

Town of Wolfeboro, New Hampshire Hazard Mitigation Plan Update, 2012

Prepared by the:

Wolfeboro Hazard Mitigation Update Committee



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

2007

Updated: February 2013

Town of Wolfeboro, New Hampshire Hazard Mitigation Plan Update

2007
Revised: 2012

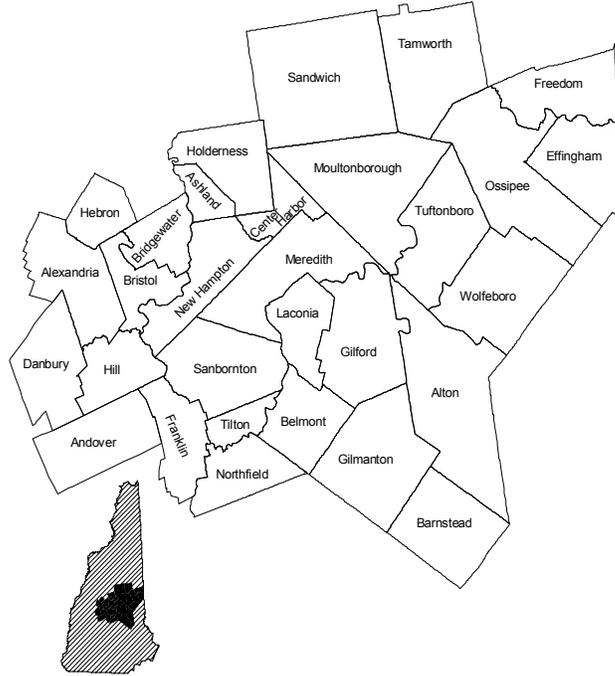
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EXECUTIVE SUMMARY

The *Wolfboro 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 Wolfboro 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 determined high and moderate natural and human-related risks, based on a ranking system detailed in Chapter III, and shown below:

High Risk	Moderate Risk
Flood	Earthquake
Severe Winter Weather	Tornado
Power Outage	Chemical Spill/Water Contamination
Hurricane	Drought/Water Shortage
Severe Thunderstorm/Lightning	Mass Casualty
Pandemic/Epidemic	HazMat (Transportation)
Transportation Incident	Intentional Water Contamination
Population Surge	Dam Failure
	Major Woodland Fire
	HazMat (Fixed location)

The Committee identified numerous existing programs related to hazard mitigation including the following:

Existing Plans, Regulations and Practices Supporting Hazard Mitigation	
Hazard Mitigation Plan 2007	Lakes Region Household Hazardous Product Facility
Code Enforcement	Public Health Emergency Preparedness Plan
Zoning Ordinance	Subdivision Regulations
Flood Plain Ordinance	Bridge Repair and Maintenance Plan
Wetlands Conservation Overlay District	Site Plan Review Regulations
Stormwater Drainage	Master Plan
Emergency Action Plans for Dams	School Emergency Evacuation Preparedness Plans
Water Conservation Plan	Capital Improvement Planning
Emergency Power Generation	Emergency Response Training and Drills
Mutual Aid Agreements	

The Committee developed a list of 26 general and hazard-specific mitigation actions (pp. 49-51). These actions were prioritized based on local criteria. Discussions were held regarding how implementation might occur. The results of these discussions are summarized in Table XVI: Implementation Schedule for Mitigation Actions (pp. 58-60).

CHAPTER I: PLANNING PROCESS

A. BACKGROUND

The Federal Emergency Management Agency (FEMA) has mandated that all communities within the state of New Hampshire establish local hazard mitigation plans as a means to reduce and mitigate future losses from natural or human hazard events. In response to this mandate, the NH Department of Safety's Division of Homeland Security and Emergency Management (HSEM) and regional planning commissions in the state entered into agreements to aid communities with plan development. The plan development process followed the steps outlined in the *Guide to Hazard Mitigation Planning for New Hampshire Communities*.

B. AUTHORITY

This Hazard Mitigation Plan was prepared in accordance with the Planning Mandate of Section 409 of Public Law 93-288 as amended by Public Law 100-707, the Robert T. Stafford Act of 1988, hereinafter referred to as the "Stafford Act." Accordingly, this Hazard Mitigation Plan will be referred to as the "Plan."

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 Wolfeboro Hazard Mitigation Plan is a planning tool to be used by the town of Wolfeboro, as well as other local, state, and federal government entities, in their efforts to reduce the 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 Wolfeboro, as identified by the Committee. The hazards were reviewed under the following categories as outlined in the New Hampshire's Natural Hazards Mitigation Plan:

- I. **Flood, Wild Land Fire, Drought** (Flood, Dam Break, 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**

F. METHODOLOGY

The Lakes Region Planning Commission (LRPC) met with the NH HSEM field representative for Carroll County and the Wolfeboro Fire Chief/Emergency Management Director in December of 2011 to initiate the hazard mitigation update process in the town of Wolfeboro. The Fire Chief established the Wolfeboro Hazard Mitigation Planning Update Committee in January of 2012 for the purpose of updating a long-range plan for hazard mitigation. The Committee consisted of representatives from the departments of Police, Public Works, Fire, Municipal Electric, Planning, along with representatives from the Board of Selectmen, the Planning Board, Chamber of Commerce, schools, Huggins Hospital, and members of the public.

Using the *Guide to Hazard Mitigation Planning for New Hampshire Communities*, the Committee developed the content of the Plan by following the process set forth in the handbook, and by referring to FEMA's *Local Multi-Hazard Mitigation Planning Guidance*. The committee reviewed and referenced a variety of plans, studies, reports and technical information during the development of this Plan Update, a list of many of these resources can be found in Appendix K. The Committee held meetings from January through June, 2012 in order to review and update the existing plan. The following timeline shows the dates and corresponding Committee actions. The planning team reviewed each section of the plan and LRPC provided updated information on hazards in New Hampshire. Each section of the existing plan was revised in order to develop a more comprehensive document.

Committee Meetings

January 23, 2012:	Introductory Committee Meeting: Town Hall Meeting Room
Step 1:	Overview of update process and objectives
Step 2:	Review community goals and objectives
Step 3:	Locate critical facilities and hazards on map
Step 4:	Review development trends and hazard events since 2007
February 14, 2012:	Committee meeting: Town Hall Meeting Room
Step 5:	Identify all natural and human-related hazards that affect Wolfeboro
Step 6:	Rate probability of occurrence and community vulnerability to hazards
February 28, 2012:	Committee meeting: Town Hall Meeting Room
Step 7:	Review Existing Mitigation Programs
Step 8:	Review Status of 2007 Implementation Strategies
Step 9:	Discuss Gaps in Protection
March 21, 2012:	Committee meeting: Town Hall Meeting Room
Step 10:	Brainstorm hazard mitigation strategies Estimate the cost of mitigation strategies Discuss potential funding sources
April 26, 2012:	Committee meeting: Town Hall Meeting Room
Step 11:	Prioritize Strategies (STAPLEE)
Step 12:	Discuss Implementation Strategy
June 12, 2012:	Committee meeting: Town Hall Meeting Room Review of Draft Plan by Committee

Public Involvement

The Wolfeboro EMD invited a wide variety of Hazard Mitigation Planning stakeholders to join the Hazard Mitigation Planning Committee. A letter soliciting input to the update process of the Plan was also sent to the Emergency Management Directors in the neighboring towns of Tuftonboro, Ossipee, Brookfield, New Durham, and Alton; none attended. The Committee was well represented by municipal officials, staff and other stakeholders including representatives of from Huggins Hospital and the public. A representative from Carroll County Public Health joined in on the latter stages of this planning process. 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 F). The town's recording secretary kept minutes and made them available after each meeting.

The Committee held a public comment period in order to obtain additional feedback. The Plan (including comment instructions) was available for public review at Town Hall, the town library, and at the town website from July 12 - 24, 2012. This was announced at the July 11, 2012 Board of Selectmen's meeting and a press release was distributed to regional media announcing the public comment period (Appendix F). 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 Wolfeboro and surrounding towns to review the plan. There was no public response or comment during the development of the plan or during the public review of the draft document.

G. ACKNOWLEDGMENTS

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

Philip Morrill	<i>Chief, Fire Department, Emergency Management Director</i>
David Owen	<i>Town Manager</i>
Linda Murray	<i>Chairman, Board of Selectman</i>
Sarah Silk	<i>Vice Chairman, Board of Selectman; Site Coordinator, Lakes Region Household Hazardous Product Facility</i>
Katherine Barnard	<i>Chairman, Planning Board</i>
Ken Marschner	<i>Citizen</i>
Robert Ness	<i>Citizen and Lakes Region Repeater Association</i>
David Ford	<i>Director, Department of Public Works; Director, Department of Water & Sewer, Utilities</i>
Adam Tasker	<i>Superintendent of Solid Waste, Department of Public Works</i>
Rob Houseman	<i>Director, Planning and Development Department</i>
Janet Williamson	<i>EMS Coordinator, Huggins Hospital</i>
Barry Muccio	<i>Director of Operations, Electric Department</i>
Mary DeVries	<i>Executive Director, Wolfeboro Area Chamber of Commerce</i>
Dan Noyes	<i>Director of Facilities, Brewster Academy</i>
Mary Reed	<i>Region Coordinator, Carroll County Coalition for Public Health</i>
Amy Capone-Muccio	<i>Recording secretary</i>
Heidi Lawton	<i>Field Representative, NH Homeland Security and Emergency Management</i>
David Jeffers	<i>Regional Planner, Lakes Region Planning Commission</i>

The following community members were invited to attend as part of the Committee but were unable to attend meetings. Agendas, minutes, and materials were sent to them along with other committee members and there was opportunity for them to provide input by email or phone.

Stuart Chase	<i>Chief</i> , Police Department
Mary Patry	<i>Business Administrator</i> , Governor Wentworth Regional School District
Brian Black	<i>Retired</i> , Police Department
Benjamin Ladd	Citizen

CHAPTER II: COMMUNITY PROFILE

A. GEOGRAPHY

The town of Wolfeboro is located in the southwest corner of Carroll County, on the shores of Lake Winnepesaukee, approximately 40 miles northeast of Concord. It also contains Lake Wentworth, Crescent Lake, and Rust Pond and sits in the heart of the Lakes Region of Central New Hampshire. The town is bordered by Tuftonboro to the north, Alton and New Durham to the south, and Ossipee, Brookfield, and Wakefield to the east. Wolfeboro has approximately 17 miles of shoreline along the southeastern portion of Lake Winnepesaukee. Wolfeboro's mainland area is 48.3 square miles and contains 10.1 squares miles of inland water.

The topography of the town ranges from hilly terrain in the north, northeast and far south to flatlands along the southwest shoreline and Lake Wentworth area. The land area of Wolfeboro consists mainly of well drained sand and gravel soils, glacial till, seasonally wet, and shallow to bedrock soils.¹ Prominent peaks include Moody Mountain (1,420'), Whiteface Mountain (1,339'), Trask Mountain (1,320'), and Batson Hill (1,300'), and Long Stack Mountain (1,223'). Willey Brook is the principal stream within the community. Although not large, the Smith River does flow right through the village center, and forms Back Bay.

B. WEATHER CONDITIONS

Characteristic of the New England region, Wolfeboro's temperatures and precipitation vary greatly. January temperatures range from an average high of 30 degrees Fahrenheit to an average low of 10 degrees Fahrenheit. In July, temperatures range from an average high of 82 degrees Fahrenheit to an average low of 60 degree Fahrenheit. Annual precipitation totals average 40.9 inches. Rainfall is fairly evenly distributed throughout the year. The wettest month of the year is November with an average rainfall of 4.2 inches. Wolfeboro averages about 70-75 inches of snow per year.² According to FEMA, New Hampshire is in a 160 mile per hour wind zone; the majority of the southern portion of the state (including all of Wolfeboro) is located in a hurricane susceptible region.

C. PUBLIC UTILITIES AND INFRASTRUCTURE

Wolfeboro residents have access to drinking water through both private wells and municipal water supply. The municipal water supply source is Upper Beech Pond. Because the source of the water supply is relatively remote, there are few concerns about contamination of the water supply. While sufficient for current needs, there is some concern that during very long dry spells the water supply system can be taxed. In some places, the infrastructure for the village area is one hundred years old; the town is upgrading this as opportunities arise.

Wolfeboro has its own wastewater system serving the village area and several branches extending from it. In 2005 the NHDES imposed a Sewer Moratorium on the Town which placed a halt on any new development and connections to the sewer system because of limited capacity with the effluent

¹ Town of Wolfeboro Master Plan, Land Use Element, 2-15-2-16

² <http://www.city-data.com/city/Wolfeboro-New-Hampshire.html>, 2012

disposal system. The Town had permitted and constructed a Rapid Infiltration Basin (RIB) system which went on line in 2009 and had the sewer moratorium lifted in April of 2009, allowing additional connections and growth within the existing sewer areas.

The Wolfeboro Department of Public Works (DPW) is responsible for road construction, highway maintenance on 64 miles of town roads and adjacent sidewalks, the sewer and water systems, and maintenance of Town Docks. The DPW also assists NH DOT with winter maintenance on state roads from time to time. These state routes (NH Routes 28, 109, and 109A) serve as the major roads through town and are the primary access roads to most of the town's critical facilities. The Wolfeboro Municipal Electric system is operated by the town and distributes electricity to most of the town's residents and some in the neighboring communities. They are responsible for maintaining the equipment and conduct a regular tree maintenance program.

The governing body of the town is an elected five-member Board of Selectmen assisted by a Town Manager. The Selectmen are responsible for formulating policy, adopting an annual budget, enacting the town ordinances, and approving the use and care of town property, including buildings, streets and other infrastructure projects. Wolfeboro does have town zoning, which is developed and implemented by the Planning Board and Town Planner and enforced by the Code Enforcement Officer.

The Huggins Hospital, located near the center of town, is a regional facility that has just completed an upgrade. Emergency medical (ambulance) services are contracted out by the town. The town fire department has a full time staff supported by on-call firefighters. The town has a full-time police department with a dozen officers. Wolfeboro has two elementary schools and is home to Kingswood Regional Middle and High Schools. The Kingswood campus has completed a substantial upgrade and expansion of its facilities. The regional schools serve students from the neighboring communities of Tuftonboro, Ossipee, Effingham, Brookfield, and New Durham. Brewster Academy is private boarding and day school in the center of town serving 365 students. Several local churches also serve as emergency shelters. The regional schools can serve as a limited shelter, although the amount of emergency power supply is limited.

D. LAND USE AND DEVELOPMENT TRENDS

As Table I shows, since 1960, Wolfeboro's population has more than doubled. The 2010 Census indicates that the town's population grew at a rate of just 3.1 percent since 2000, a marked decrease in the rate of change from previous decades. Wolfeboro does continue to serve as a summer vacation community and its population can swell tremendously; the 2007 Master Plan estimates the summer population to be approximately 15,000.

Table I. Wolfeboro Population Growth, 1960-2010

Year	Population	Change
2010	6,269	3.1%
2000	6,083	26.5%
1990	4,807	21.1%
1980	3,968	30.7%
1970	3,036	12.9%
1960	2,689	

In 2009 there were 4,252 housing units which equates to roughly 88 units per square mile of land.³ Residential housing is permitted throughout much of the town but much of it has been concentrated in the village area. Commercial activity is focused in the village center where municipal services are readily available and three state routes (NH Routes 28, 109, and 109A) converge.

These state routes carry most of the town's traffic, both year-round and seasonal. The traffic counts conducted by the NH Department of Transportation indicate that the average daily traffic along these roads range from 7,000 – 11,000 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.

The Town Planner reported that during the past five years with the slower rate of population growth and downturn in the economy, the change in local development has shifted the type of development. Instead of new residential construction, there have been a number of renovations and additions. Additionally, there has been growth in the commercial and institutional projects. A new bank was built and as noted above, the regional hospital and school facilities have undergone substantial renovation and expansion. A new complex of twenty-four affordable housing units has opened up. None of these are in particularly vulnerable locations. There is housing available in town for all price ranges from starter units to top end homes.

In the past five years the town has modified its zoning to simplify it but also allow for five residential districts and encourage infill development in the village area, served by sewer and water infrastructure (now that the moratoriums on expansion by NH DES have been lifted). Lower densities including innovative land use techniques are encouraged and even required further away from the village center. In some districts, Open Space Development is mandatory, a Steep Slopes ordinance was passed in March 2012, the Floodplain ordinance was updated based on the new FEMA maps for Carroll County, and the Wetlands ordinance has been updated.

³ *Development Activity in the Lakes Region, 2011 Annual Report*, Lakes Region Planning Commission.

CHAPTER III: RISK ASSESSMENT

A. IDENTIFYING HAZARDS

The town of Wolfeboro is prone to a variety of natural and man-made hazards. The Committee used the *2010 Multi-Hazard Mitigation Plan*, developed by the New Hampshire Department of Safety's Division of Homeland Security and Emergency Management, to identify all hazards that could affect the Lakes Region.⁴ The Committee also reviewed media archives and internet sources for information about past hazard events in Wolfeboro. The State Multi-Hazard Mitigation Plan identified several natural and human caused hazards that have the potential to impact the State. Table II provides a state-wide summary of the frequency and severity of these hazards.⁵

Table II. New Hampshire Hazards Profile

Hazard	Frequency	Severity
Flooding	High	High
Coastal Flooding	Moderate	Moderate
Dam Failure	<i>Low</i>	Moderate
Drought	<i>Low</i>	Moderate
Wildfire	High	Moderate
Earthquake	<i>Low</i>	High
Landslide	<i>Low</i>	<i>Low</i>
Radon	Moderate	<i>Low</i>
Tornado/Downburst	Moderate	Moderate
Hurricane	Moderate	High
Lightning	Moderate	<i>Low</i>
Severe Winter Weather	High	High
Snow Avalanche	<i>Low</i>	<i>Low</i>
Epidemic	Moderate	High
Fire and Hazardous Materials	Moderate	Moderate
Terrorism	<i>Low</i>	Moderate

⁴ <http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hmp-chapter-4.pdf> , visited April 27, 2011.

