff Time, plus ±\$50,000		Improved safety in the Village center	
3	Mass Casualty	Several organizations and entities in town hold events that attract large crowds, such as ice races on area ponds and large gatherings at Castle in the Clouds	Staff to develop and bring to the Selectmen for approval a Special Events Permit Ordinance designed to mitigate the potential of accidents and injuries	± 20 hours Staff Time,		Will give EMD and other town officials opportunity to work with event organizers to mitigate risks	Additional regulation can be viewed negatively

E. PRIORITIZATION OF ACTIONS

The identified Mitigation Actions were prioritized, based on similar priorities established in the 2013 Plan. The table below shows the Actions grouped by hazard type and then ordered by their priority category as High, Medium, or Low Priority. Implementation will depend on timeframe and costs.

Recommended Mitigation Actions by Hazard and in Ranked Order

ID	Hazard	Problem	Recommended Action	Priority
5	All hazards	In the rare case that the Primary EOC is compromised, making emergency information records inaccessible, limited information would be available.	Keep duplicate emergency information records at Town Hall.	High
6	All hazards	There are some areas of town (Bean Road, Harvard Camp Road, and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 1 - Conduct a propagation study (with soft estimate for implementation).	High
6A	All hazards	There are some areas of town (Bean Road, Harvard Camp Road, and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 2 - Work towards implementation of recommendations of the Step 1 Study (contingent upon funding).	High
2	All hazards	More than 20,000 people may be without electronic communications throughout town, especially during a wind or ice event.	Continue use of 2 traffic response equipment and trailer capability to serve as message boards along main roads.	High
15	All hazards	If Lakes Region Water is compromised, approximately 750 residences will be without water. This could happen with any hazard event.	Maintain working relationship with the private water utility to share information regarding contingency plans.	Medium
16	All hazards	If Bay District Sewer system is compromised, an unknown number of residences and businesses will be without sewage services. This could happen with any hazard event.	Maintain working relationship with the sewer utility to share information regarding contingency plans.	Medium
13	All hazards	Lack of information and readiness can exacerbate the risk of hazards	Encourage residents and town employees to subscribe to Code Red alert system	Medium
12	Fire	The town has 50 dry hydrants throughout town that require maintenance; many are on private property.	Implement dry hydrant maintenance plan.	Medium
11	Fire	Approximately 175 residences on the NW side of Long Island are vulnerable to wildfire due to geography, fuel supply, and limited access.	Reach out to the homeowner's associations, especially on Long Island to promote and implement the practices of the FireWise Communities program.	High
9	Flood	Properties at the end of Kim's Alley along the lake flood when lake levels rise. Other properties in low-lying areas can experience damage during a heavy rain.	Provide education and outreach to homeowners regarding flood proofing their property.	High
25	Flood, erosion	Town roads and homes in steep areas are threatened by erosion. Additionally, access by emergency vehicles can be compromised by heavy or frequent rainfall.	Staff will bring draft regulations for driveway standards on steep slopes to the Board of Selectmen for consideration.	Low

ID	Hazard	Problem	Recommended Action	Priority
8	Flooding, washout	Roads could be compromised by heavy or frequent rainfall.	Conduct regular ditch maintenance to mitigate the flow of water alongside roadways.	High
1	Flooding, washout	Sections of Ossipee Park Road have steep side slopes; the road could be compromised by heavy/frequent rainfall. This is the primary road for tractor-trailers making deliveries to and from Castle Springs Water Bottling.	Conduct erosion repair on the steep slopes of Ossipee Park Road. Install a bituminous curb to concentrate water to a closed drainage system.	High
23	Flood, washout	Sunrise Drive and Robin Lane cross flood-prone areas and have undersized drainage; access to properties at the end of the road (approximately 50) can be limited by heavy or frequent rainfall.	Engage in a conversation with the homeowners' associations (along Sunrise Drive and Robin Lane) regarding maintenance of roads and drainage.	Low
20	Flood/Dam failure	The Class B state dam at Lake Kanasatka does have a Dam Emergency Plan.	Maintain communication with the owners (NH DES) as Dam Emergency Plan is updated.	Medium
22	High Winds, Severe Winter Weather	Downed limbs and trees can block roads, and during heavy snowstorms many private road contractors aren't able to clear smaller roads. Several areas of town have limited road access, including Paradise Drive and Moultonborough Neck Road.	Work with and educate private homeowner associations throughout town on vegetation trimming and recommended minimum road standards, including width, base, and clear zones	Low
19	High Winds and Severe Winter Weather	Downed limbs and trees can cause property damage and power outages and can block roads.	Work with utility companies to identify trees that need trimming or removal.	Medium
18	High Winds, Severe Winter Weather	Downed limbs and trees can cause property damage and power outages and can block roads.	DPW to remove compromised and dead trees in regular course of road improvements	Medium
7	Extreme Temperatures Severe Winter Weather	Heavy snow and ice, and extreme cold and heat, can damage property and cause frostbite, hypothermia, and heat-induced illness and even death	Reach out to residents and visitors with information on preparing for inclement weather, including storing fuel and food, and checking on neighbors and vulnerable populations	High
14	Extreme Temperatures	Vulnerable populations, including children, seniors, and those with chronic illness or disabilities, and others are at risk of injury or death due to extreme heat or cold, and power outages	Reach out to residents and visitors with information on availability and locations of heating and cooling centers, including schools, recreation building, library, and public safety building	Medium
10	Lightning	All town electronics, including the communications network are vulnerable to damage from lightning.	Regular monitoring and maintenance of grounding and surge protection equipment to mitigate against loss of function of Critical Facilities	High
17	Lightning	Residents and visitors attending large public gatherings, particularly during peak seasons, may be vulnerable to lightning strikes	EMD to issue weather notices for planning public events	Medium

ID	Hazard	Problem	Recommended Action	Priority
4	Mass Casualty	People in public buildings, such as employees and others at town hall or the library, or students and employees in schools, and worshippers in places of worship, can be vulnerable to violent acts	Planning and training exercises, including regional drills, to mitigate vulnerabilities to active shooter and similar incidents	High
21	Mass Casualty	The Village center is compact and densely developed with an important state highway as the main street; peak seasonal traffic and speeding vehicles increase the potential for serious accidents and injuries	Develop traffic calming measures to increase safety for motorists, bicyclists and pedestrians	Medium
24	Mass Casualty	Peak summer season means high volume of recreational boating traffic on area lakes, including night-time boating, with multiple boaters on board each vessel	Work with Marine Patrol to advocate for better warning of unseen ledges and rocks in the water	Low
3	Mass Casualty	Several organizations and entities in town hold events that attract large crowds, such as ice races on area ponds and large gatherings at Castle in the Clouds	Staff to develop and bring to the Selectmen for approval a Special Events Permit Ordinance designed to mitigate the potential of accidents and injuries	High

F. IMPLEMENTATION OF MITIGATION ACTIONS

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

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

Priorities were set in executing Mitigation Actions based in the context of the factors above, the, recognizing that some actions are of greater priority to different town departments. This implementation schedule contains a matrix (see table below) indicating the estimated cost of implementation, potential funding sources, the parties responsible for bringing about these actions, and implementation time frame. The time frame for executing some Mitigation Actions depends upon staff time and budgetary limitations.

The Mitigation Actions below are listed in order of their Time Frame. To keep the plan current, the implementation schedule should be updated and re-evaluated on a regular basis as outlined in the monitoring section of this plan.

