Town of Holderness, New Hampshire
Hazard Mitigation Plan Update, 2014

Prepared by the:

Holderness Hazard Mitigation Update Committee

Pemigewasset River flooding in Holderness along NH Rte. 175, April 2011

Credit: http://farm7.staticflickr.com/6079/6092948164_57ea16a060_z.jpg

(Month of FEMA Approval) 2014

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Town of Holderness, New Hampshire
Hazard Mitigation Plan Update

(Month of FEMA Approval), 2014

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EXECUTIVE SUMMARY

The *Holderness Hazard Mitigation Plan Update* (the Plan) serves as a means to reduce future losses from natural or man-made hazard events before they occur. The Plan was developed by the Holderness 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 agreed that the hazards identified in the 2008 Plan continue today; three additional hazards were added to the list, hurricane, earthquake, and epidemic. The Committee determined those natural and human-related hazards which pose at least a moderate risk, based on a ranking system detailed in Chapter III, and shown below:

Flooding and Ice Jams	Severe Wind (Thunderstorm, Tornado/Downburst)	Severe Winter Weather
Lightning	Wildfire	Earthquake
Epidemic	Hurricane	Hazardous Materials in Transport
	Radon	

There have been a few minor changes to the list of Critical Facilities. The Committee identified numerous existing programs related to hazard mitigation including the following:

Existing Plans, Regulations and Practices Supporting Hazard Mitigation	
Hazard Mitigation Plan 2008	Subdivision Regulations
Code Enforcement	Site Plan Review Regulations
Zoning Ordinance	Master Plan
Flood Plain Ordinance	School Emergency Operation Plan
Emergency Power Generation	Emergency Response Training and Drills
Mutual Aid Agreements	

About half of the Actions from the 2008 Plan have either been completed 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 27 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 Table 19: Implementation Schedule for Mitigation Actions.

CHAPTER I: PLANNING PROCESS

A. BACKGROUND

In order to be eligible to receive disaster related Federal Emergency Management Agency (FEMA) grant funding to be used for hazard mitigation projects and actions that will ultimately reduce and mitigate future losses from natural or human hazard events, FEMA has required that all communities within the state of New Hampshire establish local hazard mitigation plans. In response to this requirement, the NH Department of Safety's Division of Homeland Security and Emergency Management (HSEM) and the nine regional planning commissions in the state entered into agreements to aid communities with plan development and update. The plan development process generally followed the steps outlined in FEMA's *Local Mitigation Planning Handbook (2013)*

B. AUTHORITY

The town of Holderness 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 Holderness Hazard Mitigation Plan is a planning tool to be used by the town of Holderness, as well as other local, state, and federal government entities, in their efforts to reduce the negative effects from natural and human-related hazards. The Plan contains statements of policy as outlined in the Implementation Schedule for Mitigation Actions and in Chapter 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 hazards affecting the town of Holderness, as identified by the Committee. The hazards were initially reviewed under the following categories as outlined in New Hampshire's *Multi-Hazards Mitigation Plan Update, 2010:*

I. **Flood, Wild Land Fire, Drought** (Flood, Dam Failure, Ice Jam, Wildfire, Drought)
II. **Geological Hazards** (Earthquake, Radon, Landslide)
III. **Severe Wind** (Tornado/Downburst, Hurricane, Thunderstorm/Lightning, Hail)
IV. **Winter Weather** (Blizzard/Snow Storm, Ice Storm, Nor'easter, Avalanche).
V. **Other Hazards** (Epidemic, Fire and Hazardous Materials, Terrorism)

During the update process New Hampshire's 2013 Update to the *Multi- Hazards Mitigation Plan* was adopted and approved. Where possible, an effort has been made to reflect the information of the 2013 Update without detracting from Committee discussions and local concerns and priorities. The list of hazards in the New Hampshire's *Multi-Hazards Mitigation Plan Update, 2013* includes most of those listed above except for Ice Jam, Thunderstorm, and Hail. Blizzard/Snow Storm/Ice Storm/Nor'easter are now considered as Severe Winter Weather and Radiological was added to the list.

F. METHODOLOGY

The Lakes Region Planning Commission (LRPC) corresponded with the Holderness Emergency Management Director (EMD) in early 2013 to initiate the hazard mitigation update process in the town of Holderness. The EMD established the Holderness Hazard Mitigation Planning Update Committee in July 2013 for the purpose of updating a long-range plan for hazard mitigation. The Committee consisted of representatives from the departments of Police, Fire, and Public Works, the Town Administrator, members of the Board of Selectmen, the Chair of the Planning Board, and the Director of the Holderness Library. All meetings were open to the public.

Using FEMA's *Local Mitigation Plan Review Guide (2011), Mitigation Planning Workshop materials (2012), and the Local Mitigation Planning Handbook (2013*) as guidance, the Committee reviewed and updated various elements of the town's 2008 Hazard Mitigation Plan. The planner and the committee reviewed and referenced a variety of plans, studies, reports, and technical information during the development of this Plan Update; a list of these resources can be found in Appendix I. Data on property valuation was gathered through correspondence with the Town Assessing Coordinator.

The Committee held meetings from July through September, 2013 with a review of the draft plan by committee members in April and August 2014. The following timeline shows the dates and corresponding Committee actions. The committee reviewed each section of the plan and LRPC provided updated information on hazards in New Hampshire. Each section of the existing plan was revised and in some cases reformatted in order to develop a more comprehensive document. Meeting agendas were posted in Town Hall and at the LRPC web page and are included in Appendix D.

Committee Meetings

July 17, 2013: *Introductory Committee Meeting:*
Holderness Public Safety Building
Overview of update process and objectives
Discussion of Development Trends since 2007
Locate critical facilities and hazards on map
Identify Hazard Events since 2007

July 31, 2013: *Committee Meeting:*
Holderness Public Safety Building
Probability of Hazard Occurrence
Asset Assessment
Review of Community Goals

August 27, 2013: *Committee Meeting:*
Holderness Public Safety Building
Risk Assessment

Mitigation Strategies

September 17, 2013: *Committee Meeting:*
Holderness Public Safety Building
Prioritization of Mitigation Actions
Implementation of Mitigation Actions

April & August, 2014: Review of Draft Plan by Committee

Public Involvement
The Holderness 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. Specific opportunities for public input occurred at each meeting. Local businesses and members of the public were encouraged to attend all meetings through press releases and postings on the town and LRPC websites (Appendix C).

The Committee held a public comment period in order to obtain additional feedback on the draft document. The Plan (including comment instructions) was available for public review at Town Hall, the town library, and at the town website from August 21, 2014 – August 28, 2014. The neighboring towns were also notified of the review period. This provided an opportunity for local and regional businesses, organizations, agencies, educational and health institutions in Holderness and surrounding towns to review and comment on the plan update. No comments were received from the public during this review period.

G. ACKNOWLEDGMENTS

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

J. W. Laverack	*Vice-Chair*, Holderness Board of Selectman
Peter Webster	*Selectman*, Holderness Board of Selectman
Walter Johnson	*Town Administrator/Emergency Management Director (EMD),* Town of Holderness
Eleanor Mardin	*Chief*, Holderness Fire Department
Jeremiah Patridge	*Chief*, Holderness Police Department
Barry Tanner	*Lieutenant*, Holderness Police Department
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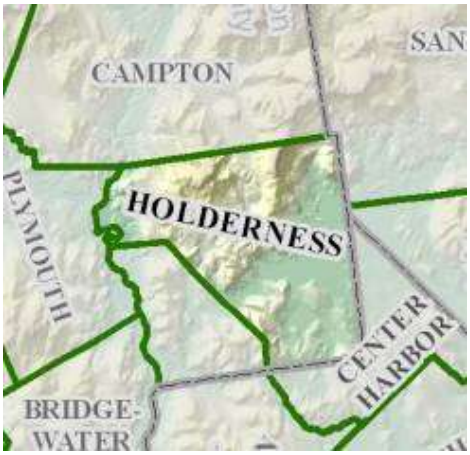
Earl Hansen	*Chair*, Holderness Planning Board
Victoria Lang	*Director,* Holderness Library
Paul Hatch	*Grafton County Field Representative* for NH Homeland Security and Emergency Management
David Jeffers	*Regional Planner*, Lakes Region Planning Commission

Additional information was provided by:

Amy Sharpe	*Assessing Coordinator*, Holderness
Jennifer Gilbert	*Floodplain Management Coordinator*, NH Office of Energy and Planning

CHAPTER II: COMMUNITY PROFILE

A. GEOGRAPHY



The town of Holderness is located on the southeastern edge of Grafton County. It is bordered by Center Harbor, Moultonborough, and Sandwich to the east, Campton to the north, Plymouth to the west and Ashland to the southwest. The town of Holderness contains 30.5 square miles of land area (85%) and 5.4 square miles of inland water area (15%).[1] The 2010 population for Holderness was 2,108, resulting in a population density of 69.1 persons per square mile of land area.

Rugged, heavily wooded slopes dominate the Holderness topography. Nearly 44 percent, or 8,573 acres, of the town's land area is characterized by slopes of 15 percent or greater. The Squam Range, including the Rattlesnake Mountains, Mt. Webster, Mt. Livermore, and Cotton Mountain, forms the northern shoreline of Squam Lake, while Mt. Prospect and The Button form the skyline to the north. 1,649 acres of Holderness (8.5%) is permanently conserved land.[2]

The Pemigewasset River forms the northwestern border with the town of Plymouth, providing a small amount of flood-basin land on the eastern shore. Rivers running through Holderness include Carr Brook and Owl Brook on the northern slope of the Squam Range. The remainder of land in town is characterized by hilly to rolling terrain, divided by inter-connected wetlands, ponds, and lakes. On the southern shore of Squam Lake sits Shepard Hill, surrounded by Little Squam Lake to the west and White Oak Pond and several large wetland areas to the east. Groton, Sheep, Moon and Bowman Islands and part of Great Island are all within Holderness.

Holderness is a town of primarily rural, residential land use characteristics with scattered areas of commercial and institutional uses. Residential use accounts for the greatest amount of developed land (837.23 acres) in the community, of which approximately 33% of the total residential units are used seasonally and located by the larger water bodies. Commercial uses can be found along much of the length of US Route 3/NH Route 25, and especially in the village center at the intersection of US Route 3/NH Route 25 and NH Route 113. Other smaller commercial areas are located on NH Route 175A near Plymouth and elsewhere throughout town on a parcel by parcel basis. The town's major institutional uses are found near the village center (Post Office, Town Hall, Fire Station, and Library) as well the Holderness School and Plymouth State University athletic facilities in the northwest of Holderness.[3]

B. WEATHER CONDITIONS

Like many New England towns, Holderness's temperatures and precipitation vary greatly. January temperatures range from an average high of 30 degrees Fahrenheit to an average low of 8 degrees

[1] *Holderness Master Plan*, Lakes Region Planning Commission, update 2007.
[2] *Lakes Region Planning Commission*, August 6, 2007.
[3] Holderness Master Plan (2007), Chapter VII Existing Land Use

Fahrenheit. July temperatures range from an average high of 81 degrees Fahrenheit to an average low of 55 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. Holderness averages about 70 inches of snow per year.[4]

C. PUBLIC SERVICES

A five-member Board of Selectmen governs the town of Holderness. The town has a 30 member call Fire Department and part-time Fire Chief. The Town Administrator serves as the Emergency Management Director and Health Officer. The Police Department consists of a full-time Police Chief and five full-time officers. Holderness does have a Land Use Compliance Officer. The Road Agent directs a staff of three who maintain 38 miles of town roads. Speare Memorial Hospital is located in Plymouth, four miles to the northwest of Holderness, Lakes Region General Hospital is in Laconia, 17 miles south, and Franklin Regional Hospital is in Franklin, 21 miles to the south. Additional hospitals are also located in Dover, Concord, and Lebanon.

Interstate 93 runs north/south along the western edge of Holderness, with Exit 24 providing access to the freeway. US Route 3/NH Route 25 runs generally east-west along the southern portion of town between Meredith and Ashland. NH Route 175 runs generally north-south, extending into Campton and NH Route 175 connects to I-93 and Plymouth. NH Route 113 runs along the north shore of Squam Lake.

Water and sewer services are supplied to the Plymouth State University (PSU) Fieldhouse and ice arena as well as the Holderness School through Plymouth Sewer & Water. Sewer service is also available to residences along North and South River Street, adjacent to the Pemigewasset River. The town is served by NH Electric Cooperative.

D. LAND USE AND DEVELOPMENT TRENDS

Like many Lakes Region communities, the population of Holderness grew rapidly between 1960 and 1980; growth since then has fluctuated around 10% per decade (Figure 1). Population growth is projected to continue at a much slower pace for the foreseeable future (Figure 2). The median age of residents is 46.9 years.

Table 1: Holderness, NH Year-Round Population, 1980-2010

Year	1980	1990	2000	2010
Population	1,586	1,694	1,930	2,108
% Changed	---	7%	14%	9%

Table 2: Holderness, NH Projected Year-Round Population, 2020-2040[5]

Year	2010	2020	2030	2040
Population	2,108	2,171	2,236	2,258
% Change	---	3%	3%	1%

[4] http://www.city-data.com/city/Holderness-New-Hampshire.html, visited June 19, 2007.
[5] New Hampshire Office of Energy and Planning, March 2013 http://www.nh.gov/oep/data-center/documents/2013-projections-municipalities.pdf.

The 2010 Census reported 1,510 households in Holderness, an increase of 302 units since the 2000 Census. Most of that growth occurred prior to recent economic downturn; between 2008 and 2011 just five residential permits were recorded in Holderness[6]. The seasonal character of the community is highlighted by the fact that 860 of the housing units recorded by the Census were occupied and 650 vacant. Because of this very seasonal nature of housing in Holderness, it is important to acknowledge that the actual number of people residing in town can fluctuate quite a bit.

While there is some variability over the years, the Traffic Volume Reports from the NH Department of Transportation indicate no dramatic changes in traffic volumes since 2008 along the major roadways in Holderness. Table 3 indicates the Average Annual Daily Traffic counts, measured in 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.

Table 3: Holderness Traffic Counts

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
BUREAU OF TRAFFIC

Bureau of Planning, Traffic Section, Traffic Reports *12-Feb-13*

STAT.	TYPE	LOCATION	FC	2005	2006	2007	2008	2009	2010	2011	2012
Town: HOLDERNESS											
221050	82	NH 175 NORTH OF NORTH ASHLAND ROAD	08	*	4300	*	*	4100	*	*	4000
221051	82	NH 175 NORTH OF NH 175A	17	*	1700	*	*	1700	*	*	1500
221052	62	NH 113 (SQUAM LAKE RD) AT SANDWICH TL	08	*	500	*	*	610	*	*	590
221054	62	I-93 BETWEEN EXITS 25-26 (SB-NB) (61221054-61221053)	11	*	*	*	18500	*	*	18000	*
221055	82	US 3/NH 25 (DANIEL WEBSTER HWY) EAST OF SHEPARD ST	07	*	5800	*	*	5800	*	*	4400
221056	82	NH 113 (SQUAM LAKE RD) WEST OF FINISTERRE POINT ROAD	08	*	990	*	*	900	*	*	1100
221057	82	NH 175A (HOLDERNESS RD) WEST OF I-93	17	*	7500	*	*	7600	*	*	8300
221060	82	NH 175 SOUTH OF OWL BROOK RD	08	*	3300	*	*	3200	*	*	3100

In the past five years the town adopted a Steep Slopes ordinance and the Floodplain ordinance has been updated. The new Digital Flood Insurance Rate Map (DFIRM) for Grafton County was adopted by the town and the floodplain ordinance was revised accordingly.

[6] Development Activity in the Lakes Region, 2013 Annual Report, Lakes Region Planning Commission.

CHAPTER III: RISK ASSESSMENT

A. IDENTIFYING HAZARDS

The town of Holderness is prone to a variety of natural and man-made hazards. The *2013 Multi-Hazard Mitigation Plan*, developed by the New Hampshire Department of Safety's Division of Homeland Security and Emergency Management identified the following hazards as those posing a risk to Grafton County communities.[7]

Table 3: Grafton County Hazards

Flooding	Epidemic	Earthquake	Severe Winter Weather
Wildfire	Dam Failure	Hurricane	Tornado/Downburst
Lightning	Drought	Snow Avalanche	Landslide
Terrorism	Radon	Radiological	Fire & Hazardous Materials

Due to geography, landslide, and snow avalanche were not considered as locally pertinent. Radiological contamination (most closely associated with nuclear power plants and hospital labs) was not considered a threat to Holderness. Terrorism was discussed but seen as beyond the scope of this plan (low risk man-made hazard). The Committee reviewed all of the hazards identified in the 2008 Plan. This plan identified the following hazards events as the greatest threats to the town at that time (Table 4).

Table 4: Hazards identified in the 2008 Holderness Hazard Mitigation Plan

High Risk	Moderate Risk
Flood	Wildfire
Ice Jam	Thunderstorm/ Lightning
	Tornado/Downburst
	Ice Storm
	Motor Vehicle Accident with Hazardous Materials
	Oil Spill

The Committee also reviewed historical information from internet sources about past hazard events in and near Holderness since 2008. Through this review of state-wide hazards, past regional and local events, and with discussion, the committee identified the hazards listed in Table 5 as the most significant hazards to the town of Holderness. Drought, hail, rabies, and aircraft accidents were are considered but found to be low risk to the community.

[7] http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hazard-mitigation-plan.pdf, visited December 2013.

Table 5: Significant Hazards: Holderness, NH

Severe Wind (Thunderstorm, Tornado/Downburst)	Lightning	Flooding and Ice Jams
Radon	Severe Winter Weather (snow and ice)	Wildfire
Earthquake	Hurricane	
	Hazardous Materials in Transport	Epidemic

This differs from the earlier version of the Plan by acknowledging the significance of hurricane, epidemic, and earthquake as natural hazards that might impact Holderness.

B. PROFILING HAZARD EVENTS

The committee reviewed the various hazards that might occur in Holderness and assessed the probability of such an event occurring in Holderness. This process began by taking the risk rating matrix from the previous plan, reviewing the hazards, past occurrences, specific areas of concern, and revising the Probability of Occurrence rating using the following categories:

- Unlikely: Less than 1% probability of occurrence in the next year or a recurrence interval of more than every 100 years.
- Occasional: 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
- Likely: 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
- Highly Likely: 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year.

For this update, lightning was treated as a hazard distinct from thunderstorm. Tornado, downburst, and thunderstorm were grouped as "High Wind Event" and similarly, blizzard and snowstorm were grouped together. The resulting summary indicates that Severe Wind and Lightning are Highly Likely natural hazard occurrences with Flood, Ice Jam, Radon, Blizzard/Snow Storm, and Nor'easter as Likely natural events. Recreational Activities was also noted by the Committee as a frequent occurrence though this is not considered a natural hazard.

Table 6: Probability of Occurrence

Holderness	Geographic Area					Specific Areas of Concern	Probability of Occurrence
Hazard Type	Localized	Town-wide	Regional	State-wide	Other (explain)	Describe potential impact areas (critical facilities, floodplain, etc)	Unlikely, Occassional, Likely, Highly Likely
Flood, Drought, Extreme Heat & Wildfire							
Flood	X					PSU fieldhouse is in the Pemi floodway.	Likely
Ice Jam	X					Concern for bridge pilings on Pemi bridge	Likely
Drought			X				Occasional
Extreme Heat				X			Occasional
Wildfire	X					Most of town is rural, mountainous and hard to access in event of fire.	Occasional
Geologic Hazards							
Earthquake			X				Unlikely
Landslide	X						Unlikely
Radon	X						Likely
Severe Wind Hazards							
Hurricane				X			Occasional
Hail	X						Occasional
Severe Wind (Tornado/Downburst/ Thunderstorm)	X					Mount Prospect side, Pemi Valley	Highly Likely
Lightning	X						Highly Likely
Winter Weather Hazards							
Blizzard/Snow Storm			X				Likely
Ice Storm			X			Mount Prospect	Occasional
Nor'easter			X				Likely
Avalanche	X						Unlikely
Human-Related Events							
MV Accident involving Hazardous Materials	X					Depending on location - could impact more than site. Near water could be large impact.	Occasional
Oil Spills	X					same as above.	Occasional
Military Aircraft Accident	X					Holderness is in military training flight path.	Unlikely
Pandemic				X			Unlikely
Other							
Rabies				X		10 year cycles	Unlikely
Recreational Activities	X					Search & Rescue/Hiking - Boating, ice fishing, island rescue	Highly Likely

Probability of Future Events

- **Unlikely:** Less than 1% probability of occurrence in the next year or a recurrence interval of more than every 100 year
- **Occasional:** 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 year
- **Likely:** 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 year
- **Highly Likely:** 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year

Each of the hazards that the Committee identified as likely or highly likely to occur in Holderness is profiled below. It describes the likely location of each hazard, the extent of the hazard, and the

probability of an occurrence in Holderness. The extent is a description of "how bad the hazard could get". A list of events prior to 2008 is included in Appendix E. For more information on these hazards, please see Appendix G.