⁵ <http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hmp-chapter-3.pdf> , visited April 27, 2011.

The following narrative provides an overview for the hazards that might impact the Lakes Region.

I. FLOOD, WILDFIRE, DROUGHT

Flooding

Flooding is defined as a temporary overflow of water onto lands that are not normally covered by water. It results from the overflow of rivers and tributaries or inadequate drainage. The most recent 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. 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.⁶

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 (dam failure)

Dam failure results in rapid loss of water that is normally held back by a dam. These types of floods can be extremely dangerous and pose a threat to both life and property. Dam classifications in New Hampshire are based on the degree of potential damages that a failure or disoperation of the dam is expected to cause. The classifications are designated as non-menace, low hazard, significant hazard, and high hazard and are summarized in greater detail in Table III⁷.

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.

⁶ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html> date visited: January 18, 2011

⁷ <http://des.nh.gov/organization/commissioner/pip/factsheets/db/documents/db-15.pdf> visited January 18, 2011

Table III: New Hampshire Dam Classifications

Classification	Description
Non-Menace (Class AA)	No Possible loss of Life or Property. Less than six feet in height if it has a storage capacity greater than 50 acre-feet. Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.
Low Hazard (Class A)	No Possible loss of Life. Low economic loss to structures or property. Potential structural damage to local roads and infrastructure. Potential release of material if the storage capacity is less than 2 acre-ft and is located more than 250 feet from a water body or water course. Reversible environmental losses to environmentally sensitive sites.
Significant Hazard (Class B)	No Probable loss of Lives. Major economic loss to structures or property. Structural damage to Class I or II roads that could render the road impassable or 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 material if the storage capacity is 2 acre-feet or more; Irreversible environmental losses.
High Hazard (Class C)	Potential to cause failure of habitable building foundations. Water levels to rise above first floor elevation of habitable structure. Structural damage to an interstate highway that could render the road impassable or interrupt public safety services. The release of a quantity and concentration of "hazardous waste" as defined by RSA 471-A:2 VI. Any other circumstances that would more likely than not cause one or more deaths.

Ice Jam

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. 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.⁸

Wildfire

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. A present concern is the amount of woody debris in the forests from ice and wind storms the region has experienced. This debris may fuel future wildfires.

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.

⁸ "Ice Jams in New Hampshire," CRREL, <http://www.crrel.usace.army.mil/ierd/tectran/IERD26.pdf> visited February 8, 2011

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 for the community.

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

ZONE 3 is a low fuel volume zone. Here selected plantings of mostly low growing and fire resistant plants provides 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.

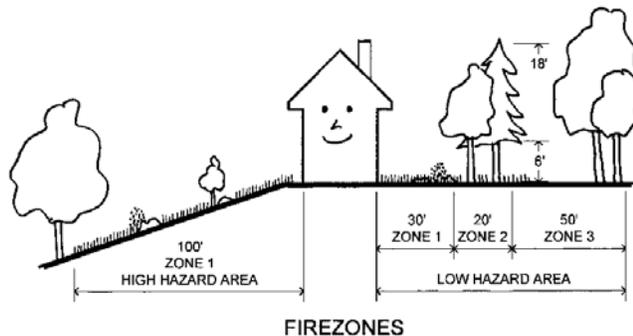


Image from www.firewise.org ⁹

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 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.



Alton Bay Christian Conference Center, 2009

⁹ <http://www.firewise.org/resources/files/wildfr2.pdf> , A Homeowners Guide to Wildfire Retrofits, accessed January 18, 2011, p. 7.

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. Many structures in the region are old, wood buildings, some of which still lack fire suppression systems. As such, several town and city centers in the region are susceptible to conflagration. On April 12, 2009 the Alton Bay Christian Conference Center complex caught fire, resulting in an 11-alarm fire and destroying more than 40 structures.

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 – 2002¹⁰.

II. GEOLOGICAL HAZARDS

Earthquake

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 IV.¹¹

Table IV. 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. On average,

¹⁰ <http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf> visited February 8, 2011.

¹¹ <http://pubs.usgs.gov/gip/earthq4/severitygip.html>, visited February 8, 2011.

every other year the Lakes Region experiences an earthquake, though these earthquakes are mild and go mostly undetected by people. Tamworth is identified as a major epicenter in the region.¹²

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. Additionally, 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.¹³ 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. Other notable New Hampshire earthquakes are listed in Table V with the extent of the hazard expressed in the Modified Mercalli Intensity scale and the Richter Magnitude¹⁴.

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

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

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

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

¹² <http://des.nh.gov/organization/commissioner/pip/factsheets/geo/documents/geo-3.pdf>, pg. 3, visited January 25, 2011.

¹³ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html> visited February 8, 2011.

¹⁴ http://earthquake.usgs.gov/learn/topics/mag_vs_int.php, visited June 8, 2012.

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 Casualties.
- 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.¹⁵ Also, during the 2007 Nor'easter a landslide occurred in Milton, resulting in the temporary closure of NH Route 101.

Radon

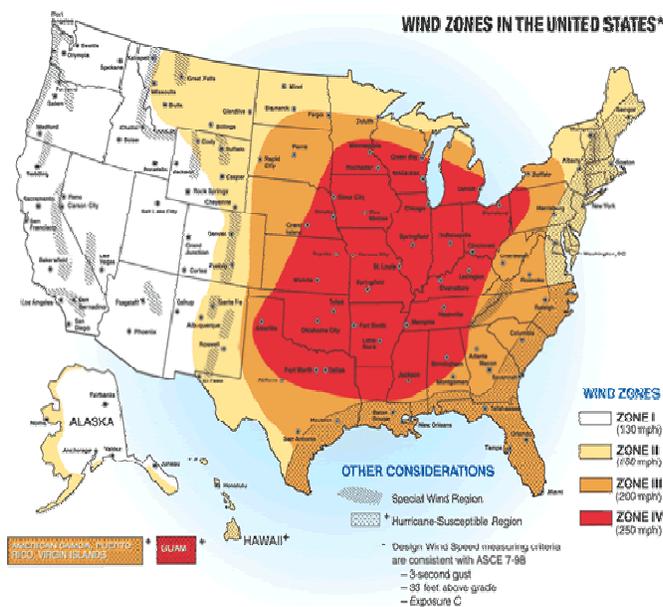
Radon is a naturally occurring colorless, odorless radioactive gas usually associated with granite rock formations. The gas can seep into basements through the air. It can also be transported via water and is released once the water is aerated, such as during a shower. Extended exposure to radon can 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 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.¹⁶ Table VI lists the indoor radon test levels for the four counties comprising the Lakes Region. Wolfboro is in Carroll County, which showed the highest levels of radon among the four counties.

Table VI: Short-term Indoor Radon Test Results in NH’s Radon Database (May 7, 1999)

County	# of Tests	Maximum	%>4.0 pCi/l
Belknap	744	22.3	14.1
Carroll	1,042	478.9	45.4
Grafton	1,286	174.3	23.2
Merrimack	1,961	152.8	25.2

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. Figure I indicates the building standards that should be implemented in the various wind zones throughout the country.



The northeast is located in a zone that should be 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

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. 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

Figure I. Wind Zones in the US. Image source: www.fema.gov

¹⁵ <http://www.nh.gov/safety/divisions/nsem/naturalhazards/muex.html> visited February 8, 2011.

¹⁶ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html> visited February 8, 2011.

buildings. Although tornadoes are locally produced, damage paths can be in excess of one mile wide and 50 miles long.¹⁷ 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 VII.¹⁸ 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 counties¹⁹.

Table VII. The 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 well constructed 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.²⁰ Downbursts are 10 times more likely to occur than tornadoes and fall into two categories based on their size:

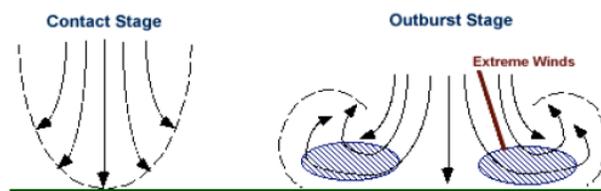


Image source: NH HSEM

- 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.

¹⁷ FEMA Hazards: Tornadoes <http://www.fema.gov/business/guide/section3e.shtm>, visited February 8, 2011.

¹⁸ <http://www.tornadoproject.com/fscale/fscale.htm> visited March 8, 2011.

¹⁹ <http://www.fema.gov/news/newsrelease.fema?id=45525> visited March 8, 2011.

²⁰ *Weather Glossary*. National Oceanic and Atmospheric Administration, <http://www.weather.gov/glossary/index.php?letter=d>, visited March 8, 2011.

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. However, on July 24, 2008 a tornado affected ten New Hampshire communities including several in Carroll County.



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

Hurricane

Hurricanes are severe tropical storms that have winds at least 74 miles per hour. In the Lakes Region they could produce heavy rain and strong winds that could cause flooding or damage buildings, trees, power lines, and cars.²¹ Hurricanes are measured by the Saffir-Simpson Hurricane Scale: a 1-5 rating based on a hurricane's intensity using wind speed as the determining factor (Table VIII). The scale is used to give an estimate of the potential property damage and flooding expected from a hurricane landfall.

Table VIII. 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.

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

Category	Characteristics
4	Winds 130-156 mph (114-135 kts or 210-249 km/hr). Storm surge generally 13-18 ft above normal. More extensive curtainwall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km).
5	Winds greater than 156 mph (135 kts or 249 km/hr). Storm surge generally greater than 18 ft above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required.

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

According to NOAA, 2010 was one of the busiest hurricane seasons on record.²² However, the position of the jet streams kept the northeastern Atlantic region dry as a barrier to the storms. 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.²³ 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.²⁴

Thunderstorm/Lightning

Thunderstorms have several threats associated with them including heavy rain, high wind, and hail. In a heavy rain storm, large amounts of rain may fall in a short period of time, severely impacting roads and low-lying developments. All thunderstorms contain lightning, which can cause death, injury, and property damage and have great potential to cause structure and wildfires. The discharge of lightning causes an intense sudden heating of air. The air rapidly expands when heated then contracts as it cools, causing a shock wave that we hear as thunder. This shock wave is sometimes powerful enough to damage windows and structures.

Although the numbers were trending downward in recent decades, during the last half of the twentieth century more people were killed in the US each year by lightning than by any other weather event. Lightning damages cost the insurance industry more than \$5 billion annually in the United States.²⁵ In the Lakes Region, however, fewer than two lightning strikes occur per square kilometer annually.²⁶ While this value is not particularly high, the concern that lightning might ignite a wildfire is quite high since a large percentage of the area is rural and forested.

²² http://www.noaanews.noaa.gov/stories2010/20101129_hurricane_season.html visited January 25, 2011.

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

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

²⁵ *National Lightning Safety Institute webpage*, http://www.lightningsafety.com/nlsi_lls/nlsi_annual_usa_losses.htm visited February 8, 2011.

²⁶ *Northeast States Emergency Consortium*, <http://www.nesec.org/> visited January 25, 2011.

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 IX. 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 few years. In 2007 and 2008 Laconia experienced hail storms with no resulting damage, though reported hail sizes were as large as 1.25 inches (H4).

Table IX: 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			

IV. WINTER WEATHER

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

Blizzard/Snow Storm

A heavy snowstorm can be defined as one which deposits four or more inches of snow in a twelve hour period.²⁷ Heavy snows can cause damage to property, disrupt services, and make for unsafe travel, even for emergency responders. Due to poor road conditions, residents may be stranded for several days. Extra pressure is placed on road crews and emergency services under these conditions.

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

²⁷ <http://www.nh.gov/safety/divisions/hsem/NaturalHazards/index.html>, visited February, 8, 2011.

Snowstorms are a common occurrence throughout the Lakes Region. Blizzards, which may dump 12” – 36” or more of snow in a one- to three-day period are less frequent, but can have a serious impact on structures, utilities, and services. The region typically receives greater than 66” of snow annually.²⁸

Ice Storm

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

In the winter of 1998, a major ice storm crippled much of New Hampshire, coating everything with as much as three inches of ice. This storm was the most costly FEMA/Presidential Declared disaster in New Hampshire's history. The ice load bent trees and power lines and led to massive power outages throughout the state. The U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory estimates a 40 – 90 year return period for an event with a uniform ice thickness of between .75 and 1.25 inches. Ten years later, however, New Hampshire was struck again by another severe ice storm. The December 2008 ice storm caused more damage than any other storm in the state's history. The President declared this storm as a major disaster and the state received \$15 million in federal aid for recovery.²⁹



Nor'easter

New Hampshire generally experiences at least one or two nor'easters each year with varying degrees of severity. A nor'easter is defined as a large anticyclone weather system that resides near the New England region. These storms have the potential to inflict more damage than many hurricanes because high winds can last from twelve hours to three days, while the duration of hurricanes ranges from six to twelve hours. A nor'easter also has the potential to sustain hurricane force winds, produce torrential rain, and create blizzard conditions in winter months. Infrastructure, including critical facilities, may be impacted by these events, and power outages, communications, and transportation disruptions (i.e., snow and/or debris-impacted roads, as well as hazards to navigation and aviation) are often associated

²⁸ *Northeast States Emergency Consortium*, <http://www.nesec.org/>, visited January 25, 2011.

²⁹ <http://www.fema.gov/news/newsrelease.fema?id=48384>, visited January 25, 2011

with the event. A series of nor'easters struck the state between February 23 and March 3, 2010 that left 330,000 residents without power. This was declared a major disaster by the President and the state received \$2 million in federal recovery aid.³⁰

In the winter months, the state may experience the additional coincidence of blizzard conditions with many of these events. A blizzard is characterized by sustained winds or frequent gusts to 35 miles per hour or greater and considerable amounts of falling or blowing snow that last for a duration of three hours or longer. The combination of winds and snow reduce visibility to less than a quarter mile.³¹ The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods. The 2007 Patriots' Day Nor'easter was one of the largest springtime storms to strike New England.³² The storm brought heavy snowfall to the central and northern New Hampshire which flooded many rivers. The storm also packed hurricane force winds which caused structural damage and power outages from downed trees. FEMA and the U.S. Small Business Administration paid nearly \$30 million in New Hampshire for disaster aid related to this nor'easter.

V. OTHER HAZARDS

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

Motor Vehicle Accident involving Hazardous Materials

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

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

³⁰ <http://www.fema.gov/news/newsrelease.fema?id=51887> visited January 25, 2011

³¹ "Winter storm terms," http://www.fema.gov/hazard/winter/wi_terms.shtm, visited February 8, 2011.

³² <http://www.fema.gov/about/regions/regioni/ora/externalaffairs/patriotsdaynoreaster.shtm>, visited May 15, 2012.

Oil Spill

NH Route 25 is a major east-west corridor for the transport of oil from Portland, Maine to central and western portions of New Hampshire. North-south corridors, such as NH Routes 16, 28 and 109 link Wolfeboro to other Lakes Region and this corridor. Since oil is the most commonly used home heating fuel in the state, oil trucks are regularly traveling all manner of roads in the region. Wolfeboro also has a fuel oil business with several storage sites in the downtown area. Spillage of oil in any of these areas has the potential to result in direct contamination of the surface waters in Wolfeboro as well as ground water resources.

Epidemic/Pandemic

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.³³ 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.³⁴ Currently towns are working with the state and non-profits, such as the Public Health Network, to revise and redevelop their Public Health Emergency Response Plans.

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.³⁵ H1N1 is an influenza virus that can spread “human to human” through respiratory droplets from coughs or sneezes.³⁶ Many of the planning systems developed out of the H5N1 pandemic were useful during this pandemic.³⁷

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

³³ <http://www.pandemicflu.gov/>, visited February 8, 2011.

³⁴ <http://www.dhhs.nh.gov/dphs/cdcs/avian/documents/pandemic-plan.pdf>, visited February 8, 2011.

³⁵ http://c3ph.org/Files/vaccine_fact.pdf, visited February 15, 2011.

³⁶ <http://c3ph.org/Files/H1N1FAQ.pdf>, visited February 15, 2011.

³⁷ <http://www.cdc.gov/h1n1flu/cdcreponse.htm>, visited February 8, 2011.

B. HISTORICAL HAZARD EVENTS

On January 7 and 8, 1998, a devastating ice storm hit and mainly affected upstate New York, northern New Hampshire and Vermont, much of Maine, and southeast Canada. Some locations received over 3 inches of rain (as freezing rain), with radial ice thickness of one inch or more. New England reported over 500,000 customers without power and overall damages approached \$3 billion for Canada and were at least \$1.4 billion for the U.S. In New Hampshire, 140,000 people lost electricity, some for as long as eight days, 38 shelters were set up that served 700 refugees, and two storm related deaths were reported.

More recently, 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. At the regional level, the August 4, 2008 rain events caused substantial flash flooding and washouts in New Hampton, Center Harbor, Meredith, and Ashland. In addition to property damages, one death was recorded as a result of this storm.