Implementation Schedule for Mitigation Actions

ID	Hazard	Problem	Recommended Action	Priority	Estimated Cost	Potential Funding	Lead Party	Time Frame
4	Mass Casualty	People in public buildings, such as employees and others at town hall or the library, or students and employees in schools, and worshipers in places of worship, can be vulnerable to violent acts	Planning and training exercises, including regional drills, to mitigate vulnerabilities to active shooter and similar incidents	High	± 20 hours Staff Time	Operating Budget	Police Chief, Fire Chief	Annual 2019 - 23
5	All hazards	In the rare case that the Primary EOC is compromised, making emergency information records inaccessible, limited information would be available.	Keep duplicate emergency information records at Town Hall.	High	10 hours Staff Time	Operating Budget	EMD	Annual 2019 - 23
7	Extreme Temps, Winter Weather	Heavy snow and ice, and extreme cold and heat, can damage property and cause frostbite, hypothermia, and heat-induced illness and eve death	Reach out to residents and visitors with information on preparing for inclement weather, including storing fuel and food, and checking on neighbors and vulnerable populations	High	± 20 hours Staff Time	Operating Budget	Fire Chief	Annual 2019 - 23
8	Flooding, washout	Roads could be compromised by heavy or frequent rainfall.	Conduct regular ditch maintenance to mitigate the flow of water alongside roadways.	High	\$1,000/year plus staff and equipment (\$5,000)	Operating Budget	DPW	Annual 2019 - 23
10	Lightning	All town electronics, including the communications network are vulnerable to damage from lightning.	Regular monitoring and maintenance of grounding and surge protection equipment to mitigate against loss of function at town-owned Critical Facilities	High	± 20 hours Staff Time	Operating Budget	DPW	Annual 2019 - 23
11	Wildfire	Approximately 175 residences on the NW side of Long Island are vulnerable to wildfire due to geography, fuel supply, and limited access.	Reach out to the homeowner's associations, especially on Long Island to promote and implement the practices of the FireWise Communities program.	High	± 80 hours Staff Time	Operating Budget	Fire Chief	Annual 2019 - 23

ID	Hazard	Problem	Recommended Action	Priority	Estimated Cost	Potential Funding	Lead Party	Time Frame
18	High Winds Severe Winter Weather	Downed limbs and trees can cause property damage and power outages, and can block roads	DPW to remove compromised and dead trees in regular course of road improvements	High	± 20 hours Staff Time	Operating Budget	DPW	Annual 2019 - 23
19	High Winds Severe Winter Weather	Downed limbs and trees can cause property damage and power outages, and can block roads	Work with utility companies to identify trees that need trimming or removal	High	± 10 hours Staff Time	Operating Budget	DPW	Annual 2019 - 23
22	High Winds and Severe Winter Weather	Downed limbs and trees can block roads, and during heavy snowstorms many private road contractors aren't able to clear smaller roads. Several areas of town have limited road access including Paradise Drive and Moultonborough Neck Road.	Work with and educate private homeowner associations throughout town on vegetation trimming and recommended minimum road standards, including width, base, and clear zones.	High	± 50 hours/ year Staff Time	Operating Budget	DPW	Annual 2019 - 23
2	All hazards	More than 20,000 people may be without electronic communications throughout town, especially during a wind or ice event.	Continue use of 3 traffic response equipment and trailer capability (to serve as message boards along main roads.	Medium	± 20 hours Staff Time	Operating Budget	Police, EMD	Annual 2019 - 23
12	Fire	The town has 50 dry hydrants throughout town that require maintenance; many are on private property.	Implement dry hydrant maintenance plan.	Medium	15 hours Staff Time + \$15,000/ year (\$75,000)	Operating Budget	Fire Chief	Annual 2019 - 23
14	Extreme Temperatures	Vulnerable populations, including children, seniors and those with chronic illness or disabilities, and others are at risk of injury or death due to extreme heat or cold, and power outages	Reach out to residents and visitors with information on availability and locations of heating and cooling centers, including schools, recreation building, library, and public safety building	Medium	± 20 hours Staff Time	Operating Budget	Fire Chief	Annual 2019 - 23

ID	Hazard	Problem	Recommended Action	Priority	Estimated Cost	Potential Funding	Lead Party	Time Frame
15	All hazards	If Lakes Region Water is compromised, approximately 750 residences will be without water. This could happen with any hazard event.	Maintain working relationship with the private water utility to share information regarding contingency plans.	Medium	± 10 hours Staff Time	Operating Budget	Town Admin.	Annual 2019 - 23
16	All hazards	If Bay District Sewer system is compromised, an unknown number of residences and businesses will be without sewage services. This could happen with any hazard event.	Maintain working relationship with the sewer utility to share information regarding contingency plans.	Medium	± 10 hours Staff Time	Operating Budget	Town Admin.	Annual 2019 - 23
17	Lightning	Residents and visitors attending large public gatherings, particularly during peak seasons, may be vulnerable to lightning strikes	EMD to issue weather notices for planning public events	Medium	± 10 hours Staff Time	Operating Budget	Fire Chief	Annual 2019 - 23
20	Flood/ Dam failure	The Significant Hazard state dam at Lake Kanasatka does have a Dam Emergency Plan.	Maintain communication with the owners (NH DES) as Dam Emergency Plan is updated.	Medium	5 hours/year (25 hours) Staff Time	Operating Budget	EMD	Annual 2019 - 23
23	Flood, washout	Sunrise Drive and Robin Lane cross flood-prone areas and have undersized drainage; access to properties at the end of the road (approximately 50) can be limited by heavy or frequent rainfall.	Engage in a conversation with the homeowners' associations (along Sunrise Drive and Robin Lane) regarding maintenance of roads and drainage.	Low	Outreach - 10 hours/year (50 hours) Staff Time	Operating Budget	EMD, DPW	Annual 2019 - 13
1	Flood, washout	Sections of Ossipee Park Road have steep side slopes; the road could be compromised by heavy/frequent rainfall. This is the primary road for tractor-trailers making deliveries to and from Castle Springs Water Bottling.	Conduct erosion repair on the steep slopes of Ossipee Park Road. Install a bituminous curb to concentrate water to a closed drainage system.	High	\$85,000	Operating Budget	DPW	2019

ID	Hazard	Problem	Recommended Action	Priority	Estimated Cost	Potential Funding	Lead Party	Time Frame
3	Mass Casualty	Several organizations and entities in town hold events that attract large crowds, such as ice races on area ponds and large gatherings at Castle in the Clouds	Staff to develop and bring to the Selectmen for approval a Special Events Permit Ordinance designed to mitigate the potential of accidents and injuries	High	± 20 hours Staff Time	Operating Budget	Town Admin	2020
6	All hazards	There are some areas of town (Bean Road, Harvard Camp Road, and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 1 - Conduct a propagation study (with soft estimate for implementation).	High	\$10,000	Operating Budget	Police Chief	2020
9	Flood	Properties at the end of Kim's Alley along the lake flood when lake levels rise. Other properties in low-lying areas can experience damage during a heavy rain.	Provide education and outreach to homeowners regarding floodproofing their property.	High	± 16 hours Staff Time	Operating Budget	Town Planner	mid-2020
13	All hazards	Lack of information and readiness can exacerbate the risk of hazards	Encourage residents and town employees to subscribe to Code Red alert system	Medium	± 10 hours Staff Time	Operating Budget	Fire Chief	2020
25	Flood, erosion	Town roads and homes in steep areas are threatened by erosion. Additionally, access by emergency vehicles can be compromised by heavy or frequent rainfall.	Staff will bring draft regulations for driveway standards on steep slopes to the Board of Selectmen for consideration.	Low	± 20 hours Staff Time	Operating Budget	Town Planner	2021

ID	Hazard	Problem	Recommended Action	Priority	Estimated Cost	Potential Funding	Lead Party	Time Frame
24	Mass Casualty	Peak summer season means high volume of recreational boating traffic on area lakes, including night-time boating, with multiple boaters on board each vessel	Work with Marine Patrol to advocate for better warning of unseen ledges and rocks in the water	Low	± 10 hours Staff Time	Operating Budget	Fire Chief	2022
21	Mass Casualty	The Village center is compact and densely developed with an important state highway as the main street; peak seasonal traffic and speeding vehicles increase the potential for serious accidents and injuries	Develop traffic calming measures to increase safety for motorists, bicyclists and pedestrians	Medium	± 20 hours Staff Time plus \$50,000	Operating Budget	Town Admin	2023
6A	All hazards	There are some areas of town (Bean Road, Harvard Camp Road, and Moultonborough Neck Road near station) that do not have reliable radio communication. During any hazard event emergency personnel might need to communicate with others.	Reduce the number of gaps in the emergency communication system and streamline the system to limit the number of channels needed to send and receive messages. Step 2 - Work towards implementation of recommendations of the Step 1 Study (contingent upon funding).	High	Unknown – This depends upon the findings of Step 1 (Project #6)	Operating Budget	Police Chief	2023