SEVERE WINDS (THUNDERSTORM/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 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. Tornados are classified using the Fujita Scale, based on wind speed and physical damage (Table 7).

Table 7: Fujita Scale

F-Scale #	Intensity Phrase	Wind Speed	Type of Damage
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.
F1	Moderate tornado	73-112 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 mph	Roof and some walls torn off wellconstructed houses; trains overturned; most trees in forest uprooted.
F4	Devastating tornado	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel reinforced concrete structures badly damaged.
F6	Inconceivable tornado	319-379 mph	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies.

Source: http://www.tornadoproject.com/fscale/fscale.htm

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.[8] Downbursts fall into two categories based on their size:

- microbursts, which cover an area less than 2.5 miles in diameter, and
- macrobursts, which cover an area at least 2.5 miles in diameter.

[8] *Weather Glossary*. National Oceanic and Atmospheric Administration, http://www.weather.gov/glossary/index.php?letter=d, visited March 8, 2011.

History:

Hazard	Date	Location	Remarks/Description	Source
Tornado	7/24/2008	Southern Lakes Region	F2 Tornado 50-mile path Uprooted and snapped trees, damaged structures. Declared disaster DR-1782	NOAA
Tornado	8/21/2011	Grafton, Orange	F1 Tornado 2.7 miles long, 350 yds wide Damaged hundreds of trees and several buildings	NOAA
Tornado	7/17/2012	Bridgewater	F0 Waterspout on Newfound Lake No damages	NOAA
Microburst	10/31/2012	Franklin	Winds > 50 knots Downed numerous trees, destroying one house and damaging several others	NH Union Leader[9]

NOAA reported twenty-seven thunderstorm/high wind events impacting southern Grafton County between 1/1/2008 and 6/30/2013; one injury was reported but no substantial damages.

Probability of Occurrence: Highly Likely

LIGHTNING

Location: Lightning can strike anywhere in town.

Extent: 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.[10] Thunderstorms occur mainly in the summertime; some can be anticipated and detected well in advance while others are "pop-up" storms that are limited in size and duration. Exactly where and when lightning will strike is unknown. Most thunderstorms do not last long in any one location but move through fairly quickly. These giant sparks of electricity can result in fire or electrical damage to property or electrocution of people.

The National Weather Service does utilize a six-point scale for characterizing lightning activity called the Lightning Activity Level (LAL) based on frequency of ground strikes along with rainfall and ground conditions.[11]

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.

[9] http://www.unionleader.com/article/20121031/NEWS11/121039788
[10] http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hmp-chapter-3.pdf accessed September 16, 2013.
[11] NWS Definitions webpage, http://graphical.weather.gov/definitions/defineLAL.html. Accessed June 3, 2014.

LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.

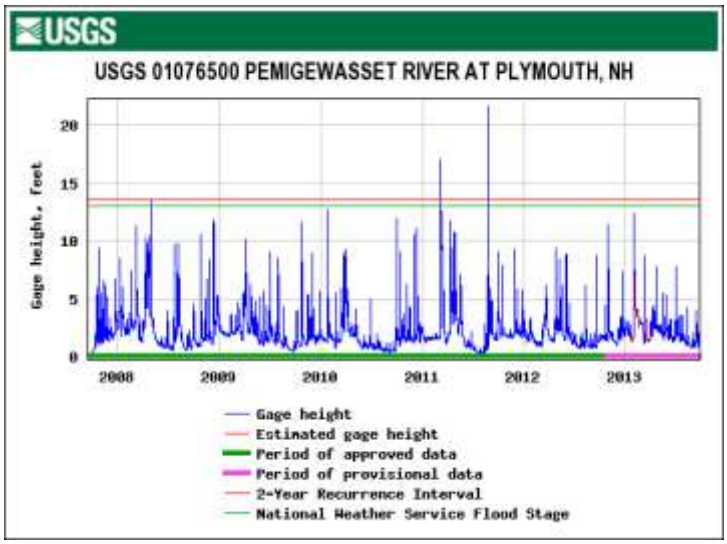
History: Committee members indicated that at least three homes have been hit by lightning over the last twenty years, causing structure fires; no dates were available at the time of this report. The potential for damage or injury exist within any of the many thunderstorms that pass overhead each year, especially in the summertime.

Probability of Occurrence: Highly Likely.

FLOODING

Location: The Grafton County Digital Flood Insurance Rate Map (DFIRM, 2008) shows the flood boundaries in the event of a 100-year flood, defined as a having a one percent chance of flooding each year. This identifies sections along the Pemigewasset River including sections of NH Rte. 175A and North and South River Street. There are a few additional road segments in Holderness that flood (Lower Perch Pond Rd. and NH Rte. 113 between Cotton Cove and Mooney Point Rd.).

Extent: 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 the 1% annual (or 100-year) floodplain. Areas in this floodplain have been identified as having a one percent chance of flooding any given year.



Stream gauges along the Pemigewasset and Squam Rivers can give an indication of the number of feet above flood stage at which each river is running[12]. This US Geological Survey (USGS) graph of the Pemigewasset River at the stream gauge in Plymouth indicates that the height of the river varies a great deal throughout the year from less than three feet to over ten feet.[13] In several of the years since 2008 the river reached flood stage of more than 13 feet. Flooding from Tropical Storm Irene (2011) forced the closure of Exit 24 of I-93 for a little over 24 hours.[14]

Dams in New Hampshire are classified by the New Hampshire Department of Environmental Services Dams Bureau. The four dam hazard classifications (High, Significant, Low, and Non-Menace) are based on the potential losses associated with a dam failure (see Appendix G for a detailed

[12] Pemi in Plymouth http://waterdata.usgs.gov/nh/nwis/uv/?site_no=01076500&PARAmeter_cd=00065,00060,72020, Squam River in Ashland http://www.americanwhitewater.org/content/Gauge2/detail/id/30652/.
[13] US Geological Survey, Current Water Data for New Hampshire http://waterdata.usgs.gov/nh/nwis/rt.
[14] New Hampshire Union Leader, Irene Blog, August 29, 2011 http://newhampshire.com/article/20110829/NEWS11/110829899/0/newhampshire.

description). High (H) and Significant (S) Hazard dams have the highest potential for damage; this could include damage to state or municipal roadways as well as structures. There are eleven active dams in Holderness (Table 8); four Low (L) Hazard, and seven Non-Menace (NM) Hazard dams.

Table 8: Holderness Dams

DAMCODE	HAZCL	NAME	TOWN	RIVER	STATUS
118.05	NM	WILDLIFE POND	HOLDERNESS	NATURAL SWALE	ACTIVE
118.06	NM	GOOSE POND	HOLDERNESS	NATURAL SWALE	ACTIVE
118.09	NM	MARSHALL DAM	HOLDERNESS	UNNAMED STREAM	ACTIVE
118.08	NM	BUTLER DAM	HOLDERNESS	UNNAMED STREAM	ACTIVE
118.12	NM	HIGHLAND LINKS DAM	HOLDERNESS	UNNAMED STREAM	ACTIVE
118.14	NM	HOLDERNESS SCHOOL POND DAM	HOLDERNESS	UNNAMED STREAM	ACTIVE
118.03	NM	FROG POND	HOLDERNESS	UNNAMED STREAM	ACTIVE
118.10	L	WILLOUGHBY RIDGE FARM POND	HOLDERNESS	UNNAMED BROOK	ACTIVE
118.13	L	HARRIS RECREATION POND DAM	HOLDERNESS	UNNAMED STREAM	ACTIVE
118.11	L	HIGHLAND LINKS COLONY DAM	HOLDERNESS	UNNAMED STREAM	ACTIVE
118.02	L	WHITE OAK POND DAM	HOLDERNESS	WHITE OWL BROOK	ACTIVE

History:

Hazard	Date	Location	Remarks/Description	Source
Flood	7/24/2008-8/14/2008	Grafton Co.	Damages of over $3 million Declared Disaster DR-1787	NOAA
Flood	4/26-30 /2011	Grafton Co.	Damages of $1.8 million Declared Disaster DR-4006	NOAA
Flood	8/28/2011	Grafton County, Holderness & Plymouth	Tropical Storm Irene caused the Pemigewasset River to crest at 21.7 feet in Plymouth, 8.7 feet above flood stage. Declared Disaster DR-2046	NOAA
Flood	10/26 – 11/6/2012	Grafton County	Declared Disaster DR-4095	NOAA

On August 4, 2008 rain events caused substantial flash flooding and washouts in Ashland, New Hampton, Center Harbor, and Meredith. In addition to property damages, one young girl died in Ashland as a result of this storm[15]. The NOAA database reports a total of 22 flooding events in Grafton County since June 2008, resulting in $8.345 million in property damages.

Probability of Occurrence: Likely

ICE JAM

Location: The NH Route 175A bridge across the Pemigewasset River and at the sandbars just below the bridge.

Extent: Ice forming in riverbeds and against structures often presents significant hazardous conditions for communities. Meltwater or stormwater may encounter these ice formations and apply lateral and/or vertical force upon structures. Moving ice may scour abutments and riverbanks. Ice may also create temporary dams. These dams can create flood hazard conditions where none previously existed. As indicated by the stream gauge record (below right), ice jams can lead to very rapid changes in river levels (in this case a fifteen foot increase in twelve hours).

[15] USAToday http://usatoday30.usatoday.com/news/nation/2008-08-08-596728286_x.htm.

March 2011 Ice Jam at NH Route 175A bridge across the Pemigewasset River

Stream gauge at bridge indicating change in river level in early March 2011.

History: Between 1835 and 2008 there were 42 ice jams reported in the Holderness/Plymouth area of the Pemigewasset. According to the Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL), 43% of New Hampshire ice jams have occurred in March and April during the ice breakup on the rivers, while 47% of ice jams occurred in January and February during either ice freeze up or ice break up periods.[16] Concern was expressed in the 2008 Plan that the newly-built bridge to Plymouth has abutments in the river that may increase the likelihood of ice jams. There have been three jams during the past five years.[17]

Date	Pemigewasset River Level (Flood stage is 13.0 ft)	Notes
1/26/2010	12.5 feet	
3/7/2011	17.5 feet	(More than four feet above flood stage) Rapid increase in water level due to an ice jam
1/31/2013	11.7 feet	Minor flooding – water rose 8 feet in 2 hours

Probability of Occurrence: Likely.

RADON

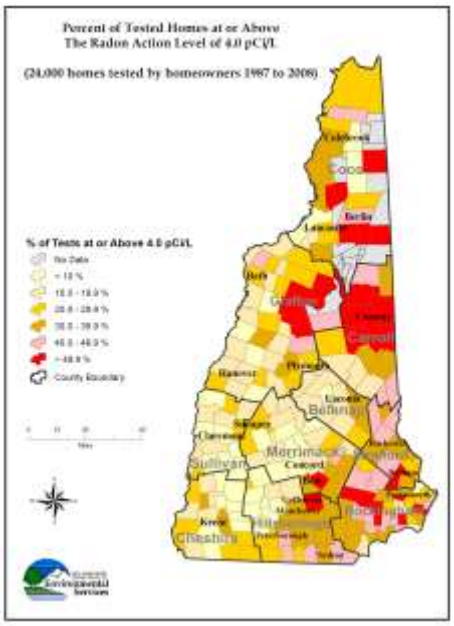
Location: Town-wide

Extent: Radon is a naturally occurring colorless, odorless radioactive gas usually associated with granite rock formations. The gas can seep into basements through the air. It can also be transported via water and is released once the water is aerated, such as during a shower. Extended exposure to radon can lead to higher rates of cancer in humans. Radon is not a singular event – it can take years or decades to see the effects. The NH Office of Community and Public Health's Bureau of Radiological

[16] "Ice Jams in New Hampshire," CRREL, http://icejams.crrel.usace.army.mil/tectran/IERD26.pdf Visited July 25, 2013

[17] Ice Jam Database, CRREL, https://rsgisias.crrel.usace.army.mil/apex/f?p=273:1: Visited July 25, 2013.

Health indicates that one third of homes in New Hampshire have indoor radon levels that exceed the US Environmental Protection Agency's "action level" of 4 pCi/l.[18]



History: The map at the right indicates that 20-29.9% of the homes in Holderness exceeded the recommended limit of 4.0 pCi/l in state-wide testing conducted over the past twenty years.[19]

Probability of Occurrence: Likely.

SEVERE WINTER WEATHER (SNOW STORMS, NOR'EASTERS, ICE STORMS)

Location: Snow and Ice Storms can affect the entire town. Severe winter weather occurs frequently in the northeast and the possibility exists for residents to have to withstand several days without power. No one area of the town and region is at greater risk than another, but there are segments of the population that are more at risk. These include the elderly, people that are in need of regular medical care, and young children. These weather events can vary greatly based on slight differences in temperature, humidity, and elevation. Some events will produce a combination of winter weather types.

Extent:

A heavy snowstorm can be defined as one which deposits four or more inches of snow in a twelve hour period. The region typically receives greater than 66" of snow annually.[20] Records indicate that eight or more inches have fallen in a single day on most dates from late November through mid-March but Holderness's average snowfall on any day from November through April is less than an inch. The record also shows that deposits of more than ten inches have happened in each of these months and on several days in February the town has seen more than fifteen and even twenty inches of snow in one day.

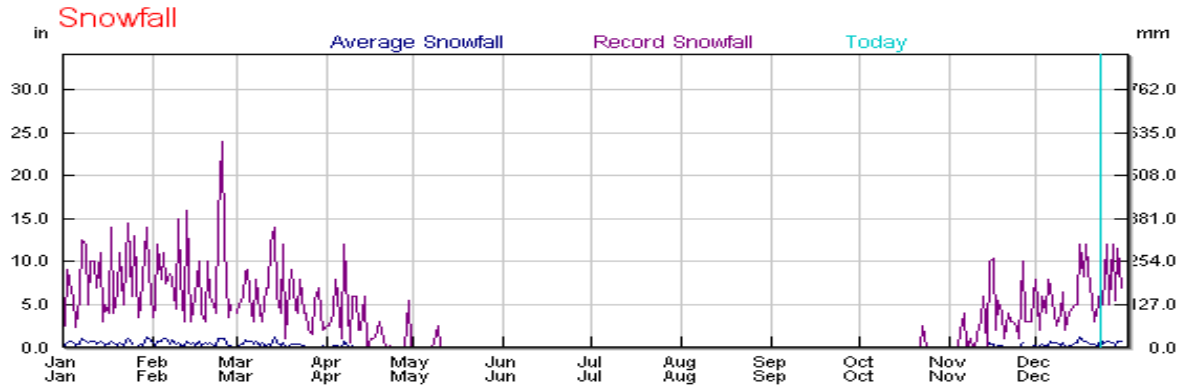
In the winter months, the region may experience blizzard conditions. A blizzard is characterized by sustained winds or frequent gusts to 35 miles per hour or greater and considerable amounts of falling or blowing snow that last for a duration of three hours or longer. The combination of winds and snow reduce visibility to less than a quarter mile.[21]

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

[18] http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html visited February 8, 2011.
[19] NH DES Radon Program http://des.nh.gov/organization/divisions/air/pehb/ehs/radon/index.htm, accessed October 9, 2012.
[20] *Northeast States Emergency Consortium,* http://www.nesec.org/, visited January 25, 2011.
[21] "Winter storm terms," http://www.fema.gov/hazard/winter/wi_terms.shtm, visited February 8, 2011.

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.

Average and Record Snowfalls for Holderness, NH[22]



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

The Sperry-Piltz Ice Accumulation (SPIA) Index is being used to forecast and classify ice storms based on a combination of the average thickness of ice coating (referencing expected temperature and precipitation levels) and wind speed; ratings range from 0 to 5.[23] The SPIA Index was first used in the United States in 2009 and is now beginning to be utilized by the National Weather Service.

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

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

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

[22] Weather Underground, Season Weather Averages http://www.wunderground.com/NORMS/DisplayNORMS.asp?AirportCode=KLCI&SafeCityName=Holderness&StateCode=NH&Units=none&IATA=LCI.

[23] SPIA Northeast webpage, http://www.spia-index.com/neIce.php, June 3, 2014.

History:

Hazard	Date	Location	Remarks/Description	Source
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. Disaster Declaration DR-1812. In Southern Grafton County, damages were $225,000.	NH HSEM NOAA
Nor'easters	Feb. 23 – March 3, 2010	Statewide	330,000 without power and $2 million in damages. Disaster Declaration DR-1892	FEMA
Ice Storm	3/6/2011	Statewide	$700,000 plus numerous power outages. Ice jams along the Pemigewasset River in Plymouth. In Southern Grafton County, damages were $159,000.	NOAA

Additionally, NOAA reported twenty-seven snow and winter storm events impacting southern Grafton County between 2008 and 2013.

Probability of Occurrence: Snow storm/blizzard/nor'easter – Likely, Ice storm - Occasional

WILDFIRE

Location: Holderness is heavily wooded; a fire could occur anywhere; however the steep and relatively remote Squam Range is a likely area.

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 burn less than half an acre. Much of the Lakes Region is forested and susceptible to fire. The town's ISO rating is 6/9.

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

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

History: No local occurrences have been reported since 2008. In 2013 Grafton County wildland fires burned 22.3 acres.[24]

Probability of Occurrence: Occasional

[24] NH Division of Forests and Lands http://www.nhdfl.org/fire-control-and-law-enforcement/fire-statistics.aspx, August 8, 2013.

EARTHQUAKE

Location: An earthquake could affect all areas of Holderness.

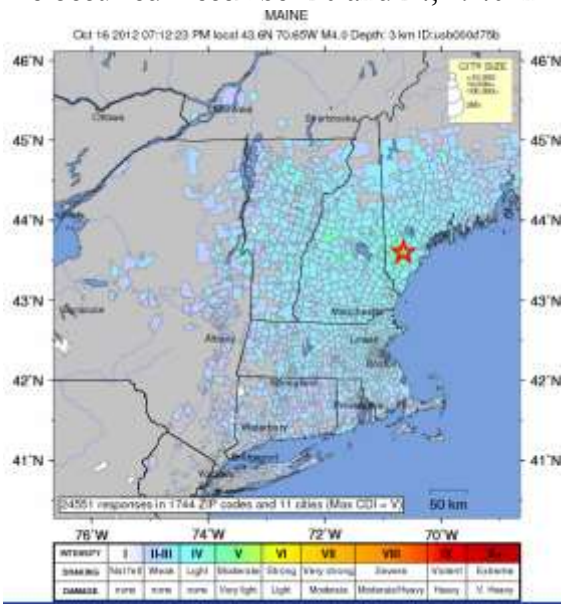
Extent: An earthquake is a series of vibrations induced in the Earth's crust by the abrupt rupture and rebound of rocks in which elastic strain has been slowly accumulating. Earthquakes are commonly measured using *magnitude*, or the amount of seismic energy released at the epicenter of the earthquake. The Richter magnitude scale is a mathematical device used to compare the size of earthquakes, shown in Table 9.[25]

Table 9: 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 totally 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 (6.5-7.0 magnitude) earthquakes, but they are not likely to occur as frequently as in a high hazard area like the Pacific coast. There is the potential for nearby earthquakes to register 5.5 on the Richter Scale, causing slight damage to buildings and structures. Due to the unique geology of New Hampshire, earthquake propagation waves travel up to 40 times further than they do in the western United States, possibly enlarging the area of damage.[26] The strongest earthquakes to strike New Hampshire occurred December 20 and 24, 1940 in the town of Ossipee. Both earthquakes had a magnitude of 5.5 and were felt over an area of 400,000 square miles.

History: On average, every other year the Lakes Region experiences an earthquake, though these earthquakes are mild and go mostly undetected by people. Sanbornton (Gaza) and Tamworth are identified as a major epicenters in the region.[27] A search of the USGS National Earthquake Information Center database shows that since 1977 there have been 15 earthquakes with a magnitude of at least 3.0 within a 100 km (62 mi.) radius of Holderness; the largest was magnitude 4.5.[28] Two such earthquakes have occurred since 2006; a 3.4 event in 2010 centered in Penacook, NH and a 4.0 quake in southern Maine shook the region on October 16, 2012. The image at right indicates the communities



Areas where the October 16, 2012 earthquake was felt

[25] http://pubs.usgs.gov/gip/earthq4/severitygip.html, visited February 8, 2011.
[26] http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html visited February 8, 2011.
[27] http://des.nh.gov/organization/commissioner/pip/factsheets/geo/documents/geo-3.pdf , pg. 3, visited January 25, 2011.
[28] USGS. http://earthquake.usgs.gov/earthquakes/eqarchives/epic/, Accessed August 2, 2012

where people reported feeling this event.[29]

Probability of Occurrence: Unlikely (a slight to moderate [2.5 – 5.4] earthquake about every three years, a rather strong [5.5 – 6.0] event once in 30 years).

