

# **GREENFIELD HAZARD MITIGATION PLAN Update 2014**

**Greenfield, New Hampshire**



**Prepared by the:**

**Town of Greenfield Hazard Mitigation Committee**

**&**

**Southwest Region Planning Commission**

**37 Ashuelot Street**

**Keene, NH 03431**

**(603) 357-0557**

**[www.swrpc.org](http://www.swrpc.org)**

## TABLE OF CONTENTS

Executive Summary .....	iv
Prioritized Hazard Mitigation Strategies.....	iv
Chapter I: Introduction.....	1
Background .....	1
What is Hazard Mitigation? .....	1
Authority .....	1
Funding Source .....	1
Purpose.....	1
Scope of the Plan.....	1
Methodology .....	1
Committee Meetings and Public Participation in the Planning Process .....	3
Resources Used in Plan Preparation .....	4
Plan Updates .....	5
Acknowledgements.....	5
Hazard Mitigation Goals.....	6
Chapter II: Community Profile.....	6
Town Overview.....	6
Location Map .....	7
Disaster Risk .....	7
Development Patterns and Land Use .....	8
Consideration for Development .....	9
Development Trends .....	10
Population Projections .....	11
Development in Hazard Areas .....	11
National Flood Insurance Program (NFIP).....	11
Chapter III: Hazard Identification.....	13
List of Hazards .....	12
Flooding- Disaster Declarations.....	13
Flooding- Localized- Medium- High Risk.....	14
Drought- Low- Medium Risk.....	16
Extreme Heat- High Risk.....	16
Wildfires- Medium Risk .....	16
Lightning- Medium- High Risk .....	17
Tornados - High Risk.....	17
Hurricanes and Tropical Storms- Medium- High Risk.....	18
Earthquakes- Low- Medium Risk .....	21
Severe Wind/ Downburst- High Risk .....	22
Extreme Winter Weather- High Risk.....	22
Hazardous Material Spills- High Risk .....	24
Snow Avalanche- Low Risk .....	24
Erosion- Low Risk .....	24
Subsidence- Low Risk .....	24
Radon- Low Risk .....	24
Dams- Low- Medium Risk .....	25
Map of Dams & Bridges .....	26
Chapter IV: Assessing Probability, Severity and Risk .....	27
Risk Assessment .....	27

Chapter V: Critical Facilities .....	28
Category 1 - Emergency Response Facilities & Services .....	28
Category 2 - Non Emergency Response Facilities.....	29
Category 3 - Facilities/Populations to Protect.....	28
Category 4 - Potential Resources .....	31
Chapter VI: Assessing Vulnerability- Identifying Potential Hazards Affecting Structures and Estimating Potential Losses .....	33
Estimating Potential Losses .....	33
Structures or Critical Facilities Potentially Affected by Hazard Areas .....	33
Chapter VII: Existing Mitigation Strategies .....	37
Existing Mitigation Strategies and Proposed Improvements .....	37
Previous Mitigation Action Update .....	39
Chapter VIII: Proposed Mitigation Strategies .....	40
New Programs or Activities .....	40
Location Specific Programs or Activities .....	40
Prioritization of Proposed Mitigation Strategies.....	41
STAPLEE Ranking Matrix .....	43
Chapter IX: Prioritized Implementation Schedule and Action Plan .....	45
Chapter X: Adoption, Implementation, Monitoring & Update.....	48
Adoption.....	48
Implementation of the Plan through Existing Programs .....	48
Master Plan .....	48
Zoning Ordinance and Regulations.....	48
Capital Improvements Program .....	48
Continued Public Involvement.....	48
Monitoring & Updates .....	49
Adoption Certificate.....	50

**Appendices**

Appendix A: Hazard Descriptions
Appendix B: Risk Assessment
Appendix C: Water Sources
Appendix D: 2007 Flood Areas
Appendix E: Resources
Appendix F: Hazard Mitigation Resource Profiles
Appendix G: Documentation of the Planning Process
Appendix H: Emergency Landing Sites- Helicopters
Appendix I: Project Status Sheets

## Executive Summary

The Greenfield Hazard Mitigation Plan Update 2014 serves as a means to reduce future losses from natural or man-made hazard events before they occur. The Plan was developed by the Greenfield Hazard Mitigation Committee and contains statements of policy adopted by the Board of Selectmen.

Hazards are addressed as follows:

- |   |                     |   |
|---|---------------------|---|
| • Flooding                              | • Subsidence        | • Snow Avalanches                           |
| • Wind (Downburst, Tornado & Hurricane) | • Radon (Air/Water) | • Severe Wind                               |
| • Wildfire                              | • Drought           | • Man-Made (Hazardous Materials/Dam Breach) |
| • Tornados                              | • Extreme Heat      |   |
| • Severe Winter Weather/Icing           | • Earthquakes       |   |
|   | • Lightning         |   |

The Greenfield Hazard Mitigation Committee identified critical facilities and potential hazard areas as follows:

<b>Critical Facilities</b>	<b>Potential Hazard Areas</b>	
• Emergency Response Facilities and Services	• New Boston Rd	• Cornwall Rd
• Non-Emergency Response Facilities	• Dunklee Rd	• Swamp Rd
• Facilities/Populations to Protect	• Minor Rd	• Otter Lake Ln
• Potential Resources	• Holden Rd	• Crotched Mountain
	• Gulf Rd	• Greenfield State Park
	• Russell Station Rd	• NH 31, 136, other town roads
	• Lyndeborough Rd	• Many hazards- townwide

The Greenfield Hazard Mitigation Committee identified existing hazard mitigation programs in various stages of development:

- |  |                                    |                                    |
|--|------------------------------------|------------------------------------|
| • School Evacuation Plan                   | • Town Warning System              | • Emergency Management Plan        |
| • Building Codes                           | • Erosion and Sedimentation Plan   | • EMS Week                         |
| • Local Road and Driveway Design Standards | • Shoreland Protection Act         | • Hazard Materials Spill procedure |
| • Emergency Snow Removal Policy            | • Wetlands Protection              | • Pandemic Plan                    |
| • Town Master Plan                         | • Health Officer                   | • Training for fire fighters       |
| • Mutual Aid                               | • Floodplain Development Ordinance | • Fire Prevention Program          |
| • Fire Pond/Dry Hydrant Management Plan    | • Steep Slopes Protection          | • Town Radio System                |
|  |                                    | • Fire Inspector                   |

## Prioritized Hazard Mitigation Strategies

<u>Rank</u>	<u>Mitigation Strategy</u>
1	Continue to comply with the NFIP
1	The town will continue to update the CIP and zoning to provide protection for new buildings from flooding and other relevant hazards where necessary
1	Informational outreach for hazard mitigation and emergency management
1	Slash monitoring to prevent fires
1	Private culvert maintenance education program
1	Campfire education
1	Have ample supplies and continue operation-level training of Fire and Police
1	All flooding hazard mitigation strategies
1	Maintain emergency warning system for Town-wide notification
2	Wetlands protection regulations- revisit them to see if changes are necessary
2	Beaver population control and monitoring plan
	Ditching
3	Open roads to sunlight to prevent icing
	Tree Pruning

## **CHAPTER I: INTRODUCTION**

### **Background**

As a result of the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency (FEMA) mandated that all communities within New Hampshire establish local hazard mitigation plans as a means to reduce future losses from natural or man-made hazard events before they occur. In response to this mandate, the NH Homeland Security and Emergency Management (formerly Bureau of Emergency Management) contracted with the Southwest Region Planning Commission (SWRPC) to develop a program that would achieve this goal. SWRPC prepared a hazard mitigation planning handbook to be used by local communities as a guide in the preparation of hazard mitigation plans. SWRPC then facilitated two hazard mitigation planning processes with selected communities as pilot projects. The resulting plans laid the foundation in an effort to enable all New Hampshire Regional Planning Commissions, through education outreach, the capability to assist their local communities, such as the Town of Greenfield, in the preparation of local hazard mitigation plans.

### **What is Hazard Mitigation?**

<p>“Hazard Mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards” (44 CFR 206.401).</p>
---

### **Authority**

This Hazard Mitigation Plan Update 2014 was prepared under the authority of the planning requirements of Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390, which amended the Robert T. Stafford Act of 1988.

### **Funding Source**

This Plan was funded by the NH Homeland Security and Emergency Management, with grants from the Predisaster Mitigation Competitive Grant Program from FEMA.

### **Purpose**

The Greenfield Hazard Mitigation Plan Update 2014 is a planning tool to be used by the Town of Greenfield, as well as other local, state and federal governments, in their efforts to reduce the effects from natural and man-made hazards. This plan does not constitute any sections of Greenfield’s Master Plan or Town Ordinances.

### **Scope of the Plan**

The scope of this Plan includes the identification of past and potential natural and manmade hazards affecting the Town of Greenfield, the determination of vulnerability of existing and future structures to the identified potential hazards, and the identification and discussion of new strategies aimed at mitigating the likely effects of potential hazards before they occur.

### **Methodology**

Using the Guide to Hazard Mitigation Planning for New Hampshire Communities handbook, written by the Southwest Region Planning Commission, the Greenfield Hazard Mitigation Committee developed the content of the Plan by following the ten step process set forth in the handbook and summarized below.

**Step 1: Establish a Hazard Mitigation Planning Committee**

The Emergency Management Director (EMD) contacted town officials and residents who might wish to volunteer their time and serve on a committee.

**Step 2: Identification Critical Facilities**

The Committee identified all of the critical facilities within the Town. These were identified using four categories: Category 1 - Emergency Response Facilities & Services; Category 2 - Non Emergency Response Facilities; Category 3 - Facilities/Populations to Protect; and Category 4 - Potential Resources. The list of Critical Facilities is found in Chapter V, "Critical Facilities."

**Step 3: Identification of Past and Potential Hazards**

The Committee members identified the following hazards that could or have affected the Town of Greenfield and the locations of these past and/or potential events:

<b>Flooding</b>	<b>Tornado</b>	<b>Hazardous Materials Spills</b>
<b>Drought</b>	<b>Hurricanes</b>	<b>Snow Avalanche</b>
<b>Extreme Heat</b>	<b>Earthquakes</b>	<b>Subsidence</b>
<b>Wildfire</b>	<b>Severe Wind/Downburst</b>	<b>Radon</b>
<b>Lightning Strikes</b>	<b>Extreme Winter Weather</b>	<b>Dams</b>

The table in Chapter III contains information about all the past and potential hazards. The Hazard Mitigation Map and the end of the Plan shows the locations of all past and potential hazards and critical facilities.

**Step 4: Analyze Land Use and Development Trends**

The Committee was asked to determine where future development would most likely take place in town. The information was compared to other documents such as Town Reports and the Town Master Plan. Chapter II, "Community Profile," shares this information. Future development areas are also shown on the map at the end of the plan.

**Step 5: Risk Assessment**

The Committee members completed a Risk Assessment for all of the types hazards identified in Step 3 in order to assess probability, severity and risk. Potential human impact, property impact and business impact for each hazard type were determined in addition to the likelihood of the hazard occurring within the next 25 years. Severity and risk were then calculated.

**Step 6: Identifying What Mitigation Actions are already in Place**

The Committee identified plans and policies that are already in place to reduce the effects of hazards. The Committee evaluated the effectiveness of the existing measures to identify where they can be improved. The results are found in Chapter VII, "Existing Mitigation Strategies." The Committee also identified programs in place that would not be categorized as mitigation strategies.

**Step 7: Identify the Gaps in Protection**

For each general hazard type or specific potential hazard location identified in Step 3, the Committee identified possible mitigation actions not currently in place. Each was identified in one of the following categories: Preventative (Programs & Policies); Property Protection; Structural; Emergency Services; and/or Public Education & Information.

**Step 8: Prioritizing Proposed Mitigation Actions**

The Committee ranked the proposed mitigation actions developed in Step 7 using the STAPLEE method which analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of each project.

**Step 9: Develop an Implementation Plan**

Using the prioritized list of mitigation actions identified in Step 8, the Committee developed a clear strategy that outlines who is responsible for implementing each project, as well as when and how the actions will be implemented.

**Step 10: Adopt and Monitor the Plan**

The Committee members reviewed and approved each section of the plan as it was completed. After acceptance by the Committee, the Plan was submitted to the New Hampshire Homeland Security and Emergency Management for initial review, and then forwarded to FEMA, for formal approval. Once approved, the Plan was formally adopted by the Board of Selectmen. It is important to the Town of Greenfield that this plan be monitored and updated annually or after a Presidentially declared disaster. Chapter X addresses this issue.

The following are dates of Committee meetings and sub-committee meetings.

**Public Committee Meetings:**

Working committee meetings held at Greenfield Town Office on the following dates:  
September 24, October 29, November 27, January 14, 2014, and February 25, 2014.

A mailing was made to each committee member, prior to each meeting that contained information from the previous meeting, an agenda (Appendix G), and information to be covered. Agendas were posted at the Town Office to encourage public participation.

**Public Meetings with the Board of Selectmen:**

**(date):** The Board of Selectmen adopted the Greenfield Hazard Mitigation Plan Update 2014 at a public hearing held at Greenfield Town Office.

**Public Participation:**

An email was sent to each committee member, prior to each meeting that contained information from the previous meeting, an agenda, and information to be covered. A copy of the Agenda for each meeting was posted at the Municipal Office and on the Town website for public viewing prior to the meeting to encourage public participation.