CHAPTER VI: PLAN ADOPTION AND MONITORING

A. IMPLEMENTATION

The Moultonborough 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 along with grant funds available through FEMA and other sources, such as those listed in Appendix B. The Emergency Management Director will coordinate with the Town Administrator, department heads, Budget Committee, and Selectmen to ensure that funds and staff time for these projects are available. The EMD and Hazard Mitigation Committee will work with the Selectmen and Capital Improvements Plan (CIP) Committee to incorporate the various projects into subsequent budgets. The EMD will also coordinate with the NH HSEM Field Representative to ensure that the town applies for appropriate grant funds.

For those mitigation actions that involve either revisions to the land use and planning regulations or standards, members of the Hazard Mitigation Committee will work with the Planning Board to develop appropriate language.

When appropriate, an effort will be made to incorporate this plan into the Emergency Operations Plan. Within a year after the town officially adopts the 2019 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. The adoption of a steep slopes ordinance, to regulate development on slopes and mitigate erosion, was a Mitigation Action included in the 2013 Hazard Mitigation Plan and, as a result, has been incorporated into the Moultonborough Zoning Ordinance, as has the adoption of the digital Flood Insurance Rate Map (DFIRM) and the resulting amendment of the Floodplain Ordinance.

B. PLAN MAINTENANCE & PUBLIC INVOLVEMENT

The Moultonborough Hazard Mitigation Planning Committee and the Selectboard, in order to track progress and update the mitigation strategies identified in Chapter V, D and E, will review the Moultonborough Hazard Mitigation Plan every year or after a hazard event. Town of Moultonborough Emergency Management Director is responsible for initiating this review and needs to consult with members of the Moultonborough 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 community'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, the Selectmen will do so at a public Board of Selectmen's meeting, at which public comment will be encouraged.

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 mid-2024 to begin updating this plan before it expires.

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 invitations to Budget Committee members;
- ❖ 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*, *Laconia 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 Tuftonboro, Ossipee, Tamworth, Sandwich, Center Harbor, and Meredith.

C. SIGNED CERTIFICATE OF ADOPTION

(Note: To be replaced with signed copy upon completion.)

Certificate of Adoption – Town of Moultonborough

A resolution adopting the Moultonborough Hazard Mitigation Plan Update 2019

Plan dated: 2019

Conditionally approved: Aug 12, 2019

WHEREAS, the town of Moultonborough received funding from the NH Office of Homeland Security and Emergency Management under a FEMA Pre-Disaster Mitigation Grant and assistance from the Lakes Region Planning Commission for the preparation of the Moultonborough Hazard Mitigation Plan Update 2019; and

WHEREAS, several public planning meetings were held in between April and June 2019 regarding the development and review of the Moultonborough Hazard Mitigation Plan Update 2019; and

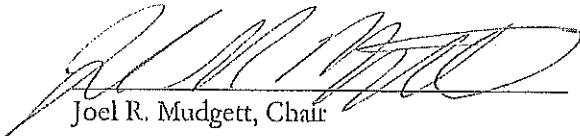
WHEREAS, the Moultonborough Hazard Mitigation Plan Update 2019 contains several potential future projects to mitigate hazard damage in the town of Moultonborough and,

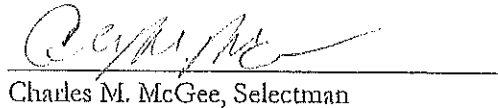
WHEREAS, a duly noticed public meeting was held by the Selectmen on August 15, 2019 to formally approve and adopt the Moultonborough Hazard Mitigation Plan Update 2019.

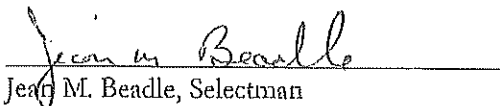
NOW, THEREFORE BE IT RESOLVED that the Moultonborough Board of Selectmen adopts the Moultonborough Hazard Mitigation Plan Update, 2019.

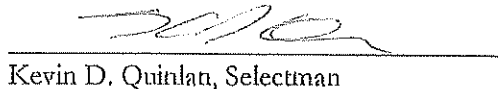
ADOPTED AND SIGNED this day of 15th August 2019.

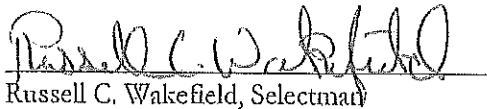
MOULTONBOROUGH BOARD OF SELECTMEN


Joel R. Mudgett, Chair

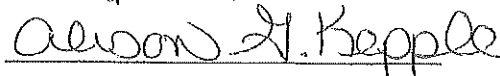

Charles M. McGee, Selectman


Jean M. Beadle, Selectman


Kevin D. Quinlan, Selectman


Russell C. Wakefield, Selectman

Town Seal or Notary



Date: 8-15-19

ALISON G. KEPPLER, Notary Public
State of New Hampshire
My Commission Expires September 13, 2022

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>

Regional Planning Commissions:

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

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

New Hampshire Floodplain Management Program
<http://www.nh.gov/ocp/programs/floodplainmanagement/index.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 271-63406
<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 Business and Economic Development 271-2591
<http://www.dbea.nh.gov/>

Division of Forests and Lands 271-2214
<http://www.nhdfl.org/>

Natural Heritage Inventory 271-2215
<http://www.nhdfl.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 Moultonborough. 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 OEP, also refer to RPC
- Dam Safety Program NH Department of Environmental Services
- Disaster Preparedness Improvement Grant (DPIG)..... NH Homeland Security and Emergency Management
- Emergency Generators Program by NESEC..... NH Homeland Security and Emergency Management
- Emergency Watershed Protection (EWP) Program..... USDA, Natural Resources Conservation Service
- Pre-Disaster Mitigation Assistance Planning (PDM) NH Homeland Security and Emergency Management
- Highway Safety Improvement Program..... NH Department of Transportation
- Mitigation Assistance Planning (MAP)..... NH Homeland Security and Emergency Management
- Mutual Aid for Public Works.....NH Municipal Association
- National Flood Insurance Program (NFIP)NH Office of Energy & Planning
- 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

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/nehrrp/	Community with a population under 20,000

APPENDIX C: SAMPLE PUBLIC NOTICE AND INFORMATION

LAKES REGION PLANNING COMMISSION

May 3, 2019

103 Main Street, Suite #3
Meredith, NH 03253
tel (603) 279-8171
fax (603) 279-0200
www.lakesrpc.org**For Immediate Release**Contact: Susan Slack, 279-5337, sslack@lakesrpc.org**Moultonborough Hazard Mitigation Plan Committee to Meet**

The Moultonborough Hazard Mitigation Plan Committee has begun the process of updating its 2013 Hazard Mitigation Plan and will meet on Friday, May 10, 2019 at the Moultonborough Town Hall, 6 Holland Street in Moultonborough at 10 am.

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

The committee is represented by a variety of local interests including representatives from the Fire, Public Works, and Planning departments, along with the Town Administrator, a representative of the Board of Selectmen, and representatives from SAU 45.

The group will focus on the natural hazards that may put Moultonborough at risk as well as the 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 as are appropriate regulations and land use ordinances. The most significant areas of concern for Moultonborough will be reviewed and evaluated through this update process. In the 2013 Hazard Mitigation Plan these included winter storms and flooding.