HURRICANE

Location: A hurricane could affect all areas of Holderness.

Extent: 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.[30] Hurricanes are measured by the Saffir-Simpson Hurricane Scale: a 1-5 rating based on a hurricane's intensity using wind speed as the determining factor (Table 10). The scale is used to give an estimate of the potential property damage and flooding expected from a hurricane landfall.

Table 10: 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

[29] USGS, Earthquake Archive Search. http://earthquake.usgs.gov/earthquakes/search/ accessed August 8, 2013

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

According to NOAA, while 2010 was one of the busiest hurricane seasons on record, 2013 was one of the least active hurricane seasons.[31] New Hampshire has not experienced a severe hurricane 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.[32] Hurricane Bob, a category 2 storm, in 1991, was declared a major federal disaster in New Hampshire and is recorded as a severe storm in the state's history.[33]

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 is 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 Hurricane Irene, which hit the area in 2011 as a tropical depression and certainly impacted the town (see Flooding).

Probability of Occurrence: Occasional

HAZARDOUS MATERIALS IN TRANSPORT

Location: Major roadways, especially in populated areas or near water bodies are areas of concern. The committee noted US Route 3/NH Route 25 near Little Squam Lake as well as NH Route 113 near Squam Lake as areas of particular concern.

Extent: Oil spills along several of the routes in Holderness could result in the contamination of wells or waterbodies in the 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: No local incidents were identified; however the volume of traffic and proximity to state roads to vulnerable water bodies led the Committee to consider a spill of hazardous materials while in transport a concern.

Probability of Occurrence: Occasional

EPIDEMIC

Location: An epidemic is an outbreak of a disease, generally isolated to one area. A pandemic is a widespread disease outbreak. The disease spreads easily person-to-person, can cause serious illness, and can sweep across the country and around the world in very short time.[34] An outbreak could impact anyone in town. Transmission of germs and diseases between people is accelerated in a close living and socializing environment. Schools, and congregate care centers for the elderly are good places for transmission to occur.

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[31] http://www.noaanews.noaa.gov/stories2010/20101129_hurricaneseason.html visited January 25, 2011 and http://www.noaanews.noaa.gov/stories2013/20131125_endofhurricaneseason.html,.

[32] http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html, visited January 25, 2011.

[33] http://www.fema.gov/news/event.fema?id=2118 visited January 25, 2011

[34] http://www.pandemicflu.gov/, visited February 8, 2011.

Extent: The New Hampshire Health and Human Services developed an epidemic and pandemic response plan in February 2007, so that communities can be prepared and respond to outbreaks.[35]

Over the past ten years, two strains of influenza viruses have become concerns across the country. The Lakes Region of New Hampshire has a large influx of seasonal visitors, which could make viral containment very difficult. Between 2005 and 2006, the Avian Influenza H5N1 virus infected 81 people and killed 52 in 10 countries in Asia and Africa**.** Most of the H5N1 cases were a result of human contact with infected poultry and the spread of the virus has not continued beyond that person. Although no human-to-human cases have been reported, viruses have the ability to mutate. The significance of the H5N1 pandemic is that it brought local, state, and federal attention to the need for pandemic emergency preparedness plans.

In 2009, the WHO declared a global H1N1 pandemic.[36] H1N1 is an influenza virus that can spread "human to human" through respiratory droplets from coughs or sneezes.[37] Many of the planning systems developed out of the H5N1 pandemic were useful during this pandemic.[38]

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. The 2012-13 flu season was much more severe in New Hampshire than any of the previous decade; 35 deaths occurred statewide, the most since 1997.[39]

Probability of Occurrence: Moderate.

RECREATIONAL ACTIVITIES

Location: Holderness is rich with natural resources, mountains, lakes, and rivers. It has several summer camps and numerous seasonal cottages. The Holderness Police and Fire Departments are frequently called to respond to lost and injured hikers or boaters in distress.

Extent: Many people come to Holderness to get outside and be active; sometimes this means that they get caught outside in bad weather. Emergency services may be called upon to assist individuals, families, or groups of ten or more who are in danger.

History: No records were found specifically associated with recreational activities. This is not a hazard by itself but it certainly can increase the likelihood that people will need assistance during a hazard.

Probability of Occurrence: Highly likely.

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. Holderness may be affected by an unavoidable extraordinary circumstance such as a violent

[35] http://www.dhhs.nh.gov/dphs/cdcs/avian/documents/pandemic-plan.pdf, visited February 8, 2011.
[36] http://c3ph.org/Files/vaccine_fact.pdf, visited February 15, 2011.
[37] http://c3ph.org/Files/H1N1FAQ.pdf, visited February 15, 2011.
[38] http://www.cdc.gov/h1n1flu/cdcresponse.htm, visited February 8, 2011.
[39] NH Department of Health and Human Services http://www.dhhs.nh.gov/media/pr/2013/01-jan/01112013flu.htm, visited January 17, 2013.

earthquake, but historically, events of this magnitude have been infrequent. Those natural events that are common to the northeast also have common elements of concern for public safety. These include the potential for long-term power outages, the potential need for short-term sheltering facilities, and the availability of equipment and trained personnel. Key to loss prevention in these relatively common event scenarios is pre-event planning that critically assesses communications within the community, mutual aid resources regionally, public awareness and education, and emergency response training.

CHAPTER IV: VULNERABILITY ASSESSMENT

A. INVENTORY ASSETS

The list of critical infrastructure for the town of Holderness (Table 11) was updated by the Committee and the values updated by the town's Assessing Coordinator (2013). The critical infrastructure list has four facility classifications, 1) Essential Services; 2) Emergency Shelters; 3) Structures and Services; 4) Populations to Protect. The first category contains facilities essential in a hazard event, including the Emergency Operation Center. The second contains the emergency shelters. The third category is a list of facilities that have been identified by the Committee as facilities to protect in order to minimize additional risk to hazards. The fourth category contains special populations that may require additional attention in the event of a disaster. In some cases a facility may fall into multiple classifications because, as in many small communities, it serves multiple functions.

Table 11: Critical Facilities

TYPE	NAME	ADDRESS	CLASSIFICATION	Generator?	Shelter Capacity	Structural Value
Public Information	Town Hall	1089 NH Route 3	Essential Services	In process	50	$322,200
EOC	Holderness Safety Building	922 NH Rte. 3	Emergency Shelter	Yes		$796,400
School and Primary Shelter	Holderness Elementary K-8	19 School St.	Populations to Protect/ Structures and Services	Yes	125	$3,979,000
Public Works	Highway Dept.	62 Beede Rd.	Essential Services	Portable		$293,800
Library	Holderness Public Library	866 NH Rte. 3	Structures and Services	In process		$198,200
School	Holderness School (Prep HS)	33 Chapel Ln.	Populations to Protect	yes		$15,426,800
Post Office	Holderness Post Office	846 NH Rte. 3	Structures and Services			$89,700
Infrastructure - Bridge	Town Center Bridge	NH Rte. 3	Structures and Services			
Daycare	Ace Program	19 School St.	Populations to Protect	Yes		Value included in Holderness Elementary
Haz Materials	Holderness School Ice Rink	NH Rte. 175	Structures and Services			$492,770
Haz Materials	PSU Fieldhouse	(Rm 134) 27 Fieldhouse Rd.	Structures and Services			$2,912,800
Haz Materials	Holderness School chemistry lab	Chapel Ln.	Structures and Services			$65,870
Haz Materials	Holderness School field house	Mt. Prospect Road	Structures and Services			$1,497,280

TYPE	NAME	ADDRESS	CLASSIFICATION	Generator?	Shelter Capacity	Structural Value
Summer Camp	Rockywold/Deephaven	Pinehurst Rd.	Populations to Protect			$7,707,700
Historic Resources	Historical Society Bldg.	NH Rte. 3 in the village	Structures and Services			$159,500
Unique Features	Squam Science Center	113 Science Ctr. Rd.	Structures & Services/ Pop. to Protect			$2,445,600
Marina	Asquam Marina	NH Rte. 3 - village	Structures and Services			$755,900
Marina	Squam Boats Livery	NH Rte. 3 - village	Structures and Services			$535,300
Infrastructure - Cell tower	cell tower/communication	Smith Rd.	Essential Services			$450,900
Secondary Shelter	HUB at PSU	Plymouth	Structures and Services		300	In Plymouth
Infrastructure- Culvert	NH Route 3	south of East Holderness Rd	Structures and Services			
School	Montessori School	Science Center	Populations to Protect			Value included in Science Center
School	Montessori School	Holderness School-Mt. Prospect Rd.	Populations to Protect			$145,310
Summer Camp	Camp Deerwood	51 Camp Road	Populations to Protect			$2,196,200
Infrastructure	Electrical substation	NH Route 175 N	Structures and Services			$4,562,600
					Total	**$45,033,830**

The *Critical Facilities and Potential Hazards 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 Holderness. 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 a hazard, committee members considered the damages and consequences that might result from an event, as defined below:

- Low: limited structural damage, the town's ability to respond is not compromised, local residents can handle the hazard event without help from outside sources
- Moderate: some structural damage, the town's ability to respond is compromised, regional or county assistance is needed to survive and/or recover
- Severe: substantial structural damage, the town's ability to respond is greatly compromised, state or federal assistance is necessary to survive and/or recover

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

Damage can occur to most structures in town as a result of downed trees in any high wind event, including the commonly occurring thunderstorms. These winds can bring down limbs and trees, causing damage to structures as well as pulling down power and telephone lines and blocking roads. This is particularly the case along private roadways that may only get limited cutback of vegetation. Structures and infrastructure that are at risk include the Holderness Town Hall, Public Safety Building, and Elementary School, along with the PSU Fieldhouse, communications infrastructure, and NH Route 3. The potential impact to the town due to high winds is moderate.

Tuftonboro - September, 2011

Lightning
Although the numbers have trended downward in recent decades, during the last half of the twentieth century more people were killed in the United States each year by lightning than by any other weather event. It can also wreak havoc with electrical and communications systems.

Power outages, whether associated with natural or man-made 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. Lightning could have a severe impact on several critical facilities (Town Hall, Public Safety Building, Elementary School, PSU Fieldhouse, and communications facilities).

Flooding
The town of Holderness actively participates in the National Flood Insurance Program (NFIP) through the administration of its floodplain ordinance. This includes correspondence with the NH Floodplain Manager regarding specific issues and periodically updating the town's floodplain

ordinance. By actively participating in the NFIP property owners are able to purchase flood insurance through the FEMA program.

In 2008 the Digital Flood Insurance Rate Maps (DFIRM) for Grafton County were reviewed and released. The town's Floodplain Ordinance was revised at that time in coordination with New Hampshire Office of Energy and Planning and adopted at Town Meeting. The Grafton County Flood Insurance Study (FIS) was also developed in 2008. The Compliance Officer is responsible for maintaining floodproofing and elevation certificates. The major floodplain in Holderness is along the Pemigewasset River, with small pockets on Coxboro Road, Perch Pond Road at the Campton town line and associated with Owl Brook near Beede, Owl Brook, and Perch Pond Roads.

There are currently 29 buildings with flood insurance policies in force through the NFIP (insurance value $4,330,700); 24 of these are residential properties. Since 1975 there have been seventy losses paid out for a total of $770,846. There have been twelve repetitive losses on five properties in Holderness. Three of these repetitive loss properties were single-family residential (SFR) and two non-residential, one of which was classified as a severe repetitive loss, having sustained at least four losses in the 1980s. There have not been any repetitive losses since 1988.[40] Areas of concern include NH Routes 3 and 175A near the Pemi River and the Plymouth State University (PSU) Fieldhouse and Ice Arena.

In 2012 Plymouth State University developed a strategic Plan for upgrading its athletic facilities in the section of Holderness between I-93 and the Pemigewasset River. This includes raising the fieldhouse on pylons with parking underneath and purchasing and removing flood-prone structures to create a greenway along the river. Modeling indicates that flood elevations will not be impacted on site or downstream.[41]

Since 2008 the town has sought technical assistance from the NH Floodplain Manager, hosted a FEMA Floodplain Management workshop, and had a Community Assistance Visit from the NH Floodplain Manager and FEMA staff. As a result, the town is updating their subdivision and site plan review regulations to better address development in the floodplain.

Flooding along a section of NH Route 113 and Lower Perch Pond Road can result in dangerous road conditions and could lead to erosion.

Potential impact to the town due to flooding is moderate.

Ice Jam

The primary area impacted by an ice jam is along the Pemigewasset River. The PSU Fieldhouse and Ice Arena could flood along with business along NH Rte. 175A and residences along River Street. Concern was expressed that the abutments on the new bridge to Plymouth may be damaged by ice jams. The impact on the town by an ice jam event would be moderate.

[40] NFIP State Coordinator, NH Office of Energy and Planning, August 2013.

[41] Holderness Selectmen's meeting February 10, 2014 http://www.holderness-nh.gov/Public_Documents/HoldernessNH_SelectmenMin/I0467796C?textPage=1.

Radon
Radon's impact is an increase in the likelihood of certain types of cancer in individuals as a result of long-term exposure. There is no impact to structures. Structures can be retrofitted to reduce the built up of radon in below-ground living spaces.

Winter Weather (Snow storms/Ice Storms)
Holderness Elementary school was the only critical facility that was identified as being significantly impacted by a snow event and the Holderness School was seen as being moderately impacted by an ice storm. Flat-roofed buildings are all susceptible to damage from snow and ice loads.

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. Residents in Holderness were impacted by this event, although not as severely as during the ice storm of 1998 (see Appendix E). The potential for impact to the town is seen as low.

Wildfire
In Holderness a wildfire could have the greatest impact on the Rockywold/Deephaven camps, Camp Deerwood, the Squam Lake Science Center, and the Highway Department along with individual homes or seasonal camps. The impact on the town by a wildfire event would be low to moderate.

Earthquake
According to the US Geologic Survey, the overall earthquake risk to the state is high due to the built environment; which means that many structures in the state are old or not built to withstand an earthquake. Damage from the 1940 earthquakes in Ossipee included some damage to most of the chimneys in the epicenter region of Ossipee, ranging from cosmetic cracks to total collapse. Sections of several foundations collapsed and at least one house rotated on its foundation. In the town of Conway, 15 miles from the epicenter, one house was lost by fire when sparks in a cracked chimney started the blaze. Splits found in the rafters and trusses temporarily closed Ossipee High School. No damages were associated with the October 2012 earthquake in Maine but the potential does exist for some damages to occur.[42]

A relatively large earthquake in all likelihood would impact the roads including the bridges, limiting the ability of emergency services to be rendered. The fire department would have some response problems if the bridges were impacted, although in most cases there are alternate options, requiring redeployment of apparatus and people or mutual aid assistance. The likely impact of an earthquake on the town would be low to moderate.

Hurricane
The impact to Holderness due to the flooding and wind damage associated with a hurricane could be severe in some locations. While most facilities in town have the potential to be impacted in some fashion, direct structural impact would most likely affect the structures in the Pemi River floodplain (PSU Fieldhouse and Ice Arena along with business along NH Rte. 175A and residences along River Street).

[42] USGS http://earthquake.usgs.gov/earthquakes/eventpage/usb000d75b#pager, accessed October 17, 2012.

Hazardous Materials in Transport and Oil Spill
The release of hazardous materials along one of the roadways in Holderness has the capacity to cause substantial damage in the town; there are many variables that could affect the degree of impact. Variables include the nature of the material, the location of the accident and its proximity to surface and groundwater, as well as structures. An oil spill along a remote section of NH Route 175 is quite different from a chemical spill along NH Route 25 along the edge of Squam Lake. Impact to the town could be severe.

Epidemic
The concerns associated with an epidemic include local capacity to respond to not only the residents of Holderness but also any visitors. The community does partner with Public Health Network of Central New Hampshire (http://www.nhphn.org/) for resources and training. The facilities that would be impacted the most are the Elementary School, Holderness School, and the PSU Fieldhouse and Ice Arena. The impact of an epidemic on the town would be moderate.

Recreational Activities
This is not a natural hazard and would not directly impact structures or infrastructure. There are areas where such activities tend to be concentrated (around water bodies, wilderness areas, and camps); such events do require emergency response. The impact on the individuals in the community would be low to moderate.

Table 12: Impact of Hazard on Holderness Critical Facilities Note: The darker shades of blue indicate greater probability of occurrence (Table 9).

NAME	Severe Wind (Tornado/ Down-burst/ Thunderstorm)	Lightning	Recreational Activities	Flood	Ice Jam	Ice Storm	Radon	Blizzard/ Snow Storm	Nor'easter	Drought	Extreme Heat	Wildfire	Hurricane	Hail	MV Accident involving HazMat	Oil Spills	Earthquake	Landslide	Avalanche	Mil. Aircraft Accident	Pandemic	Rabies	TOTAL
Town Hall	3	3	1	1	1	1	1	1	1	1	1	1	3	1	2	2	3	1	1	1	1	1	**32**
Holderness Safety Building	3	3	1	1	1	1	1	1	1	1	1	1	3	1	2	2	3	1	1	1	1	1	**32**
Holderness Elementary K-8	3	3	1	1	1	1	1	3	3	1	1	1	3	1	2	2	3	1	1	1	3	1	**38**
Highway Dept.	2	2	1	1	1	1	1	1	1	1	1	2	2	1	2	2	3	1	1	1	1	1	**30**
Holderness Public Library	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	**27**
Holderness School (Prep)	2	2	1	1	1	2	1	1	1	1	1	1	2	1	3	3	1	1	1	1	3	1	**32**
Holderness Post Office	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	**24**
Town Center Bridge	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	**27**
Ace Afterschool Program	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	2	3	1	1	1	1	1	**29**
Holderness School Ice Rink	2	2	2	1	1	1	1	1	1	1	1	1	2	1	3	3	1	1	1	1	1	1	**30**
PSU Fieldhouse	3	3	2	3	3	1	1	1	1	1	1	1	3	1	3	3	3	1	1	1	3	1	**41**
PSU Ice Arena	1	3	2	3	3	1	1	1	1	1	1	1	3	1	3	3	3	1	1	1	3	1	**39**
Holderness Schl. chem.. lab	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	**27**
Holderness School fieldhse	2	2	2	1	1	1	1	1	1	1	1	1	2	1	3	3	3	1	1	1	1	1	**32**
Rockywold/Deephaven	2	2	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2	**28**
Historical Society Bldg.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**22**
Squam Science Center	2	2	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1	1	1	2	**29**
Asquam Marina	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**23**
Squam Boats Livery	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**23**
cell tower/communication	3	3	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	**28**
HUB at PSU	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	**24**
NH Route 3	3	3	1	3	1	1	1	1	1	1	1	1	3	1	3	3	1	1	1	1	1	1	**34**
NH Route 175A	1	1	1	3	3	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	**30**
NH Route 113	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	**26**
Montesorri School A	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	**25**
Montesorri School B	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	**25**
Camp Deerwood	2	2	2	1	1	1	1	1	1	1	1	2	2	1	2	2	1	1	1	1	1	2	**30**
Electrical substation	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	**24**
Total	**53**	**55**	**37**	**36**	**34**	**29**	**28**	**30**	**30**	**28**	**28**	**32**	**55**	**28**	**56**	**56**	**44**	**29**	**28**	**28**	**36**	**31**	

C. ESTIMATING POTENTIAL LOSSES

The 2013 assessed value of the critical facilities identified in Section A are listed in Table 11, totaling $45,033,830. This does not; however, include the contents of the building 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, sidewalks, bridges, curbs, drainage, and utility transmission lines. These values can also be used to determine potential loss estimates in the event that a natural or manmade hazard damages a part of or an entire facility. Many of the facilities listed here are privately owned but represent structures or service that the Committee considered to be essential in terms of mitigating vulnerability to hazards.

The 2013 assessed value of all of the structures in Holderness is $330,386,500. The value of the residential structures in town totals $260,653,900. The value of the commercial/industrial structures in Holderness is $30,762,480 and the value of the tax-exempt structures is $35,279,920. An additional $3,690,200 of structural value is classified as public utilities. The figures used above are from the town's 2013 Assessor's Database.

In Chapter II Community Profile it was pointed out that while the year-round population of Holderness in 2010 was 2,108 residents, the true number of people in the town in the summertime could be more than twice that figure due to seasonal visitors.