Washout on Beach Pond Road – April 18, 2007

Table X details historic events that have impacted Wolfeboro and nearby communities within the last eighty years. NOAA reports 38 snow and Ice Storms and 35 Thunderstorm/Wind events impacting Carroll

County between 2007 and 2012. Several committee members suggested that the town be prepared for more weather extremes such as heavy precipitation and drought as a result of climate change.³⁸

The extent (i.e. magnitude or severity) has been determined through research of past events in Wolfeboro and nearby communities and is stated where possible.

Table X. Past Hazard Events in the Wolfeboro Area

Hazard	Date	Location	Remarks/Description	Source
Aircraft Crash	August 31, 1989	Wolfeboro	Nonfatal	4
Aircraft Crash	August 10, 1994	Wolfeboro	Nonfatal	4
Aircraft Crash	August 27, 1994	Wolfeboro	Nonfatal	4
Aircraft Crash	May 9, 1996	Wolfeboro	Nonfatal	4
Aircraft Crash	July 2, 1996	Wolfeboro	Nonfatal	4
Aircraft Crash	April 5, 1997	Wolfeboro	Nonfatal	4
Aircraft Crash	February 28, 1999	Wolfeboro	Nonfatal	4

³⁸ <http://www.t2.unh.edu/sites/t2.unh.edu/files/documents/publications/climatechange.pdf>, <http://pubs.usgs.gov/fs/2010/3104/>, and http://www.unh.edu/news/news_releases/2006/january/ds_060126weather.html accessed June 16, 2012.

Hazard	Date	Location	Remarks/Description	Source
Aircraft Crash	October 2, 1999	Wolfeboro	Nonfatal	4
Aircraft Crash	August 14, 2004	Wolfeboro	Nonfatal	4
Aircraft Crash	November 4, 2004	Wolfeboro	Nonfatal	4
Drought	1929-1936	Statewide	Regional	5
Drought	1939-1944	Statewide	Severe in Southeast	5
Drought	1947-50	Statewide	Moderate	5
Drought	1960-69	Statewide	Longest recorded continuous period of below normal precipitation	5
Drought	June 1, 1999	Most of NH	Governor's Office declaration, moderate drought for most of the state	5
Earthquake	December 20, 1940	Ossipee	Magnitude 5.5	6
Earthquake	December 24, 1940	Ossipee	Magnitude 5.5	6
Earthquake	January 19, 1982	West of Laconia	Magnitude 4.5	6
Fire - Conflagration	Winter 1956	Wolfeboro	Block fire	
Fire (woodland)	October, 1947	Freedom, NH to Atlantic Ocean	205,678 acres burned; 16 fatalities	7
Flood	7/1/1986 – 8/10/1986	Statewide	FEMA DR-771-NH: Severe summer storms with heavy rains, tornadoes; flash flood and severe winds.	2
Flood	8/ 7/1990 - 8/11/1990	Statewide	FEMA DR-876-NH: A series of storm events from August 7-11, 1990 with moderate to heavy rains produced widespread flooding in New Hampshire.	2
Flood	8/19/1991	Statewide	FEMA DR-917-NH: Hurricane Bob struck New Hampshire causing extensive damage in Rockingham and Stafford counties, but the effects were felt statewide.	2
Flood	3/13/1996	Alton	Dam break. \$500,000. 1 fatality. Not weather related.	3
Flood	June 14, 1998	Carroll County	FEMA DR-1231-NH: Damage estimate - \$550, 000	3
Flood	October, 2005	Wolfeboro	Town reported flood	8
Flood	May, 2006	Wolfeboro	Town reported flood	8
Flood	4/16/2007	Wolfeboro	FEMA funds were made available in Wolfeboro	8
Flood	3/9/2008	Conway		3
Flood	4/29/2008	Conway		3
Flood	8/28/2011	Ossipee, Moultonborough, Sandwich	Tropical Storm Irene \$575K in damages to roads and bridge	3
Hail	July 16, 1984	Carroll County	Hail accumulation ~ 1.75 inches	3

Hazard	Date	Location	Remarks/Description	Source
Hail	June 13, 1987	Carroll County	Hail accumulation ~ 1.0 inches	3
Hail	August 1, 2005	Wolfboro	Hail accumulation ~ 1 inch	3
Hail	6/20/2006	Alton	1.75 inch diameter	3
High Winds	July 15, 1974	Carroll County	winds > 56 knots	3
High Winds	July 26, 1994	Carroll County	T-storm and winds caused 1 injury; damage estimate - \$5 million	3
High Winds	8/25/2007	Moultonborough	Winds > 50 knots	3
High Winds	6/22/2008	Tamworth	Winds > 50 knots	3
High Winds	7/09/2008	Water Village	Winds > 50 knots	3
High Winds	7/19/2010	Melvin Village	Winds > 50 knots	3
Hurricane	9/21/1938	Statewide	13 Deaths, 2 Billion feet of marketable lumber blown down, flooding throughout the State, total Direct Losses - \$12,337,643 (1938 Dollars)	2
Hurricane	9/9/1991	Statewide	Hurricane Bob, severe storms	5
Hurricane Floyd	October 18, 1999	Carroll and other counties	Reported damages - \$800,000	3
Lightning	August 2, 1993	Carroll County	Lightning caused 3 injuries	3
Lightning	August 12, 1998	Wolfboro	Lightning; damage estimate \$22,000	3
Lightning	June 9, 2004	Wolfboro	Lightning; damage estimate \$50,000	3
Lightning	10/20/2006	Meredith	Three injuries and \$20,000 in damages.	3
Lightning	9/27/2007	Alton	\$200,000 in damage to home.	3
Macroburst	July 26,1994	Moultonborough	Left 1,800 people without power	2
Tornado	July 18, 1963	Carroll County	F2	1
Tornado	July 28, 1970	Carroll County	F1	1
Tornado	August 9, 1972	Carroll County	F1	1
Tornado	August 25, 1972	Carroll County	F1	1
Tornado	August 7, 1986	Carroll County	F1 - Two F1 tornadoes were reported; damage estimate - \$2.75 million	1 & 3
Tornado	7/24/2008	Five counties, including Belknap, Strafford, and Carroll	F2 - 50-mile swath cut through south-central part of NH. Nineteen homes destroyed. One death. State and federal disaster declared in five counties.	2, 8
Winter - Ice	1/5/1979	Statewide	Power and Transportation disruptions. More than \$17 million in damage in NH alone	2
Winter - Heavy Snow	March 16, 1993	Statewide	High winds and record snowfall	2

Hazard	Date	Location	Remarks/Description	Source
Winter - Ice Storm	January 7, 1998	Carroll and other counties	67,586 without power; damage estimate - \$17 million to NH Public Services	2
Winter - Heavy Snow	January 15, 2004	Carroll and other counties		2
Winter - Nor'easter	4/27/2007	Statewide	Nor'easter caused flooding, damage in excess of \$25 million	5
Winter - Ice	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.	2

<p>Table Sources:</p> <p>1 = http://www.tornadoproject.com</p> <p>2 = New Hampshire Homeland Security and Emergency Management (NHHSEM)</p> <p>3 = National Oceanic and Atmospheric Administration (NOAA)</p> <p>4 = National transportation Safety Board (NTSB)</p> <p>5 = Federal Emergency Management Agency (FEMA)</p> <p>6 = Northeast States Emergency Consortium (NESEC)</p> <p>7 = National Interagency Fire Center (NIFC): http://www.nifc.gov/stats/historicalstats.html</p> <p>8 = Wolfeboro Hazard Mitigation Plan Update Committee</p>
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C. PROFILING HAZARD EVENTS

The identification of hazards potentially important to Wolfeboro was based on local knowledge of department heads, town officials, and representatives from Huggins Hospital and the Wolfeboro Chamber of Commerce, Brewster Academy, and members of the public.

A matrix was created to determine an overall hazard risk assessment rating. Each criterion (probability of occurrence and vulnerability) was given a rating of severe, moderate, or minimal to show which hazards are the greatest threat to the community, based on indicators: danger/destruction, economic, environmental, social, and political planning level. These ratings were transformed into numerical values 3, 2, and 1, respectively. Probability of occurrence is defined as the likelihood that an event will occur in Wolfeboro in any given year, while vulnerability is the susceptibility to damage or economic loss.

The impact of a hazard is the potential degree of damage that could occur in Wolfeboro. The Committee reviewed the assessed value of each critical facility (Appendix H) 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 and the assistance that they might need, as defined below:

- Minimal: local residents can handle the hazard event without help from outside sources
- Moderate: county or regional assistance is needed to survive and/or recover
- Severe: state or federal assistance is necessary to survive and/or recover

The overall risk rating associated with each hazard was determined by multiplying the three factors. This resulted in risk ratings ranging from 1 to 27; 1-3 = low risk, 4-9 = moderate risk, 12-27 = high risk. This Plan will focus on those events that pose at least a moderate risk to the town of Wolfeboro as determined by the Committee (Table XI).

Table XI: Wolfeboro Risk Assessment

Wolfeboro	Probability of Occurrence			Vulnerability			Impact			Risk Rating	Specific Areas of Concern
	High - 3	Moderate - 2	Low - 1	High - 3	Moderate - 2	Low - 1	Severe - 3	Moderate - 2	Minimal - 1		
Hazard Type											Describe potential impact areas (critical facilities, floodplain, etc)
Flood	3			3			3			27	
Severe Winter Weather	3			3			3			27	
Power Outage	3			3			3			27	
Hurricane		2		3			3			18	
Severe Thunderstorm	3			3				2		18	
Pandemic/Epidemic		2		3			3			18	County Center, H1N1
Transportation Incident	3			3				2		18	State routes
Population Surge		2			2		3			12	
Earthquake			1	3			3			9	

Wolfeboro	Probability of Occurrence			Vulnerability			Impact			Risk Rating	Specific Areas of Concern
	High - 3	Moderate - 2	Low - 1	High - 3	Moderate - 2	Low - 1	Severe - 3	Moderate - 2	Minimal - 1		
Hazard Type											Describe potential impact areas (critical facilities, floodplain, etc)
Tornado			1	3			3			9	
Chemical Spill/Water Contamination		2			2			2		8	
Drought/Water Shortage		2			2			2		8	
Mass Casualty		2			2			2		8	school, terrorism
HazMat (Transportation)		2			2			2		8	oil
Intentional Water Contamination			1		2		3			6	
Dam Failure			1		2			2		4	NH Route 28
Major Woodland Fire			1		2			2		4	northern portion of town
HazMat (Fixed location)			1		2			2		4	Back Bay
Armed Attack			1			1		2		2	
Terrorist Attack			1			1		2		2	
Sewer Lagoon Failure			1			1			1	1	
Conflagration (urban fire)			1			1			1	1	
Aircraft Accident			1			1			1	1	
Civil Disorder			1			1			1	1	

These hazards are somewhat different from the 2007 list. Some of the differences are the result of changes within the community, such as improvements to the sewer and water infrastructure. It should be noted that the ranking of individual hazards for the purposes of planning discussion should not in any way diminish the potential severity of the impacts of a given hazard event. Further, hazards ranked as low risk may have the impact of increasing the risk of other hazards when they occur. For example, in the event of a drought, the risk of woodland fire may be greater. In combination, hazard events may have the impact of overwhelming existing emergency response systems. Similarly, the likelihood of each hazard addressed in this plan is based on historic events and local knowledge.

I. HIGH RISK HAZARDS

FLOODING

Location: Localized

Specific Areas of Concern: Hilly, upland areas including Beech Pond Road, North Main Street, Clarke Plaza, Sewer Pumps, NH Route 28/109 (Center Street), Downtown

Probability of Occurrence: High

Vulnerability: High

Impact: Severe

Overall Risk: High

Flooding is most commonly associated with structures and properties located within a floodplain. In Wolfeboro, despite the large areas of surface water and low slopes relative to the region, there are relatively few low lying areas susceptible to flooding. Flood Insurance Rate Maps (FIRM) developed in 1989 for Wolfeboro (and updated with DigitalFIRMs in 2012) show the flood boundaries in the event of a 100 year flood, which is defined as a having a one percent chance of flooding each year. The areas depicted by the rate maps indicate areas of floodplain on either side of Back Bay, including the Clarke Plaza and associated with wetlands scattered around town. The Clarke Plaza shopping areas on both sides of NH Routes 28/109 are built over what used to be a small bay that was filled in the first half of the 20th century; and has flooded frequently in the past. This is also the site of the pumps for the municipal sewer system. In recent years the DPW has kept ahead of any flooding through the use of pumps. Wolfeboro does not have large flowing rivers and is not particularly susceptible to the catastrophic riverine erosion associated with such bodies of water. The potential for shoreland flooding to occur on the largest lakes in Wolfeboro, Lakes Winnepesaukee and Wentworth, is reduced by the use of State operated dams that regulate lake water levels.

The town of Wolfeboro actively participates in the National Flood Insurance Program through the administration of a floodplain ordinance. As noted above, the Flood Insurance Rate Maps (DFIRM) were just updated in 2012 and the town's Floodplain Ordinance was revised in coordination with NHOEP and adopted in March, 2012. The Code Enforcement Officer is responsible for maintaining floodproofing and elevation certificates. The majority of the floodplain in Wolfeboro is undeveloped with the exception of the Back Bay commercial properties. There are currently 35 buildings with flood insurance policies in force (insurance value \$8.7 million). One single family home in the X zone along Bay Street has had two losses for a total of \$43,892, and is therefore considered a repetitive loss property. No mitigation has occurred at this property.³⁹

The town participates in trainings offered by the State and FEMA, they have adopted a steep slopes ordinance to minimize erosion and have adopted subdivision and site plan regulations that address stormwater runoff.

SEVERE WINTER WEATHER⁴⁰

Location: Regional

Specific Areas of Concern: Major Roads, Populations to Protect, Emergency Response Facilities, Essential Services, Flat-roofed buildings

Probability of Occurrence: High

Vulnerability: High

Impact: Severe

Overall Risk: High



Ice Storm of 1998, Wolfeboro

While the town is accustomed to seasonal heavy snowfall, any particularly severe event with significant accumulations, especially combined with severe cold can be a burden. These events often occur concurrent with other hazards such as power loss, ice accumulation, or hazardous materials spills and the generally hazardous conditions they present can significantly increase the vulnerability of populations and facilities.

³⁹ NFIP State Coordinator, NH Office of Energy and Planning, September 2011.

⁴⁰ Image source: <http://www.youtube.com/channel/HCDralXR2zcQM>

The fact that Wolfeboro is home to the regional middle school, high school, vocational school, and hospital puts added pressure on DPW crews to clear both the local roads and to assist during emergencies on state roads. The resources for the DPW to trim trees over municipal roadways are limited.

POWER OUTAGE (FROM REGIONAL ICE STORM OR OTHER CAUSE)

Location: Town-wide

Specific Areas of Concern: Water and Sewer Pumping Stations, Populations to Protect, Emergency Response Facilities, Essential Services, Huggins Hospital, downtown restaurants

Probability of Occurrence: High

Vulnerability: High

Impact: Severe

Overall Risk: High

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 and the hospital. The Town Hall does not have back-up power. The schools have only enough emergency power for basic life safety. The elderly and disabled who rely on powered medical devices are at risk and provisions need to be made for their needs (the hospital cannot serve this function). The Municipal Electric Department trims trees regularly to reduce damage to power lines.

HURRICANE

Location: State-wide

Specific Areas of Concern: Buildings in the floodplain, Buildings near trees, Populations to Protect, Infrastructure

Probability of Occurrence: Moderate

Vulnerability: High

Impact: High

Overall Risk: High

While hurricanes are not a frequent occurrence in central New Hampshire, there is always a chance that one could hit the area. A hurricane is a large event bringing heavy, extended rains which saturate the ground and strong winds which can topple trees. Damages can occur to homes (downed trees), roads (erosion and washout), and power outages. In the fall of 2011 the heavy rains associated with Hurricane Irene (then a tropical depression) resulted in substantial damage in northern Carroll County.



Tuftonboro - September, 2011

SEVERE THUNDERSTORM/LIGHTNING

Location: Local

Specific Areas of Concern: Throughout town - Buildings near trees, seasonal homes

Probability of Occurrence: Moderate

Vulnerability: High

Impact: Moderate

Overall Risk: Substantial

Thunderstorms occur with great regularity, especially in the summer months. These storms bring brief high winds which blow down branches onto homes, vehicles, and utility wires. Most of these storms bring lightning, which can ignite a home or wildfire, especially with the high number of seasonal homes, amount of forested area, and limited access in some parts of town. There have been very few recorded damages in Wolfeboro due to lightning strikes but there are many opportunities for it to hit anywhere in town.

EPIDEMIC/PANDEMIC

Location: Local or State-wide

Specific Areas of Concern: Throughout town – Schools, Elderly centers, Populations to Protect, Huggins Hospital

Probability of Occurrence: Moderate

Vulnerability: High

Impact: High

Overall Risk: High

Epidemics do occur in Wolfeboro and other Lakes Region communities from time to time. Transmission of germs and diseases between people is accelerated in a close living and socializing environment. Schools, and congregate care centers for the elderly are good places for transmission to occur. Huggins Hospital does have an emergency operations plan which addresses response to local and regional epidemics.

The concerns associated with a pandemic include local capacity to respond to not only the residents of Wolfeboro and surrounding communities but also any visitors. The hospital staff does partner with Carroll County Public Health and other regional health providers.