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. Community leaders want the town to be a disaster resistant community and believe that updating the Hazard Mitigation Plan will bring Moultonborough a step closer to that goal.

For more information please call Emergency Management Director and Fire Chief David Bengtson at 476-5658 or Susan Slack, Principal Planner, Lakes Region Planning Commission at 279-5337.

Local Hazard Mitigation Planning

Hazard Mitigation:

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

Questions to address:

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

What is a Hazard Mitigation Plan?

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



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

MITIGATION PROCESS

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

Why create a plan?

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

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

Federal Emergency Management Agency (FEMA) Requirement:

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

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

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



Frequently asked questions

- **What will a Hazard Mitigation Plan cost?**

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

- **How is a Hazard Mitigation Plan different from an Emergency Action Plan?**

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

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

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

- **Is this a community plan, a state plan, or a federal plan?**

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



Alton dam breach, 1996



The Essentials

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

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



Building stronger and safer

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

Reducing risks through mitigation planning

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

Mitigation planning elements

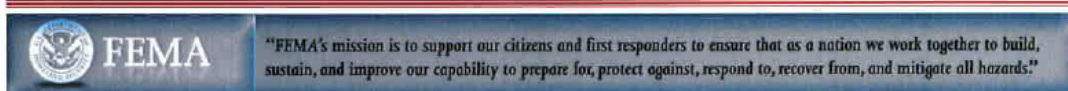
- Public involvement – In addition to government agencies involved in incident management, floodplain management and economic development, the planning process usually involves a range of stakeholders, including representatives of neighborhood groups, civic organizations, academia, environmental groups,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

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

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

Hazard mitigation plan required to receive HMGP Project Grants

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



Fact Sheet

State and Local Mitigation Planning



Mitigation Examples

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

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

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

Planning tool available for government agencies

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

For more information

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

For state name disaster recovery, visit www.fema.gov 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: SAMPLE MEETING AGENDA AND NOTES

Moultonborough Hazard Mitigation Plan Update Committee

April 29, 2019 10 AM - 11 AM
Ernest Davis Meeting Room, Moultonborough Town Hall
6 Holland Street, Moultonborough, NH

**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. Tracking time
3. Hazard Risk Assessment (p. 8-9, p. 25 of 2013 Plan)
 - a. Compare to 2018 State Hazard Mitigation Plan list of natural hazards
 - b. List hazards with risk ranking
4. Critical Facilities
 - a. Review 2013 Critical Facilities map for needed changes, updates
 - b. Assessed values of Critical Facilities
5. Updates
 - a. Community Profile – p. 5-6 of 2013 Plan
 - b. Current Plans, Policies and Regulations – p. 26-27 of 2013 Plan
6. Next Meeting – May? 2019

- a. Review Mitigation Goals – p.31-33 of 2013 Plan
- b. Review Mitigation Actions p. 34-50 of 2013 Plan

7. Public Input

Moultonborough Hazard Mitigation Plan Update April 29, 2019, 10 a.m.

Present: David Bengtson, Walter Johnson, Steve Zalewski, Ron DeDucca, Amanda Bergquist, Patrick Andrew, Josephine Belville, Joel Mudgett, Susan Slack (LRPC), Heidi Lawton (HESM)

After introductions, S. Slack discussed the task of the committee – to update the 2013 Moultonborough Hazard Mitigation Plan. The difference between hazard mitigation and emergency preparedness was briefly discussed.

S. Slack also explained the importance of keeping track of time spent at meetings and between meetings. This time is used to meet Moultonborough's in-kind match requirement required by FEMA, which is funding LRPC's work with the town on updating the Hazard Mitigation Plan. S. Slack distributed two pages from the 2018 State of New Hampshire Multi-Hazard Mitigation Plan Update, which identifies natural, technological and human-caused hazards, and identifies hazard changes between the 2013 and the 2018 state plans.

Chief Bengtson distributed a list of the most common hazards identified for Moultonborough. They include: Inland Flooding, High Wind Events, Lightning, Severe Winter Weather, and Wildfires.

S. Slack distributed a spreadsheet for ranking the probability, extent and vulnerability for the listed hazards. Committee members discussed each hazard and came to a consensus on ranking each one.

S. Slack will apply the rankings to the spreadsheet and share the results with committee members. S. Slack explained that Mitigation Actions need to be applied to high and medium ranked Hazards.

In particular, the committee discussed Dam Failures, Hazardous Materials, Mass Casualty Incidents, and Conflagration. Chief Bengtson discussed dams at Castle in the Clouds and Lake Kanasatka, as well as damage from failed beaver dams. Although there could be damage to Route 25 and traffic impacts on this important east-west highway corridor, the likelihood of failure of the Lake Kanasatka dam is considered low, as it is with the Castle in the Clouds dam. Chief Bengtson commented on the potential of a Hazardous Materials incident, given the importance of the Route 25 highway corridor connecting I-93 to the west and Route 16 to the east, particularly for the transportation of fuel. A. Bergquist and P. Andrew commented on Mass Casualty Incidents, given the concerns for school safety, and others discussed Mass Casualty Incidents related to multi-vehicle crashes. Chief Bengtson said injuries to five or more people in a motor vehicle crash would be considered a Mass Casualty for Moultonborough. P. Andrew raised the issue of ice rescues, and Chief Bengtson said public education and rescue response is well coordinated so that the probability of casualties from falling through ice is low. W. Johnson raised concern about the potential for fire at Moultonborough's many boat marinas. The committee decided to include Conflagration as a hazard to address in the Plan.

The committee decided to meet again on Friday, May 10 at 10 am. S. Slack asked committee members to review Mitigation Actions in the 2013 Plan and determine which have been completed, are on-going, or can be deleted.

S. Slack said that she would contact Town Planner Bob Ward to request that he review the Community Profile section on p. 5-6 of the 2013 Plan and update it, as well as the Current Plans, Policies and Regulations section on p. 26-27.

S. Slack also asked J. Belville to review the Inventory of Critical Facilities on p. 18 of the 2013 Plan and update their assessed values.

The meeting was adjourned at 11:10 am.

S. Slack – Note Taker

APPENDIX E: PAST HAZARD EVENTS

Hazard	Date	Location	Remarks/Description	Source
Snowstorm	2/8-/10/2013	Statewide	Total Public Assistance Grants Dollars obligated was \$6,153,471.49. Snowfall amounts were generally 18". Declared Disaster, DR-4105.	FEMA
Snowstorm	1/26-1/28/2015	Statewide	Snowfall across the state ranged from 10 to 30 inches. Blizzard conditions led to coastal flooding and splash over. Total Public Assistance Grants Dollars obligated was \$4,939,214.76. Declared Disaster, DR 4209.	FEMA
Snowstorm	3/14-3/15/2017	Statewide	Primary impact was damage to utilities. Two counties received public assistance totaling \$1,687,439.45. Declared Disaster, DR-4316.	FEMA
Blizzard	3/13-3/14/2018	Statewide	Declared Disaster, DR-4371	HSEM

Hazard	Date	Location	Remarks/Description	Source
Flood	6/26-7/3/2013	Grafton, Sullivan, Cheshire	The total Public Assistance was \$5,903,017.87. Declared Disaster, DR-4139	FEMA
Flood	7/1-7/2/2017	Coos, Grafton	The total Public Assistance \$699,661.26. Flood stages ranged from 9.00ft to 13.00ft. Declared Disaster, DR-4329.	FEMA
Flood	10/29 -11/1/2017	Coos, Grafton, Carroll, Belknap, Merrimack, Sullivan	The total Public Assistance was \$365,851.11. Flood stages ranged from 8.00ft to 13.00ft. Declared Disaster, DR-4355.	FEMA, NOAA
Flood	3/2-3/8/2018	Rockingham	Declared Disaster, DR-4370.	HSEM