In addition, an article was printed in the Southwest Region Planning Commission Newsletter prior to the first meeting to inform the members of the community as well as surrounding communities and other interested stakeholders in participating in this plan update. Copies of the newsletter were sent to the 35 towns within the region, the Cheshire County Office, businesses, and other interested parties. It is also available on the Southwest Region Planning Commission website. In addition to the SWRPC newsletter and website, an email of the SWRPC Happenings was sent to approximately 430 addresses, including neighboring communities, county, businesses, and academia. The email contains notices of public meetings and events. A copy of this mailing is included in Appendix G.

A copy of the draft plan was made available for public review and input at the Town Office from (add date of viewing period). Notification of the draft available for public viewing was included on the Town website to reach a broad range of interested parties. A copy of the public notice for the public viewing period is in Appendix G. There were no comments from the public received following the public viewing period.

### Resources Used in Plan Preparation

In addition to the Handbook that was used as a framework for this plan, additional resources used included the Greenfield Hazard Mitigation Plan (2008), Town Master Plan, Town Reports, the FEMA Community Information System website (to obtain data about the town's National Flood Insurance Program status), the State of New Hampshire Hazard Mitigation Plan 2013, and a number of the resources identified in Appendix E.

### Resource List for the Hazard Mitigation Committee

Greenfield's Emergency Management Director (EMD), or designee, reviewed and coordinated with the following agencies in order to determine if any conflicts existed or if there were any potential areas for cooperation. Training support has been offered by some of those on this resource list.

#### New Hampshire Homeland Security and Emergency Management:

33 Hazen Dr.  
Concord, NH 03305

<b>Field Representative:</b> Daniel Morse	1-603-271-2231
<b>Mitigation Planner:</b> Parker Moore	1-800-852-3792

#### New Hampshire Department of Transportation:

John Kallfelz (District 4)	Swansey, NH	352-2302
----------------------------	-------------	----------

#### Public Service of New Hampshire:

Laurel Brown	Keene, NH	357-7309 Ext. 5115 1-800-662-7764
--------------	-----------	--------------------------------------

#### Greenfield Town Office:

Aaron Patt		547-3442
------------	--	----------

#### ConVal/Greenfield School Principals:

Noreen McAloon Greenfield Elementary School	860 Forest Road, Greenfield, NH	547-3334
--	---------------------------------	----------

Anne O'Bryant South Meadow Middle School	108 Hancock Road, Peterborough, NH	924-7105
---	------------------------------------	----------

Brian Pickering ConVal High School	Route 202, Peterborough, NH	924-3869
---------------------------------------	-----------------------------	----------

### Plan Updates

During the planning process, the Committee reviewed relevant portions of the previous hazard mitigation plan and updated those portions accordingly. Unchanged sections were incorporated into the plan while other sections were amended to reflect changes. Particular attention was given to the previous mitigation strategies that have been completed and to give a status update on those that remain on the list. The 10 step process was followed during the meetings. The original plan was used as a base to begin the update. Amendments were made in each chapter to reflect changes that have occurred during the five year period. Included in the changes were:

- Ch. I Introduction- updated Methodology, Acknowledgements, etc., and added Plan Updates;
- Ch. II Community Profile - NFIP policies updated, added Continued Compliance with NFIP;
- Ch. III Hazard Identification- updated hazards and their location, added maps of bridges and dams;
- Ch. IV Assessing Probability, Severity, and Risk - updated risk assessment;
- Ch. V Critical Facilities - updated locations,;
- Ch. VI Assessing Vulnerability- estimated potential losses
- Ch. VII Existing Mitigation Strategies and Proposed Improvements - updated chart and other data, added chart for Status of Previous Mitigation Action Items;
- Ch. VIII Proposed Mitigation Strategies - updated STAPLEE chart;
- Ch. IX Prioritized Implementation Schedule - updated Action Plan;
- Ch. X Adoption, Implementation, Monitoring and Updates - Adoption certificate, updated information;
- Appendices - agendas, resources, updated information.

This update was prepared with assistance from Planners at Southwest Region Planning Commission trained in Hazard Mitigation Planning. Data and maps used to prepare this plan are available at their office and should be used in preparing future updates.

**FEMA Final Approval:** *(date)*

### **Acknowledgements**

The Greenfield Board of Selectmen extends special thanks to the Greenfield Hazard Mitigation Committee:

Karen Day- Greenfield Selectwoman	Bob Marshall- Chair Greenfield Planning Board
John Gryval III- Greenfield Emergency Mgmt. Dir.	Tim Murray- Greenfield Public Works Department
Neal Brown- Greenfield Library Trustees	Glen Roberge- Greenfield Police Department
Louise Gryval- Greenfield Heritage District Committee	Loren White- Greenfield Fire Chief

The Greenfield Board of Selectmen offers thanks to the New Hampshire Homeland Security and Emergency Management for developing the State of New Hampshire Hazards Mitigation Plan (2013) which served as a model for this plan. In addition, special thanks are extended to the staff of the Southwest Region Planning Commission for professional services, process facilitation and preparation of this document.

### **Hazard Mitigation Goals**

The Greenfield Hazard Mitigation Committee reviewed the goals set forth in the New Hampshire Hazard Mitigation Plan – 2013. The committee generally concurs with those goals and has amended them to better meet the goals of the town.

**Town of Greenfield, NH**

The overall Goals of the Town of Greenfield with respect to Hazard Mitigation are stipulated here:

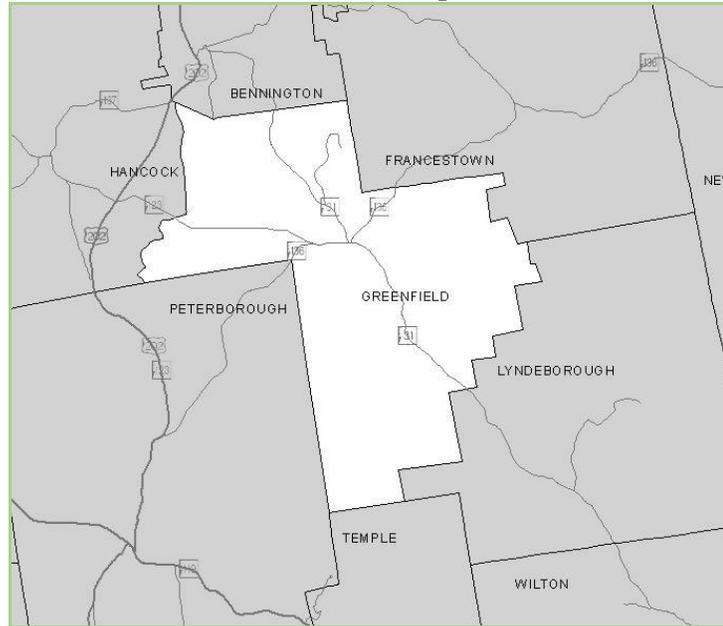
1. To improve upon the protection of the general population, the citizens of the Town of Greenfield and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the Town of Greenfield's Emergency Response Services, Critical Facilities, and infrastructure.
3. To reduce the potential impact of natural and man-made disasters on the Town of Greenfield's economy, natural resources, historic/cultural treasures, and private property.
4. To improve the Town of Greenfield's Emergency Preparedness and Disaster Response and Recovery Capability.
5. To reduce the Town of Greenfield's risk with respect to natural and man-made hazards through outreach and education.
6. To identify, introduce and implement cost-effective Hazard Mitigation measures so as to accomplish the Town's Goals and Objectives and to raise the awareness of and acceptance of Hazard Mitigation opportunities generally.
7. To address the challenges posed by climate change as they pertain to increasing risks in Greenfield's infrastructure and natural environment.
8. To work in conjunction and cooperation with the State of New Hampshire's Hazard Mitigation Goals and with FEMA.

**CHAPTER II: COMMUNITY PROFILE**

**Town Overview**

The Town of Greenfield is located in southwestern Hillsborough County, in Southwest New Hampshire. Greenfield is bounded on the north side by Francestown and Bennington, easterly by Lyndeborough, southerly by Temple and westerly by Peterborough and Hancock.

*Location Map*



The Town of Greenfield has a land area of approximately 26.2 square miles, or 17,128.7 acres. Surface water and wetlands account for approximately 392 acres of this total area. Greenfield's most significant watercourse is the Contoocook River, which forms the Town's border with Hancock, and therefore shares the river. In addition, there is Otter Brook that runs south and east from Otter Lake into Zephyr Lake. Rand Brook runs east to west between Francestown and East Road, crossing into Lyndeborough. Greenfield has six water bodies: Powder Mill Pond – 435 acres, on the border with Bennington and Hancock; Otter Lake – 61.2 acres, located in the west central part of town, just north of Forest Road; Sunset Lake – 30.9 acres, located to the north of the intersection of Sawmill and Crotched Mountain Roads; Zephyr Lake – 30.9 acres, on the west side of Route 31 south; Hogback Pond – 9.89 acres, situated between Sawmill and Forest Roads, just to the northwest of the Village; and Mud Pond.<sup>1</sup>

The topography of Greenfield is dominated by Crotched Mountain in the north and North Pack Monadnock in the south. Crotched Mountain lies in the three towns of Greenfield, Bennington, and Francestown. The mountain's highest elevation is actually in Francestown (2,020 feet above sea level); in Greenfield the highest elevation is 1,500 feet, in the northeasterly corner of the town, going down to 900 feet at Sunset Lake. North Pack Monadnock has the highest elevation in town, ranging from 1,300 feet at Mountain Road up to over 2,200 feet at the highest point just north of the Temple town line. Gould Hill in the south-central part of town and Blanchard Hill on the eastern side of town are two other concentrated areas of high elevation, although they do not exceed 1,200 feet. The western and central parts of town have the lowest elevations, ranging from 700 to 900 feet above sea level.

## **Disaster Risk**

<sup>1</sup> Data from the Town of Greenfield Master Plan (2013)

Extreme winter weather carries the greatest risk for Greenfield, followed by severe wind, and hazardous materials spills. The high risk is attributed to both the high probability of these events occurring and the extent of possible damage associated with them. Flooding has a high probability of occurring in Greenfield but an overall medium-high risk due to the low human, property and business impacts of this hazard on the town. More information about risk can be found in Chapter IV.

### Development Patterns and Land Use

The development patterns of a community are important indicators for planning for the needs of a community. The chart below shows the population trends for Greenfield between 1980 to 2010. The sharp increase in between 1980 – 1990 reflects the housing boom of the “80’s”. Although the trend has continued to rise, the rate in which the population is growing has greatly reduced. The 2010 figure reflects the lowest rate of population growth seen in recent decades.

**Table 1: Greenfield Population- 1980 to 2010**

YEAR	POPULATION	% CHANGE
1980	972	--
1990	1,519	56.3%
2000	1,657	9.1%
2010	1,749	5.6%

*Source: US Census*

The following land use descriptions are from the Greenfield Master Plan, 2013 update:

**Agricultural** – Although primarily a suburban town, Greenfield has some 608 acres of land devoted to farming as reported in the 2013 Master Plan. These are scattered throughout town in several concentrations such as the Blanchard Hill section and areas just outside the center of Town.

**Residential** – Residential development in Town is mostly single-family detached homes and manufactured housing, with an infrequent occurrence of two family and multi-family housing. Also of significance in terms of concentrated residential development are the areas around Sunset and Zephyr Lakes where residential density is higher than in other parts of Town. In general, residential use occurs along the existing road network and is devoted to single-family homes. Approximately 7,978 acres or 47% of Greenfield’s land is in residential use.

**Commercial/Industrial** – The major concentration of commercial and industrial uses is located in and around the town center. There is a limited amount of commercial development found along NH Route 31 in the southern portion of Town. The land devoted to these uses is 318 acres or 1.9% of total land in Greenfield.

**Government/Institutional** – Government/institutional uses are generally concentrated in the village center and are represented by the Town Office Building, the Fire Station, the Meeting House, and the Post Office. The schools, cemeteries, and the large tracts used by the Crotched Mountain Rehabilitation Center, Brantwood Camp and Lyris, and by Barbara C. Harris Camp and Conference Center are also included in this land use category. Some of these are considered mixed uses, such as the Camp Union area which operates both as an “educational” facility and a “recreational” area.

**Recreational** – Greenfield’s 2013 tax assessing data does not include recreational uses as a separate land use category. Recreational uses are incorporated in the Exempt categories (municipal, state, and federal). Recreational land in Greenfield includes the fairgrounds, the elementary school playground, a portion of North

Pack Monadnock Mountain, Greenfield State Park, the beaches of Sunset and Zephyr Lakes, and several private camps.