High Winds
All structures in Holderness are susceptible to damage by high wind events, whether through thunderstorms, downburst, or tornado. Assuming 1% to 5% town-wide damage to buildings any given year, high winds could result in $3,303,865 to $16,519,325 in damages annually.

Lightning All structures in Holderness 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 annually, then each year lightning could result in $3,303,865 in damages.

Flood
In 2007 the town of Holderness reported to FEMA that there were an estimated 20 residential and eight other structures in the Flood Hazard Area housing an estimated 40 people.

There are twenty-nine structures in Holderness that carry flood insurance; twenty-four are residential properties. Five non-residential properties are covered by NFIP flood insurance. Twenty-one of the insured properties are in the A-Zone (1% chance of an annual flood), the eight other properties are in the B, C, and X Zones (less than 1% chance of an annual flood - Moderate to Low Risk Areas).[43] Virtually all of the structures estimated to be in the floodplain carry flood insurance.

The insured value of the twenty-nine structures with National Flood Insurance Program (NFIP) policies is $4,330,700, yielding in an average insured value of $149,334; those in the A-Zone have an average insured value of $129,267.

[43] FEMA definitions,https://msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations.

Since 1975 there have been 70 losses paid out for a total of $770,846; two-thirds of this on residential structures and most, but not all structures were in the A-Zone. Five structures incurred more than one loss, referred to as a "repetitive loss"; totaling twelve separate losses and representing $97,913 in payments. There have not been any repetitive losses since 1988[44].

Approximately 40 people could be at risk due to flooding. If there is a 1% chance of each of these properties flooding each year, then there is the potential that flooding could result in $43,307 in damages each year.

Ice Jam
The potential losses are similar to those under Flooding. Approximately 40 people could be at risk due to flooding. If there is a 1% chance of each of these properties flooding each year, then there is the potential that flooding could result in $43,307 in damages each year.

Radon
As there are no structural impacts associated with radon, no potential losses were determined.

Winter Weather
All structures in Holderness 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 $3,303,865 to $16,519,325 in damages annually.

Wildfire
Due to the heavily wooded nature of the town, all properties in town have the potential to be impacted by a wildland fire. The areas most susceptible are identified on the map in Appendix F. These areas tend to be rather remote and relatively few structures would be impacted. Assuming 1% town-wide damage to buildings, each year wildfire could result in $3,303,865 in damages.

Earthquake
All structures in Holderness are susceptible to damage by an earthquake, although very few have more than two stories. Assuming 1% town-wide damage to buildings, an earthquake could result in $3,303,865 in damages any given year.

Hurricane
All structures in Holderness are susceptible to damage by hurricanes, which can bring high winds, heavy rains, and flooding in certain areas, especially in the Pemigewasset River floodplain. Assuming 1% to 5% town-wide damage to buildings, a hurricane event might result in $3,303,865 to $16,519,325 in damages.

Hazardous Materials in Transport/Oil Spill
A hazardous materials accident would not likely impact structures; rather the impact would be environmental. A 2007 report from NH Department of Environmental Services found that a reduction in water quality could lead to $25 million of lost income to the Lakes Region (30 communities).[45]

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[44] NFIP State Coordinator, NH Office of Energy and Planning, July, 2013.
[45] http://des.nh.gov/organization///commissioner/pip/publications/wd/documents/whats_our_water_worth.pdf.

Epidemic
An epidemic would not impact structures; rather the impact would be on people and the public safety system.

Recreational Activities
Emergencies associated with recreational activities are not natural hazard events and would not impact structures; rather the impact would be on people and the public safety system.

D. SUMMARY OF RISK

Taking into account 1) how widespread a hazard event could be, 2) the potential extent of the hazard, 3) the likelihood of occurrence of an event, and the potential impact of a particular hazard event, the significance of the various hazards that might occur in Holderness was determined (Table 13). Level of significance was determined using these definitions:

Low: Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.

Medium: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.

High: The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

Table 13: Hazard Significance

Holderness	Location	Extent (Magnitude/ Strength)	Probability of Occurrence	Impact	Hazard Significance
Hazard Type	Negligible (<10%), Limited (10-25%), Significant (25-75%), Extensive (>75%)	Weak, Moderate, Severe, Extreme	Unlikely, Occasional, Likely, Highly Likely	Low, Moderate, Severe	Low, Medium, High
Flood, Drought, Extreme Heat & Wildfire					
Flood	Limited	Moderate	Likely	Moderate	Medium
Ice Jam	Limited	Moderate	Likely	Moderate	Medium
Drought	Significant	Weak	Occasional	Low	Low
Extreme Heat	Extensive	Weak	Occasional	Low	Low
Wildfire	Significant	Moderate	Occasional	Low/Mod.	Medium
Geologic Hazards					
Earthquake	Extensive	Severe	Unlikely	Low/Mod.	Medium
Landslide	Negligible	Moderate	Unlikely	Low	Low
Radon	Significant	Weak	Likely	Low	Low
Severe Wind Hazards					
Hurricane	Significant	Severe	Occasional	Moderate	Medium
Hail	Negligible	Weak	Occasional	Low	Low
Severe Wind (Tornado/Downburst/ Thunderstorm)	Significant	Moderate	Highly Likely	Moderate	Medium
Lightning	Significant	Moderate	Highly Likely	Mod./Severe	Medium

Holderness	Location	Extent (Magnitude/ Strength)	Probability of Occurrence	Impact	Hazard Significance
Winter Weather Hazards					
Blizzard/Snow Storm	Extensive	Moderate	Likely	Low	Medium
Ice Storm	Limited	Moderate	Occasional	Low	Medium
Nor'easter	Extensive	Moderate	Likely	Low	Medium
Avalanche	Negligible	Weak	Unlikely	Low	Low
Human-Related Events					
MV Accident involving Hazardous Materials	Limited	Moderate	Occasional	Mod./Severe	Medium
Oil Spills	Limited	Moderate	Occasional	Mod./Severe	Medium
Military Aircraft Accident	Negligible	Moderate	Unlikely	Low	Low
Epidemic	Extensive	Extreme	Unlikely	Moderate	Medium
Other					
Rabies	Limited	Weak	Unlikely	Low	Low
Recreational Activities	Extensive	Weak	Highly Likely	Low	Low

Extent

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

Probability of Future Events

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

Impact

- **Low:** limited structural damage, response not compromised, residents can handle recovery w/o outside help.
- **Moderate:** some structural damage, ability to respond compromised, regional assistance needed.
- **Severe:** substantial damage, ability to respond greatly compromised, state or federal assistance necessary.

Hazard Significance:

Low: Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.

Medium: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.

High: The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

It should be noted that the ranking of individual hazards for the purposes of planning discussion should not in any way diminish the potential severity of the impacts of a given hazard event. Further, hazards ranked as low risk may have the impact of increasing the risk of other hazards when they occur. For example, in the event of a drought, the risk of wildfire 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 Holderness has developed. Many local programs have the effect of mitigating disasters; some of these have been in effect for years, others were implemented since the development of the 2008 Hazard Mitigation Plan and are indicated by an asterisk (*). A review of existing mitigation strategies was conducted and included review of pertinent documents including the zoning ordinance, subdivision regulations, emergency management plan, site plan regulations, and discussion with Committee members. The following strategies detail existing plans and regulations related to hazard mitigation. The review of existing capabilities and effectiveness utilized these categorizations:

Poor ..... *The policy, plan or mutual aid system does* ***not work as well as it should*** *and* ***often*** *falls short of meeting its goals.*
Fair .....*The policy, plan or mutual aid system does* ***not work as well as it should*** *and* ***sometimes*** *falls short of meeting its goals.*
Good .....*The policy, plan or mutual aid system* ***works well*** *and* ***is achieving its goals****.*
Excellent .....*The policy, plan or mutual aid system* ***works very well*** *and* ***often exceeds its goals.***
Untested .....*The policy, plan or mutual aid system* ***has not yet been tried or put to the test.***

Table 14: Existing Protections and Policies

Entity	Description	How Effective	Comments/ Improvements/ Changes	Area Covered	Responsible Party
Zoning	§ River Corridor District – Pemigewasset River [200+' frontage; 150' setback; 125' septic setback] "The purpose of this district is to provide protection for the environmentally sensitive corridor along the Pemigewasset River and also protection for lives and property from flood waters and debris. The restrictions contained herein take precedence over permitted uses in the portion of the districts over which it lies."	Good	No changes are necessary.	Town	Planning Board

Entity	Description	How Effective	Comments/ Improvements/ Changes	Area Covered	Responsible Party
Zoning	§ Flood Hazard District [west of I-93; only agricultural and recreational uses permitted] "This district is intended to assure that development within the designated flood hazard area shall occur in such a manner as to minimize the danger to life and property from flooding and to minimize the potential for future flooding. It is also to prevent damage to associated, contiguous, or intersecting waterways and wetlands."	Good	No changes are necessary.	Town	Planning Board
	§ Floodplain Ordinance District – applies to Special Floodplain Hazard Area as delineated on DFIRM. Level D regulations developed in consultation with NH Floodplain Manager.	Good	No changes needed at this time.		
	§ *DFIRM [updated 2008]	Good	No changes necessary.		
	§ *Steep Slopes Ordinance (2008) Restricts development on land >15% (previously >25%)	Good	No changes are necessary.		
	§ Restrictions on Roads – no roads >10% slope	Good	No changes are necessary.		
	§ Master Plan recommends water availability [cistern, sprinkler] protection for new developments	Good	No changes are necessary. Water resources are reviewed during Site Plan Review.		
	§ Structure Fire [hazards must be demolished or fixed in 1 yr]	Good	No changes necessary.		
	§ Shoreline Structure [no dug-in slips; no dredged inlets]	Good	No changes necessary.		
	§ Shoreland Protection [CSPA standards adopted, *more restrictive than current state law – SQWPA]	Good	No changes are necessary.		
	§ Special Events Permit [notify FD/Selectmen required large party]	Good	No changes are necessary.		

Entity	Description	How Effective	Comments/ Improvements/ Changes	Area Covered	Responsible Party
Zoning	§ Emergency Actions allowed [water/septic repairs without permit under certain conditions]	Good	No changes are necessary.	Town	Planning Board
	§ Require access for FD & emergency responders on all property	Fair	Could do more outreach to landowner maintenance of accessways.		
Subdivision Regulations	§ [6.2] Unsafe Land non-buildable	Good	No changes are necessary.	Town	Planning Board
	§ [6.3] Pemigewasset River Corridor Overlay District	Good	Consistent with Zoning. No changes are necessary.		
	§ [6.4] Flood Hazard Areas	Good	Consistent with Zoning. No changes are necessary.		
	§ [6.5] Unsuitable Land	Good	No changes are necessary.		
	§ [6.7] Lot Area requirements	Good	No changes are necessary.		
	§ [6.14] Grading & Drainage requirements	Good	No changes are necessary.		
	§ [6.19 E] Road Grade Requirements	Good	No changes are necessary.		
	§ [7.2] Street Size Requirements	Good	No changes are necessary.		
	§ [7.3] Drainage/Culverts	Good	No changes are necessary.		
	§ All new development & subdivisions require cistern	Good	No changes are necessary.		
Sewer Service	§ Plymouth Water & Sewer	Good	No changes are necessary.	North & South River St.	Selectmen
Water & Sewer Service		Good	No changes are necessary.	Holderness School	
		Good	No changes are necessary.	PSU Field house *and Ice Arena	
Radio Communications	§ NOAA Communications Tower [Smith Road]	Fair	See next item.	Region	Fire Chief
	*Mobile repeater	Good	No changes are necessary.		
	§ Lakes Region Response – FD	Good	No changes are necessary.		
	§ Plymouth Dispatch – PD	Good	No changes are necessary.		
	§ Dedicated town-wide channel – DPW	Good	No changes are necessary.		

Entity	Description	How Effective	Comments/ Improvements/ Changes	Area Covered	Responsible Party
Police Department	§ Full-time PD Chief	Good	No changes necessary.	Town	Police Chief
	§ 4 full-time officers & 1 seasonal full-time officer	Good	No changes necessary.		
	§ DARE program	Good	No changes necessary.		
	§ 100% NIMS/ICS Certified	Good	No changes necessary.		
	§ Mutual Aid through the state	Good	No changes necessary.		
	§ Digital Communication	Good	No changes necessary.		
Department of Public Works	§ Full-time Road Agent	Good	No changes necessary.	Town	Road Agent
	§ 3 full-time staff	Good	No changes necessary.		
	§ C.I.P. - Town maintenance plan	Good	No changes necessary.		
	§ Have a 20-year repair schedule for roads	Good	No changes necessary.		
Fire Department	§ Part-time FD Chief	Good	No changes necessary.	Town/Region	Fire Chief
	§ 30 *Call Fire Fighters	Good	No changes necessary.		
	§ Inspection/Maintenance Plan for equipment	Good	No changes necessary.		
	§ 100% Haz Mat Awareness Certified	Good	No changes necessary.		
	§ 100% NIMS/ICS Certified	Good	No changes necessary.		
	§ FD Boat launched [May 2007]	Good	No changes necessary.		
	§ Trails mapped	Good	No changes necessary.		
	§ Logging roads mapped	Good	No changes necessary.		
	§ Capital Reserve Fund for FD	Good	No changes necessary.		
	§ Holderness School and *Holderness Elementary School each has an Emergency Plan and conducts drills	Good	No changes necessary.		
	§ Expendable Trust Fund [fires & flood]	Good	No changes necessary.		
	§ *Have a Swiftwater Rescue team and equipment	Good	No changes necessary.		
	§ Inspects oil burners, wood stoves	Good	No changes necessary.		
Emergency Operations Plan	§ EOP – *updated 2013	Good	No changes necessary.	Town	Emergency Management Director

Entity	Description	How Effective	Comments/ Improvements/ Changes	Area Covered	Responsible Party
Land Use Compliance Officer	§ Use NH state building code. [No town building codes]	Good	No changes necessary.	Town	Selectmen
	§ *Hired a Land Use Compliance Officer	Good	No changes necessary.		
Dry Hydrants	§ *Three exist. These were mapped by RC&D as part of Water Resource Plan in 2008.	Fair	Due to larger capacity tankers, FD is less dependent on dry hydrants and fire ponds, which have maintenance issues.	Town	Fire Chief
Shelters	§ Elementary School [Plan updated 2006]	Good	No changes necessary.	Town	Emergency Management Director
	§ Sprinkler system installed [2007]	Good	No changes necessary.		
Town Administration	§ GIS Program available in 2008: Roads, Culverts, Bridges, Tax Maps, Building Locations, Utility Poles, *and hydrants.	Good	No changes necessary.	Town	Town Administrator
Transfer Station	§ 1 full-time, 1 part-time staff	Good	No changes necessary.	Town	Road Agent
	§ Open 5 days a week	Good	No changes necessary.		
	§ Owns parcel for relocation	Good	No changes necessary.		
	§ Capital Reserve Fund for equipment	Good	No changes necessary.		
	§ *Completed the planning process for replacement or improvement of station	Good	No changes necessary.		

B. STATUS OF 2008 ACTIONS

The 2008 HMP contained more than 50 recommendations. A review of the status of these actions reveals that nearly twenty have been completed and eight others are no longer considered pertinent. The status of the mitigation actions recommended in the 2008 plan is indicated in Table 15 as either, Completed, Deleted, or Deferred. Effectiveness was rated using the same terms and definitions as Table 14. Some of the deleted Actions are now listed above as "Current Plans, Policies, and Regulations". Deferred Actions (or deferred portions of Actions) were carried forward to be considered as new Mitigation Actions (Table 16).

Table 15: Status of Mitigation Actions from the 2008 Hazard Mitigation Plan

ID	POTENTIAL HAZARDS	MITIGATION ACTION (2008)	Status	Comment	How Effective	Improvements/ Changes
B	All	Attain back country rescue & wildfire suppression equipment [gator, etc].	Complete	none	Good	No changes necessary.
C	All	Purchase contain/confine equipment for chemical spills.	Complete	Requires replacement as used or due to age.	Good	No changes necessary.
T	All	Investigate Ambulance Service options for Holderness.	Complete	Plymouth Ambulance Service	Good	No changes necessary.
U	MVA HazMat	Construct a building for the Transfer Station.	Complete	none	Good	No changes necessary.
BB	All	Incorporate the 2007 Hazard Mitigation Plan in the Emergency Operations Plan.	Complete	none	Good	No changes necessary.
CC	All	Update GIS data layers and availability of GIS information.	Complete	Now a policy	Good	Requires periodic updates
DD	All	Update EOP to include FEMA NIMS/ICS requirements.	Complete	Completed in 2013	Good	No changes necessary.
FF	All	Develop DPW procedures for contain/confine chemical spills.	Complete	none	Good	No changes necessary.
GG	Flood/Ice Jam	Update FIRM maps with aerial overlays [digitized flood maps].	Complete	Completed in 2008	Good	No changes necessary.
PP	All	Upgrade shelter generator at the Elementary School.	Complete	with FEMA assistance	Good	No changes necessary.

ID	POTENTIAL HAZARDS	MITIGATION ACTION (2008)	Status	Comment	How Effective	Improvements/ Changes
QQ	Thunderstorm/ Lightning, Wildfire, Flood	Adopt a Steep Slopes Ordinance to restrict and/or prohibit development in difficult to reach areas.	Complete	none	Good	No changes necessary.
RR	Thunderstorm/ Lightning, Wildfire, Flood	Adopt driveway standards that address slope, width, access.	Complete	none	Good	No changes necessary.
SS	All	Update DPW Maintenance and Education Plan to include NIMS and ICS.	Complete	none	Good	No changes necessary.
TT	All	Revise ordinance to require water supply for fire suppression at new developments/subdivisions.	Complete	Plans are reviewed by the Fire Chief and discussed with the PB.	Good	No changes necessary.
UU	Thunderstorm/ Lightning, Wildfire	Amend subdivision regulations to require onsite water storage, minimum fire flow, fire breaks in wildland/urban interface areas.	Complete	Plans are reviewed by the Fire Chief and discussed with the PB.	Good	No changes necessary.
XX	All	Ensure that development projects comply with the existing mitigation strategies of the subdivision regulations, site plan review, and building codes.	Complete	This is done through the Plan Review process.	Good	No changes necessary.
D	Thunderstorm/ Lightning, Wildfire	Amend or include money in the Capital Improvement Plan for water drafting site development.	Delete	With large capacity tankers, this is no longer a priority.	n/a	n/a
V	MVA	Construct a sally-port for the Police Department.	Delete	Not Mitigation	n/a	n/a
X	All	Implement septic system maintenance & education plan.	Delete	State responsibility	n/a	n/a

ID	POTENTIAL HAZARDS	MITIGATION ACTION (2008)	Status	Comment	How Effective	Improvements/ Changes
Y	MVA HazMat	Continue to provide emergency responders with additional hazardous materials training.	Delete	Policy	n/a	n/a
AA	Thunderstorm/ Lightning, Wildfire	Encourage referral to Water Resource Plan and maps by Planning Board when reviewing subdivision proposals.	Delete	Policy	n/a	n/a
HH	All	Revise ordinance for free municipal access on new cell towers.	Delete	Not viewed as a pressing need by the committee.	n/a	n/a
II	All	Establish & Fill position for a Compliance/Code Enforcement Officer.	Delete	Not politically acceptable. Insufficient funding.	n/a	n/a
NN	Thunderstorm/ Lightning, Wildfire	Establish a dry hydrant/fire pond construction and maintenance program that will include records kept of semi–annual or annual flow tests on each hydrant and cleaning or maintenance dredging of fire ponds, per recommendations in the *Town of Holderness Water Resources Plan* (Appendix M).	Delete	With large capacity tankers and high maintenance costs of fire ponds, this is no longer a priority.	n/a	n/a
WW	Flood	Update vulnerable culverts and bridges, identified by the DPW, throughout town, including: Central School Bridge, Perkins Lane, Perch Pond Road, Coxboro Road, E. Holderness Road, NH Route 113, Range Road, Mountain Road, Old Burley Farm Road, Hardhack Road.	Complete/ Defer	Most are complete, defer Lower Perch Pond Rd. and NH Rte. 113. As the latter is a state road, much coordination will be required.	Good	Lower Perch Pond and NH Rte. 113 still needs upgrading of its roadbed and drainage to reduce flooding.
A	All	Construct a garage for the Police Department.	Defer	This is scheduled to be completed in 2015.	Good	Complete the process.