Past Hazard Events from the 2013 Moultonborough Hazard Mitigation Plan

Hazard	Date	Location	Description	Damages	Source
Earthquake	12/20/1940	Central NH	5.5 on Richter scale		NH OEM
Earthquake	12/24/1940	Central NH	5.5 on Richter scale		NH OEM
Flood	4/18/1997	Carroll County	Three to five inches of rain in 8 to 12 hours caused small rivers and streams to rise rapidly. Many roads were closed due to washouts and water over roadways, particularly near Somersworth and Rochester in Strafford County, Tamworth and Wolfeboro in southern Carroll County, and near Canaan in Grafton County. Some homes were evacuated.		NOAA
Flood	4/1/1998	Carroll County	3"- 8" of rain caused small rivers and streams to rise. Roads flooded and/or washed out.		NOAA
Flood	6/14/1998	Carroll County	3"- 8" of rain caused small rivers and streams to rise.		NOAA
Flood	5/13/2006	Carroll County	12 inches of rain in some locations in a 72-hour period.		NOAA
Hail	7/16/1984	Carroll County	1.75 inches in diameter		NOAA
Hail	6/24/1985	Carroll County	0.75 inches in diameter		NOAA
Hail	6/8/1987	Carroll County	0.75 inches in diameter		NOAA
Hail	6/13/1987	Carroll County	1.00 inches in diameter		NOAA
Hail	7/26/1994	Carroll County	0.75 in. hail accompanied by a very strong downburst from a thunderstorm. 150 other homes damaged, and several cars crushed by felled trees. 140 acres of trees sustained damage. 1800 households lost power	>1.5 million	NOAA
Hail	7/18/2000	Moultonborough	0.75 inches in diameter		NOAA
Heavy Snow	2/14/1958	Carroll County	More than a foot of snow		NH OEM
Heavy Snow	3/2/1960	Carroll County	Upwards of 2' of snow; high winds		NH OEM
Heavy Snow	1/18/1961	Carroll County	Up to 25" of snow		NH OEM
Heavy Snow	2/22-28/1969	Statewide	98" in Western Central New Hampshire, 2' to 3' across New Hampshire		NH OEM
Heavy Snow	2/5/1978	Carroll County	More than 2' of snow - "Blizzard of '78"		NH OEM
Heavy Snow	1/31/1993	Carroll County	Up to 13 inches of snow. Communities experienced electrical power failures.		NOAA
Heavy Snow	1/17/1994	Statewide	75,000 Residents lost power		NOAA
Hurricane	9/21/1938	Statewide	13 Deaths, 2 Billion feet of marketable lumber blown down, flooding throughout the State, total Direct Losses - \$12,337,643 (1938 Dollars)	\$12,337,643.00	NH OEM

Ice	1/5/1979	Statewide	Power and Transportation disruptions		NH OEM
Ice	1/7/1998	Statewide	More than \$17 million in power line damage alone	>17 million	NH OEM
Lightning	6/10/2005	Moultonborough	Lightning sparked a fire that destroyed a summer cottage on Lake Winnepesaukee's Badger Island. The lightning struck a nearby pine tree and ignited a ground fire as it traveled along the ground. The ground fire quickly spread to the cottage.	\$30,000.00	NOAA
Hazard	Date	Location	Description	Damages	Source
Lightning	8/1/2005	Moultonborough	Lightning struck a two-story home that was under construction and ignited a fire that heavily damaged the structure. The lightning apparently struck a nearby 70-ft tall pine tree behind the home and traveled into the building.	\$150,000.00	NOAA
Lightning	8/2/2005	Moultonborough	For the second night in a row, lightning struck a two-story home in Moultonborough. Fire flared up about 4 hours after the initial strike and caused considerable damage to the kitchen and a new addition.	\$50,000.00	NOAA
Thunderstorm	7/26/1994	Carroll County	Thunderstorm Winds gusted as high as 82 mph near Moultonborough		NOAA
Thunderstorm	7/26/1994	Carroll County	\$5 million in total cost.	\$5,000,000.00	NOAA
Thunderstorm	7/6/1999	Moultonborough	Thunderstorm Winds gusted as high as 60 knots near Moultonborough		NOAA
Thunderstorm/Lightning	7/30/1999	Moultonborough	Lightning struck a tree in Moultonboro and followed an underground wire to a nearby historic post and beam barn where it ignited a fire. The fire caused moderate damage to the structure.		NOAA
Thunderstorm	6/20/2006	Moultonborough	Winds 50 knots, trees down		NOAA
Tornado	7/18/1963	Carroll County	F2 - \$25,000 in damage	\$25,000.00	NOAA
Tornado	8/7/1986	Carroll County	F1 - \$250,000 in damage	\$250,000.00	NOAA
Tornado	8/7/2001	Carroll County	F1 - \$2.5 million in damage	\$2,500,000.00	NOAA

APPENDIX G: HAZARDS – SUPPLEMENTARY HAZARD INFORMATION

This section provides information on potential hazards considered by the Committee to be Low Risk for Moultonborough.

NATURAL HAZARDS

LANDSLIDE

Definition: The downward or outward movement of slope-forming materials reacting to the force of gravity, including mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides and earth flows.

Location: The steep slopes of a portion of the Ossipee Mountain range are located in Moultonborough. However, as with much of the mountainous landscape in New Hampshire, it is relatively stable. Exposure to the risk of landslide is generally limited to areas in northern Carroll County and other parts of the state.

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

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

There are also multiple types of landslides³¹:

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

History: There are no known occurrences of landslide in Moultonborough since the 2013 HMP.

Probability of Occurrence: Low

³¹ <https://oas.org/dsd/publications/Unit/oea66e/ch10.htm>

WILDFIRE

Location: Moultonborough is heavily wooded; a fire could occur anywhere; however, the remote Red Hill and densely developed Long Island are target hazard areas.

Extent: A wildfire is defined as a fire in wooded, potentially remote areas that may endanger lives. New Hampshire has about 500 wild land fires each year; most of these burns less than half an acre. Much of the Lakes Region is forested and susceptible to fire. There have been fires on Red Hill but due to a low fuel load and limited development in this area, it was not viewed as a major concern. However, Long Island is an area of concern due to a high fuel load, steep slopes, prevailing wind, a relatively dense population, and limited access.

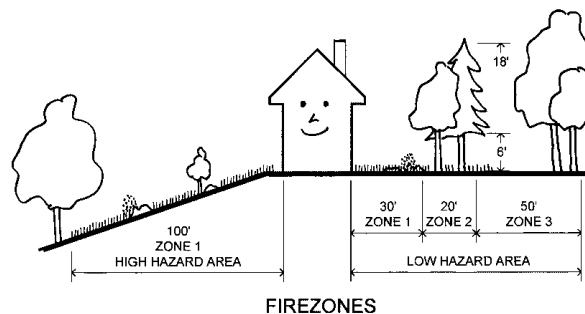
History: No local occurrences have been reported since 2007. Between 2014 and 2018 there were 724 wildfires in New Hampshire, burning 2,007 acres, averaging just under 3 acres per fire. The number of fires per year ranged from 53 (2018) to 351 (2016). Carroll County had 11 wildfires in 2018.³²

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.

Several areas in the region are relatively remote in terms of access and firefighting abilities. Of greatest concern are those areas characterized by steep slopes and vast woodlands, with limited vehicular access. These areas include the Ossipee, Squam, Belknap, and Sandwich Mountain Ranges. The islands in the region also pose a unique fire safety concern given that access is limited and most of the islands are predominately wooded with residential development. Most of the residential development on the islands is situated on the shores, and inland firefighting capabilities are often limited.