TRANSPORTATION INCIDENT

Location: Local

Specific Areas of Concern: South Main Street, Pickering Corner, intersection of NH Route 28 at North Line Road and in South Wolfeboro, Fire and Police Stations, Huggins Hospital, Schools

Probability of Occurrence: High

Vulnerability: High

Impact: Moderate

Overall Risk: High

Several areas were identified by the committee as high risk areas for transportation incidents. NH Route 28 is dangerous due to limited visibility and speed at the sharp curve in South Wolfeboro and at the intersection with North Line Road. The area around Pickering Corner can be a difficult intersection and there are several sources of hazardous materials in the area. Finally, as most of the town's emergency response facilities and schools lie along South Main Street, an incident along that street can impede the ability of emergency personnel to respond. This is also a section of town that experiences summertime congestion due to special events. In recent years steps have been taken to identify and access alternate routes for emergency vehicles.

POPULATION SURGE**Location:** Local, town-wide**Specific Areas of Concern:** Downtown, Waterfront, Emergency Response, Water and Sewer, Road network**Probability of Occurrence:** Moderate**Vulnerability:** Moderate**Impact:** High**Overall Risk:** High

Committee members acknowledged that Wolfeboro thrives on visitors to the Lakes Region, especially in the summer. As noted in Chapter One, the population of the town can more than double during certain times of the year. There are a number of other events that might drive a population surge in town and this could have impacts on water and sewer resources, the transportation network, and the hospital. Over the past five years, steps have been taken to improve the town's ability to provide water and sewer services to businesses and residences within the village core.

II. MODERATE RISK HAZARDS**EARTHQUAKE****Location:** Regional**Specific Areas of Concern:** The built environment in the downtown area., Town Hall, Fire Station**Probability of Occurrence:** Low**Vulnerability:** High**Impact:** Severe**Overall Risk:** Moderate

On average, every other year the Lakes Region of New Hampshire experiences an earthquake, though these earthquakes are mild and go mostly undetected by people. The strongest earthquakes to date to strike New Hampshire in the twentieth century 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. As to the damage done by the earthquakes, most of the chimneys in the epicentral region of Ossipee suffered some damage, 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.

Estimated losses include significant structures such as Town Hall and Annex, the Public Safety Complex, several places of worship, and several multi-story mixed use buildings in the downtown area. An earthquake in all likelihood would impact the bridges, limiting the ability of emergency services to be rendered. The fire department would have serious response problems if the bridges were impacted. It would require redeployment of apparatus and people.

In order to better prepare for a damaging earthquake, Wolfeboro can evaluate their building codes, critical facilities, and infrastructure with these issues in mind.

TORNADO/DOWNBURST**Location:** Localized**Specific Areas of Concern:** All areas in town, All critical facilities**Probability of Occurrence:** Low**Vulnerability:** High**Impact:** Severe**Overall Risk:** Moderate

In Wolfeboro, the major damage from downbursts or tornadoes come from falling trees, which may take down power lines, block roads, or damage structures and vehicles. A wind event in Moultonborough on July 26, 1994 and was classified as a macroburst. It affected an area one-half mile wide by 4-6 miles in length. This same storm produced wind damage typical of a micro/macroburst in nearby Meredith. The recent tornado on July 24, 2008 cut a 50 mile swath through central New Hampshire on the eastern side of Lake Winnepesaukee took down trees and electrical



lines and did damage buildings in parts of Wolfeboro. Fortunately, no lives were lost in town. Although tornadoes do not strike New Hampshire with the same frequency as the South and Midwest, the 2008 tornado illustrates that they can strike with severity. This storm also brought to light to committee members how quickly such storms can form and how limited the local warning system is.

CHEMICAL SPILL/WATER CONTAMINATION**Location:** Localized**Specific Areas of Concern:** Lake Winnepesaukee, Lake Wentworth, Back Bay, Beech Pond, private wells, Municipal Water System**Probability of Occurrence:** Moderate**Vulnerability:** Moderate**Impact:** Moderate**Overall Risk:** Moderate

Wolfeboro depends on a portion of its surface water to provide public drinking water to the community. As well, area tourism and water recreation are highly dependent on the availability of clean and attractive water resources. For these reasons the protection of surface waters in Wolfeboro is highly valued both as a necessity and for economic reasons. The leading potential sources of water contamination include in-transit and fixed hazardous materials.

Several transportation connections to points throughout central New Hampshire and beyond pass through Wolfeboro. These major roadways are in many places located in close proximity to local water resources. The town is at risk of an overland hazardous material spill that could cause infiltration of spilled hazardous materials into the water resources.

DROUGHT/WATER SHORTAGE**Location:** State-wide**Specific Areas of Concern:** Municipal Water System, private wells, Populations to Protect, Hospital, local businesses**Probability of Occurrence:** Moderate**Vulnerability:** Moderate**Impact:** Moderate**Overall Risk:** Moderate

There have been five droughts in New Hampshire during the last eighty years. Residents and visitors have ready access to the various lakes around town and can cool off. In past years there were concerns regarding the limited capacity of the municipal water system. These issues have been addressed and are no longer a major concern of the community.

MASS CASUALTY INCIDENT**Location:** Local**Specific Areas of Concern:** Populations to Protect, especially schools, Police, Hospital**Probability of Occurrence:** Moderate**Vulnerability:** Moderate**Impact:** Moderate**Overall Risk:** Moderate

While no one wants to think that it could happen in their small town, the potential exists that there are some few individuals that wish to do harm to others in the community. Most of the schools in town are quite visible, accessible, and home to the town's most vulnerable population.

MOTOR VEHICLE ACCIDENT INVOLVING HAZARDOUS MATERIALS**Location:** Localized**Specific Areas of Concern:** Various locations where local roads and state routes run close to sources of water, Infrastructure, Municipal water supply**Probability of Occurrence:** Moderate**Vulnerability:** Moderate**Impact:** Moderate**Overall Risk:** Moderate

Oil spills along many of the routes in Wolfeboro could result in the contamination of numerous wells or Lake Winnepesaukee or Lake Wentworth. In addition to distributing fuel to central locations in the region, tankers travel throughout the area daily to deliver home heating fuel. Most oil tankers have the capacity to carry 10,000 gallons of home heating oil. The Wolfeboro Fire Department has enough spill containment equipment to control a small spill, but would need to call upon the state's spill response team if a spill is large or if it is near a water body, regardless of the size.

INTENTIONAL WATER CONTAMINATION**Location:** Local**Specific Areas of Concern:** Downtown waterfront, Municipal water supply, private wells**Probability of Occurrence:** Low**Vulnerability:** Moderate**Impact:** High**Overall Risk:** Moderate

The potential does exist for intentional contamination of water supplies. This could very quickly impact the tourism economy along with being a risk to public health. It could quickly impact the schools and hospital. There is a security plan for the watershed and for the treatment facility. NH HSEM has conducted a security audit of the water treatment building.

DAM FAILURE**Location:** Localized**Specific Areas of Concern:** NH Route 28**Probability of Occurrence:** Low**Vulnerability:** Moderate**Impact:** Moderate**Overall Risk:** Moderate

Another source of potential flooding is associated with a dam break at any of the twelve active dams in Wolfeboro. Dams in New Hampshire are classified by the New Hampshire Department of Environmental Services Dams Bureau. The four classifications (C, B, A, AA) for dams are based on the potential losses associated with a dam failure. Class B and C dams have the highest potential for damage; this could include the loss of life and damage to state or city roadways. Crescent Lake dam is Class C, the Rust Pond and Sewage Lagoon dams are Class B. All other dams in Wolfeboro are Class A (Low Hazard) or AA (Non-Menace).

The major concern of the committee centered on Rust Pond dam, not so much because of its rating but more because of its location and potential for washout of NH Route 28, a major evacuation route to the southeast. The Rust Pond Association has designated monitors and posts a Dam Emergency Action Plan on its website.⁴¹ The town owns and maintains the other two dams and each has a Dam Emergency Action Plan.

WOODLAND FIRE**Location:** Regional**Specific Areas of Concern:** Northern section of town, Limited access roads**Critical Facilities:** Fire Department**Probability of Occurrence:** Low**Vulnerability:** Moderate**Impact:** Moderate**Overall Risk:** Moderate

⁴¹ Rust Pond Association <http://home1.gte.net/~vze3djdz/rustpond/damep4.html>, June 1, 2012.

Most communities in the region are heavily wooded; Wolfeboro is no exception. However, most of the fires in the state are limited to less than an acre. In Carroll County both the number of fires and the acres burned have been dropping nearly every year since 2007, with less than ten acres burning each year.⁴² The Fire Chief noted that most of the fuel from the ice storms of 1998 and 2008 no longer pose a big threat as dry fuel. Relatively few homes and businesses are located in the northern (more susceptible to wildfire) part of town.

HAZARDOUS MATERIALS (FIXED)**Location:** Localized**Specific Areas of Concern:** Heating oil facilities and hardware store on Back Bay, Gas stations**Probability of Occurrence:** Low**Vulnerability:** Moderate**Impact:** Moderate**Overall Risk:** Moderate

Caution must always be exercised when handling fuels, especially around sources of water. It is important to ensure that overflow containment systems are in place and best management practices are being followed. It was noted that some of the pesticides, fertilizers, and other chemicals stored in downtown businesses might get into the surface water when the water level in Back Bay rises. Discussing temporary storage options with business owners might further reduce the risk of this hazard.

⁴² NH Division of Forests and Lands <http://www.nhdf.org/fire-control-and-law-enforcement/fire-statistics.aspx>, June 2, 2012.

CHAPTER IV: VULNERABILITY ASSESSMENT

A. CLASSIFICATION OF CRITICAL INFRASTRUCTURE

A list of critical infrastructure for the town of Wolfeboro was identified by the Committee (Table XII). The complete list with locations, classifications, and values is in Appendix H. The critical infrastructure list is divided into four categories, 1) Essential Services; 2) Structures and Services; 3) Primary and Secondary Shelters; 4) Populations to Protect; and 5) Other. The first category contains facilities essential in a hazard event. The second contains essential facilities that have been identified by the Committee as facilities to protect in order to minimize additional risk to hazards. The third category is a list of the pre-defined emergency shelters within the community. The fourth category contains populations that the Committee wished to protect in the event of a disaster. The fifth category includes water access areas and fueling facilities. The Public Safety Complex serves as the Emergency Operations Center; the Municipal Electric Facility is the secondary EOC.

Table XII – Wolfeboro Critical Facilities

Facility/Infrastructure	Location	Generator	Shelter Capacity
Essential Services			
Public Safety Complex/EOC	251 S Main St	Yes	
Town Hall and Annex	84 Main St./ 9 Union St	No	
Highway Department	47 Pine Hill Rd	Partial	
Water Treatment Plant	North Line Rd Ext	Yes	
Wastewater Treatment Plant	Filter Bed Rd	Yes	
Municipal Electric Department/EOC	133 Middleton Rd	Yes	
Huggins Hospital & Medical Arts	240 S Main St	Yes	
Electric Substation #1	Filter Bed Rd	No	
Electric Substation #2	Filter Bed Rd	No	
New England Telephone substation	corner of Glendon St & School St		
Structures and Services			
Cellular phone tower - Bennett Hill	on Bennett Hill	Yes	
Cellular phone tower - Lehner Street	Lehner St	Battery	
Cellular phone tower - Pierce Camp Birchmont	Pierce Camp Birchmont	Battery	
Cellular phone tower - water tower	5 Main St	Yes	
Huggins Hospital Communications Antenna	240 S Main St		
Crescent Lake Dam			
Rust Pond Dam			
Sewage Lagoon Dam	Filter Bed Rd		
NH Route 28 (Evacuation)			
NH Route 109 (Evacuation)			
WASR tower	Varney St		
Water Storage	16 McManus Road		
Rapid Infiltration Basin (RIB)		No	
Solid Waste Facility	400 Beech Pond Rd		
LR Hazardous Product Facility	404 Beech Pond Rd		
Pop Whalen/Abenaki Ski Area	NH Route 109A	No	
Penn Air Estates	Penn Air Rd		

Facility/Infrastructure	Location	Generator	Shelter Capacity
Emergency Shelters			
Kingswood School Complex	396 South Main Street	Partial	See note 2
All Saints Episcopal Church	258 South Main Street	No	200
Brewster Academy Complex	80 Academy Drive	Partial (main campus)	See note 1
Carpenter School	102 South Main	No	300
Crescent Lake School	75 McManus Road	No	1000
First Congregational Church	115 South Main	No	300
First Christian Church	83 North Main Street	No	100
Special Populations			
Christian Ridge	20 Crescent Lake Ave		
Inquisitive Child Day Care	Lehner St		
Sugar Hill Retirement Community	83 Rolling Wood Dr		
Wolfeboro Bay Care and Rehabilitation	39 Clipper Rd		
Taylor Community	11 Taylor Dr		
The Ledges	67 Center St		
Wolfeboro Area Children's Center	180 S Main St		
Wolfeboro Nursery School	32 Central Ave		
Pierce Camp Birchmont	693 Governor Wentworth Highway		
Camp Bernadette	93 Richards Rd		
Wolfeboro Camp School	Camp School Rd	Yes	
Other			
Sawmill Boat Club	Bay Street		
Fuel stations			
Mast Landing	3 Silver Street St		
Town docks/ Dockside Facility	S Main St and Railroad Ave		
Goodhue & Hawkins Navy Yard	244 Sewall Rd		
Dock at the Libby Museum	755 N. Main St		
Wolfeboro Corinthian Yacht Club/ Irwin Marine	12 Nancy's Way		
Wolfeboro Oil (heating oil)	Railroad Avenue		
Wolfeboro Oil (diesel fuel)	Lehner Street		
Wolfeboro Oil (propane)	Wickers Drive		

NOTE: 1 USED FOR STUDENTS AND STAFF DURING SCHOOL YEAR

Partial / life safety only 1,500

NOTE 2: ** CURRENTLY UNDER CONSTRUCTION NOT USEABLE

Partial / life safety only 1,500

Middle School

Yes 1,500

B. ESTIMATING POTENTIAL LOSSES

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

The critical facilities identified in Wolfeboro have a combined assessed value of \$214,937,708. However, this does not include contents and does not necessarily reflect the cost of full replacement. Also not reflected in this assessment is the value of built infrastructure such as streets, bridges, curbs, sidewalks, drainage, and utility transmission lines. These values can also be used to determine potential loss estimates in the event that a natural or manmade hazard damages a part of or an entire facility. The estimates were generated by the town assessor and are based on property tax documentation. Many of the facilities listed here are privately owned but represent service that the Committee considered to be essential in terms of mitigating vulnerability to hazards, such as the provision of medical services and communications. A listing of Wolfeboro's critical facilities can be found in Appendix H.

The assessed value of Wolfeboro's 3,436 parcels of land with residential buildings is \$1,636,883,700, resulting in a median residential value of \$275,850. The value of the town's 231 commercial/industrial properties (land and buildings) is \$124,934,000.

CHAPTER V: MITIGATION STRATEGIES

A. STATE OF NEW HAMPSHIRE HAZARD MITIGATION GOALS⁴³

The State of New Hampshire Natural Hazard Mitigation Plan prepared and maintained by the New Hampshire Homeland Security and Emergency Management (NH HSEM), sets forth the following overall hazard mitigation goals for the State of New Hampshire:

- I. To improve upon the protection of the general population, the citizens and guests of the State of New Hampshire, from all natural and human-caused hazards.
- II. To reduce the potential impact of natural and human-caused disasters on the State's Critical Support Services, Critical Facilities, and Infrastructure.
- III. To improve the State's Emergency Preparedness, Disaster Response, and Recovery Capability in all New Hampshire communities.
- IV. To reduce the potential impact of natural and human-caused disasters on the State's economy, environment, historical & cultural treasures, and private property.
- V. To identify, introduce and implement cost effective Hazard Mitigation measures in order to accomplish the State's Goals.
- VI. To reduce the State's liability with respect to natural and human-caused hazards generally.
- VII. To address the challenges posed by climate change as they pertain to increasing risks in the State's infrastructure and natural environment.

B. WOLFEBORO, NEW HAMPSHIRE HAZARD MITIGATION GOALS

The Wolfeboro Hazard Mitigation Planning Committee concurs with the State Hazard Mitigation goals and has decided that the town goals from the 2007 plan are still appropriate. Based on the hazards studied, and the assessment of current and proposed mitigation strategies, the Committee recommends the following hazard mitigation goals for the town of Wolfeboro:

Goal I: Community and Resources Protection: Reduce the potential impact of natural and man-made hazards on the town's residents and visitors, as well as its critical facilities, property, economy, and natural resources, while improving the emergency communication, alert, and response systems.

Goal II: Public Education: Improve public awareness and knowledge of hazard preparedness and impacts of potential hazards, while increasing the public's involvement in emergency response and recovery.

Goal III: Inter/Intra Departmental Coordination: To build an awareness of hazard mitigation efforts through coordination within Wolfeboro, and between other communities, the region,

⁴³ <http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hmp-chapter-7.pdf>, pages VII-1&2.

state, and federal government agencies, and related organizations, while engaging in planned prevention through further consideration of hazard mitigation in the local land use process.

Goal IV: Damage Prevention and Reduction: Continue to develop methods to identify specific hazard areas and populations vulnerable to hazards to minimize the resultant public and private expenditures and damage.

C. CURRENT PLANS, POLICIES, AND REGULATIONS

The planning decisions that affect community growth patterns have evolved over the years as the population and demographics in Wolfeboro have grown and changed. Many local programs have the effect of mitigating disasters; some of these have been in effect for years, others have been implemented as a result of the 2007 Hazard Mitigation Plan. A review of existing mitigation strategies was conducted and included review of pertinent documents including the zoning ordinance, subdivision regulations, emergency management plan, site plan regulations, and discussion with Committee members. Input from the Town Planner was particularly useful. The following strategies detail existing plans and regulations related to hazard mitigation.