ID	POTENTIAL HAZARDS	MITIGATION ACTION (2008)	Status	Comment	How Effective	Improvements/ Changes
E	All	Obtain shelter designation for Holderness Prep School & purchase generator.	Defer	The school will likely be upgrading their campus-wide furnace; the generator may not be necessary.	Untested	Remove generator from this action.
F	All	Attain shelter necessities. [cots, blankets, towels, etc.]	Defer	This has been started.	Good	Complete the process.
G	All	Construct a Public Safety Substation for the Fire & Police Departments at the Holderness School, including a generator.	Defer	Arrangements have started for this. It should be completed in 2015.	Good	Complete the process.
H	Thunderstorm/ Lightning, Wildfire	Install a cistern at Beede Road: #020 Carr Brook draft site	Defer	Funding has not been available.	Fair	$50,000 Seek HMPG funding.
I	Thunderstorm/ Lightning, Wildfire	Install a cistern at #008 E. Holderness Rd. draft site	Defer	Funding has not been available.	Fair	$50,000 Seek HMPG funding.
J	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant system at #002 "Squam Boat draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
K	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant system at #003 "Christain lane draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
L	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant system at #005 "White Oak Pond draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.

ID	POTENTIAL HAZARDS	MITIGATION ACTION (2008)	Status	Comment	How Effective	Improvements/ Changes
M	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant system at #006 "Lewis Piper draft site	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
N	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant at #001 "Curry Place draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
O	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant at #004 "Overlook draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
P	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant at #007, "Wolfberg draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
Q	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant at #010 "Mountaineers draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
R	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant at #021 "Marrer draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.
S	Thunderstorm/ Lightning, Wildfire	Construct dry hydrant or cistern at #022 "Sargent Road draft site"	Defer	Low priority, maintenance is a problem	Fair	Keep as an action in the event that funds for BOTH construction and maintenance become available.

ID	POTENTIAL HAZARDS	MITIGATION ACTION (2008)	Status	Comment	How Effective	Improvements/ Changes
W	Thunderstorm/ Lightning, Wildfire	Implement program to provide training to fire personnel on wildfire suppression, dry hydrant design, site evaluations of water resources, etc.	Defer	Would be useful. Funding is limited.	Untested	Revise to address fire, flood, and civil disturbance. Include more emergency services staff.
Z	Thunderstorm/ Lightning, Wildfire	Map and assess water sites and other resources along woods roads and trails for fighting wildfires.	Defer	Some has been done. Time and funding has been limited.	Fair	To complete this, funds and time need to be dedicated to it.
EE	All	Purchase communications equipment for Town Hall/EOC.	Defer	Steps have been taken to implement this. It is due to be completed by the end of 2014.	Untested	Complete the process.
JJ	All	Acquire repeater for town on radio tower to establish better communication.	Defer	Police have this capability.	Fair	To complete this, funds need to be dedicated to it.
KK	All	Work with the Department of Safety, 911 Mapping Bureau to fix known problems with GIS road data to limit confusion in emergency planning and emergency response.	Defer	This is being worked on and is improving. Policy.	Good	It needs to be reviewed each year.
LL	All	Improve regional cooperation and communication among towns and agencies in the area and state.	Defer	This is being worked on and is improving. Policy.	Good	It needs to be reviewed each year.
MM	All	Include a recommendation in the Master Plan to maintain the Hazard Mitigation Plan.	Defer	MP has not been updated.	Untested	n/a
OO	All	Purchase generator for Town Hall/EOC.	Defer	This action is in process and will be completed by the end of 2014 with HSEM assistance.	Untested	n/a

ID	POTENTIAL HAZARDS	MITIGATION ACTION (2008)	Status	Comment	How Effective	Improvements/ Changes
VV	All	Adopt Building Codes to include sprinkler and life safety requirements.	Defer	Residential sprinklers can be an option, not a requirement (NH RSA 674:51.V). Hiring a Code Enforcement Officer can be expensive and is politically charged.	Untested	n/a
YY	All	Include in the plan submission sections of both site plan and subdivision regulations a reference to the Hazard Mitigation Plan, and require the applicant to articulate how the proposal complies with the standards of the plan and achieves a "no adverse impact" status as it relates to emergency situations.	Defer	Perceived as burdensome to the applicant.	Untested	It should be developed in a manner that makes it clear and simple what the applicant needs to do.

C. MITIGATION GOALS AND TYPES OF ACTIONS

In the 2008 Plan, the committee affirmed its support for the goals stated in the State HMP at the time. While the overall goals of the town of Holderness have not changed substantially since then, the form in which they are stated has. The general goals below are similar to the goals in the earlier plan while the hazard-specific goals address specific local concerns.

General Goals:

1. Improve upon the protection of the residents of Holderness and its visitors from all hazards, raise general awareness, and reduce the liability to the town from hazard events.
2. Reduce the potential impact of hazard events on Holderness' critical support services, facilities, and infrastructure.
3. Improve emergency preparedness.
4. Improve the response and recovery capability of Holderness to hazard events.
5. Reduce the potential impact of hazard events on private and public property, the natural environment, and economic resources.

Hazard Specific
Flooding

6. Minimize the impact that a flood would have on life, property, and infrastructure on the Pemigewasset River and its floodplain along with various streams of the town of Holderness.

Fire

7. Reduce the risk of loss of life, and damage to property and infrastructure due to structural or wildfires.
8. Minimize the impact to life, property, and the environment during a hazardous materials spill.
9. Reduce the impact on life, structures, and infrastructure (especially communications infrastructure) as a result of a lightning strike.

Winter Weather

10. Minimize the impact of severe winter weather on people living in or visiting Holderness along with structures and infrastructure.

Severe Wind

11. Reduce the likelihood of damage or loss of life due to high wind events.

Earthquake

12. Minimize the impact that an earthquake may have on the people in the town of Holderness as well as structures and infrastructure.

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:

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

- a. Zoning – floodplain and steep slope overlays
- b. Open space preservation
- c. Subdivision and Site Plan Review
  - i. Impervious surface limits
  - ii. Stormwater management

d. Capital Improvements Plan – limiting the extension of public infrastructure into hazard areas
e. Building and Fire codes

B. Actions that address individual buildings - Property Protection

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

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

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

D. Actions that will protect natural resources

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

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

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

F. Actions that will control the hazard – Structural projects

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

D. POTENTIAL ACTIONS

Through a review of the risk assessment and local vulnerabilities, a number of Problem Statements were identified and refined by the Committee. Multiple brainstorming sessions yielded an updated list of mitigation strategies to address these current problems. Table 16 lists the problems and actions along with the hazard(s) that they address and notes whether the action addresses existing structures/infrastructure or future (new) structures/infrastructure as well as which goal(s) they address and the type of mitigation action each represents. The ID letters are used simply for tracking purposes; they do not indicate any sort of prioritization. ID letters with similar colored highlighting address similar problem statements. Note: the goals and their numbers are listed on page 41.

Table 16: Problems and Mitigation Actions indicating Hazard, Structure, Goal, and Type of Action

ID	Hazard	Problem	Mitigation Actions	New or Existing Struct.	Goal	Type
E	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Obtain shelter designation for Holderness Prep School	E	1	Education & Awareness
F	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Obtain shelter necessities. [cots, blankets, towels, etc.]	E	1	Long-term Continuity
G	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Construct a Public Safety Substation for the Fire & Police Departments at the Holderness School, including a generator.	N	1, 2, 3, 4	Long-term Continuity
H	T"storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Install a cistern at Beede Road: #020 Carr Brook draft site	E	1, 2, 3, 4, 5, 7, 9	Structural Project
I	T"storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Install a cistern at #008 E. Holderness Rd. draft site	E	1, 2, 3, 4, 5, 7, 9	Structural Project

ID	Hazard	Problem	Mitigation Actions	New or Existing Struct.	Goal	Type
J	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant system at #002 "Squam Boat draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
K	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant system at #003 "Christain lane draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
L	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant system at #005 "White Oak Pond draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
M	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant system at #006 "Lewis Piper draft site	E	1, 2, 3, 4, 5, 7, 9	Structural Project
N	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant at #001 "Curry Place draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
O	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant at #004 "Overlook draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project

ID	Hazard	Problem	Mitigation Actions	New or Existing Struct.	Goal	Type
P	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant at #007, "Wolfberg draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
Q	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant at #010 "Mountaineers draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
R	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant at #021 "Marrer draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
S	T'storm/ Light., Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant or cistern at #022 "Sargent Road draft site"	E	1, 2, 3, 4, 5, 7, 9	Structural Project
W	T'storm/ Light., Wildfire	In addition to equipment, firefighters need appropriate training to control fires, reducing the likelihood of damage to lives and property.	Implement program to provide training to Emergency Services personnel in how to reduce and address fire, flooding, and civil disturbance issues.	E	1, 2, 3, 4, 6, 7, 9	Prevention
EE	All	The Holderness Town Hall and EOC do not have appropriate communications equipment. Failure to communicate with emergency responders could result in preventable injury or property damage.	Purchase communications equipment for Town Hall/EOC.	E	1, 2, 4	Long-term Continuity

ID	Hazard	Problem	Mitigation Actions	New or Existing Struct.	Goal	Type
HH	All	There are some areas in town where reception of emergency communication is poor. Failure to communicate with emergency responders could result in preventable injury or property damage.	Develop a policy to request free municipal access on any towers to enhance municipal communications.	E	1, 2, 4	Long-term Continuity
JJ	All	There are some areas in town where reception of emergency communication is poor. Failure to communicate with emergency responders could result in preventable injury or property damage.	Acquire repeater for town to establish better communication.	E	1, 2, 4	Long-term Continuity
KK	All	There are some areas in town where 911 data is incorrect or incomplete. Failure to communicate properly with emergency responders could result in preventable injury or property damage.	Continue to work with the Department of Safety, 911 Mapping Bureau to fix known problems with GIS road data to limit confusion in emergency planning and emergency response.	E	1, 2, 4, 5	Long-term Continuity
MM	All	Master Plans may include a Natural Hazards chapter. Reference to or incorporation of this plan into the Holderness Master Plan may help ensure the implementation of these recommendations.	Consider adopting this Hazard Mitigation Plan as a chapter of the Master Plan.	E	1, 2, 5	Prevention
OO	All	Consistent communications and coordination is vital to emergency response and reducing the likelihood of damage to people and property.	Purchase generator for Town Hall/EOC.	E	1, 2, 3, 4	Long-term Continuity
VV	All	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Adopt Building Codes to include sprinkler and life safety requirements.	N	1, 2, 4, 5, 7, 9	Prevention

ID	Hazard	Problem	Mitigation Actions	New or Existing Struct.	Goal	Type
YY	All	Municipal efforts to help mitigate the risks and costs to homeowners, business, and the town associated with potential hazards should be coordinated.	Include in the plan submission sections of both site plan and subdivision regulations a reference to the Hazard Mitigation Plan, and require the applicant to articulate how the proposal complies with the standards of the plan and achieves a "no adverse impact" status as it relates to emergency situations.	N	1, 2, 5, 6	Prevention
a	Flood	There are a few road segments in town that flood, making it difficult or dangerous for people (residents and emergency personnel) to cross.	Lower Perch Pond Road floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	E	1, 2, 4, 5, 6	Long-term Continuity
b	Flood	There are a few road segments in town that flood, making it difficult or dangerous for people (residents and emergency personnel) to cross.	NH Route 113 floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	E	1, 2, 4, 5, 6	Long-term Continuity
c	All	While the town has some methods of communicating with property owners, residents, and visitors regarding emergencies, more can be done to reduce the likelihood of injury or damage.	Partner with Grafton County to utilize the Code Red telephone and internet communication alert system.	E	1, 3, 4	Long-term Continuity
d	All	Gaining emergency access to wildfires, hikers, and islands can be difficult, resulting in a higher likelihood of damage or injury.	Work with homeowners or homeowner associations to ensure that private roads are kept clear for access by emergency vehicles.	N	1, 2, 4, 5, 7, 8, 9, 10, 11	Education & Awareness, Long-term Continuity

The Committee identified the various costs and benefits associated with each action. The estimated cost represents what the town estimates it will cost in terms of dollars or staff hours to implement each action. Table 17 shows the costs as well as the various benefits associated with each action.

Table 17: Mitigation Actions by Hazard Type – Estimated Cost & Pros/Cons

ID	Hazard	Problem	Mitigation Actions	Responsible Party	Anticipated Cost	Potential Funding	Comments
E	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Obtain shelter designation for Holderness Prep School	EMD	Staff Time <20 hours	Town Operating Budget	This would happen in conjunction with an upgraded heat & power system at the school.
HH	All	There are some areas in town where reception of emergency communication is poor. Failure to communicate with emergency responders could result in preventable injury or property damage.	Develop a policy to request free municipal access on any towers to enhance municipal communications.	EMD, PB	Staff Time 20 hours	Town Operating Budget	Modified language.
YY	All	Municipal efforts to help mitigate the risks and costs to homeowners, business, and the town associated with potential hazards should be coordinated.	Include in the plan submission sections of both site plan and subdivision regulations a reference to the Hazard Mitigation Plan, and require the applicant to articulate how the proposal complies with the standards of the plan and achieves a "no adverse impact" status as it relates to emergency situations.	EMD & PB	Staff Time 20 hours	Town Operating Budget	Inclusion is worthwhile but enforcement will require additional funding.
c	All	While the town has some methods of communicating with property owners, residents, and visitors regarding emergencies, more can be done to reduce the likelihood of injury or damage.	Partner with Grafton County to utilize the Code Red telephone and internet communication alert system.	EMD	Staff Time 20 hours	Town Operating Budget	Low cost through the county.

ID	Hazard	Problem	Mitigation Actions	Responsible Party	Anticipated Cost	Potential Funding	Comments
MM	All	Master Plans may include a Natural Hazards chapter. Reference to or incorporation of this plan into the Holderness Master Plan may help ensure the implementation of these recommendations.	Consider adopting this Hazard Mitigation Plan as a chapter of the Master Plan.	EMD & PB	Staff Time 40 hr	Town Operating Budget	MP has not been updated since 2007; it is due to be updated in 2017.
d	All	Gaining emergency access to wildfires, hikers, and islands can be difficult, resulting in a higher likelihood of damage or injury.	Work with homeowners or homeowner associations to ensure that private roads are kept clear for access by emergency vehicles.	EMD & PB	Staff Time 20 hours/ year	Town Operating Budget	For new construction can be part of the Subdivision and Site Plan approval.
KK	All	There are some areas in town where 911 data is incorrect or incomplete. Failure to communicate properly with emergency responders could result in preventable injury or property damage.	Continue to work with the Department of Safety, 911 Mapping Bureau to fix known problems with GIS road data to limit confusion in emergency planning and emergency response.	EMD	Staff Time 25 hrs/year	Town Operating Budget	Action is currently being taken on this; periodic review and updated should be expected.
J	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires in town.	Construct dry hydrant system at #002 "Squam Boat draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
K	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant system at #003 "Christain lane draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
L	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant system at #005 "White Oak Pond draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem

ID	Hazard	Problem	Mitigation Actions	Responsible Party	Anticipated Cost	Potential Funding	Comments
M	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant system at #006 "Lewis Piper draft site	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
N	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #001 "Curry Place draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
O	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #004 "Overlook draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
P	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #007, "Wolfberg draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
Q	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #010 "Mountaineers draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
R	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #021 "Marrer draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem

ID	Hazard	Problem	Mitigation Actions	Responsible Party	Anticipated Cost	Potential Funding	Comments
S	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant or cistern at #022 "Sargent Road draft site"	Fire Chief	$2,500 + regular maintenance	Town Budget, grant	Low priority, Maintenance is a problem
EE	All	The Holderness Town Hall and EOC do not have appropriate communications equipment. Failure to communicate with emergency responders could result in preventable injury or property damage.	Purchase communications equipment for Town Hall/EOC.	EMD	$10,000	FEMA	Action is currently being taken on this; expected to be completed in 2014.
JJ	All	There are some areas in town where reception of emergency communication is poor. Failure to communicate with emergency responders could result in preventable injury or property damage.	Acquire repeater for town to establish better communication.	EMD	$10,000	HSEM	Police - yes. Exploring alternate technologies such as mobile repeaters.
F	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Obtain shelter necessities. [cots, blankets, towels, etc.]	EMD	$10,000	Town Operating Budget	Action is currently being taken on this; expected to be completed in 2015.
G	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Construct a Public Safety Substation for the Fire & Police Departments at the Holderness School, including a generator.	EMD	Staff Time 50 hours	Town Operating Budget	Associated with Item E (2015)
OO	All	Consistent communications and coordination is vital to emergency response and reducing the likelihood of damage to people and property.	Purchase generator for Town Hall/EOC.	EMD	$20,000	HSEM & Town Budget	Action is currently being taken on this; expected to be completed in 2014.

ID	Hazard	Problem	Mitigation Actions	Responsible Party	Anticipated Cost	Potential Funding	Comments
H	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Install a cistern at Beede Road: #020 Carr Brook draft site	Fire Chief	$50,000	HMPG	More expensive than a dry hydrant initially but less maintenance
I	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Install a cistern at #008 E. Holderness Rd. draft site	Fire Chief	$50,000	HMPG	More expensive than a dry hydrant initially but less maintenance
W	T'storm/ Lightning, Wildfire	In addition to equipment, firefighters need appropriate training to control fires, reducing the likelihood of damage to lives and property.	Implement program to provide training to Emergency Services personnel in how to reduce and address fire, flooding, and civil disturbance issues.	EMD	$10,000 per year	FEMA	Limited funding
a	Flood	There are a few road segments in town that flood, making it difficult or dangerous for people (residents and emergency personnel) to cross.	Lower Perch Pond Road floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	DPW	$100K	Town Budget, HMPG	
VV	All	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Adopt Building Codes to include sprinkler and life safety requirements.	EMD	$75,000/ year	Town Operating Budget	Enforcement of this would require additional staff.
b	Flood	There are a few road segments in town that flood, making it difficult or dangerous for people (residents and emergency personnel) to cross.	NH Route 113 floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	DPW	$1,000,000	NHDOT, HMPG, Town Budget	Cotton Cove (Money Pit Rd. to Long Haul Rd.)

E. PRIORITIZATION OF ACTIONS

After considering the Pros and Cons of each project, the Committee began to prioritize the various projects which had been identified. Committee members agreed to adapt the standard prioritization tool to better reflect the concerns of the community. The tool that came out of this process asks the committee to consider eleven separate aspects for each Action including the Costs (See Appendix H for full details). Table 18 shows the Actions ordered by their overall score; those with similar scores are then ordered by their Cost score and then Property Protection score. Total scores range from a high of 9 to a low of -1.

Table 18: Recommended Mitigation Actions in Ranked Order

ID	Hazard	Holderness: Proposed Mitigation Actions	Total
KK	All	Continue to work with the Department of Safety, 911 Mapping Bureau to fix known problems with GIS road data to limit confusion in emergency planning and emergency response.	**9**
W	T'storm/ Lightning, Wildfire	Implement program to provide training to Emergency Services personnel in how to reduce and address fire, flooding, and civil disturbance issues.	**8**
EE	All	Purchase communications equipment for Town Hall/EOC.	**8**
HH	All	Develop a policy to request free municipal access on any towers to enhance municipal communications.	**8**
JJ	All	Acquire repeater for town to establish better communication.	**8**
MM	All	Consider adopting this Hazard Mitigation Plan as a chapter of the Master Plan.	**8**
G	All	Construct a Public Safety Substation for the Fire & Police Departments at the Holderness School, including a generator.	**7**
YY	All	Include in the plan submission sections of both site plan and subdivision regulations a reference to the Hazard Mitigation Plan, and require the applicant to articulate how the proposal complies with the standards of the plan and achieves a "no adverse impact" status as it relates to emergency situations.	**7**
E	All	Obtain shelter designation for Holderness Prep School	**7**
F	All	Obtain shelter necessities. [cots, blankets, towels, etc.]	**7**
H	T'storm/ Lightning, Wildfire	Install a cistern at Beede Road: #020 Carr Brook draft site	**7**
I	T'storm/ Lightning, Wildfire	Install a cistern at #008 E. Holderness Rd. draft site	**7**
b	Flood	NH Route 113 floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	**7**

ID	Hazard	Holderness: Proposed Mitigation Actions	Total
a	Flood	Lower Perch Pond Road floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	**7**
d	All	Work with homeowners or homeowner associations to ensure that private roads are kept clear for access by emergency vehicles.	**6**
c	All	Partner with Grafton County to utilize the Code Red telephone and internet communication alert system.	**4**
J	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #002 "Squam Boat draft site"	**0**
K	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #003 "Christain lane draft site"	**0**
L	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #005 "White Oak Pond draft site"	**0**
M	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #006 "Lewis Piper draft site	**0**
N	T'storm/ Lightning, Wildfire	Construct dry hydrant at #001 "Curry Place draft site"	**0**
O	T'storm/ Lightning, Wildfire	Construct dry hydrant at #004 "Overlook draft site"	**0**
P	T'storm/ Lightning, Wildfire	Construct dry hydrant at #007, "Wolfberg draft site"	**0**
Q	T'storm/ Lightning, Wildfire	Construct dry hydrant at #010 "Mountaineers draft site"	**0**
R	T'storm/ Lightning, Wildfire	Construct dry hydrant at #021 "Marrer draft site"	**0**
S	T'storm/ Lightning, Wildfire	Construct dry hydrant or cistern at #022 "Sargent Road draft site"	**0**
VV	All	Adopt Building Codes to include sprinkler and life safety requirements.	**-1**

F. IMPLEMENTATION OF MITIGATION ACTIONS

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

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

In the context of these factors, the Committee discussed the mitigation actions and relative level of priority, recognizing that some actions are of greater priority to different town departments. This implementation schedule contains a matrix (Table 19) indicating the estimated cost of implementation, potential funding sources, the parties responsible for bringing about these actions, and implementation time frame. Though a number of recommended mitigation actions received high scores, the time frame for which the actions are executed depend upon staff time and budgetary limitations.