As these once remote areas begin to see more development (the urban-wildfire interface), care should be taken to ensure that adequate fire protection and buffers are established. Techniques include increased buffers between wooded areas and residential buildings, requirements for cisterns or fire ponds, a restriction on the types of allowable building materials such as shake roofs, and special considerations for landscaping. The greatest risk of wildfire in New Hampshire exists in the spring when the snow has melted and before



³² NH Division of Forests and Lands <https://www.nh.gov/nhdfl/documents/2018-forest-fire-town-report.pdf>

the tree canopy has developed, and in the late summer into early fall. Appropriate planning can significantly reduce a community’s vulnerability for woodland fires. There are four-zone suggestions from the Firewise community program that could be potentially helpful for Moultonborough’s homeowners.³³

ZONE 4 is a natural zone of native or naturalized vegetation. In this area, use selective thinning to reduce the volume of fuel. Removing highly flammable plant species offers further protection while maintaining a natural appearance.

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

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

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







Probability of Occurrence: Low

AVALANCHE

Definition: An avalanche is a slope failure, like a landslide, consisting of a mass of rapidly moving, fluidized snow that slides down a mountainside. The flow can be composed of ice, water, soil, rock, and trees. Most avalanches result from structural weaknesses in the snowpack caused by temperature fluctuations or multiple snowfall events. Avalanches occur on steep slopes averaging 25 to 50 degrees and are triggered by both natural events (thermal changes, blizzards, seismic activity) and human activities (skiers, hikers, snowmobilers, sound waves).

Location: Avalanche occurs in the Presidential Range in northern Carroll County, but is not known to occur in the Ossipee Mountains in southern Carroll County, including in Moultonborough.

Extent: The extent of an avalanche prone area is

North American Public Avalanche Danger Scale Avalanche danger is determined by the likelihood, size and distribution of avalanches.		
Danger Level		Travel Advice
5 Extreme		Avoid all avalanche terrain.
4 High		Very dangerous avalanche conditions. Travel in avalanche terrain not recommended.
3 Considerable		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.
2 Moderate		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.
1 Low		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.
No Rating		Watch for signs of unstable snow such as recent avalanches, cracking in the snow, and audible collapsing. Avoid traveling on or under similar slopes.
Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.		

Avalanche Danger Scale³⁴

³³ <http://www.firewise.org> accessed September 21, 2012.

³⁴ <https://avalanche.org/avalanche-encyclopedia/danger-scale/>

determined by the amount of risk for natural or human triggered reactions based on factors such as snow-pack distribution and other atmospheric conditions. The North American Public Avalanche Danger Scale above shows the five danger classifications that are used to express avalanche risk.

History: There is no known occurrence of avalanche in Moultonborough.

Impact: Although avalanche is unlikely to occur in Moultonborough, it would most likely occur in remote, undeveloped areas of the town like the Ossipee Mountains that lack structures and infrastructure. It is possible that impacts could cause injury to humans, but it is impossible to estimate the cost of damages.

Probability of Occurrence: Low

EARTHQUAKE

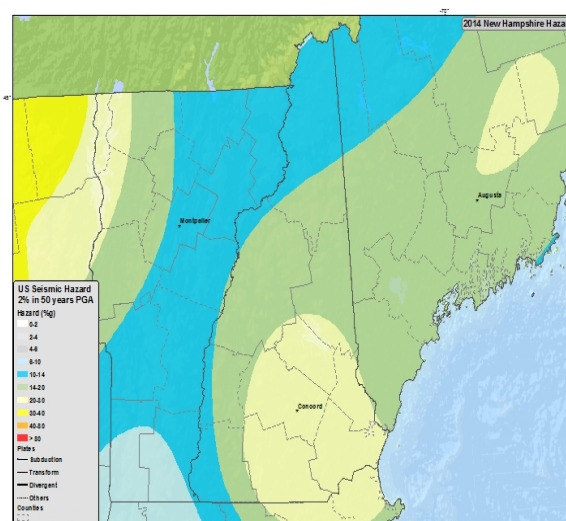
Location: An earthquake could affect all areas of Moultonborough

Extent: An earthquake is a series of vibrations induced in the Earth's crust by the abrupt rupture and rebound of rocks in which elastic strain has been slowly accumulating. Earthquakes are commonly measured using *magnitude*, or the amount of seismic energy released at the epicenter of the earthquake. The Richter magnitude scale is a mathematical device used to compare the size of earthquakes, shown in Table 7.³⁵

Table 7: Richter Magnitude Scale

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

New Hampshire is considered to be in an area of moderate seismic activity with respect to other regions of the country. This means the state could experience large (6.5 to 7.0 magnitude) earthquakes. There is the potential for nearby earthquakes to register 5.5 on the Richter Scale, causing slight damage to buildings and structures. Due to the unique geology of New Hampshire, earthquake propagation waves travel up to 40 times farther than they do in the western United States, possibly enlarging the area of damage.³⁶ The strongest earthquakes to strike New Hampshire occurred December 20 and 24, 1940 in the nearby Ossipee.



³⁵ <http://pubs.usgs.gov/gip/earthq4/severitygip.html>, visited February 8, 2011.

³⁶ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html> visited February 8, 2011.

Both earthquakes had a magnitude of 5.5 and were felt over an area of 400,000 square miles.

History: On average, the Lakes Region experiences an earthquake every other year, though these earthquakes are mild and go mostly undetected by people. Tamworth is identified as a major epicenter in the region.³⁷ According to the USGS National Earthquake Information Center database, since 1993 there have been 20 earthquakes (magnitude > 2.5) within a 50 km (31 mi.) radius of Moultonborough; the largest was magnitude 3.9. A 4.0 quake centered in southern Maine (50km away) shook the region on October 16, 2012. No earthquakes of magnitude 2.5 or higher have occurred in the area since the 2013 update and no impacts have been felt in Moultonborough during that timeframe.

Notable New Hampshire earthquakes are listed below with the extent of the hazard expressed in the Modified Mercalli Intensity scale and the Richter Magnitude.³⁸

NH Earthquakes of magnitude or intensity 4 or greater (1638-2007).

Location	Date	MMIntensity	Magnitude
Ossipee	December 24, 1940	7	5.5
Ossipee	December 20, 1940	7	5.5
Ossipee	October 9, 1925	6	4
Laconia	November 10, 1936	5	-
New Ipswich	March 18, 1926	5	-
Lebanon	March 5, 1905	5	-
Rockingham County	August 30, 1905	5	-
Concord	December 19, 1882	5	-
Exeter	November 28, 1852	5	-
Portsmouth	November 10, 1810	5	4
Off Hampton	July 23, 1823	4	4.1
15km SE of Berlin	April 6, 1989	-	4.1
5km NE of Berlin	October 20, 1988	-	4
W. of Laconia	January 19, 1982	-	4.7
Central NH	June 11, 1638	-	6.5

Damage from an earthquake generally falls into two types; Structural and Nonstructural.

- **Structural Damage** is considered any damage to the load bearing components of a building or other structure.
- **Nonstructural Damage** is considered any portion not connected to the superstructure. This includes anything added after the frame is complete.

Probability of Occurrence: Unlikely

³⁷ <http://des.nh.gov/organization/commissioner/pip/factsheets/geo/documents/geo-3.pdf>, pg. 3, visited January 25, 2011.

³⁸ http://earthquake.usgs.gov/learn/topics/mag_vs_int.php, visited June 8, 2012.

INFECTIOUS DISEASE

Definition: 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. 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.

Location: All of Moultonborough and the entire State of New Hampshire are at risk for Infectious Diseases. The prevalent diseases can change based on the time of year, such as the influenza virus in the winter and foodborne disease in the summer. In Moultonborough the schools, camps, and areas where the elderly gather are likely places for transmission to occur. Epidemics occur in Moultonborough and other Lakes Region communities from time to time. 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. Huggins Hospital has an emergency operations plan that addresses response to local and regional epidemics. The concerns associated with a pandemic include local capacity to respond to not only the residents of Moultonborough and surrounding communities but also any visitors. The Huggins Hospital staff in nearby Wolfeboro partners with Carroll County Public Health and other regional health providers. Epidemics may be caused by infectious diseases, which can be transmitted through food, water, the environment or person-to-person or animal-to-person, and noninfectious diseases, such as a chemical exposure, that causes increased rates of illness. Infectious diseases that may cause an epidemic can be categorized into the following groups:

1918 FLU PANDEMIC 100 YEARS
WE REMEMBER. WE PREPARE.

Seasonal Flu vs. Pandemic Flu

Influenza is one of the world's greatest infectious disease challenges. But did you know that seasonal flu and pandemic flu are not the same?