Type of Existing Protection	Description	Area Covered	Enforcement	Source
Building Codes				
	Construction must conform to the following: the 2009 International Building, Residential, Energy Conservation, Plumbing, and Mechanical Codes with amendments, the 2011 National Electrical Code, and the 2003 Life Safety Code	Town wide	Code Enforcement Officer	
Zoning Ordinance				
	Prohibits land use or structure from generating hazardous and toxic waste without permit from the Planning Board.	Town wide	Planning Board	Zoning Chapter 175-48
	All construction new, remodeled, or renovated shall maintain a setback of 75 ft from very poorly drained soils and 50 feet from surface water.	Town wide	Planning Board & Code Enforcement Officer	Zoning Chapter ARTICLE II, Wetlands Conservation Overlay District Section 175-3 -10
	Specific characteristics identifying hazardous conditions involving excessive slope, where development is prohibited.	Site specific	Planning Board	Steep slope ordinance was adopted March 2012.
	Ensure that development projects comply with the existing mitigation strategies of the subdivision regulations, site plan review, and building codes.	Town-wide	Planning Board	
Flood Hazard Mitigation				
	Regulations to minimize impact of flooding of structures, utilities, and other facilities, which can occur in identified Special Flood Hazard Areas (SFHA).	Site Specific; Refer to flood maps	Planning Board	Site Plan Review Regs, Chapter 65, FLOODPLAIN MANAGEMENT was updated March 2012

Type of Existing Protection	Description	Area Covered	Enforcement	Source
	The High Hazard and Significant Hazard dams are evaluated on a regular basis and during high water events.	Areas near and downstream from dams	EMD	
	Dam Emergency Action Plans are reviewed annually and updated as needed.	Areas near and downstream from dams	EMD	
National Flood Insurance				
	Member since 1989.	35 policies written	Planning Board & Code Enforcement Officer	Revisions were adopted in 2012
Wetlands Conservation Overlay District				
	Regulating the use of land and development to prevent the destruction of or significant changes to wetlands.	Soil specific	Planning Board & Code Enforcement Officer	Zoning Chapter ARTICLE II, Wetlands Conservation Overlay District Section 175-3 -10
Storm Water Drainage				
	All developments must have storm water facilities that conform to 2, 5 and 50 year storm event standards. Post-development equal to or less than pre-development runoff	Project specific	Planning Board	Site Plan Review Regs, 10, Subdivision Regulations, 14
Municipal Electric Department				
	Right-of-way tree clearing of power lines to reduce risk of power outages; one-tenth of town's lines are cleared annually; NESC C2-2002 construction standards	Town-wide	Municipal Electric Department	
Emergency Action Plan				
	Identifies individuals to assist in the Comprehensive Hazard Analysis; a hazard mitigation document		Emergency Management Director	Emergency Management Plan, O-1
Fire-Rescue Department				
	Members attending training that included firefighter certification, technical rescue, infection control, hazardous material decontamination, building/fire code seminars, responding to terrorist attack, and incident management		Chief of Fire-Rescue Department	
	Fire Warden, Fire Department, and the NH Division of Forests & Fire Lands work collaboratively to reduce the risk and frequency of wildland fires.	New and existing structures		
Treated Effluent Storage Pond				
	Measures taken to reduce the volume in the lagoon; studies being conducted to maximize spray fields	Existing structures		
	Contingency Plan consists or reasonably foreseeable emergencies that could occur.			

Type of Existing Protection	Description	Area Covered	Enforcement	Source
Water Management				
	Inspections are conducted to identify leaks in the municipal water network.	site-specific	Department of Environmental Services	
	There is a Water Conservation Plan in place for low water years.	Town-wide	DPW head	
Backup Power				
	Require periodic testing of all Essential Services backup power systems.	Town Departments	Department heads	
Building Codes				
	Ensure the fire code enforcement is occurring.	Town-wide	Fire Chief & CEO	
Education/Outreach				
	Educate public in best practice methods to help themselves and neighbors in a post-hazard scenario.	Town-wide	EMD	
	Educate residents on best methods to protect their heating, cooling, electrical, and water systems.	Town-wide	EMD	
Preparedness Training				
	Emergency Services personnel participate in NIMS training.	Town-wide	EMD	
Regional and Departmental Coordination				
	Mutual Aid agreements are maintained for Police and Fire assistance.	Town-wide	EMD	
	The Municipal Water Department and NH DES meet annually to review effective methods for protecting the town's water supply.	Areas connected to municipal water	DPW head	
All Health Hazard Planning				
	The Public Health Region Coordinating Committee meets regularly to review and update the Emergency Preparedness Plan.	Town-wide	EMD	
Review and update of Plans				
	The CERP meets quarterly to review the HMP and update the EOP each spring.	Town-wide	EMD	
	Maintenance of the Hazard Mitigation Plan is a Master Plan recommendation.	Town-wide	Planning Board	

D. IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

The committee noted that several mitigation strategies from the 2007 Hazard Mitigation Plan have been completed or are no longer applicable due to changes in local circumstances. The status of the mitigation actions recommended in the 2007 plan is indicated in Table XIII as either, Completed, Deleted, or Deferred. The Committee noted that more than half of the recommended Actions have either been completed or should be deleted. Many 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 XIV). Action #17 is in the final phase of implementation and should be completed by the time this Update is completed; therefore it was not carried over into Table XIV.

Table XIII. Status of Mitigation Actions from the 2007 Wolfeboro Hazard Mitigation Plan

	Project	Responsible Parties	Status
1	Identify which transportation routes and areas of town are vulnerable to natural hazards and a mass evacuation event.	Public Works Director, Town Planner	Deferred and expanded to identify specific projects
2	Require periodic testing of all Essential Services backup power systems.	Fire Dept, Police Dept, Municipal Electric	Completed. This existing policy is done on weekly basis.
3	Establish a backup EOC in case the Public Safety Building is incapacitated; armory.	EMD	Completed (Municipal Electric Facility)
4	Purchase a backup power source for the Critical Facilities, Shelters, and cooling centers.	EMD, Selectmen, Town Manager	This has been partially completed. The EOC has back up power. The shelters have very limited emergency power.
5	Create a town-wide alert system using reverse-911.	EMD, Fire Dept, Police Dept	Deferred, pending state legislation on this topic.
6	Establish a town-wide Emergency Alert System to be broadcast via radio and television.	EMD, Fire Dept, Police Dept, Community TV	Delete from this document; it is now in the Emergency Operations Plan (EOP).
7	Purchase a mobile communications center that can travel to remote areas of the town and act as a backup to the Public Safety communication system.	EMD, Fire Dept, Police Dept, Town Manager, Selectmen	Delete. This capacity already exists through county and state partners.
8	Evaluate vulnerability of flat roofs on critical facilities.	Town Planner, Building Inspector	Deferred – Action modified
9	Purchase commercial irrigation equipment, a pump, and generator to spread treated effluent.	Public Works Director, Wastewater Treatment Director, Selectmen, Town Manager	Delete. The new Rapid Infiltration Basin Wastewater Treatment system is no longer a concern.
10	Ensure the fire code enforcement is occurring.	Fire Chief	Completed.
11	Upgrade limited access roads, identified by the Hwy Department, that provide access to remote areas and recent developments, including Pleasant Valley Rd, New Garden Rd, Brackett Rd, and Orchards Rd.	Town Planner, Public Works Director	Work is complete on Pleasant Valley and Orchards Roads. The other roads are no longer a concern.
12	Create a public announcement system to notify homeowners that snow load estimates are at a potentially damaging weight.	EMD, Fire Dept, Police Dept, Community TV	Delete from this document; it is now in the Emergency Operations Plan (EOP).

	Project	Responsible Parties	Status
13	Conduct a town-wide inventory of citizen and contractor skills to provide support to all Wolfeboro emergency service departments.	Committee for Emergency Response Planning (CERP)	Delete from this document; it is now in the Emergency Operations Plan (EOP).
14	Educate public in best practice methods to help themselves and neighbors in a post-hazard scenario.	EMD, CERP, Local Media	Completed. This is being done through the town website.
15	Formulate a water conservation study and educate the public on water conservation methods.	Water Treatment Department, Town Manager, Selectmen	Completed. There is a Water Conservation Plan in place for low water years. Additional information from DPW.
16	Educate residents on best methods to protect their heating, cooling, electrical, and water systems.	EMD, Public Works Director, Local Media	Completed. This is being done through the town website.
17	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.	Town Planner, Fire Dept, Police Dept	This is in the final stages of review and edit and is on track to be completed by the summer of 2012.
18	Initiate in-house departmental NIMS training lead by those who are certified.	Town Administrator, Board of Selectmen	Deferred. Staffing and training capacity have been issues.
19	Establish an emergency gathering area where local and regional people could receive food, water, and medical attention.	EMD, School Dept, Selectmen	Delete from this document; it should be part of the Emergency Operations Plan (EOP).
20	Continue multiple Mutual Aid agreements including Police, Fire, and Public Works.	Fire Dept, Police Dept, Public Works Department	Completed. Most of these are existing policies. Public Works does not have written agreements; this should be reviewed as part of the updated plan.
21	Create inter-departmental documentation of training needs.	All Departments	Delete from this document; it should be part of the Emergency Operations Plan (EOP).
22	Cross training and retraining of emergency responders and departmental staff.	All Departments	Delete from this document; it should be part of the Emergency Operations Plan (EOP).
23	Create a "calling-tree" communication network to increase the efficiency of communicating emergency information between departments and townspeople.	EMD, All Departments	Deferred. A partial "calling tree" network exists. In the updated plan "townspeople" should be changed to "town officials".
24	Continue updating the All Hazards Mitigation Plan, which will lead to an update of the Emergency Management Plan.	CERP	Completed. The existing policy is that the committee meets quarterly to review the HMP and the EOP is updated each spring.
25	Update and formulate a plan for the town to maintain the Road Surface Management System (RSMS) database to evaluate condition of vulnerable culverts and bridges.	Public Works Department	Deferred. An RSMS database exists for roads; it should be expanded to include the bridges and culverts.
26	Revision of site plan review regulations to require underground cables in all new subdivision developments.	Town Planner, Planning Board, town Manager, Selectmen	Delete. The committee currently views this action as having very limited benefit and adding a burdensome cost to residents and businesses.

	Project	Responsible Parties	Status
27	Continue to provide emergency responders with additional hazardous materials training.	Fire Dept, Police Dept, Public Works Department	Delete from this document; it should be part of the Emergency Operations Plan (EOP).
28	Continue to work with the Regional Pandemic Planning Committee in developing an Emergency Preparedness Plan for all hazards, which includes infectious disease.	EMD, Regional Pandemic Planning Committee	Completed. This is an existing policy; the group meets at least once a year.
29	Work with NHDES and the Municipal Water Department on determining effective methods of protecting Wolfeboro's water supply.	Town Planner, Selectmen, NH DES, Municipal Water Department	Deferred. The policy needs to be upgraded and implemented
30	Work with NHDES and the Municipal Water Department to locate alternative/redundant water sources.	Town Planner, Selectmen, NH DES, Municipal Water Department	Delete. Water shortage is no longer a major concern as pipes are now checked regularly for leaks.
31	Work with NHDES to ensure that High Hazard and Significant Hazard dams are evaluated at state recommended intervals.	EMD, Selectmen, NH DES, Municipal Water Department	Completed. The existing policy is to evaluate the dams annually.
32	Work with NHDES to ensure Emergency Action Plans for High Hazard and Significant Hazard dams reflect current potential property damage and are reviewed annually.	EMD, Selectmen, NH DES, Municipal Water Department	Completed. The existing policy is to evaluate the plans annually.
33	Include a recommendation in the Master Plan to maintain the Hazard Mitigation Plan.	Town Manager, Selectmen, Town Planner	Completed. This was included in the 2007 Master Plan.
34	Update sewage lagoon system to reduce volume; fixing in-flow leakage.	Public Works Director, Wastewater Treatment Director, Selectmen, Town Manager	Completed.
35	Install redundant power supply to provide alternative feed to Main Street area to supply Public Safety Building, High School complex, Crescent Lake School, Wolfeboro Area Children's Center, Brewster Academy, and Huggins Hospital.	Municipal Electric Department, Town Manager, Selectmen	Completed in 2008. The High School complex is not part of this feed and there are no plans for this to be part of it in the near future.
36	Replace above ground electric and communication cables with underground cables for protection in all new homes and in downtown from Pickering Corner north to Friend Street.	Municipal Electric Department, Town Manager, Selectmen, Town Planner	Delete. The committee currently views this action as having very limited benefit and adding a burdensome cost to residents and businesses.
37	Install redundant supply feeds from other towns, as alternative to singular feed from Tuftonboro.	Municipal Electric Department, Town Manager, Selectmen, PSNH	Deleted. No longer a feasible priority.
38	Continue inspection of dams during high water events by municipal staff.	EMD, available Emergency Service staff and volunteers	Completed. The existing policy is to inspect these dams during high water events and take appropriate action.

	Project	Responsible Parties	Status
39	Upgrade and maintain the water system main lines, identified by the DPW, to reduce potable water loss in the areas of North and South Main St from Pickering Corner to the Lakeview Inn, including Pleasant St & Oak St; and off North Main St in the Port Wedlen and Robin Acres Subdivisions.	Town Water Department, Town Manager, Town Planner	Delete from the Update. The Committee determined that this is not a Hazard Mitigation issue.
40	Update vulnerable culverts and bridges, identified by the DPW, on Pleasant Valley Rd and adjacent roads, Bay St, Cross Rd, North Main St from Mill St to Oak St (on state owned road but town is responsible for drainage).	Public Works Director	Pleasant Valley Road is complete. Other sections are deferred and expanded to address specific projects.
41	Continue right-of-way tree clearing to reduce power outages.	Public Works Director, Municipal Electric Department	Completed. The existing policy is to address one-tenth of the town each year. It was pointed out that tree trimming for road right-of-way purposes is an issue that should be considered in the new actions.
42	Ensure that development projects comply with the existing mitigation strategies of the subdivision regulations, site plan review, and building codes.	Planning Board, Town Planner, Public Works Director	Completed. This existing policy coupled with regular review and update of these planning documents helps reduce the likelihood of hazards impacting structures in the town.
43	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.	Town Manager, Selectmen, Town Planner, Planning Board	Deferred. There were some concerns about this being an excessive burden.

The use of multiple brainstorming sessions yielded an updated list of recommended mitigation strategies (Table XIV). These strategies can be used to reduce the effects of hazards on both new and existing buildings and infrastructure of the community. Committee members were also asked to identify which goals and type of mitigation action each Action addressed and then estimate the cost of implementation. This last element could be reported either in dollar amounts or in terms of hours of staff time.

Table XIV: Recommended Mitigation Strategies

Key: CRP – Community and Resources Protection PE – Public Education
 IDC – Inter/Intra Departmental Coordination DPR – Damage Prevention and Reduction

Project ID	Hazard	Project	Mitigation/Response	Goal	Type of Mitigation Action	Estimated Cost	Existing/ New Structure
1	Transportation incident near sensitive environment	Improve the intersection of Center and Lehner Streets (dangerous intersection with hazardous materials in the vicinity).	M	CRP	Protect Emergency Services (long-term continuity)	Phase I: \$200,000 Total: \$2 Million	E
2	Transportation incident near sensitive environment	Evaluate alternatives to improve the turn on NH Route 28 in South Wolfeboro at Weston's Auto Body.	M	CRP	Protect Emergency Services (long-term continuity)	\$ 0 - Staff Time	E
3	Transportation incident near sensitive environment	Conduct a study to improve the intersection of North Line Road and NH Route 28.	M	CRP	Protect Emergency Services (long-term continuity)	\$50,000	E
4	Transportation incident near critical facilities	Adopt an alternative routing plan within the Village Core.	M	CRP	Protect Emergency Services (long-term continuity)	\$10,000	E/N
5	Severe Winter Weather	Collate existing data on the vulnerability of flat roofs on critical facilities.	M	DPR	Protect Emergency Services (long-term continuity)	\$0 - Staff	E
6	Drought	Formulate a water conservation study and educate the public on water conservation methods.	M	DPR PE	Public Education and Awareness	\$3,000/ year	E/N

Project ID	Hazard	Project	Mitigation/ Response	Goal	Type of Mitigation Action	Estimated Cost	Existing/ New Structure
7	All Hazard	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.	M	IDC	Protect Emergency Services (long-term continuity)	\$0 - Staff	E/N
8	All Hazard	Implement an Asset Management system for tracking the condition and planning the maintenance of bridges and culverts.	M	DPR	Protect Emergency Services (long-term continuity)	\$18,000	E/N
9	Water Contamination	Work with NHDES and the Municipal Water Department on upgrading and implementing the town's policy for protecting its water supply.	M	CRP	Protect Emergency Services (long-term continuity)	50 hours of Staff time	E/N
10	Flooding, Washout, Erosion	Update vulnerable culverts and bridges on Cross Road.	M	CRP	Control the hazard (Structural Projects)	>\$50,000	E
11	High Winds	Develop and implement a tree trimming policy for road right-of-way purposes and to eliminate hazards.	M	CRP	Property Protection	100 hours of Staff time	E/N
12	All Hazard	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.	M	PE CRP	Prevention	\$0 - Staff time	N
13	Flooding, Washout, Erosion	Upgrade the drainage system on Beech Pond Road from Boucher Hill to Nelson Hill. This is a 2,000' gravel section between two paved hills. Need to upgrade drainage and pave.	M	CRP	Control the hazard (Structural Projects)	\$220,000	E/N
14	Flooding, Washout, Erosion	Upgrade drainage system along North Main Street from Lakeview to Mill Street due to the age of the system.	M	CRP	Protect Emergency Services (long-term continuity)	\$600,000	E/N
15	Flooding, Washout, Erosion	Mitigate flooding issues on Center Street from Pickering Corner to Grove Street. Upgrade culverts per the existing drainage study.	M	CRP	Protect Emergency Services (long-term continuity)	> \$1 Million	E/N