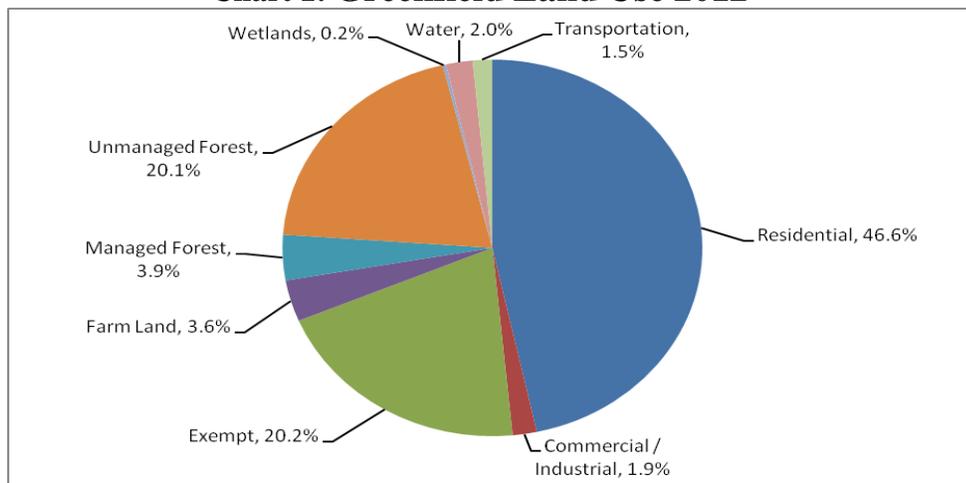
**Roads and Highways** – Roads and highways, while not typically thought of as a "use" per se, take up nearly 256 acres of land.

**Table 2: Greenfield Land Use Comparison: 2003 & 2012**

Land Use Category	2003*		2012**		2003-2012% Change***
	Acres	% of Total Land Area	Acres	% of Total Land Area	
Residential	8,198.7	48.7%	7,978.3	46.6%	-2.7%
Commercial/Industrial	353.0	2.1%	318.6	1.9%	-9.7%
Exempt	3,169.4	18.8%	3,469.2	20.2%	9.5%
Farm Land	585.1	3.5%	608.2	3.6%	3.9%
Managed Forest	532.1	3.2%	669.0	3.9%	25.7%
Unmanaged Forest	3,602.5	21.4%	3,436.5	20.1%	-4.6%
Wetland	41.5	0.2%	42.2	0.2%	1.7%
Water	350.0	2.1%	350.6	2.0%	0.2%
Transportation	-	-	256.1	1.5%	-
<b>Total:</b>	<b>16,832.2</b>		<b>17,128.7</b>		

\*Source: Town of Greenfield Assessor Database, 2003; \*\*Source: Town of Greenfield Assessor Database, 2012  
 \*\*\*Percent change is based on the difference between 2003 and 2012 acreage totals

**Chart 1: Greenfield Land Use 2012**



Source: Town of Greenfield Assessor Database, 2012

### Consideration for Development

Several factors have played, and will continue to play, an important role in the development of Greenfield. These include: the existing development pattern and availability of land for future development; the present road network; physical factors such as steep slopes, soil conditions, wetlands, and aquifers; and land set aside for conservation. These factors have an impact, both individually and cumulatively, on where and how development occurs.

## Development Trends

Overall, changing land use trends in Greenfield are dominated by the growth of single family residential development. There is strong desire amongst residents to remain a traditional, small, rural New England town. In recent years there has been a significant increase in the population of Southern New Hampshire that may have serious impacts on the ability of Greenfield to remain a small, rural community.

The proximity of Greenfield to Manchester, NH, Nashua, NH, Keene, NH, Peterborough, NH, Worcester, MA, and Boston, MA may make it an attractive location to commuters looking to live in a small community outside of the more developed regions.

The following table presents the comparison of the total housing supply for Greenfield and its subregion from 1980 to 2010, and the percentage change from each decade.

**Table 3: Subregional Comparison of Housing Units- 1970 to 2010**

<b>ABSOLUTE NUMBER OF UNITS</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>
<b>GREENFIELD</b>	330	370	517	640	699
Bennington	217	347	643	635	666
Francestown	287	325	580	656	755
Hancock	399	495	723	814	864
Lyndeborough	303	390	488	587	643
Peterborough	374	1,952	2,242	2,509	2,956
Temple	137	252	429	465	542
<b>TOTAL HOUSING UNITS</b>	<b>2,047</b>	<b>4,111</b>	<b>5,622</b>	<b>6,306</b>	<b>7,125</b>
<b>PERCENTAGE CHANGE</b>	<b>1970-1980</b>	<b>1980-1990</b>	<b>1990-2000</b>	<b>2000-2010</b>	<b>1970-2010</b>
<b>GREENFIELD</b>	12%	40%	24%	9%	112%
Bennington	60%	85%	-1%	5%	207%
Francestown	13%	78%	13%	15%	163%
Hancock	24%	46%	13%	6%	117%
Lyndeborough	29%	25%	20%	10%	112%
Peterborough	422%	15%	12%	18%	690%
Temple	84%	70%	8%	17%	296%

Greenfield had the greatest percentage of increase in housing units among the subregional towns during the 1990-2000 period with a 24% change; however it had one of the lowest percentage of change in housing units during the period between 2000- 2010 with only 9% growth.

As shown on the Hazard Mitigation Map, there have been a number of recent subdivisions in Town. These range from a proposed 25-unit development to a number of smaller 2 and 3 lot subdivisions. The town should keep track of the larger parcels in town with adequate frontage and access for subdivision and development.

## Population Projection

Population projections are an important component in planning for the future. Projections are beneficial to help communities begin to plan and budget for Capital Improvement Projects. Since population projections are based on a set of assumptions, changes can be significant if the assumptions used in the calculations are not met. For

example, a tropical storm that destroys a large employer or causes infrastructure damages to that facility, can cause a significant economic hardship to the business that may ultimately result in it's closure and loss of jobs. This can then result in an outward migration of residents from the community. Therefore, population projections should only be used as a basis to begin planning for the future. The New Hampshire Office of Energy and Planning (NH OEP) prepares population projections every five years for each community in New Hampshire.

**Greenfield Population Projection 2010-2040**

*Source: New Hampshire Office of Energy & Planning (OEP) fall 2013*

**Development in Hazard Areas**

Some hazards identified in this plan are regional risks and, as such, all new development falls into the hazard areas. These include severe winter weather, tornados, lightning, wildfires, and earthquakes. There are many areas in town that are prone to flooding as well. The town should monitor proposed development located in identified potential hazard areas.

Year	2010	2015	2020	2025	2030	2035	2040
Population	1,749	1,772	1,814	1,853	1,882	1,897	1,898

**National Flood Insurance Program (NFIP)**

Greenfield is a participating member of the National Flood Insurance Program. Flood Insurance Rate Maps for Greenfield became effective 11/17/1977, and the Town then entered the NFIP. The NFIP biennial report for 2013 notes that there are 5 structures located in FEMA designated Special Flood Hazard Areas (SFHAs). As of 2009, there were 3 flood insurance policies in force totaling \$775,000 in insurance. Flood Insurance Rate Maps, all bearing the effective date of 9/25/09, are used for flood insurance purposes and are on file with the Greenfield Planning Board. There are no Repetitive loss properties in Greenfield.

**Continued Compliance with NFIP Requirements**

The Town of Greenfield acknowledges the importance of maintaining requirements set forth in the National Flood Insurance Program. As such, the town took steps related to continued compliance with the program that will help to reduce or eliminate the potential for loss of life and property due to flooding.

The following actions have been taken since the last Hazard Mitigation Plan:

- monitored beaver population;
- maintained and replaced culverts;
- added new regulations for wetlands.

While this update continues with structural projects, public outreach and education are also seen as a key to providing information to residents by raising an awareness of measures that they can take. Many of these items will be on-going actions to maintain awareness and continued monitoring.

### **CHAPTER III: HAZARD IDENTIFICATION**

The following is a list of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of Greenfield. These hazards were identified from the State of New Hampshire Hazard Mitigation Plan (2013), the Federal Emergency Management Administration website, and in a brainstorming session with the Hazard Mitigation Planning Committee. **Appendix A** provides detailed information on all hazard types. The Hazard Mitigation Map at the end of this Plan reflects the contents of this list. The 2007 Flood Map at the back of the plan and accompanying list shows areas that flooded during the 2007 event. **Appendix D** also lists the flood areas from 2007.

#### **List of Hazards**

Flooding- Disaster Declarations  
 Flooding- Localized areas  
 Drought  
 Extreme Heat  
 Wildfires  
 Lightning  
 Tornadoes  
 Hurricanes  
 Earthquakes  
 Severe Wind/Downbursts  
 Extreme Winter Weather  
 Hazardous Materials Incidents  
 Landslide  
 Snow Avalanche  
 Erosion  
 Subsidence  
 Radon  
 Dams

**Past and Potential Hazards Table**

The following table shows each hazard type and areas that have experienced a natural or man-made hazard event, or have the potential to suffer damage if an event occurs. It also includes information on federally disaster declarations.

Hazard	Date	Location	Description of Areas Impacted
<b>FLOODING- DISASTER DECLARATIONS</b>			
Below is a listing of Disaster Declarations for flooding events within the State of New Hampshire. Several severe events have caused significant damage to structures and roadways within the Southwest Region.			
Flood	1927	Southern NH	Damage to Road Network. Caused many roads to wash out.
Flood	March 11-21, 1936	NH State	Damage to Road Network. Flooding caused by simultaneous heavy snowfall totals, heavy rains and warm weather. Run-off from melting snow with rain overflowed the rivers
Hazard	Date	Location	Description of Areas Impacted
<b>FLOODING- Con't.</b>			
Flood/ Severe Storm	August 27, 1986	Cheshire, Hillsborough Counties, NH	FEMA Disaster # 771-DR (Presidentially Declared Disaster) \$1,005,000 in damage
Flood / Severe Storm	April 16, 1987	Cheshire, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, & Sullivan Counties, NH	FEMA Disaster Declaration # 789- DR (Presidentially Declared Disaster). Flooding of low-lying areas along river caused by snowmelt and intense rain. \$4,888,889 in damage.

Flood	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan Counties, NH	FEMA Disaster Declaration # 876. Flooding caused by a series of storm events with moderate to heavy rains. \$2,297,777 in damage.
Flood	October 29, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan Counties, NH	FEMA Disaster Declaration # 1144- DR. Flooding caused by heavy rains. \$2,341,273 in damage.
Flood	July 2, 1998	Southern NH	FEMA Disaster Declaration # 1231. Severe storms and flooding
Flood	October 26th 2005	Cheshire, Grafton, Merrimack, Sullivan, and Hillsborough Counties, NH	FEMA Disaster Declaration # 1610. Severe storms and flooding.
Flood	October-November 2005	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan counties	FEMA Disaster Declaration # DR-1144-NH
Flood	May 25th, 2006	Belknap, Carroll, Hillsborough, Merrimack, Rockingham, and Strafford Counties, NH	FEMA Disaster Declaration # 1643. Severe storms and flooding.
Flood	April 16, 2007	All counties, NH	FEMA Disaster Declaration # 1695. Severe storms and flooding.
Flood	May 26-30, 2011	Coos and Grafton County	FEMA Disaster Declaration # DR-4006; May flood event.
Flood	May 29-31, 2012	Cheshire County	FEMA Disaster Declaration # 4065;

#### FLOODING- LOCALIZED- MEDIUM-HIGH RISK

The Town of Greenfield has approximately 5 structures within the special flood hazard area. The vast majority of these structures are single-family homes with basements. Assuming a major flood occurred with at depth of four feet, the estimated damage could be \$1,046,750. Below is a list of past and potential areas in Greenfield that are at risk of flooding. Estimates of damage are also indicated in locations with structures.

Flooding	Past and potential occurrences	New Boston Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2011. Culverts are at risk at this location.
Flooding	Past and potential occurrences	Dunklee Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2005. 3 residential structures are at risk at this location. Potential loss estimate: \$628,050.

Hazard	Date	Location	Description of Areas Impacted
--------	------	----------	-------------------------------

#### FLOODING- LOCALIZED- CON'T.

Flooding	Past and potential occurrences	Miner Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 culvert washed away in 2004 and was rebuilt. No other structures are at risk
----------	--------------------------------	------------	---

Flooding	Past and potential occurrences	Miner Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 culvert washed away in 2004 and was rebuilt. No other structures are at risk at this location.
Flooding	Past and potential occurrences	Holden Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. No structures are at risk at this location.
Flooding	Past and potential occurrences	Gulf Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. Access to 2 residential structures is at risk at this location.
Flooding	Past and potential occurrences	Blanchard Hill Road	Culvert previously washed out.
Flooding	Past and potential occurrences	Thomas Road and Coach Road	Edges of the road washed out in heavy rains
Flooding	Past and potential occurrences	Cavender Road	Impassible flooding in the past. A pedestrian bridge is in the Contoocook Flood plain.
Flooding	Past and potential occurrences	Riverbend Road	This road is low-lying and runs parallel to the Contoocook River.
Flooding	Past and potential occurrences	Russell Station Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 culvert is at risk at this location.
Flooding	Past and potential occurrences	Old Lyndeborough Mountain Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. Access to 7 residential structures are at risk, 4 of which are in the flood zone.
Flooding	Past and potential occurrences	Cornwell Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 2 sets of twin culverts are at risk at this location.
Flooding	Past and potential occurrences	Swamp Road	This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 residential structure is at risk. 4 undersized culverts are at risk.
Flooding	Potential Occurrences	Otter Lake Lane	1 residential house is at risk at this location. Estimated potential loss: \$209,350.
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>
<b>FLOODING- LOCALIZED- CON'T.</b>			
Flooding	Potential	Structures within the flood zone- Russell Station Rd, Old Lyndeborough Mountain Rd, Beach Rd, Forest Rd, Gibbons Lane, Old Bennington Rd, School House Rd, Holden Rd	There are approximately 14 structures (11 residences and 3 businesses). Estimated potential loss: \$4,100,000.