What is seasonal flu?	What is pandemic flu?
Influenza (flu) is a contagious respiratory illness caused by flu A and B viruses that infect the human respiratory tract. Annual flu epidemics occur among people worldwide.	A flu pandemic is a global outbreak of a new flu A virus in people that is very different from current and recently circulating seasonal flu A viruses.
How often do seasonal flu epidemics occur? Epidemics of seasonal flu happen every year. Fall and winter is the time for flu in the United States.	How often do flu pandemics occur? Flu pandemics happen rarely. Four flu pandemics have happened in the past 100 years, but experts agree another one is inevitable.
How do seasonal flu viruses spread? Flu viruses are thought to spread mainly from person to person through droplets made when someone with flu coughs, sneezes, or talks near a person (within 6 feet).	How do pandemic flu viruses spread? Pandemic flu viruses would spread in the same way as seasonal flu, but a pandemic virus will likely infect more people because few people have immunity to the pandemic flu virus.
Is there a vaccine for seasonal flu? Seasonal flu vaccines are made each year to vaccinate people against seasonal flu. Everyone 6 months and older should get a flu vaccine every year. For most people, only one dose of vaccine is needed.	Is there a vaccine for pandemic flu? Although the U.S. government maintains a limited stockpile of some pre-pandemic flu vaccines, vaccine may not be widely available in the early stages of a pandemic. Two doses of pandemic flu vaccine will likely be needed.
Are there medications to treat seasonal flu? Prescription medications called antiviral drugs can treat seasonal flu. During a severe flu season, there can be spot shortages of these drugs.	Are there medications to treat pandemic flu? Flu antiviral medications may be used to treat pandemic flu if the virus is susceptible to these drugs. While a limited amount of flu antiviral drugs are stockpiled for use during a pandemic, supplies may not be enough to meet demand during a pandemic.
Who is at risk for complications from seasonal flu? Young children, people 65 years and older, pregnant women, and people with certain long-term medical conditions are more likely to have serious flu complications.	Who is at risk for complications from pandemic flu? Because this is a new virus not previously circulating in humans, it's not possible to predict who would be most at risk of severe complications in a future pandemic. In some past pandemics, healthy young adults were at high risk for developing severe flu complications.

CDC
<https://www.cdc.gov/flu/pandemic-resources/basics/about.html>

Seasonal Flu v. Pandemic Flu Infographic³⁹

³⁹ <https://www.cdc.gov/flu/resourcecenter/freeresources/graphics/seasonal-vs-pandemic-flu-infographic.htm>

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

History: While there certainly have been minor outbreaks of flu in town, no major outbreaks of this or any other infectious disease was identified during this process.

Probability of Occurrence: Low

SOLAR STORMS & SPACE WEATHER

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

As society becomes increasingly reliant on electronics and technology, the hazards presented by space weather are not to be underestimated. The magnetic disturbances that solar storms can bring can disrupt communications, damage or destroy electronic components, corrode gas and oil pipelines, and cause significant damage to spacecraft and satellites outside the Earth's protective atmosphere.

Location: All of Moultonborough and the entire State of New Hampshire are at risk of solar storms and space weather. Solar storms and space weather always impact the Earth and its atmosphere and are therefore an ongoing threat. While the Earth is somewhat protected from solar storms and space weather by its upper atmosphere, the potential for a loss of communications, power, and GPS exists on a daily basis.

Extent: The *2018 State of New Hampshire Multi-Hazard Mitigation Plan Update* describes three different types of events: Geomagnetic Storms, Solar Radiation Storms, and Radio Blackout. Each of these is then rated on a five-level scale (minor, moderate, strong, severe, extreme), with descriptions of increasing impacts on power, spacecraft, biological, satellite, high frequency radio, and navigation systems. It is most likely that a solar storm would exacerbate radio communications problems. The following Radio Blackout Scale (below)⁴⁰ offers a measure of the extent of solar storms on radio communications:

⁴⁰ https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf, p. 141

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

History: No significant events have been reported in Moultonborough. Nearby events include Quebec, Canada, which experienced a 9-hour blackout in March 1989 when solar winds caused a fluctuation in the Earth's magnetic field and caused Hydro-Quebec's transmission to go down.⁴¹

Probability of Occurrence: Unlikely

TECHNOLOGICAL HAZARDS

HAZARDOUS MATERIALS

The Lakes Region, as its name suggests, is comprised of many surface water bodies. Many of the towns in the region depend on a portion of this resource to provide public drinking water to the community. Area tourism and water recreation are also highly dependent on the availability of clean and attractive water resources. For these reasons the protection of surface and ground waters in the Lakes Region is highly valued both as a necessity and for economic reasons. The leading potential sources of water contamination include in-transit and fixed hazardous materials.

⁴¹ Adapted from the *State of New Hampshire 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.

Hazardous materials, i.e., chemicals and chemical compounds in many forms, are found virtually everywhere: in common household products; agricultural fertilizers and pesticides; carried by vehicles as fuels, lubricants, and transported products; and, used in business and industrial processes. When improperly used, released, or spilled, they can burn or explode, diffuse rapidly through the air or in water, and endanger those who come in contact with them.

Chemicals of all types are used, stored, and transported throughout the Lakes Region. The types and locations of many of these hazardous materials are unknown. While the New Hampshire Department of Environmental Services maintains a database of hazardous waste generators and underground storage tanks located in the state, detailed information on the types and volume of hazardous materials that are transported through the region is not documented. Likewise, only a small portion of the stored hazardous materials are reported and cataloged. Thus, there is a potential of a hazardous material incident at every transportation accident or fire in the area. Further, there is extensive use of liquefied gases for heating in the area, which means that significant amounts are transported, by both vehicle and major gas pipelines, and stored in the region.

Location: Major roadways, especially in populated areas or at water crossings are areas of concern. The committee noted NH Route 25 in the Village Area and at Sheridan Road as areas of particular concern.

Extent: Oil spills along many of the routes in Moultonborough could result in the contamination of wells or waterbodies in the Lake Winnepesaukee watershed. In addition to distributing fuel to central locations in the region, tankers travel throughout the area daily to deliver home heating fuel. Many oil tankers have the capacity to carry 10,000 gallons of home heating oil.

History: In 2010 the driver of a tanker truck lost control in the Village Area. No one was injured and no substantial damages occurred in this case.

Probability of Occurrence: Moderate

TRANSPORTATION INCIDENT

Location: Localized – Ossipee Mountain Road and NH Route 171 and specific areas along NH Route 25 identified in the NH Route 25 Safety Study.

Extent: While trucks are not transporting hazardous materials along Ossipee Park Road (CG Roxanne Bottling Company), they are traveling down the hill fully loaded (approximately 18 tons). At the base of the hill is a state route. In a collision, the degree of damage would depend on what is in the vehicle crossing the intersection at the time. Vehicular accidents occur along NH Route 25, usually involving one or two vehicles; poor driving conditions may lead to the involvement of additional vehicles. Occasionally fatalities result from these incidents.

History: August 9, 2012 a fully loaded tractor-trailer lost its brakes on Ossipee Park Road through the intersection with NH Route 171 and 200 feet into the woods with only minor injury to the driver. Neighbors reported three similar incidents during the prior year.⁴² May 14, 2012 a fully

⁴² WMUR NH's News 9, August 10, 2012. <http://www.wmur.com/news/nh-news/Bottled-water-truck-crashes-in-Moultonborough/-/9857858/16047514/-/cqoy1d/-/index.html>

loaded truck lost its brakes and rolled over after crossing NH Route 171; the driver sustained a leg injury.⁴³ A fatal accident in April 2012 on NH Route 25 involving a pickup truck and logging truck tied up traffic for four hours.⁴⁴

Probability of Occurrence: High

DAM FAILURE

Definition: The sudden, rapid, and uncontrolled release of impounded water.