Project ID	Hazard	Project	Mitigation/Response	Goal	Type of Mitigation Action	Estimated Cost	Existing/New Structure
16	Flooding, Water Contamination	Conduct outreach to local businesses regarding floodproofing, especially those that may be storing hazardous materials. Outreach from EMD with DES guidelines for storage and containment.	M	PE CRP	Public Education and Awareness	< 50 hours Staff time	E/N
17	Severe Winter Weather	Repair the roof on the fire station garage (hardening of critical facility)	M	CRP	Protect Emergency Services (long-term continuity)	\$350,000	E
18	Flooding, Washout, Erosion	Ensure that roads on which there is new development meet town road standards.	M	CRP	Prevention	\$0	N
19	All Hazard	Be prepared to notify residents in the event of an emergency through mobile signage (electronic message board).	M	PE	Public Education and Awareness	\$10,000	E/N
20	All Hazard	Notify residents of emergency preparedness steps that they can take to reduce the likelihood of loss of life or property (various methods of notification).	M	PE	Public Education and Awareness	< \$500	E/N
21	All Hazard	Ensure that the Town Fueling Station can be used during a power outage.	M	CRP	Protect Emergency Services (long-term continuity)	<\$10,000	E
22	All Hazard	Ensure that back-up power is available at designated shelters.	R	CRP	Protect Emergency Services (long-term continuity)	< \$10,000	E
23	All Hazard	Create a town-wide alert system using reverse-911.	R	IDC PE	Public Education and Awareness	< \$10,000	E/N
24	All Hazard	Initiate departmental NIMS training.	R	IDC		\$0 Staff time	E/N
25	All Hazard	Create a "calling-tree" communication network to increase the efficiency of communicating emergency information between departments and town officials.	R	IDC		50 hours of Staff time	E/N
26	All Hazard	Improve sheltering capacity during a power outage.	R	CRP	Public Education and Awareness	\$0 - Staff time	E/N

These strategies were then prioritized using the STAPLEE method, which analyzes Social, Technical, Administrative, Political, Legal, Economic, and Environmental feasibility and benefits of a project and is commonly used by public administration officials and planners to make planning decisions. Higher priority is placed on recommendations that received a higher STAPLEE score, with the maximum score being 21. Though a number of recommended mitigation actions received high scores, the time frame for which the actions are executed are dependent on staff time and budgetary limitations. Table XV represents the score given to each mitigation action by the Committee. The STAPLEE prioritization rankings for each ranking criterion can be found in Appendix I.

Table XV. Recommended Mitigation Actions by Hazard and in Ranked Order

Hazard	Project	Mitigation/ Response	Type of Mitigation Action	Estimated Cost	Existing/ New Structure	STAPLEE
Drought	Formulate a water conservation study and educate the public on water conservation methods.	M	Public Education and Awareness	\$3,000/ year	E/N	21
Flooding, Washout, Erosion	Update vulnerable culverts and bridges on Cross Road.	M	Control the hazard (Structural Projects)	>\$50,000	E	21
Flooding, Water Contamination	Conduct outreach to local businesses regarding floodproofing, especially those that may be storing hazardous materials. Outreach from EMD with DES guidelines for storage and containment.	M	Public Education and Awareness	< 50 hours Staff time	E/N	19
Flooding, Washout, Erosion	Upgrade the drainage system on Beach Pond Road from Boucher Hill to Nelson Hill. This is a 2,000' gravel section between two paved hills. Need to upgrade drainage and pave.	M	Control the hazard (Structural Projects)	\$220,000	E/N	18
Flooding, Washout, Erosion	Upgrade drainage system along North Main Street from Lakeview to Mill Street due to the age of the system.	M	Protect Emergency Services (long-term continuity)	> \$1 Million	E/N	17
Flooding, Washout, Erosion	Mitigate flooding issues on Center Street from Pickering Corner to Grove Street. Upgrade culverts per the existing drainage study.	M	Protect Emergency Services (long-term continuity)	\$600,000	E/N	17

Hazard	Project	Mitigation/ Response	Type of Mitigation Action	Estimated Cost	Existing/ New Structure	STAPLEE
Flooding, Washout, Erosion	Ensure that roads on which there is new development meet town road standards.	M	Prevention	\$0	N	10
High Winds	Develop and implement a tree trimming policy for road right-of-way purposes and to eliminate hazards.	M	Property Protection	100 hours of Staff time	E/N	21
Severe Winter Weather	Collate existing data on the vulnerability of flat roofs on critical facilities.	M	Protect Emergency Services (long-term continuity)	\$0 - Staff	E	21
Severe Winter Weather	Repair the roof on the fire station garage (hardening of critical facility)	M	Protect Emergency Services (long-term continuity)	\$350,000	E	21
Transportation incident near critical facilities	Adopt an alternative routing plan within the Village Core	M	Protect Emergency Services (long-term continuity)	\$10,000	E/N	21
Transportation incident near sensitive environment	Evaluate alternatives to improve the turn on NH Route 28 in South Wolfeboro at Weston's Auto Body.	M	Protect Emergency Services (long-term continuity)	\$ 0 - Staff Time	E	21
Transportation incident near sensitive environment	Conduct a study to improve the intersection of North Line Road and NH Route 28.	M	Protect Emergency Services (long-term continuity)	\$50,000	E	21
Transportation incident near sensitive environment	Improve the intersection of Center and Lehner Streets (dangerous intersection with hazardous materials in the vicinity).	M	Protect Emergency Services (long-term continuity)	Phase I: \$200,000 Total: \$2 Million	E	20
Water Contamination	Work with NHDES and the Municipal Water Department on upgrading and implementing the town's policy for protecting its water supply.	M	Protect Emergency Services (long-term continuity)	50 hours of Staff time	E/N	21

Hazard	Project	Mitigation/ Response	Type of Mitigation Action	Estimated Cost	Existing/ New Structure	STAPLEE
All Hazard	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.	M	Protect Emergency Services (long-term continuity)	\$0 - Staff	E/N	21
All Hazard	Ensure that Town Fueling Station can be used during a power outage.	M	Protect Emergency Services	< \$10,000	E	21
All Hazard	Be prepared to notify residents in the event of an emergency through mobile signage (electronic message board).	M	Public Education and Awareness	\$10,000	E/N	21
All Hazard	Improve sheltering capacity during a power outage.	R	Public Education and Awareness	\$0 - Staff time	E/N	21
All Hazard	Notify residents of emergency preparedness steps that they can take to reduce the likelihood of loss of life or property (various methods of notification).	M	Public Education and Awareness	< \$500	E/N	21
All Hazard	Create a "calling-tree" communication network to increase the efficiency of communicating emergency information between departments and town officials.	R		50 hours of Staff time	E/N	21
All Hazard	Initiate departmental NIMS training.	R		\$0 Staff time	E/N	20
All Hazard	Implement an Asset Management system for tracking the condition and planning the maintenance of bridges and culverts.	M	Protect Emergency Services (long-term continuity)	\$18,000	E/N	19
All Hazard	Ensure that back-up power is available at designated shelters.	R		< \$10,000	E	19
All Hazard	Create a town-wide alert system using reverse-911.	R	Public Education and Awareness	< \$10,000	E/N	18
All Hazard	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.	M	Prevention	\$0 - Staff time	N	18

Cost to Benefit Review

The Wolfeboro HMP Committee considered 26 Action items. Those actions that cost the least amount or impart the highest benefit to the residents are not always the first Actions to be implemented. This simple benefit-to-cost review evaluates the Actions in a somewhat different manner and should also be considered by the town when working to complete the various recommended Actions.

\$10,000 or less

Sixteen mitigation actions in Table XV are estimated to cost less than \$10,000. Many of the \$0 Actions account for labor and in-kind costs to the respective town departments and utilize existing equipment. Minor costs may be incurred for copying, public notices, or legal review because these Actions are preformed by volunteers such as the Planning Board or by paid staff as part of their regular duties. Where possible, committee members estimated the number of hours required to complete the job.

The highest benefit for each Action item is dependent upon the chances of a hazard event occurring, the type of hazard, and its severity. However, the following may provide the best cost to benefit relationship.

- ❖ Notify residents of emergency preparedness steps that they can take to reduce the likelihood of loss of life or property (various methods of notification).
- ❖ 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.
- ❖ Be prepared to notify residents in the event of an emergency through mobile signage (electronic message board).

\$10,001 to \$50,000

Five mitigation actions in Table XV are estimated to cost between \$10,001 and \$50,000. The highest benefit for the cost again depends upon the chances of a hazard event occurring, the type of hazard, and its severity. The potential loss of life and property are very difficult to predict or quantify. However, the following may provide the best benefit to cost relationship within the medium cost category based on their capability to positively impact a large number of people.

- ❖ Update vulnerable culverts and bridges on Bay Street, and Cross Road.
- ❖ Ensure that Town Fueling Station can be used during a power outage.

Over \$50,000

Five mitigation actions in Table XV are estimated to cost more than \$50,000. Most of these projects are Capital Improvement projects and address the town's infrastructure. The highest benefit is difficult to anticipate; however, the following may provide the best benefit to cost relationship within this highest cost category based on their capability to positively affect a large number of people.

- ❖ Improve the intersection of Center and Lehner Streets (dangerous intersection with hazardous materials in the vicinity).
- ❖ Mitigate flooding issues on Center Street from Pickering Corner to Grove Street. Upgrade culverts per the existing drainage study.
- ❖ Repair the roof on the fire station garage (hardening of critical facility)

E. IMPLEMENTATION OF MITIGATION ACTIONS

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

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

In the context of these factors, the Committee discussed the mitigation actions and utilized the STAPLEE method as a guide to reach consensus regarding their relative level of priority, recognizing that some actions are of greater priority to different town departments. This implementation schedule contains a matrix (Table XVI) indicating the implementation time frame, parties responsible for bringing about these actions, and potential funding sources. Though a number of recommended mitigation actions received high scores, the time frame for which the actions are executed are dependent on 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.

All actions taken by the town shall comply with federal, state, and local standards.

Table XVI: Implementation Schedule for Mitigation Actions

Time	Action	Responsible Party	Estimated Cost	Potential Funding	Hazard	Type of Mitigation Action	Status/Notes
2012	Be prepared to notify residents in the event of an emergency through mobile signage (electronic message board).	DPW, BoS	\$10,000	Budget	All Hazard	Public Education and Awareness	
2012	Repair the roof on the fire station garage (hardening of critical facility)	DPW	\$350,000	Budget, HMPG	Severe Winter Weather	Protect Emergency Services (long-term continuity)	
2012	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.	BoS, Town Planner, Town Mgr.	\$0 - Staff	n/a	All Hazard	Protect Emergency Services (long-term continuity)	This is in the final stages of review and edit and is on track to be completed by the summer of 2012.
2012	Update vulnerable culverts and bridges on Cross Road.	DPW	> \$50,000	Budget. HMPG	Flooding, Washout, Erosion	Control the hazard (Structural Projects)	Cross Road is in the permitting stage
2012	Initiate departmental NIMS training.	EMD - Town Mgr., Huggins, CCPublic Health	\$0 Staff time	n/a	All Hazard		Staffing and training capacity have been issues. CCCPublic Health and Huggins Hospital may be able to provide assistance.
2012	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.	Planning	\$0 - Staff time	n/a	All Hazard	Prevention	
2012 and 2015	Mitigate flooding issues on Center Street from Pickering Corner to Grove Street. Upgrade culverts per the existing drainage study.	DPW	\$600,000	Budget. HMPG	Flooding, Washout, Erosion	Protect Emergency Services (long-term continuity)	Phase I is in preliminary design. Several businesses flood; the town's sewer pump stations are also located here and used to flood frequently.

Time	Action	Responsible Party	Estimated Cost	Potential Funding	Hazard	Type of Mitigation Action	Status/Notes
2013	Collate existing data on the vulnerability of flat roofs on critical facilities.	EMD/ CEO	\$0 - Staff	n/a	Severe Winter Weather	Protect Emergency Services (long-term continuity)	
2013	Improve sheltering capacity during a power outage.	EMD	\$0 - Staff time	n/a	All Hazard	Public Education and Awareness	Use Medical Reserve Corps (Carroll County) and Emergency Management Committee
2013	Work with NHDES and the Municipal Water Department on upgrading and implementing the town's policy for protecting its water supply.	DPW	50 hours of Staff time	n/a	Water Contamination	Protect Emergency Services (long-term continuity)	
2013	Create a "calling-tree" communication network to increase the efficiency of communicating emergency information between departments and town officials.	EMD - Town Mgr.	50 hours of Staff time	n/a	All Hazard		
2013	Implement an Asset Management system for tracking the condition and planning the maintenance of bridges and culverts.	DPW	\$18,000	T2	All Hazard	Protect Emergency Services (long-term continuity)	
2013, '14, '15, '16, '17	Notify residents of emergency preparedness steps that they can take to reduce the likelihood of loss of life or property (various methods of notification).	EMD	< \$500	Budget	All Hazard	Public Education and Awareness	Use the town website, WASR radio, and handout
2013, '14, '15, '16, '17	Conduct outreach to local businesses regarding floodproofing, especially those that may be storing hazardous materials. Outreach from EMD with DES guidelines for storage and containment.	EMD	< 50 hours Staff time	n/a	Flooding, Water Contamination	Public Education and Awareness	Post on website and use Chamber of Commerce.
2013, '14, '15, '16, '17	Ensure that roads on which there are new subdivisions meet town road standards.	FD, Planning	\$0	n/a	Flooding, Washout, Erosion	Prevention	Mitigated on a case by case basis
2013, '14, '15, '16, '17	Formulate a water conservation study and educate the public on water conservation methods.	DPW	\$3,000/ year	Budget	Drought	Public Education and Awareness	
2014	Evaluate alternatives to improve the turn on NH Route 28 in South Wolfeboro at Weston's Auto Body.	DPW, Town Manager	\$ 0 - Staff Time	n/a	Transportation incident near sensitive environment	Protect Emergency Services (long-term continuity)	Concept plans have been presented to stakeholders

Time	Action	Responsible Party	Estimated Cost	Potential Funding	Hazard	Type of Mitigation Action	Status/Notes
2014	Develop and implement a tree trimming policy for road right-of-way purposes and to eliminate hazards.	DPW	100 hours of Staff time	Budget	High Winds	Property Protection	
2014	Ensure that Town Fueling Station can be used during a power outage.	DPW	< \$10,000	Vehicle Fund, HMPG	All Hazard	Protect Emergency Services (long-term continuity)	Station needs upgrading
2014 and 2015	Improve the intersection of Center and Lehner Streets (dangerous intersection with hazardous materials in the vicinity).	DPW	Phase I: \$200,000 Total: \$2 Million	NH DOT	Transportation incident near sensitive environment	Protect Emergency Services (long-term continuity)	Working on Preliminary Design with NH DOT
2015	Adopt an alternative routing plan within the Village Core	DPW, Town Manager	\$10,000	Budget	Transportation incident near critical facilities	Protect Emergency Services (long-term continuity)	Concept plans have been presented to stakeholders, steering committee working on alternative
2015	Conduct a study to improve the intersection of North Line Road and NH Route 28.	DPW	\$50,000	NH DOT	Transportation incident near sensitive environment	Protect Emergency Services (long-term continuity)	High speed intersection
2016	Upgrade the drainage system on Beech Pond Road from Boucher Hill to Nelson Hill. This is a 2,000' gravel section between two paved hills. Need to upgrade drainage and pave.	DPW	\$220,000	Budget, HMPG	Flooding, Washout, Erosion	Control the hazard (Structural Projects)	Highly erodible gravel hill. It could be used as a cut through in emergency situations.
2017	Ensure that back-up power is available at designated shelters.	EMD	< \$10,000	Budget	All Hazard		Long term project
2017	Upgrade drainage system along North Main Street from Lakeview to Mill Street due to the age of the system.	DPW	> \$1 Million	Budget, HMPG, DOT	Flooding, Washout, Erosion	Protect Emergency Services (long-term continuity)	State highway
2017	Create a town-wide alert system using reverse-911.	EMD/Town Manager	< \$10,000	Budget, HMPG	All Hazard	Public Education and Awareness	Deferred, pending state legislation on this topic.

CHAPTER VI: PLAN ADOPTION AND MONITORING

A. IMPLEMENTATION

The Wolfeboro 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.

NH RSA 674:2(e) makes the recommendation that a natural hazard section may be included in the town master plan. Inclusion of this document as an addendum to the Wolfeboro Master Plan, following the process set forth in RSA 675:6, provides an opportunity for issues addressed in this plan to be taken into consideration when planning for development within the community.

A Capital Reserve Fund for Hazard Mitigation projects may be established to set aside funding for the projects identified in the Hazard Mitigation Plan. The Hazard Mitigation Committee will work with the Selectmen and Capital Improvements Plan (CIP) Committee to incorporate the various projects into subsequent budgets.

If mitigation actions involve either revisions to the Subdivision Regulations or development of regulations or standards, 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 2012 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 Wolfeboro 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 Wolfeboro Hazard Mitigation Plan every year or after a hazard event. Town of Wolfeboro Emergency Management Director is responsible for initiating this review and needs to consult with members of the Wolfeboro 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, best suggested time is mid-year, 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-2016 to begin updating this plan before it expires.