Flooding	Potential	School House Road	One House and the railroad tracks have the potential to flood. Estimated potential loss: \$209,350.
<b>DROUGHT- LOW-MED RISK</b>			
Greenfield has not had experience with severe drought conditions. Drought will increase the risk of wildfire. Below is a list of drought events within the State of New Hampshire.			
Drought	1929-1936	Statewide	Regional. Recurrence Interval 10 to > 25 years
Drought	1939-1944	Statewide	Severe in southeast and moderate elsewhere. Recurrence Interval 10 to > 25 years
Drought	1947-1950	Statewide	Moderate. Recurrence Interval 10 to > 25 years
Drought	1960-1969	Statewide	Regional longest recorded continuous spell of less than normal precipitation. Encompassed most of the Northeastern US. Recurrence Interval > 25 years
Drought	2001-2002	Statewide	Third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942.
Drought	Spring 2012	Statewide	Considered worse than the drought of 1941-42.
<b>EXTREME HEAT- HIGH RISK</b>			
Extreme heat can be dangerous to those residents with medical conditions and the elderly. It is important to have cooling areas and a good supply of water available. Extreme heat can add to the potential for wildfires and depletes the water supply for firefighting. Outreach and education on methods of dealing with extreme heat are important. In Greenfield, elderly are at risk. Approximately 11 percent of the Greenfield's population is 65 years or older. Quantity of and access to water sources throughout town reduces risk.			
Extreme Heat	July, 1911	New England	11-day heat wave in New Hampshire
Extreme Heat	Late June to Sept. 1936	North America	Temps to mid 90s in the northeast
Extreme Heat	Late July, 1999	Northeast	13+ days of 90+ degree heat
Extreme Heat	Early August, 2001	New Hampshire	Mid 90s and high humidity
Extreme Heat	August 2-4, 2006	New Hampshire	Regional heat wave and severe storms.
<b>WILDFIRES- MEDIUM RISK</b>			
As timber harvesting is reduced, wood roads close, debris builds up on the ground, the potential for wildfire increases town-wide. The entire town is at risk with minimal forest fire protection (dependent on on-call firefighters and problems with accessibility).			
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>
<b>WILDFIRES- MEDIUM RISK- Con't</b>			
Wildfire	1998		School house was destroyed, caused by lightning strike.
Wildfire	2003	South of Zephyr Lake	Caused by lightning strike
Wildfire	2003	Off of Old Bennington Rd	Set by campers

Wildfire	Past and Potential	Crotched Mountain	Mostly caused by lightning strikes
Wildfire	Potential	Townwide	The whole town is at risk with many large blocks of forest and problems accessing remote areas
Wildfire	Potential	Greenfield State Park	While there have been no known past occurrences of wildfires, there are 253 camp sites at the park.

**LIGHTNING-MEDIUM-HIGH RISK**

Lightning is an unpredictable hazard. It could strike anywhere in Greenfield and potentially start a forest fire especially in periods of drought. High elevations and areas around waterbodies may be more susceptible to lightning strike incidents. The following have a greater potential of risk of a lightning strike: utility poles, antennas and cell towers, boaters, and hikers.

Lightning	Past and Potential	Crotched Mountain	Lightning strikes with frequency and has caused brush fires.
Lightning	Past and Potential	Muzzey Hill Road	Lightning strikes with frequency; no reports of fire
Lightning	Potential	Fletcher Farm Rd., Gould Hill Rd., Blanchard Hill Rd., Thomas Rd.	High elevations; no reports of strikes

**TORNADOS (FUJITA SCALE GIVEN IF KNOWN)- HIGH RISK**

Tornadoes rarely occur in this part of the country; therefore, assessing damages is difficult. Buildings have not been built to Zone 2, Design Wind Speed Codes. An estimated damage to 10% of structures with 20% damages is \$5,062,258. Estimated cost does not include building contents, land values or damages to utilities. River corridors and hill tops susceptible.

The Fujita Scale is used to rate the intensity of a tornado by examining the damage caused by the tornado once it has passed. (see scale below).

**Fujita Scale  
F-Scale Number, Intensity Phase, Wind Speed, and Type of damage**

- F-0**  
Intensity Phase: Gale Tornado  
Wind Speed: 40-72 mph  
Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.
- F-1**  
Intensity Phase: Moderate Tornado  
Wind Speed: 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.
- F-2**  
Intensity Phase: Significant Tornado  
Wind Speed: 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.
- F-3**  
Intensity Phase: Severe Tornado  
Wind Speed: 158-206 mph  
Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted

**F-4**

Intensity Phase: Devastating Tornado

Wind Speed: 207-260 mph

Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

**F-5**

Intensity Phase: Incredible Tornado

Wind Speed: 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 re-enforced concrete structures badly damaged

**F-6**

Intensity Phase: Inconceivable Tornado

Wind Speed: 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>

**Past Occurrences**

<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>
Tornado	July 28, 1748	Hillsborough County	n/a
Tornado	May 21, 1814	Hillsborough County	n/a
Tornado	Sept. 15, 1922	Hillsborough County	F2
Tornado	July 2, 1961	Hillsborough County	F2
Tornado	June 9, 1963	Hillsborough County	F2
Tornado	July 19, 1966	Hillsborough County	F2
Tornado	July 17, 1968	Hillsborough County	F2
Tornado	August 20, 1968	Hillsborough County	F3
Tornado	July 2, 1997	Hillsborough County	F2
Tornado	1996	Greenfield	This tornado started above Otter Lake and traveled east-northeast into Frankestown. 2 commercial buildings had major damage and 2 commercial buildings were destroyed.
Tornado	May 23, 1998	Hillsborough County	F2
Tornado	July 24, 2008	Deerfield/Northwood	F2

**HURRICANES (CATEGORY GIVEN IF KNOWN) AND TROPICAL STORMS- MEDIUM-HIGH RISK**

Greenfield's inland location in southwestern New Hampshire reduces the risk of extremely high winds that are associated with hurricanes. The Town has experienced small blocks of downed timber and uprooting of trees onto structures. Hurricanes can, and do, create flooding. Estimated wind damage 5% of the structures with 10% damage is \$1,265,565. Estimated flood damage 10% of the structures with 20% damage is \$5,062,258. Cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included. Possible flooding of evacuation routes.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating system based on a hurricane's sustained wind

speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. In the western North Pacific, the term "super typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph. (<http://www.nhc.noaa.gov/aboutsshws.php>)

### **Saffir-Simpson Hurricane Wind Scale Category, Sustained Winds, and Types of Damage**

#### **Category 1**

Wind Speed: 74-95 mph, 64-82 kts

Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days

#### **Category 2**

Wind Speed: 96-110 mph, 83-95 kts

Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.

#### **Category 3**

Wind Speed: 111-129 mph, 96-112 kts

Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.

#### **Category 4**

Wind Speed: 130-156 mph, 113-136 kts

Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

#### **Category 5**

Wind Speed: 157 mph or higher, 137 kts or higher

Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months

Source: <http://www.nhc.noaa.gov/aboutsshws.php>

<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>
<b>HURRICANES AND TROPICAL STORMS- (CON'T)</b>			
Hurricane	August, 1635	n/a	
Hurricane	October 18-19, 1778	n/a	Winds 40-75 mph
Hurricane	October 9, 1804	n/a	
Gale	Sept. 23, 1815	n/a	Winds > 50mph
Hurricane	Sept. 8, 1869	n/a	

Hurricane	September 21, 1938	Southern New England	Flooding caused damage to road network and structures. 13 deaths, 494 injured throughout NH. Disruption of electric and telephone services for weeks. 2 Billion feet of marketable lumber blown down. Total storm losses of \$12,337,643 (1938 dollars). 186 mph maximum winds.
Hurricane (Carol)	August 31, 1954	Southern New England	Category 3, winds 111-130 mph. Tree and crop damage in NH, localized flooding
Hurricane (Edna)	September 11, 1954	Southern New England	Category 3 in Massachusetts. This Hurricane moved off shore but still cost 21 lives and \$40.5 million in damages throughout New England. Following so close to Carol it made recovery difficult for some areas. Heavy rain in NH
Hurricane (Donna)	September 12, 1960	Southern and Central NH	Category 3 (Category 1 in NH). Heavy flooding in some parts of the State.
Tropical Storm	October 7, 1962	Coastal NH	Heavy swell and flooding along the coast
Tropical Storm	August 28, 1971	New Hampshire	Center passed over NH resulting in heavy rain and damaging winds
Hurricane (Belle)	August 10, 1976	Southern New England	Primarily rain with resulting flooding in New Hampshire. Category 1
Hurricane (Gloria)	September, 1985	Southern New England	Category 2, winds 96-110 mph. Electric structures damaged; tree damages. This Hurricane fell apart upon striking Long Island with heavy rains, localized flooding, and minor wind damage in NH
Hurricane (Bob)	August 19, 1991	Southern New England	Structural and electrical damage in region from fallen trees. 3 persons were killed and \$2.5 million in damages were suffered along coastal New Hampshire. Federal Disaster FEMA-917-DR
Hurricane (Edouard)	September 1, 1996	Southern New England	Winds in NH up to 38 mph and 1 inch of rain along the coast. Roads and electrical lines damaged
Tropical Storm (Floyd)	September 16-18, 1999	Southern New England	FEMA DR-1305-NH. Heavy Rains
Tropical Storm (Tammy)	October 5-13, 2005	East Coast of US	Remnants of Tammy contributed to the October 2005 floods which dropped 20 inches of rain in some places in NH.
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>
Tropical Storm (Irene)	2011	New England states	FEMA Disaster Declaration #DR-4026 and EM- 3333.

Tropical Storm (Sandy)	October 26- November 8, 2012	Eastern United States	FEMA Disaster Declaration # DR-4095; Considered the costliest hurricane/tropical storm in US history w/ costs exceeding \$70 billion. 253 deaths, millions of power outages.
<b>EARTHQUAKES- LOW- MEDIUM RISK</b>			
Moderate potential for serious damage in dense residential areas. Structures are mostly of wood frame construction. Assuming an estimated loss of 20% of structures in town, the estimated damage is \$50,622,580. Costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures are not included.			
Earthquake	1638	Central New Hampshire	6.5-7
Earthquake	October 29, 1727	Off NH/MA coast	Widespread damage Massachusetts to Maine
Earthquake	December 29, 1727	Off NH/MA coast	Widespread damage Massachusetts to Maine
Earthquake	November 18, 1755	Cape Ann, MA	6.0, much damage
Earthquake	1800s	Statewide New Hampshire	83 felt earthquakes in New Hampshire
Earthquake	1900s	Statewide New Hampshire	200 felt earthquakes in New Hampshire
Earthquake	March 18, 1926	Manchester, NH	Felt in Hillsborough County
Earthquake	December 20, 1940	Ossipee, NH	Both earthquakes of magnitude 5.5, both felt for 400,000 sq miles, structural damage to homes, damage in Boston MA, water main rupture.
Earthquake	December 24, 1940	Ossipee, NH	
Earthquake	December 28, 1947	Dover-Foxcroft, ME	4.5
Earthquake	June 10, 1951	Kingston, RI	4.6
Earthquake	April 26, 1957	Portland, ME	4.7
Earthquake	April 10, 1962	Middlebury, VT	4.2
Earthquake	June 15, 1973	Near NH Quebec Border, NH	4.8
Earthquake	January 19, 1982	Gaza (west of Laconia), NH	4.5, walls and chimneys cracked, damage up to 15 miles away in Concord
Earthquake	October 20, 1988	Near Berlin, NH	4
Earthquake	January 3, 2011	Northwest of Laconia	2.5
Earthquake	August 23, 2011	Travelled up the east coast from Virginia to New Hampshire	5.8
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>
Earthquake	September 18, 2012	Southern New Hampshire	1.2
Earthquake	October 16, 2012	Felt throughout most of the New	4.0

		England states; centered in Maine	
Earthquake	January 28, 2014	Franconia/ Woodsville, NH	2.3

**SEVERE WIND/ DOWNBURST- HIGH RISK**

Town at risk from severe localized blasting winds. Structural damage potential; such events cause small blocks of downed timber. High elevations at greatest risk. Old trees along roads at risk of falling and causing damage to structures during wind events. Potential for loss of electricity. Downbursts are sometimes mistaken for tornados and can cause very similar damage.

**EXTREME WINTER WEATHER- HIGH RISK**

Three types of winter events are heavy snow, ice storms and extreme cold. Occasionally heavy snow will collapse buildings. Ice storms have disrupted power and communication services. Extreme cold affects the elderly. These random events make it difficult to set a cost to repair or replace any of the structures or utilities affected.

The chart below is an indicator of the severity of ice storms and can assist emergency management officials in predicting the length of power outages based on wind speed and amount of ice accumulation during the storm. This index is similar to those that are used to predict the severity of tornados and hurricanes. Planning ahead will mitigate the damage and prepare communities for severe ice events days in advance.