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

Table 19: Implementation Schedule for Mitigation Actions by Time Frame

ID	Hazard	Problem	Mitigation Actions	Time Frame	Anticipated Cost	Potential Funding	Responsible Party
JJ	All	There are some areas in town where reception of emergency communication is poor. Failure to communicate with emergency responders could result in preventable injury or property damage.	Acquire repeater for town to establish better communication.	2014	$10,000	HSEM	EMD
OO	All	Consistent communications and coordination is vital to emergency response and reducing the likelihood of damage to people and property.	Purchase generator for Town Hall/EOC.	2014	$20,000	HSEM & Town Operating Budget	EMD

ID	Hazard	Problem	Mitigation Actions	Time Frame	Anticipated Cost	Potential Funding	Responsible Party
b	All	While the town has some methods of communicating with property owners, residents, and visitors regarding emergencies, more can be done to reduce the likelihood of injury or damage.	Partner with Grafton County to utilize the Code Red telephone and internet communication alert system.	2014	Staff Time 20 hours	Town Operating Budget	EMD
E	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Obtain shelter designation for Holderness Prep School	2014	Staff Time <20 hours	Town Operating Budget	EMD
W	T'storm/ Lightning, Wildfire	In addition to equipment, firefighters need appropriate training to control fires, reducing the likelihood of damage to lives and property.	Implement program to provide training to Emergency Services personnel in how to reduce and address fire, flooding, and civil disturbance issues.	2014, '15, '16, '17, '18	$10,000 per year	FEMA	EMD
c	All	Gaining emergency access to wildfires, hikers, and islands can be difficult, resulting in a higher likelihood of damage or injury.	Work with homeowners or homeowner associations to ensure that private roads are kept clear for access by emergency vehicles.	2014, '15, '16, '17, '18	Staff Time 20 hours/ year	Town Operating Budget	EMD & PB
KK	All	There are some areas in town where 911 data is incorrect or incomplete. Failure to communicate properly with emergency responders could result in preventable injury or property damage.	Continue to work with the Department of Safety, 911 Mapping Bureau to fix known problems with GIS road data to limit confusion in emergency planning and emergency response.	2014, '15, '16, '17, '18	Staff Time 25 hrs/year	Town Operating Budget	EMD
EE	All	The Holderness Town Hall and EOC do not have appropriate communications equipment. Failure to communicate with emergency responders could result in preventable injury or property damage.	Purchase communications equipment for Town Hall/EOC.	2015	$10,000	FEMA	EMD
a	Flood	There are a few road segments in town that flood, making it difficult or dangerous for people (residents and emergency personnel) to cross.	Lower Perch Pond Road floods due to a low roadbed. Raising the the roadbed and adding larger culverts could reduce the likelihood of flooding.	2015	$100K	Town Operating Budget, HMPG	DPW

ID	Hazard	Problem	Mitigation Actions	Time Frame	Anticipated Cost	Potential Funding	Responsible Party
HH	All	There are some areas in town where reception of emergency communication is poor. Failure to communicate with emergency responders could result in preventable injury or property damage.	Develop a policy to request free municipal access on any towers to enhance municipal communications.	2015	Staff Time 20 hours	Town Operating Budget	EMD, PB
YY	All	Municipal efforts to help mitigate the risks and costs to homeowners, business, and the town associated with potential hazards should be coordinated.	Include in the plan submission sections of both site plan and subdivision regulations a reference to the Hazard Mitigation Plan, and require the applicant to articulate how the proposal complies with the standards of the plan and achieves a "no adverse impact" status as it relates to emergency situations.	2015	Staff Time 20 hours	Town Operating Budget	EMD & PB
G	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Construct a Public Safety Substation for the Fire & Police Departments at the Holderness School, including a generator.	2015	Staff Time 50 hours	Town Operating Budget	EMD
MM	All	Master Plans may include a Natural Hazards chapter. Reference to or incorporation of this plan into the Holderness Master Plan may help ensure the implementation of these recommendations.	Consider adopting this Hazard Mitigation Plan as a chapter of the Master Plan.	2017	Staff Time 40 hr	Town Operating Budget	EMD & PB
F	All	Having multiple well-stocked facilities that could serve as a shelter would help to serve a population that fluctuates in size seasonally.	Obtain shelter necessities. [cots, blankets, towels, etc.]	2018	$10,000	Town Operating Budget	EMD
H	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Install a cistern at Beede Road: #020 Carr Brook draft site	2018	$50,000	HMPG	Fire Chief
I	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Install a cistern at #008 E. Holderness Rd. draft site	2018	$50,000	HMPG	Fire Chief

ID	Hazard	Problem	Mitigation Actions	Time Frame	Anticipated Cost	Potential Funding	Responsible Party
d	Flood	There are a few road segments in town that flood, making it difficult or dangerous for people (residents and emergency personnel) to cross.	NH Route 113 floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	2018	$1,000,000	NHDOT, HMPG, Town Operating Budget	DPW
VV	All	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Adopt Building Codes to include sprinkler and life safety requirements.	2018	$75,000/ year	Town Operating Budget	EMD
K	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant system at #003 "Christian lane draft site"	2018	$2,500 + regular maintenance	Town Budget, grant	Fire Chief
L	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant system at #005 "White Oak Pond draft site"	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief
M	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant system at #006 "Lewis Piper draft site	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief
N	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #001 "Curry Place draft site"	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief
O	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #004 "Overlook draft site"	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief
P	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #007, "Wolfberg draft site"	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief

ID	Hazard	Problem	Mitigation Actions	Time Frame	Anticipated Cost	Potential Funding	Responsible Party
Q	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #010 "Mountaineers draft site"	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief
R	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant at #021 "Marrer draft site"	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief
S	T'storm/ Lightning, Wildfire	As Holderness does not have a municipal water and hydrant system, alternative methods are needed to ensure that sufficient water is available to fight fires.	Construct dry hydrant or cistern at #022 "Sargent Road draft site"	2018	$2,500 + regular maintenance	Town Operating Budget, grant	Fire Chief

CHAPTER VI: PLAN ADOPTION AND MONITORING

A. IMPLEMENTATION

The Holderness 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 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 which involve either revisions to the Subdivision Regulations or development of regulations or standards, members of the Hazard Mitigation Committee will work with the Planning Board to develop appropriate language.

When appropriate, an effort will be made to incorporate this plan into the Emergency Operations Plan. Within a year after the town officially adopts the 2014 update to the Hazard Mitigation Plan, an attempt will be made to have hazard mitigation strategies integrated into these existing mechanisms and into all other ongoing town planning activities.

B. PLAN MAINTENANCE & PUBLIC INVOLVEMENT

The Holderness Hazard Mitigation Planning Committee and the Selectboard, in order to track progress and update the mitigation strategies identified in Chapter V - D & E, will review the Holderness Hazard Mitigation Plan every year or after a hazard event. Town of Holderness Emergency Management Director is responsible for initiating this review and needs to consult with members of the Holderness 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, a public hearing will be held to receive public comment on the Plan.

Maintenance and updating will be held during the annual review period and the final product adopted by the Selectboard. The Committee will meet annually as part of this plan maintenance.

The Emergency Management Director is also responsible for updating and resubmitting the plan to FEMA to be re-approved every five years. The EMD will convene a plan update committee in mid-2018 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 *Plymouth Record Enterprise*, *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 Ashland, New Hampton Center Harbor, Moultonborough, Sandwich, Campton, and Plymouth.

C. SIGNED CERTIFICATE OF ADOPTION

Town of Holderness, NH
Board of Selectmen

A RESOLUTION ADOPTING THE HOLDERNESS, NH HAZARD MITIGATION PLAN UPDATE 2014

WHEREAS, the town of Holderness has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of flooding, high winds, snow and ice storms, earthquake, and fire resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the town of Holderness has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its Hazard Mitigation Plan Update 2014 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held between July 2013 and February 2014 regarding the development and review of the Hazard Mitigation Plan Update **2014**; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the town of Holderness; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the town of Holderness, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the town of Holderness eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

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

IN WITNESS WHEREOF, **the undersigned has affixed his/her signature and the corporate seal of the Town Seal or Notary _____ Date: _____this ___ day of _____, *2014.***

Shelagh Connelly, Chairman _____

John W. Laverack, Jr, Vice Chair _____ Jill White _____

Peter Francesco _____ Samuel Brickley _____

APPENDIX A: TECHNICAL RESOURCES

NH Homeland Security and Emergency Management 271-2231
http://www.nh.gov/safety/divisions/HSEM/
Hazard Mitigation Section 271-2231
http://www.nh.gov/safety/divisions/hsem/HazardMitigation/index.html

Federal Emergency Management Agency ..... (617) 223-4175
http://www.fema.gov/
FEMA, National Flood Insurance Program, Community Status Book
http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book

NH Regional Planning Commissions:
Central NH Regional Planning Commission 796-2129
http://www.cnhrpc.org/
Lakes Region Regional Planning Commission 279-8171
http://www.lakesrpc.org/
Nashua Regional Planning Commission 883-0366
http://www.nashuarpc.org/
North Country Council 444-6303
http://www.nccouncil.org/
Rockingham Regional Planning Commission 778-0885
http://www.rpc-nh.org/
Southern New Hampshire Regional Planning Commission 669-4664
http://www.snhpc.org/
Southwest Regional Planning Commission 357-0557
http://www.swrpc.org/
Strafford Regional Planning Commission 742-2523
http://www.strafford.org/
Upper Valley Lake Sunapee Regional Planning Commission 448-1680
http://www.uvlsrpc.org/

NH Governor's Office of Energy and Planning 271-2155
http://www.nh.gov/oep/index.htm
New Hampshire Floodplain Management Program
http://www.nh.gov/oep/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 Resources and Economic Development 271-2411
http://www.dred.state.nh.us/
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 Holderness. The NH Homeland Security and Emergency Management Field Representative for Grafton 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

Emergency Watershed Protection (EWP) Program ..... USDA, Natural Resources Conservation Service

Flood Mitigation Assistance Program (FMAP) ..... NH Homeland Security and Emergency Management

Highway Safety Improvement Program……. NH Department of Transportation

Mitigation Assistance Planning (MAP) ..... NH Homeland Security and Emergency Management

Mutual Aid for Public Works ..... NH Municipal Association

National Flood Insurance Program (NFIP) ..... NH Office of Energy & Planning

Project Impact ..... NH Homeland Security and Emergency Management

Roadway Repair & Maintenance Program(s) ..... NH Department of Transportation

Shoreline Protection Program ..... NH Department of Environmental Services

Various Forest and Lands Program(s) ..... NH Department of Resources & Economic Development

Wetlands Programs ..... NH Department of Environmental Services

State Aid Bridge Program for Communities ..... NH Department of Transportation

Contribution to Damage Losses (RSA 235:34) ..... NH Department of Transportation

Federal Emergency Management Agency (FEMA)

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

Mitigation Funding Sources 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 Planning Grant (HMPG)	Provides grants to implement long-term hazard mitigation measures after a major disaster declaration http://www.fema.gov/government/grant/hmpg/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 (EPA)

The EPA makes funds available 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

Floodplain, Wetland and Watershed Protection Programs

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

Mitigation Funding Sources Program	Details	Notes
USACE Planning Assistance to States (PAS)	Fund plans for the development and conservation of water resources, dam safety, flood damage reduction and floodplain management. 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

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

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

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	Funds for soil conservation; flood prevention; conservation, development, utilization and disposal of	See website

Service Watershed Protection and Flood Prevention	water; and conservation and proper utilization of land. http://www.nrcs.usda.gov/programs/watershed/index.html	

Health and Economic Agencies

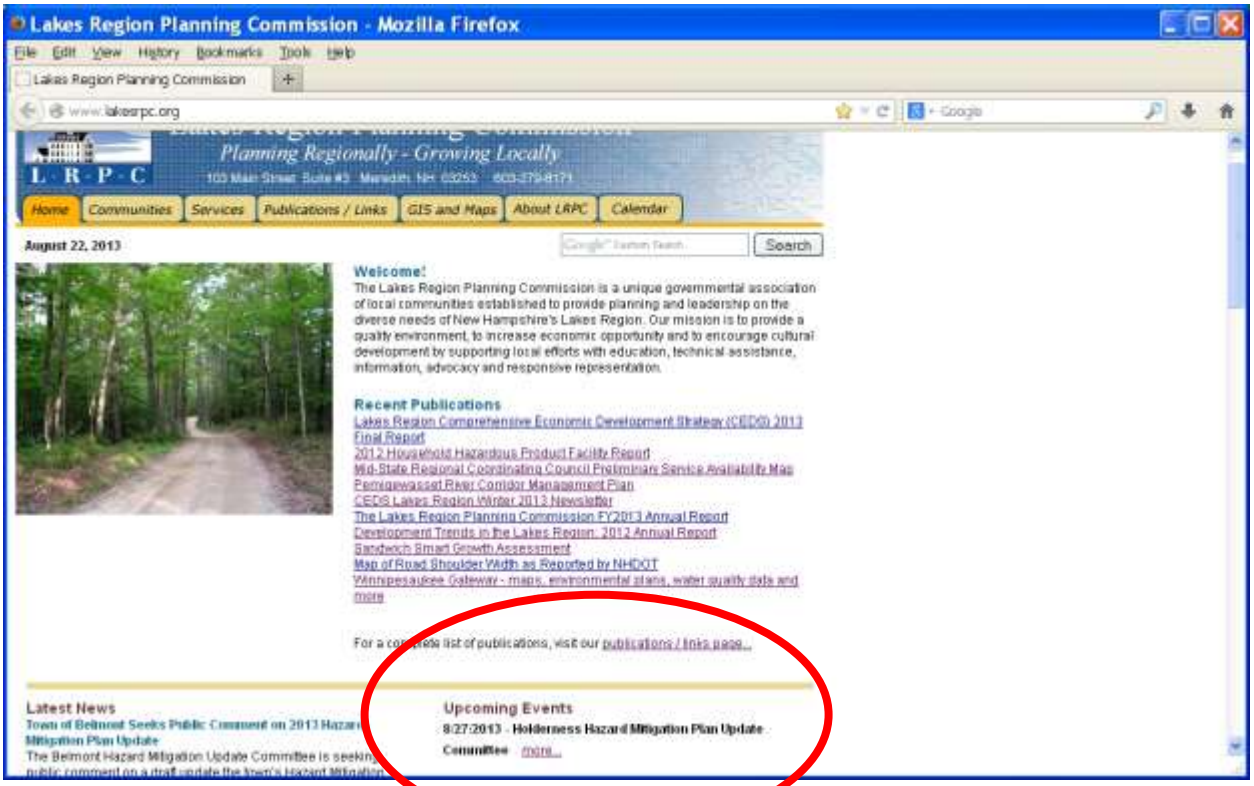
Alternative mitigation programs can be found through health and economic agencies that provide loans and grants aimed primarily at disaster relief.

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

APPENDIX C: PUBLICITY AND INFORMATION

Committee meetings were announced on the town of Holderness webpage calendar. Press releases similar to the one below were sent to the weekly *Plymouth Record Enterprise* and the local daily papers *Laconia Citizen* and *Laconia Daily Sun* prior to the Committee meetings. Several informational handouts and the 2008 Hazard Mitigation Plan were distributed to the committee and available at all meetings.

Lakes Region Planning Commission - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Lakes Region Planning Commission
www.lakesrpc.org
Recent Publications
2012 Household Hazardous Product Facility Report
Mid-State Regional Coordinating Council Preliminary Service Availability Map
Pemigewasset River Corridor Management Plan
CEDS Lakes Region Winter 2013 Newsletter
The Lakes Region Planning Commission FY2013 Annual Report
Development Trends in the Lakes Region: 2012 Annual Report
Sandwich Smart Growth Assessment
Map of Road Shoulder Width as Reported by NHDOT
Winnipesaukee Gateway - maps, environmental plans, water quality data and more
For a complete list of publications, visit our publications / links page...
Latest News
Lakes Region Broadband: Sector-Based Survey
Upcoming Events
7/31/2013 - Sanbornton Hazard Mitigation Plan
Meeting more...
7/31/2013 - Holderness Hazard Mitigation Plan
Meeting more...
The Holderness Hazard Mitigation Plan Committee is continuing the process of updating the town's 2008 Hazard Mitigation Plan. Committee members are focusing on the natural hazards that put Holderness at risk as well as the development of recommendations to protect the safety and well being of town residents. More information can be found in the full Press Release.


Lakes Region Planning Commission - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Lakes Region Planning Commission
www.lakesrpc.org
L·R·P·C
Planning Regionally - Growing Locally
Home
Communities
Services
Publications / Links
GIS and Maps
About LRPC
Calendar
August 22, 2013
Search
Welcome!
The Lakes Region Planning Commission is a unique governmental association of local communities established to provide planning and leadership on the diverse needs of New Hampshire's Lakes Region. Our mission is to provide a quality environment, to increase economic opportunity and to encourage cultural development by supporting local efforts with education, technical assistance, information, advocacy and responsive representation.
Recent Publications
Lakes Region Comprehensive Economic Development Strategy (CEDS) 2013 Final Report
2012 Household Hazardous Product Facility Report
Mid-State Regional Coordinating Council Preliminary Service Availability Map
Pemigewasset River Corridor Management Plan
CEDS Lakes Region Winter 2013 Newsletter
The Lakes Region Planning Commission FY2013 Annual Report
Development Trends in the Lakes Region: 2012 Annual Report
Sandwich Smart Growth Assessment
Map of Road Shoulder Width as Reported by NHDOT
Winnipesaukee Gateway - maps, environmental plans, water quality data and more
Latest News
Upcoming Events
8/27/2013 - Holderness Hazard Mitigation Plan Update
Committee more...

LAKES REGION PLANNING COMMISSION

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

July 22, 2013

For Immediate Release

Contact: David Jeffers, 279-8171, djeffers@lakesrpc.org

Town of Holderness Hazard Mitigation Plan Meeting

The Holderness Hazard Mitigation Plan Committee has begun the process of updating its 2008 Hazard Mitigation Plan. The committee, which is represented by Selectmen; the Town Administrator; the Police, Fire, and Highway Departments; the Town Library, and the Planning Board is reviewing the natural and manmade hazards that put Holderness at risk. They will update recommendations aimed at mitigating hazards and protecting the safety and well being of town residents. The committee will have its next meeting on July 31, 2013 at the Holderness Public Safety Building NH Route 3, Holderness, NH starting at 1:30 PM. Residents of Holderness and representatives from neighboring communities are encouraged to attend and provide input.

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 Holderness will be determined as a result of this process; in the last plan this included flooding, ice jams, high winds and lightning, motor vehicle accidents involving hazardous materials, ice storms, and wildfire. With the update to the Hazard Mitigation Plan, community leaders will be able to 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 Holderness one step closer to that goal.

For more information please call Walter Johnson, Holderness Emergency Management Director at 968-2145 or David Jeffers, Regional Planner, Lakes Region Planning Commission at 279-8171.

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

L · R · P · C

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.

State and Local Mitigation Planning

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.

FEMA "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."

Fact Sheet

State and Local Mitigation Planning

FEMA

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

APPENDIX D: MEETING AGENDAS AND NOTES

This section contains copies of the Committee meeting agendas, notes, and a summary of participation. All Committee meetings were held in the Holderness Public Safety Building. Agendas were developed by the LRPC planner and meetings were chaired by the Emergency Management Director. At each meeting there was opportunity for public input.