Location: Lake Kanasatka dam near NH Route 25 is the only Significant Hazard dam in Moultonborough.

There are ten active dams in Moultonborough (see table below); one Significant Hazard, two Low (L) Hazard, and seven Non-Menace (NM) Hazard dams; the Lake Kanasatka dam is a Significant Hazard dam. The Lamprey Sewage Lagoon had been listed as a Significant Hazard dam; the dam was removed in 2010.

Active dams in Moultonborough

Hazard Class	NAME	RIVER	IMPOUND (Acre-Ft)	HEIGHT (Feet)	DRAIN AREA (Sq. Mi.)
S	LAKE KANASATKA DAM	TR LAKE WINNIPESAUKEE	392.00	17.00	7.30
L	CASTLE IN THE CLOUDS DAM	SHANNON BROOK	4.00	20.00	1.92
L	CAMP WINAUKEE SEWAGE LAGOON	N/A - NO OUTLET	0.00	0.00	0.00
NM	WEED BROOK HYDRO	WEED BROOK	0.25	2.67	1.25
NM	HALFWAY BROOK HYDRO	HALFWAY BROOK	0.50	5.00	1.00
NM	FARM POND DAM	HALFWAY BROOK	0.15	7.00	0.01
NM	EMERSON DAM	UNNAMED STREAM	3.00	5.00	0.00
NM	LEES MILL DAM	LEE MILL POND	0.52	16.00	27.41
NM	FARM POND DAM	NATURAL SWALE	0.75	6.50	0.01
NM	ASHJIAN DAM	UNNAMED STREAM	0.23	15.00	0.00

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

Non-Menace Structure

A non-menace structure is a dam that is not a menace because it is in a location and of a size that failure or mis-operation of the dam would not result in probable loss of life or loss to property, provided the dam is:

⁴³ WMWV <http://www.wmv.com/water-truck-driver-injured-after-crash-in-moultonborough/>

⁴⁴ WMUR <http://www.wmur.com/Fatal-Crash-Shuts-Down-Route-25-In-Meredith/-/9858568/13424472/-/rrfg0p/-/index.html>

- Less than six feet in height if it has a storage capacity greater than 50 acre-feet; or
- Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.

Low Hazard Structure

A low hazard structure is a dam that has a low hazard potential because it is in a location and of a size that failure or mis-operation of the dam would result in any of the following:

- No possible loss of life.
- Low economic loss to structures or property.
- Structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupts public safety services.
- The release of liquid industrial, agricultural, or commercial wastes, septage, or contaminated sediment if the storage capacity is less than two-acre-feet and is located more than 250 feet from a water body or water course.
- Reversible environmental losses to environmentally-sensitive sites.

Significant Hazard Structure

A significant hazard structure is a dam that has a significant hazard potential because it is in a location and of a size that failure or mis-operation of the dam would result in any of the following:

- No probable loss of lives.
- Major economic loss to structures or property.
- Structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services.
- Major environmental or public health losses, including one or more of the following:
 - Damage to a public water system, as defined by RSA 485:1-a, XV, which will take longer than 48 hours to repair.
 - The release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more.
 - Damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.

High Hazard Structure

A high hazard structure is a dam that has a high hazard potential because it is in a location and of a size that failure or mis-operation of the dam would cause probable loss of human life as a result of:

- Water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure, which is occupied under normal conditions.
- Water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to dam failure is greater than one foot.
- Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services.
- The release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 147-A:2 VII.
- Any other circumstance that would more likely than not cause one or more deaths.

History: There have been no known dam failures in Moultonborough.

Probability of Occurrence: Low

APPENDIX H: CRITICAL FACILITIES-VULNERABILITY

Facility/Infrastructure	Lightning	Severe Winter Weather (Blizzard/Snow Storm, Ice Storm, Nor'easter)	High Wind Event (Tornados, Downburst)	Flood	Wildfire	Hazardous Materials	Dam Failure	Earthquake	Infectious Disease
Moultonborough Central School	High	High	Moderate	Low	Low	High	Low	Low	Moderate
Moultonborough Academy	High	High	Moderate	Low	Low	Low	Low	Low	Moderate
Moultonborough Safety Building	High	Moderate	Moderate	Low	Low	High	Low	Low	Low
Moultonborough Neck Fire Station	Low	Moderate	Moderate	Low	Moderate	High	Low	Low	Low
Town Hall	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low
Highway Garages	Moderate	Moderate	Moderate	Low	Low	High	Low	Low	Low
Town Landfill	Low	Moderate	Low	Low	Low	High	Low	Low	Low
Electrical substation (NH Rte. 25)	High	Moderate	High	Low	Low	High	Low	Low	Low
Electrical substation (Moultonborough Neck Road)	High	Moderate	High	Low	Low	Moderate	Low	Low	Low
Lakes Region Water Utility	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low
Bay Sewage System Utility	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low
Commercial District - West (Rte. 25 near Center Harbor town line)	High	Moderate	High	Low	Low	High	Low	Low	Low
Commercial District - Central (Moultonborough Neck Road)	High	Moderate	High	Low	Low	High	Low	Low	Low

Facility/Infrastructure	Lightning	Severe Winter Weather (Blizzard/Snow Storm, Ice Storm, Nor'easter)	High Wind Event (Tornados, Downburst)	Flood	Wildfire	Hazardous Materials	Dam Failure	Earthquake	Infectious Disease
Commercial District - East Moultonborough Village	High	Moderate	High	Low	Low	High	Low	Low	Low
Castle Springs (commercial water withdrawal well)	Moderate	Moderate	Moderate	Low	High	High	Low	Low	Low
WestWynde (Taylor Community)	High	High	Moderate	Moderate	Moderate	Low	Low	Low	Moderate
Imaginations Childcare	High	High	High	Low	Low	High	Low	Low	Moderate
Deer Hill Camp	High	Low	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Quinebarge (camp)	High	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate
Tecumseh (camp)	High	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate
Robindel (camp)	High	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate
Geneva Point (camp)	High	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate
Winaukee (camp)	High	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate
Long Island (high density)	High	High	Moderate	High	High	Moderate	Low	Low	Low
States Landing (high density)	High	High	Moderate	High	High	Moderate	Low	Low	Low
Suissevale (high density)	High	Moderate	Moderate	High	Low	Moderate	Low	Low	Low
Balmoral (high density)	High	Moderate	Moderate	High	Low	Moderate	Low	Low	Low
Trexler's Marina	High	Moderate	Moderate	Moderate	Moderate	High	Low	Low	Low
Harilla Landing	High	Moderate	Moderate	Moderate	Moderate	High	Low	Low	Low
Ambrose Cove Marina	High	Moderate	Moderate	Moderate	Moderate	High	Low	Low	Low
Downtown Historic District	High	Moderate	Low	Low	Low	High	Low	Low	Low
Castle in the Clouds	High	High	Moderate	Low	High	High	Low	Low	Low
Lions Club property	Low	Low	Low	Low	Low	Low	Low	Low	Low

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

Moultonborough Hazard Mitigation Plan, 2013

Moultonborough Master Plan Update, 2016-19

Moultonborough Zoning Ordinance

Moultonborough Subdivision Regulations

Moultonborough Site Plan Regulations

FEMA Community Information System

Town Assessor Database, 2019 <http://gis.vgsi.com/moultonboroughnh/>

2018 State of New Hampshire Multi-Hazard Mitigation Plan, NH Homeland Security and
Emergency Management

National Oceanic and Atmospheric Administration website <https://www.noaa.gov/>

NH Division of Forests and Lands <http://www.nhdf.org/fire-control-and-law-enforcement/fire-statistics.aspx>

APPENDIX K: 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)