**The Sperry-Piltz Ice Accumulation Index, or “SPIA Index” – Copyright, February, 2009**

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

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

**EXTREME WINTER WEATHER- (Con’t...)**

Hazard	Date	Location	Description of Areas Impacted
--------	------	----------	-------------------------------

Ice Storm	December 17-20, 1929	New Hampshire	Unprecedented disruption and damage to telephone, telegraph and power system. Comparable to 1998 Ice Storm (see below)
Blizzard	February 14-17, 1958	New Hampshire	20-30 inches of snow in parts of New Hampshire
Snow Storm	March 18-21, 1958	New Hampshire	Up to 22 inches of snow in south central NH
Snow Storm	January 18-20, 1961	New Hampshire	Up to 25 inches of snow in southern NH
Snow Storm	February 2-5, 1961	New Hampshire	Up to 18 inches of snow in southern NH
Snow Storm	January 11-16, 1964	New Hampshire	Up to 12 inches of snow in southern NH
Blizzard	January 29-31, 1966	New Hampshire	Third and most severe storm of 3 that occurred over a 10-day period. Up to 10 inches of snow across central NH
Snow Storm	December 26-28, 1969	New Hampshire	Up to 41 inches of snow in west central NH
Snow Storm	February 18-20, 1972	New Hampshire	Up to 19 inches of snow in southern NH
Snow Storm	January 19-21, 1978	New Hampshire	Up to 16 inches of snow in southern NH
Blizzard	February 5-7, 1978	New Hampshire	New England-wide. Up to 25 inches of snow in central NH
Snow Storm	February, 1979	New Hampshire	President's Day storm
Ice Storm	January 8-25, 1979	New Hampshire	Major disruptions to power and transportation
Snow Storm	April 5-7, 1982	New Hampshire	Up to 18 inches of snow in southern NH
Ice Storm	February 14, 1986	New Hampshire	Fiercest ice storm in 30 yrs in the higher elevations in the Monadnock region. It covered a swath about 10 miles wide from the MA border to New London NH
Extreme Cold	November-December, 1988	New Hampshire	Temperature was below 0 degrees F for a month
Ice Storm	March 3-6, 1991	New Hampshire	Numerous outages from ice-laden power lines in southern NH
Snow Storm	1997	New Hampshire	Power outages throughout Greenfield due to heavy snowfall
Ice Storm	January 15, 1998	New Hampshire	Federal disaster declaration DR-1199-NH, 20 major road closures, 67,586 without electricity, 2,310 without phone service, \$17+ million in damages to Public Service of NH alone
Snow Storm	February 2006	New Hampshire	Trees down and power outages (for three days) throughout Greenfield due to heavy snowfall.
<b>EXTREME WINTER WEATHER- (Con't...)</b>			
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>

Ice Storm	December 8, 2008	New Hampshire	Downed trees and power lines, power outages up to 1 Month.
Snow Storm	October 29-30, 2011	New Hampshire	FEMA Disaster Declaration # DR-4049 (Hillsborough and Rockingham Counties). Severe snowstorm event. Snowfall 34" in a 24 hour period.
Snow Storm	February 8-10, 2013	New Hampshire	February Blizzard "Nemo", exceeded previous snow fall amounts; category B Declaration # DR4105

#### HAZARDOUS MATERIAL SPILLS- HIGH RISK

Public transportation of chemicals and bio-hazardous materials through town on NH 31 and NH 136 by truck is a concern. There is limited history of hazardous materials spills in Greenfield.

HAZMAT	2001	Otter Lake	Fuel oil tank dumped fuel into the lake.
HAZMAT	Potential	NH 31 and NH 136 and other town roads	Heavy truck travel increases the risk.

#### SNOW AVALANCHE- LOW RISK

If a snow avalanche were to occur, it could cause damage to roads, bridges, utilities, houses, and other structures. The Town has no history of snow avalanche events. If information becomes available regarding vulnerable risk locations or avalanche occurrences, the plan will amended accordingly.

Avalanche	Potential	Railroad runs parallel to Forest Rd. ; 7 crossings	From Lyndeborough to Hancock
-----------	-----------	---	------------------------------

#### SUBSIDENCE- LOW RISK

There are no areas that have been or would be affected by subsidence in Greenfield.

#### RADON- LOW RISK

No known records of illness can be attributed to radon. However, Greenfield residents should be aware that radon is present. Houses with granite and dirt cellars are at increased risk. Below is a table showing the radon levels in each county of New Hampshire. The data indicates that all of the New Hampshire Counties have a higher average than the national average.

Table and information from the NH State Hazard Mitigation Update 2013.

**State of New Hampshire 2011\*\* Average Radon Levels (per county)**

County	County Average	National Average	Difference
Belknap	2.6 pCi/L	1.3 pCi/L	1.3 pCi/L
Carroll	8.8 pCi/L	1.3 pCi/L	7.2 pCi/L
Cheshire	3.3 pCi/L	1.3 pCi/L	2.0 pCi/L
Coös	8.8 pCi/L	1.3 pCi/L	7.2 pCi/L
Grafton	4.5 pCi/L	1.3 pCi/L	3.2 pCi/L
Hillsborough	5.3 pCi/L	1.3 pCi/L	4.0 pCi/L
Merrimack	5.1 pCi/L	1.3 pCi/L	3.8 pCi/L
Rockingham	5.6 pCi/L	1.3 pCi/L	4.3 pCi/L
Strafford	6.2 pCi/L	1.3 pCi/L	4.9 pCi/L
Sullivan	2.2 pCi/L	1.3 pCi/L	.9 pCi/L

**Picocuries Per Liter pCi/L**): A unit of measure for levels of [radon gas](#); becquerels per cubic meter is the metric equivalent-

\*\*In 2011 NH State Legislature cut the NH Radon Program; this is the last updated information available

**DAMS- LOW-MEDIUM RISK**

The State of New Hampshire classifies dams into the following four categories:

NM – Non-menace            S – Significant hazard            Blank- Non-Active  
 L – Low hazard            H – High Hazard

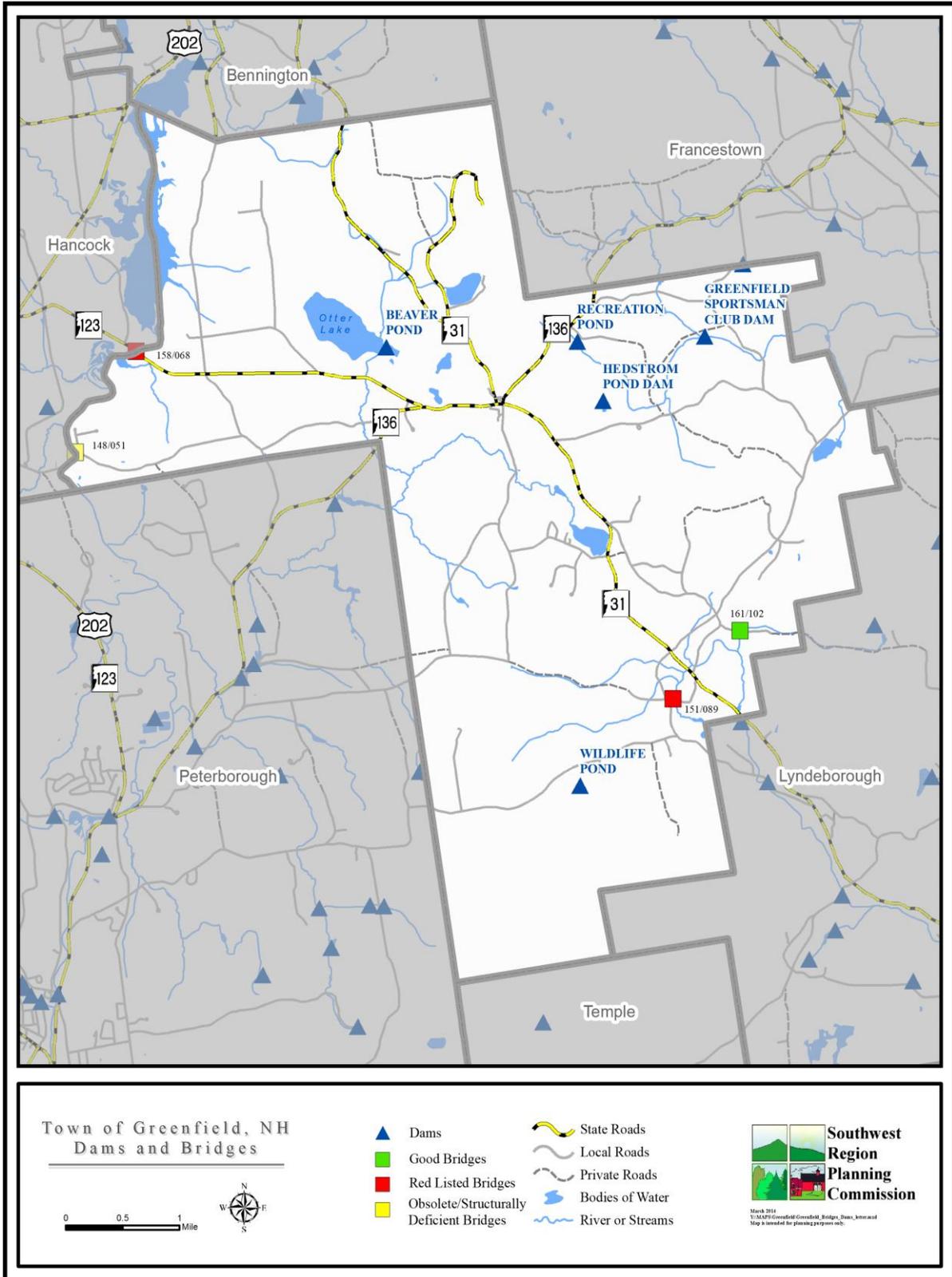
The table below shows all dams in the Town of Greenfield.

<b>Dam #</b>	<b>Class</b>	<b>Dam Name</b>	<b>Owner</b>	<b>Status</b>	<b>Type</b>	<b>Height (Ft)</b>	<b>IMPND (Acres)</b>
098.04		Greenfield Sportsmen Club Dam	Greenfield Sportsmen Club	Breached	Concrete	12.00	2.000
098.01	NM	Recreation Pond	Unknown	Active	Earth	8.00	0.330
098.05		Hedstrom Pond Dam	Mr. David Hedstrom	Exempt	Earth	4.50	3.400
098.03	NM	Wildlife Pond	Mr. Roger Swain	Active	Earth	10.00	0.030
098.02		Beaver Pond	DRED	Exempt	Concrete	4.00	3.000

The McDowell Dam in Peterborough is the only dam that poses a risk to the town of Greenfield. If the dam were to fail, there would be major flooding in town.

Source: Dam information provided by the NH dam Bureau on 9/17/ 2013 and will be verified by Town Officials

**MAP OF GREENFIELD DAMS & BRIDGES**



## CHAPTER IV: ASSESSING PROBABILITY, SEVERITY AND RISK

The Committee members completed a Risk Assessment all of the types hazards identified in Chapter III. **Appendix B** provides a detailed methodology for the Risk Assessment. The process involved assigning Low, Medium, or High values (numerically 1, 2 or 3) to each hazard type for its possible impact to Human, Property, and Business factors (vulnerability). (A score of zero was given if the hazard was non-applicable). To assess probability, a 1, 2, or 3 value was assigned to each hazard type with respect to the probability that the hazard would occur in the next 25 years (See **Appendix B** for specific methodology). The Severity was calculated by determining the average of the Human, Property, and Business impacts. Risk was calculated by multiplying severity by probability. Low-Medium-High (1-2-3) risk was assigned as shown below.

0-1.9- Low

2.0-3.9- Low-Med

4-5.9- Med

6-7.9- Med-High

8-9- High

### Risk Assessment

	Human Impact	Property Impact	Business Impact	Probability	Severity	Risk	Risk
	Probability of death or injury	Physical Losses and damages	Interruption of Service	likelihood this will occur in 25 years	Avg. of Human/Property/Business	Severity x Probability (Relative Threat)	
Flooding	2	3	2	3	2.3	6.9	Med-High
Riverine Flooding	2	3	2	3	2.3	6.9	Med-High
Drought	1	1	1.5	3	1.2	3.6	Low- Med
Extreme Heat	3	3	2	3	2.7	8.1	High
Wild Fire	2	2.5	2	2	2.2	4.4	Med
Lightning	2.5	2.5	2.5	3	2.5	7.5	Med-High
Tornado	3	3	3	3	3	9	High
Hurricane	3	3	3	2	3	6	Med-High
Earthquake	2	2	2	1	2	2	Low- Med
Subsidence	.5	.5	1	.5	.7	.4	Low
Radon	.5	.5	.5	.5	.5	.3	Low
Severe Wind	3	3	3	3	3	9	High
Extreme Winter Weather	3	3	3	3	3	9	High
Landslide	1.5	1	1	1	1.2	1.2	Low
Avalanche	1.5	1	1	1	1.2	1.2	Low
HazMat Spills	3	3	3	3	3	9	High
Dam Failure*	3	3	3	1	3	3	Low- Med

- \* The only dam failure considered is the McDowell Dam in Peterborough

## CHAPTER V: CRITICAL FACILITIES

A Critical Facility is defined as a building, structure, or location which:

- Is vital to the hazard response effort
- Maintains an existing level of protection from hazards for the community
- Would create a secondary disaster if a hazard were to impact it

The Critical Facilities List for the Town of Greenfield has been identified using the following four categories:

### Category 1 - Emergency Response Facilities & Services:

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards

### Category 2 - Non Emergency Response Facilities:

The town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Greenfield.