Holderness Hazard Mitigation Plan Update Committee

July 17, 2013 – 1:30 PM
Public Safety Building, NH Route 3
Holderness, NH

AGENDA

1. Introductions
2. What is Hazard Mitigation Planning?
    a. Mitigation planning vs. emergency response planning
    b. Why the need for an update? What has changed?
    c. Role of the HMP Update Committee
3. Review and update Community Goals
4. Discussion of Development Trends
5. Confirm and update Critical Facilities on 2008 map
6. Identify all hazards (past – especially since 2008 & potential) in Holderness and update the 2008 map
    a. What are the hazards?
    b. What is at risk from those hazards (structures, infrastructure, areas of town, populations)?
7. Set schedule for future meetings
8. Public Input

Goals for next meeting:

a. Risk Assessment, including data collection
b. Man-made hazards
c. Impact of hazards on Critical Facilities

Holderness Hazard Mitigation Plan Update Committee

July 31, 2013 – 1:30 PM
Public Safety Building, NH Route 3
Holderness, NH

AGENDA

1. Introductions
2. Review and update Community Goals
3. Review of map
4. Impact of hazards on the town
    a. Flood data
    b. Average structural values
    c. Critical Facilities
5. Set schedule for future meetings
6. Public Input

Goals for next meeting:

a. Status of 2008 recommendations
b. Gaps

Holderness Hazard Mitigation Plan Update Committee

August 27, 2013 – 1:30 PM
Public Safety Building, NH Route 3
Holderness, NH

AGENDA

1. Introductions
2. Risk Assessment
    a. Problem Statements (Gaps)
3. Mitigation Strategy
    a. Mitigation Ideas
    b. Types of Mitigation Actions
    c. Benefits and costs
4. Set schedule for future meetings
5. Public Input

Goals for next meeting:
- Action Prioritization

Holderness Hazard Mitigation Plan Update Committee

September 17, 2013 – 1:30 PM
Public Safety Building, NH Route 3
Holderness, NH

AGENDA

1. Introductions
2. Risk Assessment
    a. Review Problem Statements (Gaps)
3. Review of Mitigation Actions
    a. Addressing multiple types of mitigation actions
    b. Identified benefits and costs
4. Prioritization of Mitigation Actions
5. Implementation of Mitigation Actions
6. Set schedule for future meetings
7. Public Input

Goals for next meeting:
- Review of Draft Plan

Holderness Hazard Mitigation Plan (HMP) Update Committee
Meeting Notes
July 31, 2013

In Attendance:

Walter Johnson	Town Administrator, Emergency Management Director
Eleanor Marden	Fire Department
Peter Webster	Board of Selectmen
Victoria Lang	Library Director
Paul Hatch	NH HSEM Field Representative
David Jeffers	Lakes Region Planning Commission (LRPC)

After Introductions, the committee reviewed the Community Goals, determining that there was not a need to adjust the 2007 Goals at this time.

Committee members also reviewed the updated HMP map.

- Update the dams layer
- Show the marina at the bridge
- Clarify overlapping symbols
- Add trails and road names
- Identify the Cotton Mountain trail and Livermore Falls

There was discussion of the potential impacts on the town of various hazards, especially flooding in light of the NFIP insurance policies, repetitive floods, the average structural values of properties in town, and the value of the town's critical facilities.

- It was noted that the Planning Board has been working with property owners in the Pemigewasset River floodplain to come into greater compliance with the town's Floodplain Ordinance, reducing the likely impacts of future flooding events. The Board has also communicated with the State Floodplain Management Coordinator on this issue.
- D. Jeffers pointed out that National Flood Insurance Program (NFIP) records indicate that several properties covered by the NFIP suffered repetitive losses in the 1980s but none since then. Committee members commented that this is likely due to businesses utilizing private flood insurance.
- The Committee completed a matrix rating the potential impact of various hazards on the town's critical facilities. The rating terms of Low, Moderate and High were defined in terms of the amount of structural damage, the town's ability to respond, and whether outside assistance would be needed.

The Committee also reviewed the status of the recommended actions in the 2008 Hazard Mitigation Plan. Committee members discussed whether each action had been completed and if not, whether it is still pertinent.

Next meeting: 8/27/13 at 1:30 PM in the Holderness Fire Station Meeting Room. The public is encouraged to attend and participate.

Holderness Hazard Mitigation Plan (HMP) Update Committee
Meeting Notes
August 27, 2013

In Attendance:

Walter Johnson	Holderness Town Administrator, Emergency Management Director
J.W. Laverack	Holderness Board of Selectman
Eleanor Marden	Holderness Fire Department
Kevin M. Coburn	Holderness Highway Department
Paul Hatch	NH HSEM Field Representative
David Jeffers	Lakes Region Planning Commission (LRPC)

The draft notes from the July 31, 2013 meeting were reviewed and corrected to indicate that Chief Partridge from the Holderness Police Department participated in the meeting.

The committee again reviewed the Community Goals, determining that there was not a need to adjust the 2007 Goals at this time.

Committee members reviewed and edited a table indicating the impact of various hazards on the town's critical facilities.

- This included a discussion regarding the definition of the rankings used
- The PSU Fieldhouse and Ice Rink should be rated separately due to their physical properties and uses (the Fieldhouse can serve as a shelter).

Committee members reviewed and completed a table summarizing the significance of various hazards to the town of Holderness.

- For each hazard, its location, extent, and probability of occurrence were evaluated on a four-point scale.
- This included a discussion regarding the definition of the rankings used.
- Based on these parameters, the most significant hazards for the town of Holderness were determined to be Blizzard/Snow Storm, Nor'easter, and Pandemic.

The Committee reviewed and made minor updates to the current status of the 2008 mitigation actions.

The Committee was asked to identify any gaps - areas where some sort of steps might be taken to mitigate a hazardous situation.

- A couple of sections of roadway that are susceptible to flooding were discussed.

A sheet describing four types of mitigation action along with some examples of these actions was distributed to committee members and they were asked to consider these for the next meeting.

Next meeting: 9/17/13 at 1:30 PM in the Holderness Fire Station Meeting Room. The public is encouraged to attend and participate.

Committee Member	Position	7/17/13	7/31/13	8/27/13	9/17/13
Walter Johnson	Holderness Town Administrator and EMD	X	X	X	X
J. W. Laverack	Holderness Selectman	X		X	X
Peter Webster	Holderness Selectman	X	X		X
Barry Tanner	Holderness Police Lieutenant	X			
Eleanor Marden	Holderness Fire Chief	X	X	X	X
Kevin M. Coburn	Holderness Public Works	X		X	
Earl Hansen	Holderness Planning Board	X			X
Victoria Lang	Holderness Library	X	X		
Jeremiah Partridge	Holderness Police Chief			X	
Paul Hatch	NH HSEM	X	X	X	
David Jeffers	Regional Planner	X	X	X	X

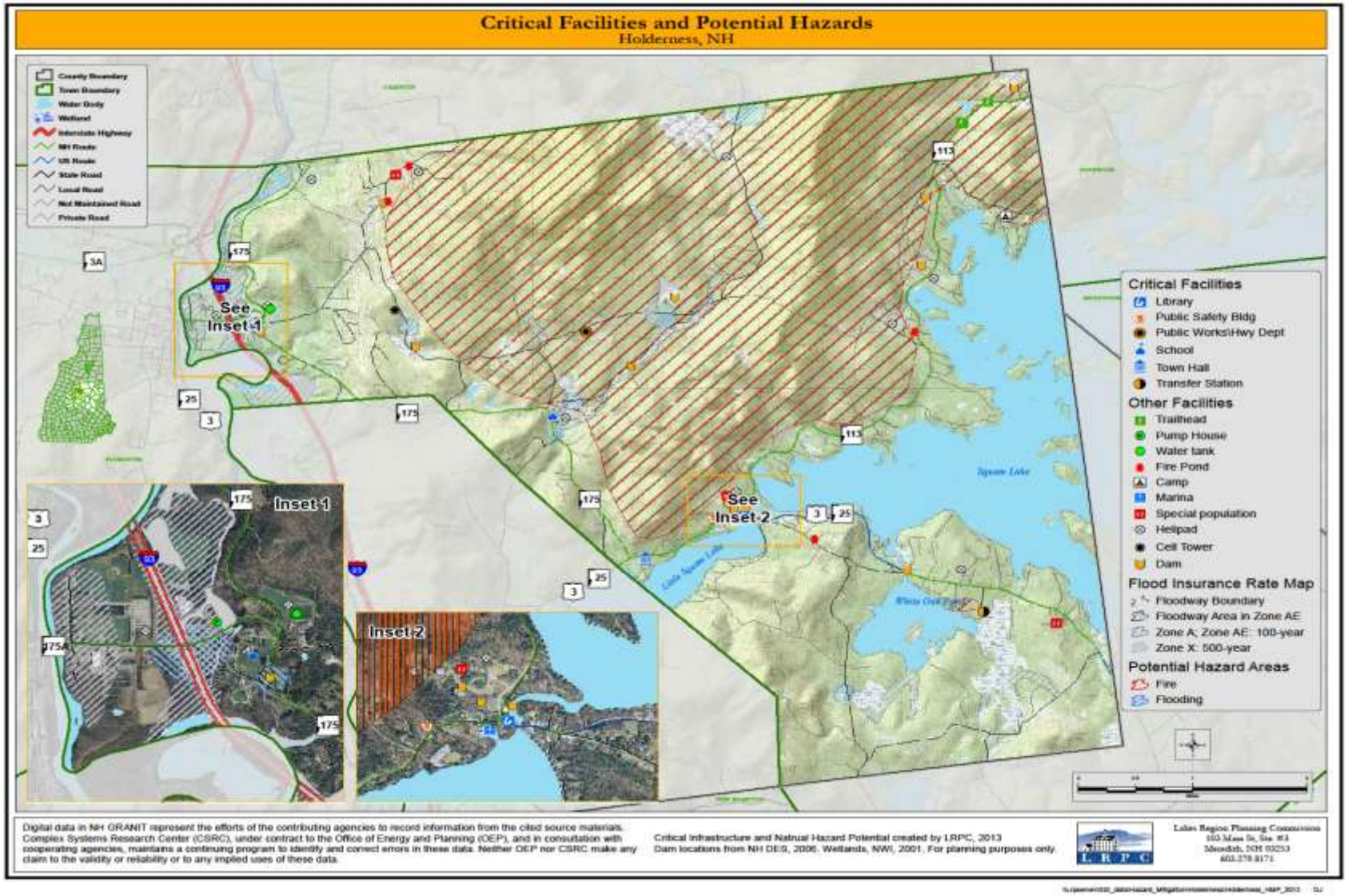
APPENDIX E: HAZARD EVENTS PRIOR TO 2008

Hazard	Date	Location	Impacts/Assessment
Tornado	July 14, 1963	Grafton County	F1
Tornado	June 27, 1964	Grafton County	F0
Tornado	August 11, 1966	Grafton County	F2
Tornado	August 25, 1969	Grafton County	F1
Tornado	July 21, 1972	Grafton County	F1
Tornado	July 21, 1972	Grafton County	F1
Tornado	May 11, 1973	Grafton County	F2
Tornado	June 11, 1973	Grafton County	F0
Downburst	July 6, 1999	Grafton and Carroll County	Large macroburst in Moultonborough affecting surrounding region.
Drought	1929-1936	Statewide	Regional
Drought	1939-1944	Statewide	Sever in Southeast
Drought	1947-1950	Statewide	Moderate
Drought	1960-1969	Statewide	Longest record continuous period of below normal precipitation.
Drought	June 1, 1999	Statewide	Governor's Office declaration moderate drought for most of the state.
Earthquake	December 24, 1940	Carroll County	5.5 - felt over 400,000 square miles. Severe damage.
Earthquake	January 18, 1982	Sanbornton, NH	Gaza Corners had a 4.5 quake felt throughout the state.
Earthquake	March 21, 2007	Holderness	Epicenter on slopes of Mount Morgan. 2.7 on Richter scale. Tremors felt in Holderness, Ashland, and Campton.
Flood	July 4, 1973	Grafton County	Fourteen bridges and many roadways were damaged totaling $171,000. In Holderness, US Route 3, Hardhack Road were flooded.
Flood	July 1, 1986 - August 10, 1986	Statewide	Severe summer storms with heavy rains, flash flooding and severe high winds
Flood	August 7-11, 1990	Statewide	Wide spread flooding, a series of storm events with moderate to heavy rains
Flood	October 1, 1996	Grafton County	Heavy Rains
Flood	October - November 1995	Grafton County	Heavy Rains
Flood	September 12, 2003	Statewide	Severe storms and flooding
Flood	October 26, 2005	Statewide	Severe storms and flooding
Flood	May, 12 - June 30, 2006	Statewide	Severe storms and flooding
Forest Fire	1978	Holderness	Burned Rattlesnake Mountain
Forest Fire	August 9, 2001	Holderness	Livermore - Fire caused by lightning burned 0.75 acres.
Hurricane	1938	Statewide	Severe storms, flooding along Pemigewasset River
Hurricane	September 9, 1991	Statewide	Hurricane Bob, severe storms
Hurricane	September 18- 19, 1999	Grafton County	Heavy Rains associated with tropical storms, Hurricane Floyd affected the area.

Hazard	Date	Location	Impacts/Assessment
Blizzard	March 16, 1993	Statewide	High winds and record snowfall
Ice Storm	January 7, 1998	Statewide	In Grafton County there was moderate to severe conditions. 52 communities in county were impacted, six injuries and one fatality, major roads closures, 67,586 with our electricity, 2,310 with out phone service, one communication tower, 17 million dollars of damages.
Nor'easter	April 27, 2007	Statewide	Nor'easter caused flooding, damage in excess of $29 million as of October 1, 2007.
Snow Storm	December 1, 1973	Grafton County	Two back-to-back snow storms
Snow Storm	February 6, 2001	Grafton County	Accumulation of 34 inches
Snow Storm	March 16, 1993	Statewide	
Snow Storm	March 30, 2005	Statewide	$6.5 million in public assistance
Snow Storm	January 15, 2004	Statewide	
Snow Storm	March 28, 2001	Statewide	

Table Sources:
1 = http://www.tornadoproject.com
2 = New Hampshire Homeland Security and Emergency Management (NHHSEM)
3 = National Oceanic and Atmospheric Administration (NOAA)
4 = National transportation Safety Board (NTSB)
5 = Federal Emergency Management Agency (FEMA)
6 = Northeast States Emergency Consortium (NESEC)
7 = National Interagency Fire Center (NIFC)

APPENDIX F: CRITICAL FACILITIES & POTENTIAL HAZARDS MAP



APPENDIX G: HAZARDS – SUPPLEMENTARY HAZARD INFORMATION

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

I. FLOOD, WILDFIRE, DROUGHT

Flooding

Historically, the state's two largest floods occurred in 1936 and 1938. The 1936 flood was associated with snow melt and heavy precipitation. The 1938 flooding was caused by the Great New England Hurricane of 1938. Those floods prompted the construction of a series of flood control dams throughout New England, built in the 1950s and '60s. They continue to be operated by the US Army Corps of Engineers.[46]

A series of floods in New Hampshire began in October 2005 with a flood that primarily affected the southwest corner of the state and devastated the town of Alstead. The flood killed seven people. It was followed by floods in May 2006 and April 2007 and a series of floods during the late summer and early fall of 2008. The most recent flooding in the region was aassociated with Tropical Storm Irene in September 2011.

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

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

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

Flooding due to Dam Failure

Dam failure results in rapid loss of water that is normally held back by a dam. These types of floods can be extremely dangerous and pose a threat to both life and property. Dam classifications in New Hampshire are based on the degree of potential damages that a failure or disoperation of the dam is

[46] http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html date visited: January 18, 2011

expected to cause. The classifications are designated as non-menace, low hazard, significant hazard, and high hazard and are summarized in greater detail in Table G-1.

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

Table G-1: New Hampshire Dam Classifications[47]

Classification	Description
Non-Menace	A dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property, provided the dam is: • 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	A dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following: • No possible loss of life. • Low economic loss to structures or property. • Structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services. • The release of liquid industrial, agricultural, or commercial wastes, septage, or 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	A dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following: • 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	A dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as a result of: • 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.

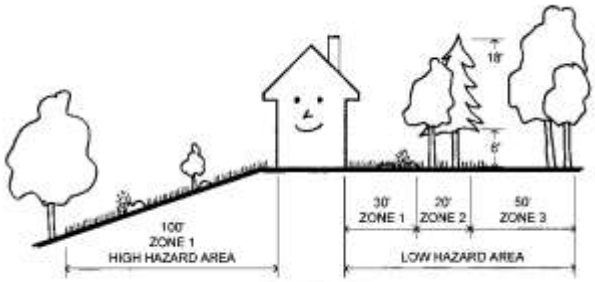
[47] NH DES Fact Sheet WD-DB-15 "Classification of Dams in New Hampshire", http://des.nh.gov/organization/commissioner/pip/factsheets/db/documents/db-15.pdf. Accessed October 1, 2012.

Wildfire

Several areas in the region are relatively remote in terms of access and fire fighting 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 fire fighting 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. While historically massive wildfires have been western phenomena, each year hundreds of woodland acres burn in New Hampshire. The greatest risk exists in the spring when the snow has melted and before the tree canopy has developed, and in the late summer – early fall. Appropriate planning can significantly reduce a community's vulnerability for woodland fires. There are four-zone suggestions from the Firewise community program that could be potentially helpful homeowners in Holderness.[48]

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.



FIREZONES

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

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

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

Conflagration

Conflagration is an extensive, destructive fire in a populated area that endangers lives and affects multiple buildings. Historically, many New Hampshire towns were settled in areas along waterways in order to power the mills. Often the town centers were at a low point in the topography, resulting in dense residential development on the steeper surrounding hillsides. Hillsides provide a natural updraft that makes fire

Alton Bay Christian Conference Center, 2009

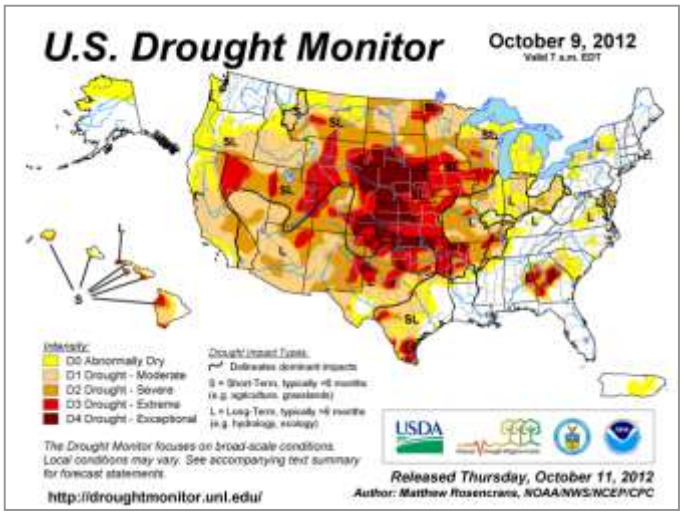
[48] http://www.firewise.org accessed September 21, 2012.

fighting more difficult. In particular, structural fires spread more readily in hillside developments because burning buildings pre-heat the structures that are situated above them.

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

Drought

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 rain/snowfall, increased rates of evaporation, and increased water usage. New Hampshire generally receives adequate rainfall; it is rare that the state experiences extended periods of below normal water supplies.



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. There have been five extended droughts in New Hampshire in the past century: 1929 – 1936, 1939 – 1944, 1947 – 1950, 1960 – 1969, and 2001 – 2002.[49] While much of the country experienced drought conditions in 2012, New Hampshire received adequate precipitation.[50]

II. GEOLOGICAL HAZARDS

Earthquake

Notable New Hampshire earthquakes are listed in Table G-2 with the extent of the hazard expressed in the Modified Mercalli Intensity scale and the Richter Magnitude.[51]

Table G-2: NH Earthquakes of magnitude or intensity 4 or greater (1638-2007).

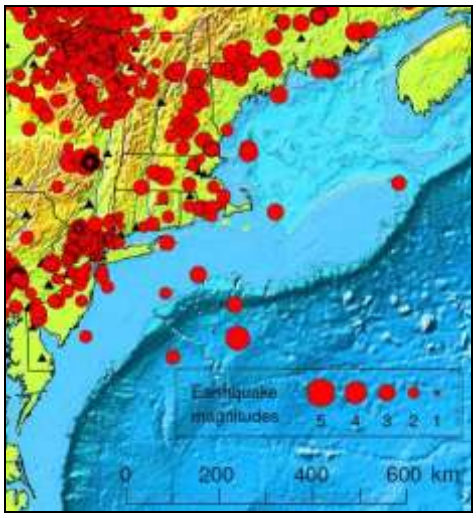
Location	Date	MMIntensity	Magnitude
Ossipee	December 24, 1940	7	5.5
Ossipee	December 20, 1940	7	5.5
Ossipee	October 9, 1925	6	4

[49] http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf visited February 8, 2011.
[50] US Drought Monitor http://droughtmonitor.unl.edu/. Accessed October 9, 2012.
[51] http://earthquake.usgs.gov/learn/topics/mag_vs_int.php, visited June 8, 2012.