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

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

- ❖ Provide invitations to Budget Committee members;
- ❖ Provide invitations to municipal department heads;
- ❖ Post notices of meetings at the Town Hall, Fire Station, Library, and on the town website;
- ❖ Submit press releases for publication in the Granite State News and other appropriate newspapers or media outlets.

Entities to invite to future Hazard Mitigation plan updates include the Emergency Management Directors of the neighboring communities of Tuftonboro, Ossipee, Brookfield, New Durham, and Alton.

C. SIGNED CERTIFICATE OF ADOPTION

**Certificate of Adoption- Town of Wolfeboro
A resolution adopting the Wolfeboro Hazard Mitigation Plan Update 2012**

Plan dated: 2012

Conditionally approved: December 19, 2012

WHEREAS, the Town of Wolfeboro received funding from the NH Office of Homeland Security and Emergency Management under a Flood Mitigation Project Assistance Grant and assistance from the Lakes Region Planning Commission for the preparation of the Wolfeboro Hazard Mitigation Plan Update 2012; and

WHEREAS, several public planning meetings were held between December 2011 and June 2012 regarding the development and review of the Wolfeboro Hazard Mitigation Plan Update 2012; and

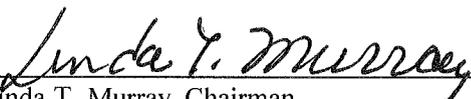
WHEREAS, the Wolfeboro Hazard Mitigation Plan Update 2012 contains several potential future projects to mitigate hazard damage in the Town of Wolfeboro and,

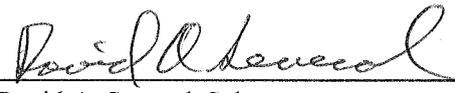
WHEREAS, a duly noticed public meeting was held by the Selectmen on December 19, 2012 to formally approve and adopt the Wolfeboro Hazard Mitigation Plan Update 2012.

NOW, THEREFORE BE IT RESOLVED that the Wolfeboro Board of Selectmen adopts the Wolfeboro Hazard Mitigation Plan Update 2012.

ADOPTED AND SIGNED this day of December 19, 2012.

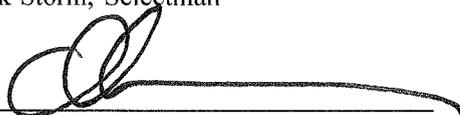
WOLFEBORO BOARD OF SELECTMEN


Linda T. Murray, Chairman

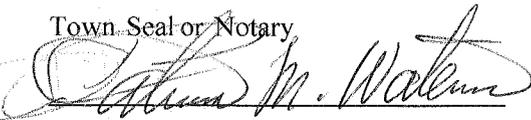

David A. Senecal, Selectman


Sarah M. Silk, Vice-Chairman


Chuck Storm, Selectman


Q. David Bowers, Selectman

Town Seal or Notary



Date: 12-19-12

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/fema/csb.htm	
NH Regional Planning Commissions:	
Central NH Regional Planning Commission	796-2129
http://www.cnhrpc.org/	
Lakes Region Regional Planning Commission.....	279-8171
http://www.lakesrpc.org/	
Nashua Regional Planning Commission	883-0366
http://www.nashuarpc.org/	
North Country Council.....	444-6303
http://www.nccouncil.org/	
Rockingham Regional Planning Commission	778-0885
http://www.rpc-nh.org/	
Southern New Hampshire Regional Planning Commission.....	669-4664
http://www.snhpc.org/	
Southwest Regional Planning Commission	357-0557
http://www.swrpc.org/	
Strafford Regional Planning Commission.....	742-2523
http://www.trafford.org/	
Upper Valley Lake Sunapee Regional Planning Commission.....	448-1680
http://www.uvlsrc.org/	
NH Governor's Office of Energy and Planning	271-2155
http://www.nh.gov/oep/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/	
Air Resources.....	271-1370
http://www.des.state.nh.us/ard_intro.htm	
Waste Management.....	271-2900
http://www.des.state.nh.us/waste_intro.htm	
Water Division	271-3406
http://www.des.state.nh.us/water_intro.htm	

Pollution Prevention Division	271-6460
http://www.des.state.nh.us/nhppp/	
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/	
Natural Heritage Inventory	271-3623
http://www.dred.state.nh.us/divisions/forestandlands/bureaus/naturalheritage/aboutus.htm	
Division of Forests and Lands.....	271-2214
http://www.dred.state.nh.us/divisions/forestandlands/index.htm	
Division of Parks and Recreation.....	271-3255
http://www.nhparks.state.nh.us/	
NH Department of Health and Human Services	271-8835
http://www.dhhs.nh.gov/DHHS/DHHS_SITE/default.htm	
Greater Plymouth Public Health Network Coordinator:	
Ann Graves	536-1120
http://www.dhhs.state.nh.us/DHHS/CDCS/LIBRARY/Fact+Sheet/PPCC-AHR-Map.htm	
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/	

- Public Service of New Hampshire**..... 436-7708
<http://www.psnh.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 – Goddard Space Flight Center “Disaster Finder”
<http://disasterfinder.gsfc.nasa.gov/>
- NASA Optical Transient Detector
<http://thunder.msfc.nasa.gov/>
- Dartmouth Flood Observatory**
<http://www.dartmouth.edu/artsci/geog/floods/>
- National Lightning Safety Institute**
<http://lightningsafety.com/>
- The Tornado Project Online**
<http://www.tornadoproject.com/>
- National Severe Storms Laboratory**
http://www.oar.noaa.gov/atmosphere/atmos_nssl.html
- Plymouth State University Weather Center**
<http://vortex.plymouth.edu/>

APPENDIX B: MITIGATION FUNDING RESOURCES

404 Hazard Mitigation Grant Program (HMGP)	NH Homeland Security and Emergency Management
406 Public Assistance and Hazard Mitigation	NH Homeland Security and Emergency Management
Community Development Block Grant (CDBG)	NH HSEM, NH OEP, also refer to RPC
Dam Safety Program	NH Department of Environmental Services
Disaster Preparedness Improvement Grant (DPIG)	NH Homeland Security and Emergency Management
Emergency Generators Program by NESEC	NH Homeland Security and Emergency Management
Emergency Watershed Protection (EWP) Program	USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP)	NH Homeland Security and Emergency Management
Flood Plain Management Services (FPMS)	US Army Corps of Engineers
Mitigation Assistance Planning (MAP)	NH Homeland Security and Emergency Management
Mutual Aid for Public Works	NH Municipal Association
National Flood Insurance Program (NFIP)	NH Office of Energy & Planning
Power of Prevention Grant by NESEC	NH Homeland Security and Emergency Management
Project Impact	NH Homeland Security and Emergency Management
Roadway Repair & Maintenance Program(s)	NH Department of Transportation
Section 14 Emergency Stream Bank Erosion & Shoreline Protection	US Army Corps of Engineers
Section 103 Beach Erosion	US Army Corps of Engineers
Section 205 Flood Damage Reduction	US Army Corps of Engineers
Section 2098 Snagging and Clearing	US Army Corps of Engineers
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

APPENDIX C: PLAN NOTICE EXAMPLE

LAKES REGION PLANNING COMMISSION

January 9, 2012

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

**For Immediate Release**

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

Town of Wolfeboro Hazard Mitigation Plan Meeting

The Wolfeboro Hazard Mitigation Plan Committee will begin the process of updating its 2007 Hazard Mitigation Plan. The committee, which is represented by a variety of local interests, will focus on the natural and manmade hazards that put Wolfeboro at risk as well as the development of recommendations to protect the safety and well being of town residents. The committee will have its first meeting on January 23, 2012 at the Wolfeboro Town Hall Meeting Room (84 South Main Street) starting at 6:30 PM. Residents of Wolfeboro 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 Wolfeboro will be determined as a result of this process. 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 Wolfeboro one step closer to that goal.

For more information please call Chief Philip H. Morrill, Jr., Wolfeboro Fire Chief and Emergency Management Director at 569-8190 or David Jeffers, Regional Planner, Lakes Region Planning Commission at 279-8171.

APPENDIX D: SAMPLE AGENDA

Wolfeboro Hazard Mitigation Plan Update Committee

Wolfeboro Town Hall Meeting Room – February 28, 2012 – 10:00 AM

AGENDA

1. Review Hazard Risk Ratings
2. Existing Plans and Protections
3. Identifying Gaps in Protections
4. Status of 2007 Mitigation Actions
5. Initial brainstorming of Mitigation Actions

Goals for next meeting:

- a. Brainstorming new Mitigation Actions
- b. Cost of Mitigation Actions
- c. Potential sources of funding
- d. Introduce method of prioritization

APPENDIX E: SAMPLE NOTIFICATION TO NEIGHBORING EMDs

From: David Jeffers [mailto:djeffers@lakesrpc.org]
Sent: Friday, February 24, 2012 11:50 AM
To: fire@tuftonboro.org
Subject: Wolfeboro Hazard Mitigation Plan update

Dear Chief Thompson,

The Wolfeboro Hazard Mitigation Plan Committee has begun to update their 2007 Hazard Mitigation Plan. The committee is represented by a variety of local interests including the Emergency Management Director, Police Chief, Public Works Department, Town Manager, Selectmen, Town Planner, Planning Board, Huggins Hospital, the Chamber of Commerce, several citizens, a representative from NH DHSEM, and a regional planner from the Lakes Region Planning Commission. The committee's focus is on the natural and manmade hazards that put Wolfeboro at risk, and the development of recommendations to protect the safety and well being of town residents.

The committee held their second meeting on February 14; **their next meeting is set for February 28 at 10:00 AM at the Wolfeboro Town Hall. Future meetings are scheduled for March 21 and April 17 at the same time and location. Representatives from neighboring communities are encouraged to attend and provide input**, especially as it relates to regional or multi jurisdictional mitigation opportunities.

Hazard Mitigation Planning is important to reducing disaster losses, as are appropriate regulations and land use ordinances. The most significant areas of concern for Wolfeboro will be determined as a result of this process. 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 Wolfeboro one step closer to that goal.

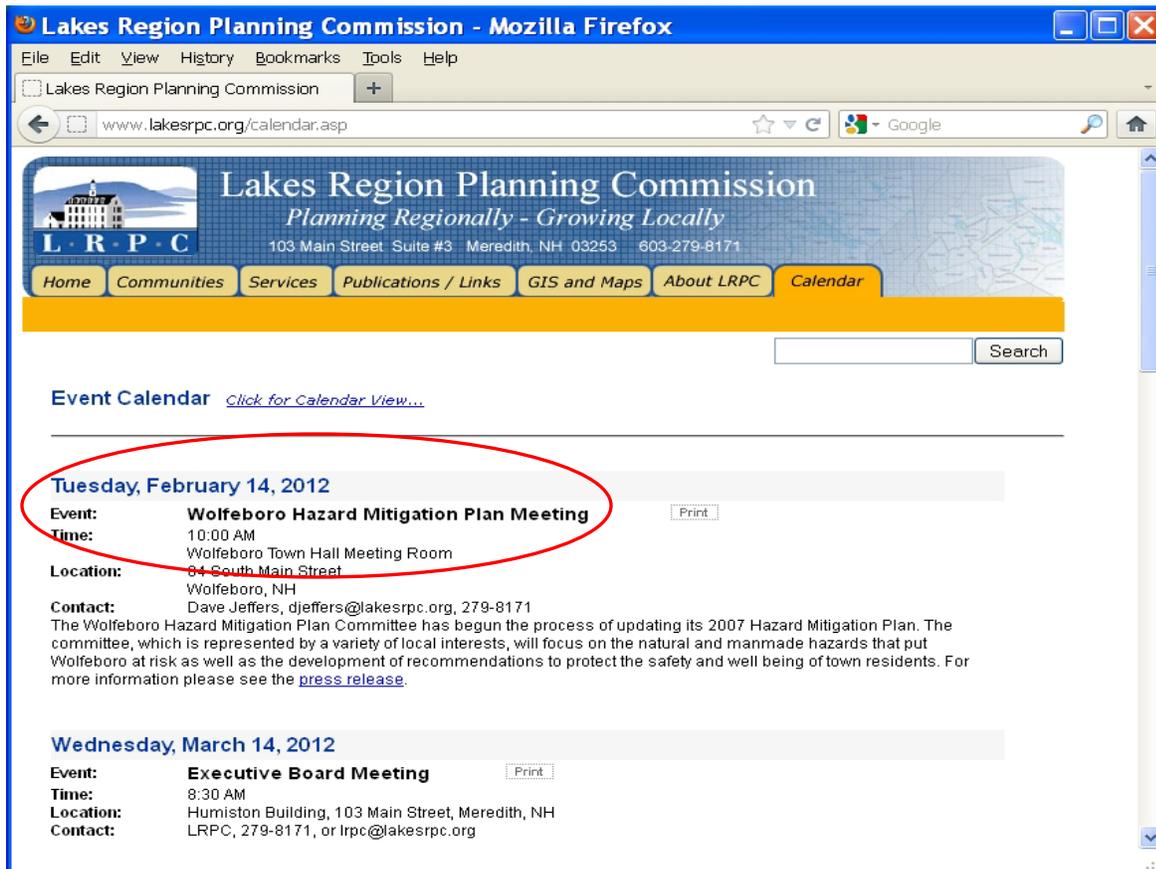
For more information please call the Lakes Region Planning Commission at 279-8171.

Sincerely,

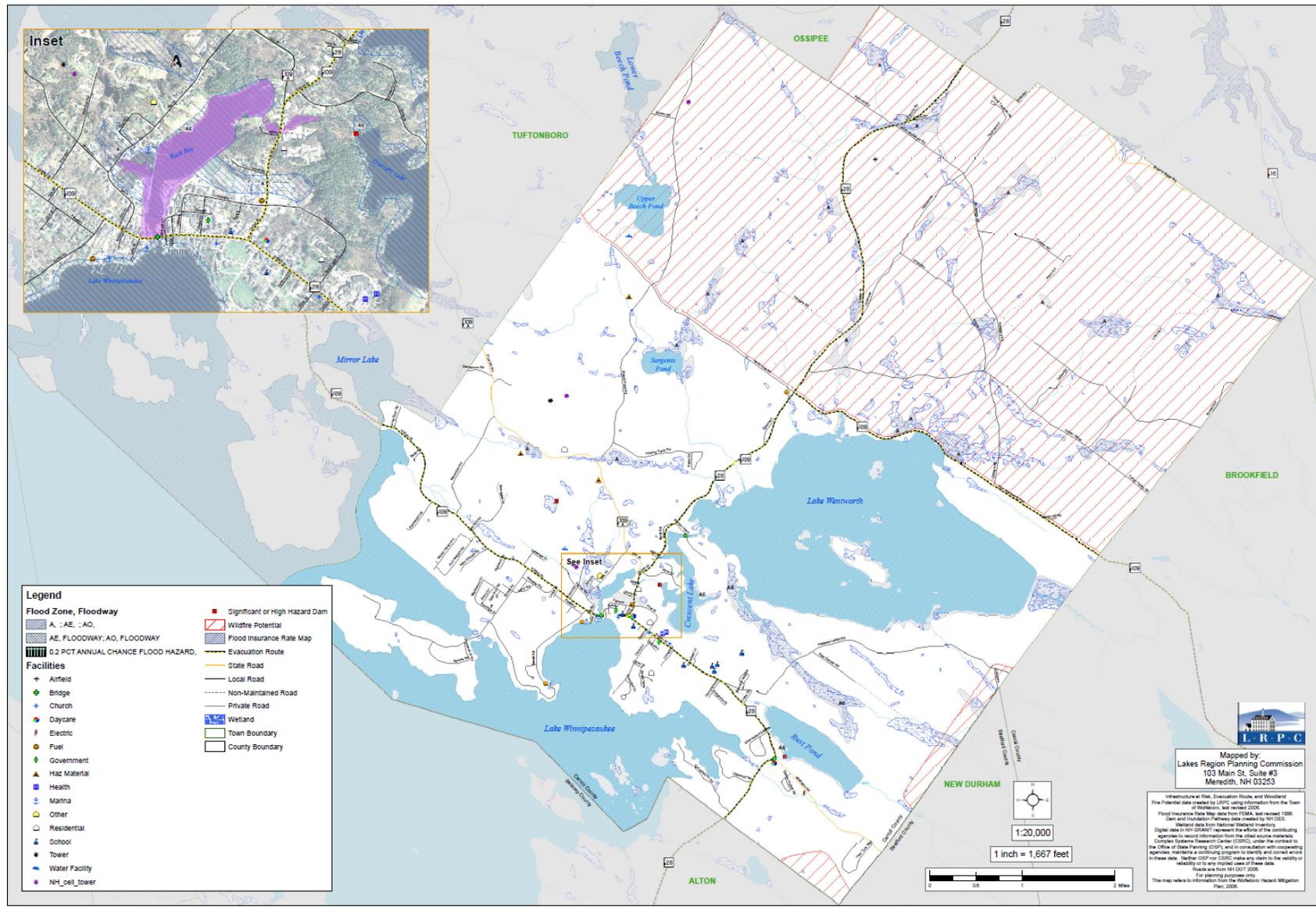
Dave

David Jeffers
Regional Planner
Lakes Region Planning Commission
103 Main St.
Meredith, NH 03253
(603) 279-8171
(603) 279-0200 fax