### Category 3 - Facilities/Populations to Protect:

The third category contains people and facilities that need to be protected in event of a disaster.

### Category 4 - Potential Resources:

Contains facilities that provide potential resources for services or supplies.

Type of Critical Facility	Name	Address	Comments
<b>CATEGORY 1 - EMERGENCY RESPONSE FACILITIES &amp; SERVICES</b>			
Emergency Operations Center	Fire Station	814 Forest Road	
Bridges Located on Primary Evacuation Routes	Shown on Hazard Mitigation map		
Town Garage	Public Works Department	29 DPW Drive	
Communications	Verizon Switching Station	764 Forest Road	
Hospitals	Monadnock Community Hospital	Peterborough, NH	
	St. Joseph's Medical Center	Milford, NH	
Helicopter Landing Sites	18 locations	Barbara C. Harris Camp - ballfield; Sawmill Rd- behind Town Offices; Cavender Rd/Riverbend Dr intersection; East Rd- across from Lehnrs; 971 Forest Rd (Rt. 31) - Oak Park; 171 Forest Rd (Rt. 31) - Yankee Farmer; Francestown Rd (Rt. 136) - Field; Verney Dr.- Crotched Mtn Rehab; Mountain Rd- Brantwood Camp; Mountain Rd- Plowshare Farm; Muzzey Hill Rd- Cilley Field; Old Bennington Rd.- Robinson farm field; Old Bennington Rd.- Swamp Rd. intersection; Sawmill Rd.- American Steel parking lot; Sawmill Rd. - DOT parking lot; North of Brantwood Ballfield; East of Whitney Drive	
Sewer Department	Town sewer and septic field	South of NH 136 and West of Depot Drive	
<b>CATEGORY 1 - EMERGENCY RESPONSE FACILITIES &amp; SERVICES (CONT...)</b>			

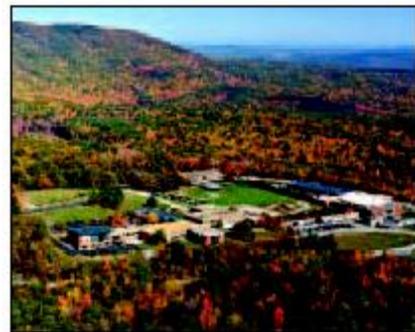
Town Offices	Town Offices	7 Sawmill Road	
Meeting House	Meeting House	776 Forest Road	
Fire Station	Fire Station	814 Forest Road	
Police Station	Police Station	7 Sawmill Road	
Ambulance Service	Peterborough Ambulance	Peterborough, NH	
	Antrim Fire Department		
	Wilton-Lyndeborough-Temple		
Emergency Fuel Facilities	Fire Station	814 Forest Road	Diesel only
	Public Works Department	29 DPW Drive	Diesel only
	Rymes Fuel	715 Forest Rd. unit 1	
	Crotched Mountain	Crotched Mountain	
Emergency Generators	Fire Station	814 Forest Road	
	Town Office		
	Public Works Department		2 portables
	Barbara C. Harris Center		portables
	American Steel	328 Sawmill Road	
Emergency Shelters	Crotched Mountain Rehabilitation Center	106 Verney Drive	
	Barbara C. Harris Center	Wally Stone Lane	Camp and Conference Center
Dry Hydrants - Fire Ponds - Water Sources	<b>Appendix C</b> lists all water sources in town by street	See <b>Hazard Mitigation Map</b> for hydrant locations	
Primary Evacuation Routes	NH 31 (Sawmill Rd/Forest Rd); NH 136 (Peterborough Rd)		
<b>CATEGORY 2 - NON EMERGENCY RESPONSE FACILITIES</b>			
Secondary Evacuation Routes	Forest Road to Hancock		
	New Boston Road to Francestown		
	Mountain Road to Peterborough/Temple		
Bridges on Secondary Evacuation Routes	See <b>Hazard Mitigation Map</b>		
Recycling Center	Recycling Center	29 DPW Drive	
<b>CATEGORY 3 - FACILITIES/POPULATIONS TO PROTECT</b>			
Special Needs Populations	Crotched Mountain Rehabilitation Center	Crotched Mountain	Treats 2,000 people annually
	Lyris Corp Plowshare	164 Mountain Road	4 homes and several non-residential buildings; day and live-in residents
	Senior Housing- Greenfield Commons	826 Forest Road	24 Units
Hazardous Material Storage	American Steel	328 Sawmill Road	Propane
	NH DOT	299 Sawmill Road	
	Rymes	775 Forest Road	Gasoline; Diesel
	Monadnock Warehouse	231 Forest Road	Propane
	Flagg Junkyard	1167 Forest Road	Automotive
	Kemps Junkyard	38 Russell Station Road	Automotive
New England Forest Products	315 Sawmill Road		
<b>CATEGORY 3 - FACILITIES/POPULATIONS TO PROTECT (Cont...)</b>			

Fairgrounds	Oak Park	971 Forest Road	
Library	Library	761 Forest Road	
Schools	Crotched Mountain Rehabilitation Center	Crotched Mountain	
	Greenfield Elementary School	860 Forest Street	Approx. 100 students
Day Care	Crotched Mountain Rehab Center	Crotched Mountain	
Churches	Greenfield Congregational Covenant Church	10-12 Depot Drive	
Post Office	Post Office	75 Slip Road	
Recreation Areas	Camp Winamac	Winamac Lane	
	Sunset Lake Beach	Crotched Mountain Road	
	Otter Lake Beach (Campers)	Otter Lake Drive	
	Otter Lake Beach (Day)	Otter Lake Drive	
	Greenfield State Park	Between Forest Road and Sawmill Road by Otter Lake	252 campsites
	Oak Park	971 Forest Road	
	Barbara C. Harris Center	Wally Stone Lane	Camp and Conference Center
	Public Boat Landing	Forest Rd by Hancock town boundary	
	Wapack Trail	South of Mountain Rd at SW corner of Town	
	Wapack National Wildlife Refuge	South of Mountain Road at southwestern corner of Greenfield	
	Brantwood Camp	Brantwood Camp Road	
	Zephyr Lake Beach	Forest Road at Zephyr Lake	
	Crotched Mtn Trailhead Parking	Crotched Mountain Road	
Historic Buildings	Town Offices	7 Sawmill Road	
	Meeting House	776 Forest Road	
Employment Centers	Crotched Mountain Rehabilitation Center	Crotched Mountain	Employing approximately 900
	New England Forest Products	315 Sawmill Road	Approx 10
	American Steel	328 Sawmill Road	Approx 70
	Mitchell Warehouse	217 Forest Road	Approx 10
	Monadnock Warehouse	231 Forest Road	Approx 4
	Barbara C. Harris Center	Wally Stone Lane	Seasonal Camp and Conference Center
Apartment Complexes	Rymes Apartments	775 Forest Road	3 Units
	Long Block	771 Forest Road	4 units
	Greenfield Corner Properties	4 Slip Road	8-9 Units
	Gibbons Apartments	9 Gibbons Lane	2 Buildings; 8 Units
	Todd Lane Apartments	10 Todd Lane	2 Buildings; 4 Units
	Apartments	214 Francestown Road	3 units
	Greenfield Commons	826 Forest Road	Elderly complex
<b>CATEGORY 4 - POTENTIAL RESOURCES</b>			
Food/Water	Crotched Mountain	Crotched Mountain	

	Rehabilitation Center		
	Harvester Market	783 Forest Road	Grocery items
	River House Cafe	4 Slip Road	restaurant
	Greenfield Congregational Covenant Church	10-12 Depot Drive	
	Barbara C. Harris Center	Wally Stone Lane	Camp and Conference Center
	Brantwood Camp	Brantwood Camp Road	
Medical Supplies	Crotched Mountain Rehabilitation Center	Crotched Mountain	Limited Supplies
Gravel Pits	Fracestown Sand and Gravel	Between Old Bennington and Muzzy Hill Roads at NW corner of Greenfield	
	State Highway Shed	Sawmill Road	
	Cemetery Gravel Operations	Near 525 Forest Road	
Fuel	American Steel	328 Sawmill Road	Propane
	Rymes	775 Forest Road	Gasoline and Diesel
Building Material and Heavy Equipment Suppliers	New England Forest Products	315 Sawmill Road	
	McGrath Lumber	328 Sawmill Road	
	Kemps Trucking & Equipment	38 Russell Station Road	
	Fran McMan	23 Dodge Road	
	American Steel	328 Sawmill Road	
	Sullivan Paving	101 Slip Road	
	NH DOT		
	Merzi Trucking	89 Peterborough Road	
	Gagnon & Sons Construction	210 Cornwell Road	
	Todd Smith	236 Forest Road	Welder
	Steve Seigar	97 Pine Ridge Road	

**Crotched Mountain Rehabilitation Facility**

Crotched Mountain Rehabilitation Facility, located at 1 Verney Drive in Greenfield offers health, education and rehabilitation services to children and adults with disabilities. The Rehabilitation Center is part of a 1,400 acre property that is located within three towns, Greenfield, Bennington and Frankestown. The Rehabilitation Center includes a school, specialty hospital, outpatient clinic, media center and an athletic complex including a gymnasium and swimming pools. The 25 yard lap pool is open to the public for lessons and swimming. Also featured on the campus is New Hampshire’s first wheelchair accessible tree house and over two miles of trails built to U.S. Forest Service accessibility standards that are open to the public.



The facility employs more than 800 people and provides care to more than 2,000 people annually. Some of the facilities include:

**Wonderworks Learning Center:** Ages 6 weeks-12 years; infant program, before and after school program, swimming program, summer programs for Crotched Mountain employees and the community.

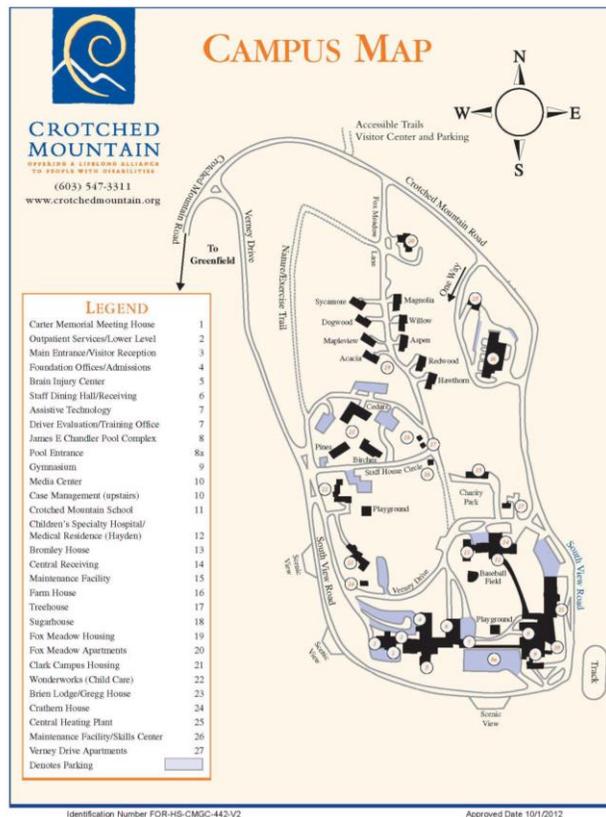
**Specialty Hospital:** a 62 bed hospital providing acute and sub-acute rehabilitation service for children and adults. Programs include rehabilitation and medical services following brain injuries, stroke, spinal cord injuries and other neuro-rehabilitation conditions, complex medical conditions and a ventilator program.

**Crotched Mountain School:** Licensed to enroll 105 students with disabilities in grades K-12 curriculum. There are both residential and day programs for the ages of 6 and 21.

The Crotched Mountain campus is also home to the offices of the Crotched Mountain Foundation which provides includes the office of the president and the administrative support services including finance, IT, human resources and development that support all of the programs of Crotched Mountain. Crotched Mountain provides services to people with disabilities throughout New Hampshire and in locations in Massachusetts, Maine and New York.

The Crotched Mountain Rehabilitation Center has been identified by the Hazard Mitigation Committee as a critical facility in the following categories: helicopter landing site, emergency generator, emergency shelter, special needs population services, recreation area, school, employment center, emergency IT support, food/water supply, gasoline and fuel supply, automotive service center and medical supply area. Crotched Mountain is also a member of the Greater Monadnock Public Health Network.

The town should work closely with the facility in all emergency planning measures. The campus map on the following page shows all the facilities within Crotched Mountain. More information can be found at [www.crotchedmountain.org](http://www.crotchedmountain.org).



## **CHAPTER VI: ASSESSING VULNERABILITY- IDENTIFYING POTENTIAL HAZARDS AFFECTING STRUCTURES; ESTIMATING POTENTIAL LOSSES**

Existing and future structures have the potential of being affected by some of the hazards identified in this Plan. Some hazards identified in this plan are regional or town wide risks and, as such, all structures, infrastructure and critical facilities fall into the hazard area.

In order to determine estimated potential losses due to future natural and man made hazards, structures need to be assigned a value. Information was gathered from both the 2013 Greenfield Assessor's records and from the NH Economic & Labor Market Information Bureau. Human losses were not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Also not included is the value of contents within structures. The total value of all structures in Greenfield is \$128,180,000 and the median value of a home is \$209,350

### **Hazard Vulnerability Assessment**

Potential losses were calculated for each hazard area by multiplying the type and number of potentially at risk structures by the appropriate calculated average valuation.