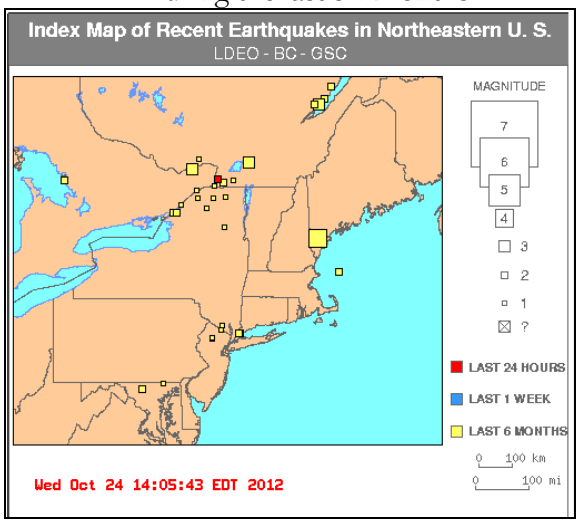
Location	Date	MMIntensity	Magnitude
Laconia	November 10, 1936	5	-
New Ipswich	March 18, 1926	5	-
Lebanon	March 5, 1905	5	-
Rockingham County	August 30, 1905	5	-
Concord	December 19, 1882	5	-
Exeter	November 28, 1852	5	-
Portsmouth	November 10, 1810	5	4
Off Hampton	July 23, 1823	4	4.1
15km SE of Berlin	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

Earthquakes in the Northeast[52]

1990 – 2010



During the last six months



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.

According to the NH Division of Homeland Security and Emergency Management, some of the issues likely to be encountered after a damaging earthquake could be:

- Total or partial collapse of buildings, especially un-reinforced masonry structures and those not built to seismic codes.
- Damage to roads and bridges from ground settlement and structural damage.
- Mass Causalities.

[52] Lamont-Doherty Cooperative Seismic Network http://www.ldeo.columbia.edu/LCSN/index.php, accessed October 24, 2012

- Loss of electric power.
- Loss of telecommunication systems.
- Fires from gas line ruptures and chimney failures.
- Total or partial loss of potable and fire fighting water systems from pipe ruptures.
- Hazardous Material incidences.
- Loss of critical capabilities from structural and nonstructural damages.
- Lack of mutual aid support.

The NH HSEM also notes that a "cascade of disasters" typically occurs after a damaging earthquake. For example:

- Damage to gas lines and chimneys result in fires that are difficult to extinguish due to damage to the road, water systems, fire and police stations.
- Structural and Nonstructural damage cause many injuries, but because of damage to health care facilities and emergency response facilities, there is a slow or nonexistent response.
- Responders are slowed in their response because of Hazardous Material incidents.
- Flooding due to dam failures.

Landslide

A landslide is 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. Landslides may be formed when a layer of soil atop a slope becomes saturated by significant precipitation and slides along a more cohesive layer of soil or rock. Seismic activity may play a role in the mass movement of landforms also. Although New Hampshire is mountainous, it consists largely of relatively old geologic formations that have been worn by the forces of nature for eons. Consequently, much of the landscape is relatively stable and the exposure to this hazard type is generally limited to areas in the north and north central portion of the state. Formations of sedimentary deposits and along the Connecticut and Merrimack Rivers also create potential landslide conditions.

Although the overall vulnerability for landslides in the state is low, there is considerable terrain susceptible to landslide action. This was exemplified in May of 2003 when the Old Man of the Mountain collapsed. The continuous action of freezing and thawing of moisture in rock fissures causes it to split and separate. This action occurs frequently on the steeply sloped areas of the state, increasing the risk of landslides. In addition to being susceptible to this freeze/thaw process, the Ossipee Mountain Range, Squam Range, and other mountains throughout the Lakes Region are also close to seismic faults and at risk to increased pressure to development. Consideration must be given to the vulnerability of man-made structures in these areas due to seismic- and/or soils saturation-induced landslide activity. Landslide activities are also often attributed to other hazard events. For example, during a recent flood event, a death occurred when a mass of saturated soil collapsed. This death was attributed to the declared flood event.[53] Also, during the 2007 Nor'easter a landslide occurred in Milton, NH resulting in the temporary closure of NH Route 101.

III. Severe Wind

The Lakes Region is at risk of several types of natural events associated with high winds, including nor'easters, downbursts, hurricanes and tornadoes. The northeast is located in a zone that should be

[53] http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html visited February 8, 2011.

built to withstand 160 mile an hour wind gusts. A large portion of the northeast, including the Lakes Region, is in a designated hurricane susceptible region.

Tornado/Downburst

Although tornadoes are locally produced, damage paths can be in excess of one mile wide and 50 miles long.[54] The Fujita Scale is used to measure the intensity of a tornado (or downburst) by examining the damage caused in the aftermath, shown in Table G-3.[55] An F2 tornado ripped through a 50-mile section of central NH in July of 2008 from Epsom to Ossipee leading to requests for federal disaster declarations in several counties.[56]

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 4-6 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.

Hail

High winds can bring down limbs and trees, knocking out electricity and blocking roads. Hail can cause damage to crops and structural damage to vehicles. Hail is measured by the TORRO intensity scale, shown in Table G-3. Although hailstorms are not particularly common in the Lakes Region, which averages fewer than two hailstorms per year, several have occurred in New Hampshire in the last decade. In 2007 and 2008 nearby Laconia experienced hail storms with no resulting damage, though reported hail sizes were as large as 1.25 inches (H4).

Table G-3: TORRO Hailstorm Intensity Scale

Code	Diameter	Description	Typical Damage
H0	5-9 mm*	Pea	No damage
H1	10-15 mm	Mothball	Slight damage to plants, crops
H2	16-20 mm	Marble, grape	Significant damage to fruit, crops, vegetation
H3	21-30 mm	Walnut	Severe damage to fruit/crops, damage to glass/plastic structures, paint & wood scored
H4	31-40 mm	Pigeon's egg	Widespread glass damage, vehicle bodywork damage
H5	41-50 mm	Golf ball	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	51-60 mm	Hen's egg	Aircraft bodywork dented, brick walls pitted
H7	61-75 mm	Tennis ball	Severe roof damage, risk of serious injuries
H8	76-90 mm	Large orange	Severe damage to aircraft bodywork
H9	91-100 mm	Grapefruit	Extensive structural damage. Risk of severe or fatal injuries to exposed persons
H10	>100 mm	Melon	Extensive structural damage. Risk of severe or fatal injuries to exposed persons

***mm** = millimeters (Approximate range since other factors (e.g. number, density of hailstones, hail fall speed, surface wind speed) affect severity
Source: http://www.torro.org.uk/torro/severeweather/hailscale.php

[54] FEMA Hazards: Tornadoes http://www.fema.gov/business/guide/section3e.shtm, visited February 8, 2011.
[55] http://www.tornadoproject.com/fscale/fscale.htm visited March 8, 2011.
[56] http://www.fema.gov/news/newsrelease.fema?id=45525 visited March 8, 2011.

APPENDIX H: PRIORITIZATION DETAILS

As the Committee began the process of prioritizing these actions, the group considered the standard tool for project prioritization, the STAPLEE Method and agreed that the tool could be expanded to more accurately reflect the priorities of the town. In addition to the standard STAPLEE categories (Social, Technical, Administrative, Political, Economic, and Environmental), the committee considered whether a particular action impacted Life Safety and Protected Property within Holderness, as well as whether there was a Local Champion for the project and whether the action augmented other Local Objectives. The STAPLEE term "Economic" was changed to "Cost".

This section contains a summary of rankings for each of the proposed Mitigation Actions by the Holderness Hazard Mitigation Committee. For each action, the benefits and costs of implementing the action (under each of the eleven categories) was considered and scored -1, 0, 1 with a 'minus one' indicating that the costs outweighed the benefits in a particular category, a 'one' meant that the benefits were greater that the costs, and a 'zero' meant that the while there are costs associated with the project, they are balanced out by the benefits. The eleven category scores were summed for an overall project total. A maximum total score is 11, the minimum is -11. Actual results ranged from 9 to -1. Where the Total Score of two or more Actions is the same, they are ordered based the most beneficial Cost and Property Protection scores. Similar ID colors indicate that the Actions address similar Problems. These ratings were arrived at through committee discussion and group consensus.

Scoring: 1 = Highly effective of feasible, 0 = Neutral, -1 = Ineffective or not feasible			Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Objectives	Cost	**Total**
ID	**Hazard**	**Holderness: Proposed Mitigation Actions**												
KK	All	Continue to work with the Department of Safety, 911 Mapping Bureau to fix known problems with GIS road data to limit confusion in emergency planning and emergency response.	1	1	1	1	1	1	1	1	1	0	0	**9**
W	T'storm/ Lightning, Wildfire	Implement program to provide training to Emergency Services personnel in how to reduce and address fire, flooding, and civil disturbance issues.	1	1	1	1	1	1	1	1	0	0	0	**8**
EE	All	Purchase communications equipment for Town Hall/EOC.	1	1	1	1	0	0	1	1	1	1	0	**8**

Scoring: 1 = Highly effective of feasible, 0 = Neutral, -1 = Ineffective or not feasible			Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Objectives	Cost	**Total**
HH	All	Develop a policy to request free municipal access on any towers to enhance municipal communications.	1	1	1	1	1	1	1	1	0	0	0	**8**
JJ	All	Acquire repeater for town to establish better communication.	1	1	1	1	1	1	1	1	0	0	0	**8**
MM	All	Consider adopting this Hazard Mitigation Plan as a chapter of the Master Plan.	1	1	1	1	1	1	1	1	0	0	0	**8**
G	All	Construct a Public Safety Substation for the Fire & Police Departments at the Holderness School, including a generator.	1	1	1	0	1	1	1	1	0	0	0	**7**
YY	All	Include in the plan submission sections of both site plan and subdivision regulations a reference to the Hazard Mitigation Plan, and require the applicant to articulate how the proposal complies with the standards of the plan and achieves a "no adverse impact" status as it relates to emergency situations.	1	1	1	1	1	1	0	1	0	0	0	**7**
E	All	Obtain shelter designation for Holderness Prep School	1	0	1	1	1	1	1	1	0	0	0	**7**
F	All	Obtain shelter necessities. [cots, blankets, towels, etc.]	1	0	1	1	1	1	1	1	0	0	0	**7**
b	Flood	NH Route 113 floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	1	1	1	1	1	0	1	1	1	0	-1	**7**
H	T'storm/ Lightning, Wildfire	Install a cistern at Beede Road: #020 Carr Brook draft site	1	1	1	1	1	1	1	1	0	0	-1	**7**
I	T'storm/ Lightning, Wildfire	Install a cistern at #008 E. Holderness Rd. draft site	1	1	1	1	1	1	1	1	0	0	-1	**7**

Scoring: 1 = Highly effective of feasible, 0 = Neutral, -1 = Ineffective or not feasible			Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Objectives	Cost	**Total**
a	Flood	Lower Perch Pond Road floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	1	1	1	1	1	1	1	1	0	0	-1	**7**
d	All	Work with homeowners or homeowner associations to ensure that private roads are kept clear for access by emergency vehicles.	1	1	1	1	0	1	1	1	0	0	-1	**6**
c	All	Partner with Grafton County to utilize the Code Red telephone and internet communication alert system.	1	1	1	0	0	1	0	0	0	0	0	**4**
J	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #002 "Squam Boat draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
K	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #003 "Christain lane draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
L	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #005 "White Oak Pond draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
M	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #006 "Lewis Piper draft site	0	0	0	0	0	0	0	0	0	0	0	**0**
N	T'storm/ Lightning, Wildfire	Construct dry hydrant at #001 "Curry Place draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
O	T'storm/ Lightning, Wildfire	Construct dry hydrant at #004 "Overlook draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
P	T'storm/ Lightning, Wildfire	Construct dry hydrant at #007, "Wolfberg draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**

Scoring: 1 = Highly effective of feasible, 0 = Neutral, -1 = Ineffective or not feasible			Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Objectives	Cost	**Total**
Q	T'storm/ Lightning, Wildfire	Construct dry hydrant at #010 "Mountaineers draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
R	T'storm/ Lightning, Wildfire	Construct dry hydrant at #021 "Marrer draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
S	T'storm/ Lightning, Wildfire	Construct dry hydrant or cistern at #022 "Sargent Road draft site"	0	0	0	0	0	0	0	0	0	0	0	**0**
VV	All	Adopt Building Codes to include sprinkler and life safety requirements.	1	1	0	-1	-1	1	0	-1	0	0	-1	**-1**

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

Holderness Hazard Mitigation Plan, 2008
Holderness Master Plan, 2007
Holderness Zoning Ordinance
Holderness Subdivision Regulations
Holderness Site Plan Regulations
Town of Holderness Flood Mitigation Plan, 2001
Holderness Emergency Operations Plan, 2013
"Development Activity in the Lakes Region, 2011 Annual Report", Lakes Region Planning Commission.
FEMA Community Information System
Holderness Assessor Database, 2013
State of New Hampshire Multi-Hazard Mitigation Plan, Update 2013
National Oceanic and Atmospheric Administration website, http://www.ncdc.noaa.gov/
NH Division of Forests and Lands http://www.nhdfl.org/fire-control-and-law-enforcement/fire-statistics.aspx
NH Department of Transportation Traffic Volume Reports, http://www.nh.gov/dot/org/operations/traffic/tvr/locations/index.htm

APPENDIX J: MONITOR, EVALUATE, & UPDATE

Table A: Periodic Hazard Mitigation Plan Review Record

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

Table B: Project Implementation Checklist

ID	Hazard	Mitigation Actions	Responsible Party	Potential Funding	Time Frame	Status 2015	Status 2016	Status 2017	Status 2018
JJ	All	Acquire repeater for town to establish better communication.	EMD	HSEM	2014				
OO	All	Purchase generator for Town Hall/EOC.	EMD	HSEM & Town Budget	2014				
b	All	Partner with Grafton County to utilize the Code Red telephone and internet communication alert system.	EMD	Town Operating Budget	2014				
E	All	Obtain shelter designation for Holderness Prep School	EMD	Town Operating Budget	2014				
W	T'storm/ Lightning, Wildfire	Implement program to provide training to Emergency Services personnel in how to reduce and address fire, flooding, and civil disturbance issues.	EMD	FEMA	2014, '15, '16, '17, '18				
c	All	Work with homeowners or homeowner associations to ensure that private roads are kept clear for access by emergency vehicles.	EMD & PB	Town Operating Budget	2014, '15, '16, '17, '18				
KK	All	Continue to work with the Department of Safety, 911 Mapping Bureau to fix known problems with GIS road data to limit confusion in emergency planning and emergency response.	EMD	Town Operating Budget	2014, '15, '16, '17, '18				
EE	All	Purchase communications equipment for Town Hall/EOC.	EMD	FEMA	2015				
a	Flood	Lower Perch Pond Road floods due to a low roadbed. Raising the roadbed and adding larger culverts could reduce the likelihood of flooding.	DPW	Town Budget, HMPG	2015				
HH	All	Develop a policy to request free municipal access on any towers to enhance municipal communications.	EMD, PB	Town Operating Budget	2015				

ID	Hazard	Mitigation Actions	Responsible Party	Potential Funding	Time Frame	Status 2015	Status 2016	Status 2017	Status 2018
YY	All	Include in the plan submission sections of both site plan and subdivision regulations a reference to the Hazard Mitigation Plan, and require the applicant to articulate how the proposal complies with the standards of the plan and achieves a "no adverse impact" status as it relates to emergency situations.	EMD & PB	Town Operating Budget	2015				
G	All	Construct a Public Safety Substation for the Fire & Police Departments at the Holderness School, including a generator.	EMD	Town Operating Budget	2015				
MM	All	Consider adopting this Hazard Mitigation Plan as a chapter of the Master Plan.	EMD & PB	Town Operating Budget	2017				
F	All	Obtain shelter necessities. [cots, blankets, towels, etc.]	EMD	Town Operating Budget	2018				
H	T'storm/ Lightning, Wildfire	Install a cistern at Beede Road: #020 Carr Brook draft site	Fire Chief	HMPG	2018				
I	T'storm/ Lightning, Wildfire	Install a cistern at #008 E. Holderness Rd. draft site	Fire Chief	HMPG	2018				
d	Flood	NH Route 113 floods due to a low roadbed. Raising the the roadbed and adding larger culverts could reduce the likelihood of flooding.	DPW	NHDOT, HMPG, Town Budget	2018				
VV	All	Adopt Building Codes to include sprinkler and life safety requirements.	EMD	Town Operating Budget	2018				
K	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #003 "Christain lane draft site"	Fire Chief	Town Budget, grant	2018				

ID	Hazard	Mitigation Actions	Responsible Party	Potential Funding	Time Frame	Status 2015	Status 2016	Status 2017	Status 2018
L	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #005 "White Oak Pond draft site"	Fire Chief	Town Budget, grant	2018				
M	T'storm/ Lightning, Wildfire	Construct dry hydrant system at #006 "Lewis Piper draft site	Fire Chief	Town Budget, grant	2018				
N	T'storm/ Lightning, Wildfire	Construct dry hydrant at #001 "Curry Place draft site"	Fire Chief	Town Budget, grant	2018				
O	T'storm/ Lightning, Wildfire	Construct dry hydrant at #004 "Overlook draft site"	Fire Chief	Town Budget, grant	2018				
P	T'storm/ Lightning, Wildfire	Construct dry hydrant at #007, "Wolfberg draft site"	Fire Chief	Town Budget, grant	2018				
Q	T'storm/ Lightning, Wildfire	Construct dry hydrant at #010 "Mountaineers draft site"	Fire Chief	Town Budget, grant	2018				
R	T'storm/ Lightning, Wildfire	Construct dry hydrant at #021 "Marrer draft site"	Fire Chief	Town Budget, grant	2018				
S	T'storm/ Lightning, Wildfire	Construct dry hydrant or cistern at #022 "Sargent Road draft site"	Fire Chief	Town Budget, grant	2018				

APPENDIX K: FEMA WEBLIOGRAPHY

DISASTERS AND NATURAL HAZARDS INFORMATION

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

FLOOD RELATED HAZARDS

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

FIRE RELATED HAZARDS

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

GEOLOGIC RELATED HAZARDS

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

2012 Maine earthquake	http://www.huffingtonpost.com/2012/10/17/maine-earthquake-2012-new-england_n_1972555.html

WIND-RELATED HAZARDS

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

GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND MAPPING

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

DETERMINING RISK AND VULNERABILITY

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

DATA GATHERING

National Information Sharing Consortium (NISC): brings together data owners, custodians, and users in the fields of homeland security, public safety, and emergency management and response. Members leverage efforts related to the governance, development, and sharing of situational awareness and incident management resources, tools, and best practices	http://nisconsortium.org/

The Hydrologic Engineering Center (HEC), an organization within the Institute for Water Resources, is the designated Center of Expertise for the US Army Corps of Engineers	http://www.hec.usace.army.mil/
National Water & Climate Center	http://www.wcc.nrcs.usda.gov/
WinTR-55 Watershed Hydrology	http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?&cid=stelprdb1042901
USACE Hydrologic Engineering Center (HEC)	http://www.hec.usace.army.mil/software/
Stormwater Manager's Resource Center SMRC	http://www.stormwatercenter.net
USGS Current Water Data for the Nation	http://waterdata.usgs.gov/nwis/rt
USGS Water Data for the Nation	http://waterdata.usgs.gov/nwis /
Topography Maps and Aerial photos	http://www.terraserver.com/view.asp?tid=142
National Register of Historic Places	http://www.nps.gov/nr/about.htm
National Wetlands Inventory	http://www.fws.gov/wetlands/
ICLUS Data for Northeast Region	http://www.epa.gov/ncea/global/iclus/inclus_nca_northeast.htm

SUSTAINABILTY/ADAPTATION/CLIMATE CHANGE

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

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

PLANNING

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

OTHER FEDERAL RESOURCES

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

Small Business Administration: SBA can provide additional low-interest funds (up to 20% above what an eligible applicant would qualify for) to install mitigation measures. They can also loan the cost of bringing a damaged property up to state or local code requirements.	www.sba.gov/disaster
Environmental Protection Agency	www.epa.gov

OTHER RESOURCES

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

FEMA RESOURCES

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

into a Community's Comprehensive Plan: A Guidebook for Local Governments	library/assets/documents/89725
Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning	http://www.fema.gov/media-library/assets/documents/4317

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

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

FEMA REGION I MITIGATION PLANNING CONTACTS

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