APPENDIX F: SAMPLE WEB POSTINGS



APPENDIX G: CRITICAL FACILITIES & POTENTIAL HAZARDS MAP



APPENDIX H: CRITICAL FACILITIES ASSESSMENT

Wolfeboro, NH Critical Facilities

Facility/Infrastructure	Location	Owner	Assessed Value	Capacity	Generator
Essential Services					
Public Safety Complex/EOC	251 S Main St	Town	\$993,100		Yes
Town Hall and Annex	84 Main St./ 9 Union St	Town	\$957,700		No
Highway Department	47 Pine Hill Rd	Town	\$257,700		Partial
Water Treatment Plant	North Line Rd Ext	Town	\$2,780,200		Yes
Wastewater Treatment Plant	Filter Bed Rd	Town	\$2,621,100		Yes
Municipal Electric Department/EOC	133 Middleton Rd	Town	\$238,400		Yes
Huggins Hospital & Medical Arts	240 S Main St	Private	\$60,064,900		Yes
Electric Substation #1	Filter Bed Rd	Town			No
Electric Substation #2	Filter Bed Rd	Town			No
New England Telephone substation	corner of Glendon St & School St	Private	\$464,600		
Structures and Services					
Cellular phone tower - Bennet Hill	on Bennett Hill	Private	\$411,100		Yes
Cellular phone tower - Lehner Street	Lehner St	Private			Battery
Cellular phone tower - Pierce Camp Birchmont	Pierce Camp Birchmont	Private	\$332,900		Battery
Cellular phone tower - water tower	5 Main St	Private	\$135,500		Yes
Crescent Lake Dam		Town			
Rust Pond Dam		Private	\$5,015		
Sewage Lagoon Dam	Filter Bed Rd	Town			
NH Route 28 (Evacuation)		State			
NH Route 109 (Evacuation)		State			
WASR tower	Varney St	Private	\$51,100		
Water Storage	16 McManus Road		\$437,600		
Rapid Infiltration Basin (RIB)		Town			No
Solid Waste Facility	400 Beech Pond Rd	Town	\$222,900		

Facility/Infrastructure	Location	Owner	Assessed Value	Capacity	Generator
LR Hazardous Product Facility	404 Beech Pond Rd	Town	\$208,300		
Pop Whalen/Abenaki Ski Area	NH Route 109A	Town	\$1,818,000		No
Penn Air Estates	Penn Air Rd	Private			
Emergency Shelters					
Kingswood School Complex	396 South Main Street	GWRSD	\$46,086,200	See note 2	Partial
All Saints Episcopal Church	258 South Main Street	PVT	\$1,327,500	200	No
Brewster Academy Complex	80 Academy Drive	PVT	\$31,346,600	See note 1	Partial (main campus)
Carpenter School	102 South Main	GWRSD	\$3,581,600	300	No
Crescent Lake School	75 McManus Road	GWRSD	\$4,112,800	1000	No
First Congregational Church	115 South Main	PVT	\$1,301,600	300	No
First Christian Church	83 North Main Street	PVT	\$378,200	100	No
Special Populations					
Christian Ridge	20 Crescent Lake Ave		\$1,596,100		
Inquisitive Child Day Care	16 Lehner St		in rented facility		
Sugar Hill Retirement Community	83 Rolling Wood Dr		\$9,527,100		
Wolfeboro Bay Care and Rehabilitation	39 Clipper Rd		\$2,974,900		
Taylor Community	11 Taylor Dr		\$4,559,700		
The Ledges	67 Center St		\$2,702,400		
Wolfeboro Area Children's Center	180 S Main St		\$916,900		
Wolfeboro Nuresry School	32 Central Ave		\$122,400		
Pierce Camp Birchmont	693 Governor Wentworth Highway		\$8,103,800		
Camp Bernadette	93 Richards Rd		\$6,394,293		
Wolfeboro Camp School	Camp School Rd				Yes

Facility/Infrastructure	Location	Owner	Assessed Value	Capacity	Generator
Other					
Sawmill Boat Club			\$30,000		
Fuel stations					
Mast Landing	3 Silver Street St		\$284,000		
Town docks/ Dockside Facility	S Main St and Railroad Ave		\$2,363,500		
Goodhue & Hawkins Navy Yard	244 Sewall Rd		\$10,623,100		
Dock at the Libby Museum	755 N. Main St		\$1,952,600		
Wolfeboro Corinthian Yacht Club/ Irwin Marine	12 Nancy's Way		\$2,199,700		
Wolfeboro Oil (heating oil)	61 Railroad Avenue		\$161,100		
Wolfeboro Oil (diesel fuel)	Center Street		\$290,500		

NOTE: ¹ USED FOR STUDENTS AND STAFF DURING SCHOOL YEAR

NOTE: ** CURRENTLY UNDER CONSTRUCTION NOT USEABLE

**High School ²

**Middle

School²

Arts Center²

1500

1500

1500

Partial / life safety only

Partial / life safety only

Yes

APPENDIX I: STAPLEE RESULTS

This section contains a summary of STAPLEE rankings for each of the proposed Mitigation Actions by the Wolfeboro Hazard Mitigation Committee. The highest possible rank in each of the seven categories is 3 - the lowest is 1. The scores for each of the criteria have been totaled. A maximum score is 21. These ratings were arrived at through committee discussion and group consensus.

Project ID	Project Rating: 3 is a positive score 2 is an intermediate score 1 is a negative score	Social - Community Accept	Technically Feasible	Administratively Workable	Politically Acceptable	Legally Workable	Economic Benefit vs. Cost	Environmental Impacts	Total
1	Improve the intersection of Center and Lehner Streets (dangerous intersection with hazardous materials in the vicinity).	3	3	3	3	3	2	3	20
2	Evaluate alternatives to improve the turn on NH Route 28 in South Wolfeboro at Weston's Auto Body.	3	3	3	3	3	3	3	21
3	Conduct a study to improve the intersection of North Line Road and NH Route 28.	3	3	3	3	3	3	3	21
4	Adopt an alternative routing plan within the Village Core	3	3	3	3	3	3	3	21
5	Collate existing data on the vulnerability of flat roofs on critical facilities.	3	3	3	3	3	3	3	21
6	Formulate a water conservation study and educate the public on water conservation methods.	3	3	3	3	3	3	3	21
7	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.	3	3	3	3	3	3	3	21
8	Implement an Asset Management system for tracking the condition and planning the maintenance of bridges and culverts.	3	3	3	2	3	2	3	19
9	Work with NHDES and the Municipal Water Department on upgrading and implementing the town's policy for protecting its water supply.	3	3	3	3	3	3	3	21
10	Update vulnerable culverts and bridges on Bay Street, and Cross Road.	3	3	3	3	3	3	3	21
11	Develop and implement a tree trimming policy for road right-of-way purposes and to eliminate hazards.	3	3	3	3	3	3	3	21

Project ID	Project Rating: 3 is a positive score 2 is an intermediate score 1 is a negative score	Social - Community Accept	Technically Feasible	Administratively Workable	Politically Acceptable	Legally Workable	Economic Benefit vs. Cost	Environmental Impacts	Total
12	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.	2	3	3	1	3	3	3	18
13	Upgrade the drainage system on Beach Pond Road from Boucher Hill to Nelson Hill. This is a 2,000' gravel section between two paved hills. Need to upgrade drainage and pave.	2	3	3	2	3	2	3	18
14	Upgrade drainage system along North Main Street from Lakeview to Mill Street due to the age of the system.	2	3	3	1	3	2	3	17
15	Mitigate flooding issues on Center Street from Pickering Corner to Grove Street. Upgrade culverts per the existing drainage study.	2	3	3	2	3	2	2	17
16	Conduct outreach to local businesses regarding floodproofing, especially those that may be storing hazardous materials. Outreach from EMD with DES guidelines for storage and containment.	2	3	3	3	3	2	3	19
17	Repair the roof on the fire station garage (hardening of critical facility)	3	3	3	3	3	3	3	21
18	Ensure that roads on which there is new development meet town road standards.	1	1	3	1	1	1	2	10
19	Be prepared to notify residents in the event of an emergency through mobile signage (electronic message board).	3	3	3	3	3	3	3	21
20	Notify residents of emergency preparedness steps that they can take to reduce the likelihood of loss of life or property (various methods of notification).	3	3	3	3	3	3	3	21
21	Ensure that Town Fueling Station can be used during a power outage.	3	3	3	3	3	3	3	21
22	Ensure that back-up power is available at designated shelters.	2	3	3	3	3	2	3	19
23	Create a town-wide alert system using reverse-911.	3	3	2	3	3	1	3	18
24	Initiate departmental NIMS training.	3	3	2	3	3	3	3	20
25	Create a "calling-tree" communication network to increase the efficiency of communicating emergency information between departments and town officials.	3	3	3	3	3	3	3	21
26	Improve sheltering capacity during a power outage.	3	3	3	3	3	3	3	21

APPENDIX J: SAMPLE MEETING MINUTES

Wolfeboro Hazard Mitigation Planning Update**Meeting minutes****February 28, 2012****Members present:**

Board of Selectmen Representatives Sarah Silk and Linda Murray, Emergency Management Director/Fire Chief Philip Morrill, Lakes Region Planning Dave Jeffers, Huggins Hospital Representative Janet Williamson, Planning and Development Director Rob Houseman, Chamber of Commerce Mary DeVries, Electric Department Director Barry Muccio, NHHSEM Heidi Lawton, Dan Noyes Representative for Brewster Academy, Chairman of the Planning Board Kathy Barnard, and Ken Marschner, Resident.

Members absent:

Town Manager Dave Owen, Governor Wentworth School District Representative Mary Patry, Public Works Director Dave Ford, Adam Tasker Public Works, Police Chief Stu Chase and Lakes Region Repeater Association Bob Ness.

Ms. Silk called the meeting to order at 10:00 AM.

I. Update from last meeting

Dave Jeffers stated he has updated the Critical Facilities and Values sheet from last meeting and will incorporate the Assessment Values to the report.

Mr. Muccio stated he would provide the current values for his location.

Ms. Silk suggested Mr. Ford do the same.

II. Risk Rating for Hazards Update

Mr. Jeffers stated he compiled the information to update the Risk Rating for Hazards sheet and explained the scoring system. He questioned if there are any errors. He noted that tornadoes, earthquakes and water shortage moved up to medium and power outages and thunderstorms moved up to high since the last review.

Mrs. Murray stated that they have become aware of the significant damage of a storm if it came through the downtown area.

Ms. Silk noted they also became aware of the lack of warning.

Mr. Muccio questioned if the same parameters were used last time as the power outage moved up.

Mr. Jeffers replied the impact section was different.

Mr. Muccio stated that the probability has always been there but feels they are more aware of how vulnerable they are and that they also rely on others for power.

Mr. Jeffers noted that population surge and conflagration are down from last time.

Chief Morrill replied he feels that conflagration was overrated last time and the population surge may be due to the Community Hospital.

Ms. Silk questioned if he is confident with the changes.

Mr. Jeffers replied yes, it is an update and things change as well as different people could be in the group. He referred to Appendix D, page 1, Exiting Hazard Mitigation Strategies in regards to BOCA standards.

Kathy Barnard stated she would like to have time to sit down with the Town Planner and provide the updates for this section. She stated they would e-mail the Committee the updated section.

Mr. Muccio stated he could provide the updated Electrical Code.

Mrs. Murray stated that infiltration and inflow should be changed to just Leak Detection and the sewage lagoon should be reworded by Mr. Ford.

Mr. Jeffers questioned the status of the NIMS training.

Chief Morrill replied that they have some staff trained, but it is ongoing.

Mr. Jeffers stated that the National Flood insurance has gone from 10 polies to 35 and there have been 4 reported losses at a total of \$50, 000 for Wolfeboro.

Mrs. Murray questioned if that included roads and/or culverts.

Mr. Jeffers replied it does not; this would be homes or businesses that have experienced loss. He would also like to update the storm water drainage information and site plan regulations for driveways etc.

Marie Watson replied they do have those regulations for new and existing properties.

Mr. Jeffers questioned if they have town road standards.

Mrs. Watson replied they do.

Mr. Jeffers questioned if they have updated the Emergency Operations Plan.

Chief Morrill replied it is reviewed and adopted annually in the spring.

Mr. Jeffers questioned if the school has an Emergency Operations Plan.

Chief Morrill replied he does not know, but they do have one from the Wolfeboro Nursery School.

Dan Noyes replied he would provide Brewster Academy's plan.

Janet Williamson stated she would provide the Hospital's updated plan.

Mr. Jeffers questioned if the Fire and Police Departments do programs with the schools.

Chief Morrill replied they do.

Mr. Jeffers questioned if there is any other programs they should consider for road maintenance.

Mrs. Watson replied she would check with the Public Works Director.

Mr. Jeffers questioned if they still trim 1/10th of the town power lines.

Mr. Muccio replied that they do and he will also provide an SPCC plan that has been implemented since their last review.

Mrs. Williamson questioned if he would like what they have for Pandemic information.

Mr. Jeffers replied yes and that if the Public Works Director could provide any areas of concern in the last five years for infrastructure improvements as well.

Ms. Silk noted the benefit of the Household Hazardous Product Facility and its increase in use due to the construction project at the school and chemicals from the Water Treatment Plant.

Mr. Jeffers agreed it is a good resource and should be included. He questioned if they have dam inspections.

Mrs. Watson replied they do yearly in October.

Mrs. Murray stated they also do an action plan annually.

Mr. Jeffers questioned if they have any gaps in power.

Mr. Muccio replied they have a lack of back up generation.

Chief Morrill agreed at this point the only town owned generated locations are the Public Safety Building and the Municipal Electric Department.

Ms. Silk stated this issue is an obvious problem and they became even more aware of the lack of back up generation when they had to repair the substation and many of the businesses do not have their own back up source of power. She also noted that they would not have a location for those in need of oxygen if they lost power.

Ms. Williamson explained that that becomes a legal issue for the Hospital and have regulations for the number of beds; they are not able to take people who need power for their oxygen. She stated that other towns have established locations for those patients to go and plug in and they are

currently working to change the regulations to allow ambulances to transport those persons to other facilities other than a hospital.

Heidi Lawton noted that most towns do not have a location for those people and they are ultimately transported to the hospital.

Mrs. Murray stated that it looks as though they need to have a plan to deal with this issue and there must be some way to handle it.

Chief Morrill noted that most people on oxygen are self-sufficient and have back up plans. He would like to see a regional plan for a shelter.

Heidi Lawton replied that is a great idea if they could do that.

Chief Morrill stated that towns are limited on funding and noted that Alton has set up the new High School for a shelter. He noted that they have used it in the past, but do find that most people are not willing to leave their homes.

Heidi Lawton stated that it is good to have the plan in place if it is needed.

Mrs. Murray stated Governor Wentworth is not capable of being a shelter.

Chief Morrill replied the only part would be the Arts Center, but they don't have the ability to make food. The High School is only set up for life safety items.

The Committee had a lot of discussion on the topic of back up generation.

Mr. Jeffers questioned if they have any gaps for severe winter weather.

Mrs. Murray stated the only issue she sees is losing the roads during spring storms and not being able to get emergency vehicles down the road.

Mr. Jeffers replied that Mr. Ford could provide them with any of the roads he may have a concern about.

Ms. Silk questioned transportation.

Chief Morrill replied he does not see the probability of that as high.

Ms. Williamson agreed.

The Committee agreed to change it to a one.

Ms. Silk stated the gaps in communication would be for their dispatching capabilities, but they are working on that by adding repeaters.

Mr. Jeffers questioned if the EMD sees any issues with radio transmission problems with the Departments.

Chief Morrill replied he doesn't, they have some dead spots, but for the most part do not have a problem communicating.

III. Implementation Schedule

Mr. Jeffers stated that they need to review the 2007 Mitigation Actions and update it.

Mr. Houseman joined the Committee and provided updates for topics pertaining to his Department.

The Committee reviewed the actions and made some changes. Several of the actions need review by the Public Works Director. (See attached)

IV. Next Meeting

Mr. Jeffers stated he would compile the information updated today, plus what the Public Works Director and Town Planner provide and send it out to the Committee. He stated for the next meeting they should have the mitigation actions in order and ready to move forward.

Ms. Silk questioned the potential sources for funding.

Mr. Jeffers replied he has some lists of funding sources, but is not familiar with the funding portion.

Heidi Lawton stated that the USDA has given a lot of grants for Hazard Mitigation.

V. Consideration of Minutes of February 14, 2012

Ms. Silk noted that the title of the Committee should be Hazard Mitigation Plan Update.

It was moved by Chief Morrill and seconded to accept the minutes of February 14, 2012 as amended. Members voted and being none opposed, the motion passed.

VI. Next Meetings

- March 21, 2012 1:00 PM
- April 17, 2012 10:00 AM

Being no further business before the Committee they adjourned at 12:00 PM.

Respectfully submitted,

Amelia Capone-Muccio

Recording Secretary

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

Wolfeboro Master Plan, 2007

Zoning Ordinance

Subdivision Regulations

Site Plan Regulations

Wolfeboro Hazard Mitigation Plan, 2007

Fact Sheet, “Current Codes for Town of Wolfeboro”, Planning and Development Office

“Development Activity in the Lakes Region, 2011 Annual Report”, Lakes Region Planning Commission.

FEMA Community Information System

Hazard Mitigation Assistance Program, Letters of Intent

Rust Pond Association <http://home1.gte.net/~vze3djdz/rustpond/damep4.html>

DPW records regarding FEMA reimbursement

Town Assessor Database

“2010 Multi-Hazard Mitigation Plan”, NH Homeland Security and Emergency Management

National Oceanic and Atmospheric Administration website

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

Influenza Pandemic Public Health Preparedness & Response Plan