### **Estimating Potential Losses**

**Flooding (including riverine) – Medium to High Risk (\$1,046,750)** The Town of Greenfield has approximately 5 structures within the special flood hazard area. The vast majority of these structures are single-family homes with basements. Assuming a major flood occurred with a depth of four feet, the estimated damage could be \$1,046,750. Below is a list of past and potential areas in Greenfield that are at risk of flooding. Estimates of damage are also indicated in locations with structures.

New Boston Road-This area floods when more than 3 inches of rain falls. The last occurrence was in 2011. Culverts are at risk at this location. 2<sup>nd</sup> NH Turnpike South- estimated cost to replace is \$1,200,000.

Dunklee Road. This area floods when more than 3 inches of rain falls. The last occurrence was in 2005. 3 residential structures are at risk at this location. Potential loss estimate: \$628,050.

Swamp Road- This area floods when more than 3 inches of rain falls. The last occurrence was in 2006. 1 residential structure is at risk. 4 undersized culverts are at risk. Estimated potential loss: \$209,350.

Otter Lake Lane-1 residential house is at risk at this location. Estimated potential loss: \$209,350.

There are approximately 14 structures (11 residences and 3 businesses ) within the flood zone- Russell Station Rd, Old Lyndeborough Mountain Rd, Beach Rd, Forest Rd, Gibbons Lane, Old Bennington Rd, School House Rd, Holden Rd. Estimated potential loss: \$4,100,000.

**Drought – Low to Medium Risk - No Record of Cost:** Drought will increase the risk of wildfire, especially in areas of high recreational use and as more timberland is set aside as non-harvested timberland, the potential for the risk of wildfire will increase.

- Forested areas with high fuel content have more potential to burn
- Severe drought conditions existed in New Hampshire from 1960 to 1969

- Spring of 2012- drought conditions throughout the state. This was considered one of the top five worst droughts in New Hampshire's history.

**Extreme Heat - High Risk - No Record of Cost:** Extreme heat can be dangerous to those residents with medical conditions and the elderly. It is important to have cooling areas and a good supply of water available. Extreme heat can add to the potential for wildfires and depletes the water supply for firefighting. Outreach and education on methods of dealing with extreme heat are important. In Greenfield, elderly are at risk. Approximately 11 percent of the Greenfield's population is 65 years or older. Quantity of and access to water sources throughout town reduces risk.

**Wildfire - Medium Risk - \$159,777,521:** There is plenty of fuel and much contiguous forested land. The whole town is at risk for wildfires. A lack of direct access to many remote areas within town adds to the danger. There is a substantial amount of debris on the ground from the Ice Storms of 1998 and 2008, wind shears, heavy winds, and logging practices. As timber harvesting is reduced, wood roads close, debris builds up on the ground, and the potential for wildfire increases town-wide. Greenfield State Park is a concern due to the large forested area and a large campground that has 253 camp sites. Assuming a wildfire destroys 100% of structures in town, the potential damage is estimated to be \$159,777,521

**Earthquake - Low – Medium Risk - \$50,622,580:** New Hampshire generally lies in a zone of moderate seismic vulnerability. Hillsborough County is in an area of particularly high seismicity that is evident in a crescent of historical events beginning in the Ossipee Range and following the general contour of the Merrimack River Valley.

Structures are mostly of wood frame construction. Assuming an estimated loss of 20% of town assessed structures, the estimated cost is \$50,622,580. This does not include the costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures.

- Four earthquakes were recorded in New Hampshire between January 2011 to January 2014, ranging in magnitudes of 1.2 to 5.8.

**Erosion - High Risk - No Record of Cost:** Steep slopes within the watersheds pose a threat to water quality.

**Subsidence - Low Risk - No Record of Cost:** Subsidence is the collapse of the Earth's surface elevation due to the removal of subsurface support. Events range from broad regional lowering of the land surface that occurs over long periods of time, to sudden localized collapse. Occurrences can include the collapse of highways, parking lots, and can also include large holes in the ground that can collapse structures. There is no record of subsidence within the Town of Greenfield and little concern for an occurrence.

**Radon Air/Water - Medium Risk - No Record of Cost:** Radon is a naturally occurring radioactive gas with carcinogenic properties. The gas is a common problem in many states, including New Hampshire. Data collected by the NH Office of Community and Public Health's Bureau of Radiological Health indicates that one third of the houses in New Hampshire have indoor radon levels that exceed the U.S. Environmental Protection Agency's "action level" of four Pico curies per liter for at least some portion of the year. Radon may also enter homes dissolved in drinking water from drilled wells. A higher level of radon in water from individual drilled wells is a common occurrence in New Hampshire.

No known records of illness has be attributed to radon in Greenfield, however, residents should be aware that radon is present, particularly with older granite and dirt cellars. Hillsborough County has

the highest rate of radon in the Southwest Region of New Hampshire and the fourth highest rating in the State. For additional information on the radon ratings, see the Radon Table on page 25.

**Tornado - High Risk - \$5,062,258:** Risk from tornados is considered to be high in Hillsborough County. The Fujita Scale is used to determine the intensity of tornadoes. Most tornadoes are in the F0 to F2 Class. Building to modern wind standards provides significant property protection from these hazard events. New Hampshire is located within Zone 2 for Design Wind Speed for Community Shelters, which is 160 mph, and is also noted as being within a hurricane susceptible region. While it is difficult to assess the monetary impact a tornado may have on a community, the range of monetary damage shown below indicates an approximate amount that could be expected.

The southwestern portion of the state is considered a special wind hazard area as demonstrated by the high proportion of tornadoes and severe wind events that are experienced in this region annually. On July 3, 1997 several tornadoes struck this section of the state. An F1 tornado caused severe tree loss in Swanzey, destroying a building and damaging the stables at the Cheshire Fairgrounds. Although outside the southwest region, the 2008 Barnstead Tornado caused significant damage and also involved loss of life. Therefore, this is a real hazard and the damage it could inflict should not to be taken lightly.

A tornado occurred in Greenfield along Crotched Mountain in 1999. One barn was destroyed. An estimated damage to 10% of structures in town with 20% damages is \$5,062,258. Estimated cost does not include building contents, land values or damages to utilities. River corridors and hill tops are susceptible.

**Hurricane/Tropical Storms – Medium- High Risk - No Record of Cost - \$6,327,000:** A major hurricane can cause significant damage to a community. Hurricane Andrew in 1992 caused billions of dollars in damage in the State of Florida. A series of Hurricanes also hit Florida in 2004. And the extremely destructive Hurricane Katrina hit the Gulf Region in 2005, which caused an estimated \$100 billion in damages. Most of the damage is caused by high water and high winds. Greenfield's inland location in southwestern New Hampshire reduces the risk of extremely high winds that are associated with hurricanes. The Town has experienced small blocks of downed timber and uprooting of trees onto structures. Hurricanes can, and do, create flooding. Estimated wind damage to 5% of the structures with 10% damage per structure is \$1,265,565. Estimated flood damage to 10% of the structures with 20% damage per structure is \$5,062,258. Cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included. Possible flooding of evacuation routes is also a risk.

- 1938 hurricane was a major event - wind damage and flooding
- 1990s recorded a number of events with high winds and torrential rains
- Tropical Storm Irene (2011) and Tropical Storm Sandy (2012) caused significant damage to the Northeast U.S. A bridge in Greenfield (that was under construction) needed repair due to the effects of Tropical Storm Irene.
- Power and phone lines - disruptions of services
- Flooding/washing of evacuation routes

**Severe Wind/ Downburst - High Risk - No Record of Cost:** A downburst is a severe, localized wind blasting down from a thunderstorm. These "straight line" winds are distinguishable from tornadic activity by the pattern of destruction and debris. Significantly high winds occur especially during tornadoes, hurricanes, winter storms and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees

are common during severe wind occurrences. Greenfield has experienced downbursts in the last ten years. Downbursts are unpredictable therefore make cost estimates difficult to determine.

**Lightning Strikes – Medium - High Risk- No Record of Cost:** Lightning strikes with frequency and has caused brush fires at Crotched Mountain Rehabilitation Center. No record of loss of life or property from lightning strikes has been recorded in Greenfield. There are frequent strike on Muzzey Hill also, but no reports of individuals being struck. Telephone and power outages occur when transformers are hit by lightning or when a tree gets struck and falls onto the lines. Antennas and satellites, church steeples, cupolas, and other upward protruding architectural features are at greater risk for lightning strikes. Hikers, fisherman, and boaters are at risk during lightning events and should seek safe shelter. Forested areas with a high fuel load, such as excessive accumulation of downed timber due to timber removal or after severe weather events, are a high risk for forest fire during lightning storms. Areas of high elevation include: Fletcher Farm Rd., Gould Hill Rd., Blanchard Hill Rd., Thomas Rd.

**Extreme Winter Weather – High Risk - No Record of Cost:** Three types of winter events that cause concern are heavy snow, ice storms and extreme cold. Occasionally, heavy snow events can collapse buildings. Ice storms have disrupted power and communication services. Timberland has been severely damaged. Extreme cold can also affect the elderly. Greenfield's recent history has not recorded any loss of life due to the extreme winter weather. These random events are difficult to set a cost to repair or replace any of the structures or utilities affected.

- The area has been subject to extremely heavy snow falls
- 1969 heavy snow - several 3 feet events
- 1988 temperature below 0 degrees for a month (Nov.-Dec.)
- 1998 and 2008 severe ice storm events throughout town
- The 2008 ice storm caused all of town to lose power. Some areas lost power for approximately one month.
- Elderly are affected by extreme weather

**Landslide – Low Risk – No Record of Cost:** landslides are considered low risk in Greenfield. If a one were to occur, it could cause damage to roads, bridges, utilities, houses, and other structures. The Town has no history of landslide events. Areas surrounding Crotched Mountain are more at risk.

**Snow Avalanche - Low Risk - No Record of Cost:** Snow avalanches occur on slopes averaging from 25 to 50 degrees, the majority occurring on slopes from 30 to 40 degrees. Snow avalanches are considered low risk in Hillsborough County. If a snow avalanche were to occur, it could cause damage to roads, bridges, utilities, houses, and other structures. The Town has no history of snow avalanche events. Areas surrounding Crotched Mountain are more at risk.

**Man-Made Hazards - Hazardous Materials –High Risk - No Record of Cost:** Public transportation of chemicals and bio-hazardous materials through town by truck is a concern especially on NH 31 and NH 136. Facilities that store hazardous materials near water resources pose a risk for groundwater contamination. In 2001, a fuel oil tanker spilled fuel into Otter Lake.

**Man-Made Hazards – Dam Failure –Low to Medium Risk:**

There are only 2 dams in Greenfield that are currently on the Active List with the State of New Hampshire. Both of these dams are classified as Non-Menace. There is a concern however, that if

the McDowell Dam in Peterborough were to fail, much of Greenfield could potentially experience significant flooding.

## CHAPTER VII: EXISTING MITIGATION STRATEGIES

This step involves identifying existing mitigation strategies and Town programs and evaluates their effectiveness. This section outlines those programs and recommends improvements to ensure the highest quality emergency services possible.

### Existing Mitigation Strategies and Proposed Improvements

Existing Protection	Description/ Area Covered	Responsible Local Agent	Effectiveness	Proposed Improvements/Comments
<b>School Evacuation Plan-</b> Designated plan to evacuate the schools in the event of an emergency or disaster addressing bussing, transportation routes (primary and alternative), traffic & crowd control, end destination and parental notification.	Greenfield Elementary School	School Board	Unknown	Plan should be shared with town officials
<b>Building Codes-</b> The town employs a code enforcement officer and has adopted provisions of the NH Life Safety Code and the NH State Building Code which includes the International Building Code, International Plumbing Code, International Mechanical Code, International Energy Conservation Code and National Electric Code.	Townwide	Building inspector/ Code enforcement officer	High	Ongoing training
<b>Local Road and Driveway Design Standards-</b> Standards set by the town and the Public Works Department	Townwide	Planning Board	High	Mutual Aid member
<b>Emergency Snow Removal Policy-</b> procedures for snow removal in town.	Townwide	Highway Dept.	High	
<b>Town Master Plan-</b> Continuously being updated. A planning document to ensure that overall development in town is sustainable, meeting the needs of the citizens by setting forth steps and guidelines for a sound living environment through well-planned growth.	Townwide	Planning Board	Moderate	Began updates in 2011 and is currently updating sections.
<b>Mutual Aid-</b> provides assistance to all aspects of the town's emergency management services. Southwest NH Fire Mutual Aid and the Hillsborough County Sheriff's Dept. provide mutual aid.	Townwide	Fire and Police Chiefs	Very High	
<b>Fire Pond/Dry Hydrant Management Plan-</b> Designates a maintenance schedule for water sources used by the Fire Dept.	Townwide	Fire Dept.	High	The plan calls for maintaining and flushing the systems two times per year
<b>Town Warning System-</b> The town has a town-wide phone tree and an alarm on the fire station. - Code RED; ECN notification system utilizing cell, text, email and landline methods of communication.	Townwide	Fire Dept., Police Dept., Public Works, and EMD	Moderate-High	This is an ongoing development process because of changing population and technology. There is some need for upgraded fire alarm equipment. E-911
<b>Erosion and Sedimentation Plan-</b> The Town follows the state's best management practices	Townwide	Planning Board	High	

Existing Protection	Description/ Area Covered	Responsible Local Agent	Effectiveness	Proposed Improvements/Comments
<b>Shoreland Protection Act</b> - The Town follows the state's guidelines	Townwide	Planning Board	High	
<b>Wetlands Protection</b> - The town requires 25-foot setback from all wetland soils in town.	Townwide	Planning Board	High	
<b>Steep Slopes Protection</b> - The town has requirements for the construction of driveways only (no more than 8% grade).	Townwide	Planning Board/ DPW	High	Steep Slopes Ordinance was proposed but not approved
<b>Floodplain Development Ordinance</b> - The town has an ordinance to control development in the 100-year floodplain as required by FEMA to remain eligible for the National Flood Insurance Program.	Townwide	Planning Board	High	
<b>Health Officer</b> - Maintains state health requirements, inspects complaints as required.	Townwide	Health Officer	High	
<b>Emergency Management Plan</b> - This plan was first written in 1994 and establishes protocol for all town departments in the event of an emergency.	Townwide	EMD & all Town Depts.	High	Updated in 2010 Work in progress- reviewed annually
<b>EMS Week</b> - a public awareness week held each year by the fire department,	Townwide	Fire Department	Unknown	
<b>Hazard Materials Spill procedure</b> - the Nashua or Keene Hazmat Team responds to Greenfield. Training for fire personnel is provided	Townwide	Fire Department	Moderate	Provides safety to public & property.
<b>Pandemic Plan</b> - the plan is in the process of being written with 15 neighboring towns. It is now based in Keene	Regional	EMD, Fire Dept & Selectboard	Unknown	
<b>Training for fire fighters/ EMS</b> - all firefighters required to go through state certification course to fight structural fires & wildfires.	Townwide	Fire Department	High	Additional training is done.
<b>Fire Prevention Program</b> - this program is held annually in the community.	Townwide	Fire Department	unknown	
<b>Town Radio System</b> - Narrow band radios. There is a disaster frequency that all departments use when there is an emergency.	Townwide	Hwy, Fire and Police Depts.	Poor	Department Public Works & Police Dept. need portable radios to use outside of vehicles; mobile repeaters are necessary to limit dead spots in town. All radios need analyzed and upgraded.
<b>Fire Inspector</b> - inspects any new buildings and any foster homes and assisted living facilities.	Townwide	Fire Inspector	High for new structures, or foster/ assisted facilities	Low to moderate effectiveness for commercial and other existing buildings. Need to do annual inspections of multifamily dwellings.

### Previous Mitigation Action Update

The Hazard Mitigation Committee reviewed each Mitigation Action Item from the previous plan to determine the status of the proposed actions. A status of *completed, deferred, or deleted* is recorded in the table below.

Mitigation Action	Status	Explanation of Status
Informational pamphlets for severe weather	Deferred	Town has provided some information. Will add this as a new mitigation action to provide additional information
Continue to remain in compliance with the National Flood Insurance Program	Completed	This will be added as new mitigation action to ensure continued compliance
The town will continue to update the capital improvement plan and zoning regulations to provide protection for new buildings from flooding and other relevant hazards where necessary	Completed	This is a continuing action and will be added as new mitigation action
Wetlands protection regulations- revisit them to see if changes are necessary	Completed	This will be added as new mitigation action ; check new regulations for potential changes
Private culvert maintenance education program	Deferred	Will add outreach & education as a new mitigation action for residents/businesses with private culverts
Campfire education	Completed	Permits are required and have restrictions. This will be added as a new mitigation action since it is on-going.
Classification sign at the fire station	Completed	Installed new Smokey Bear sign in 2013
Have ample supplies and continue operation-level training of Fire and Police	Completed	Continued monthly. This will be added as a new mitigation action
All flooding hazard mitigation strategies	Completed	This is a continuing action and will be added as new mitigation action
Develop emergency warning system for Townwide notification	Completed	Code Red & reverse 911 are used
Recommend to the planning board to consider requiring underground utilities for subdivisions or site plans	Completed	This is done by the Planning Board on a case-by-case basis.
Beaver population control and monitoring plan	Completed	This is a continuing action and will be added as new mitigation action
Open roads to sunlight to prevent icing in E/W directions	Completed	This is a continuing action and will be added as new mitigation action
Slash monitoring to prevent fires	Completed	This is a continuing action and will be added as new mitigation action

## CHAPTER VIII: PROPOSED MITIGATION STRATEGIES

The following programs and activities are aimed at mitigating the effects of the identified potential hazards. As more information becomes available for other hazards that may have the potential to impact the town of Greenfield, additional projects will be added to the Hazard Mitigation Plan. The identified projects are not only meant to address reducing the effects of hazards on existing buildings and infrastructure, but also to address reducing the effects of hazards on new buildings and infrastructure.

### New Programs or Activities

In addition to the programs and activities that Greenfield is currently undertaking to protect its residents and property from natural and manmade disasters, a number of additional strategies were identified by the Local Hazard Mitigation Committee for consideration. The process of compiling a comprehensive list of all mitigation strategies currently in place throughout the Town has helped the Committee to identify gaps in the existing coverage and improvements which could be made to the existing strategies.

New strategies were identified for each general hazard type using the following categories: Prevention (programs and policies), Property Protection, Structural Projects, Emergency Services, and Public Education and Involvement.

### Location Specific Programs or Activities

In addition to the mitigation strategies proposed generally for each hazard type as indicated above, the Committee brainstormed actions for specific potential hazard areas identified in Chapter III. In these cases, the Committee felt that the risk to the location was so great, mitigation actions could be geared directly to mitigating hazards at that location. The table below shows proposed mitigation actions for both general hazard types and specific potential hazard areas.

Hazard Type or Specific Location	Prevention	Property Protection	Structural Projects	Emergency Services	Public Information	
Flooding	Beaver population control and monitoring plan	Revisit wetlands protection regulations to see if revisions should be made	Raise Cornwell Road		Private culvert maintenance education program	
	Continue to remain in compliance with the National Flood Insurance Program	The town will continue to update the capital improvement plan and zoning regulations to provide protection for new buildings from flooding and other relevant hazards where necessary	Upsize culvert on Russell Station Road			
			Replace culvert and raise the road at Dunklee Hill Road			
	Consider enhancements to local Zoning Ordinance		Cavender Road			Outreach & Education
			New Boston Road			
			Thomas Road			

Hazard Type or Specific Location	Prevention	Property Protection	Structural Projects	Emergency Services	Public Information
Wildfires	Slash monitoring within camp areas & some trails by trail groups		Francestown Road- strengthen bridge structure		Campfire education
Severe winter weather/ Icing	Tree trimming along roads to open up to sunlight along east/west routes to prevent icing			Code Red, reverse 911 or other public notification	Informational pamphlets for severe weather suggestions
Hazard Materials Spills	Continue Emergency Training			Have supplies and continue operation-level training	Outreach and education - pamphlets
All town-wide hazards (tornados, earthquakes, hurricanes, wind, etc)	Continue Emergency Training		Recommend to the Planning Board to consider requiring underground utilities of new applicants for subdivision or site plan	Use Code Red or reverse 911	Informational pamphlets for severe weather preparation
				Update the EOP	

### Prioritization of Proposed Mitigation Strategies

The goal of each strategy identified in the previous table is reduction or prevention of damage from a hazard event. In order to determine their effectiveness in accomplishing this goal, a set of criteria was applied to each strategy. The STAPLEE method analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies and discussed in the table on the following page:

- **Social:** Is the proposed strategy socially acceptable to the community? Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- **Technical:** Will the proposed strategy work? Will it create more problems than it solves?
- **Administrative:** Can the community implement the strategy? Is there someone to coordinate and lead the effort?
- **Political:** Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?
- **Legal:** Is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?

- **Economic:** What are the costs and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?
- **Environmental:** How will the strategy impact the environment? Will the strategy need environmental regulatory approvals?

Each mitigation strategy was evaluated and assigned a score (Good = 3, Average = 2, Poor = 1) based on the above criteria. An evaluation chart with total scores for each strategy can be found in the table below. Each strategy was evaluated and prioritized according to the final score. The highest scoring strategies were determined to be of most importance, economically, socially, environmentally, and politically.

An additional factor that is not considered here but should be considered by the Committee on a project-by-project basis is the ability to find funding.

### STAPLEE Ranking Matrix

Proposed Mitigation Strategy	Is it <b>Socially</b> acceptable?	Is it <b>Technically</b> feasible?	Is it <b>Administratively</b> workable?	Is it <b>Politically</b> acceptable?	Is there <b>Legal</b> authority to implement?	Is it <b>Economically</b> beneficial?	Is it <b>Environmentally</b> beneficial?	<b>Total Score</b>
Continue to comply with the NFIP (floodplain management, outreach & education)	3	3	3	3	3	3	3	21
The town will continue to update the CIP and zoning to provide protection for new buildings from flooding and other relevant hazards where necessary	3	3	3	3	3	3	3	21
Cornwell Road- Raise the Road	3	3	3	3	3	3	3	21
Russell Station Rd- Replace the Culvert with a larger one	3	3	3	3	3	3	3	21
Dunklee Hill Rd- Replace culvert and raise the road	3	3	3	3	3	3	3	21
County Road Reconstruction	3	3	3	3	3	3	3	21
Cavendar Road –elevate road	3	3	3	3	3	3	3	21
Swamp Road- elevate approximately 1,550' of road	3	3	3	3	3	3	3	21
New Boston Road- culvert near Forest Road-	3	3	3	3	3	3	3	21
Old Bennington Road (from Country Rd. to Forest Rd.) elevate	3	3	3	3	3	3	3	21
School House Road-elevate	3	3	3	3	3	3	3	21
Informational outreach for hazard mitigation and emergency management	3	3	3	3	3	3	3	21
Slash monitoring to prevent fires	3	3	3	3	3	3	3	21
Private culvert maintenance education program	3	3	3	3	3	3	3	21
Campfire education	3	3	3	3	3	3	3	21
Have ample supplies and continue operation-level training of Fire and Police	3	3	3	3	3	3	3	21
All flooding hazard mitigation strategies	3	3	3	3	3	3	3	21
Maintain emergency warning system for Town-wide notification	3	3	3	3	3	3	3	21

Proposed Mitigation Strategy	Is it <b>Socially</b> acceptable?	Is it <b>Technically</b> feasible?	Is it <b>Administratively</b> workable?	Is it <b>Politically</b> acceptable?	Is there <b>Legal</b> authority to implement?	Is it <b>Economically</b> beneficial?	Is it <b>Environmentally</b> beneficial?	Total Score
Add the Hazard Mitigation Plan Update as an appendix in the Master Plan.	3	3	3	3	3	3	3	21
Update the Emergency Operations Plan	3	3	3	3	3	3	3	21
Barbara C. Harris Center: Investigate hazards & property use during an event; obtain map of the grounds	3	3	3	3	3	3	3	21
Beaver population control and monitoring plan	3	3	3	3	3	3	3	21
Obtain information from Peterborough on the McDowell Dam	3	3	3	3	3	3	3	21
Wetlands protection regulations-revisit them to see if changes are necessary	2	3	3	3	3	3	3	20
Improve ditching along roads to improve stormwater management	3	3	3	3	2	3	3	20
Open roads to sunlight to prevent icing (pruning)	2	3	3	2	3	3	3	19
Tree pruning near powerlines, roads, public structures	2	3	3	2	3	3	3	19
Recommend to the Planning Board to consider requiring underground utilities for new subdivisions or site plans	2	3	3	2	3	2	3	18

## CHAPTER IX: PRIORITIZED IMPLEMENTATION SCHEDULE AND ACTION PLAN

The following questions were asked to develop an implementation schedule for the identified priority mitigation strategies:

**WHO?** Who will lead the implementation efforts? Who will put together funding requests and applications?

**WHEN?** When will these actions be implemented, and in what order?

**HOW?** How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

A fourth consideration was the cost/benefit of each proposed action. Comments regarding the cost/benefit of each project are included, along with the “who,” “when,” and “how” in the table on the following page.

As additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the Plan will be reviewed and amended accordingly.

Mitigation Action	Who (Leadership)	When (Deadline)	How (Estimated Cost and Funding Source)	Cost/Benefit Comments
Continue to comply with the NFIP (floodplain management, outreach & education)	Selectmen, Planning Board	Annually	Less than \$100; Town budget	Benefits outweigh the costs
The town will continue to update the CIP and zoning to provide protection for new buildings from flooding and other relevant hazards where necessary	Selectmen, Planning Board	2016-2017	Less than \$100; Town budget	Benefits outweigh the costs
Cornwell Road- Raise the Road	Department of Public Works		\$6,800	Benefits outweigh the costs
Russell Station Rd- Replace the Culvert with a larger one	Department of Public Works		\$11,000	Benefits outweigh the costs
Dunklee Hill Rd- Replace culvert and raise the road	Department of Public Works		\$4,900	Benefits outweigh the costs
County Road Reconstruction	Department of Public Works		\$42,000	

Mitigation Action	Who (Leadership)	When (Deadline)	How (Estimated Cost and Funding Source)	Cost/Benefit Comments
Cavendar Road –elevate road	Department of Public Works		\$15,000	
Swamp Road- elevate approximately 1,550' of road	Department of Public Works		\$30,000	
New Boston Road- culvert near Forest Road-	Department of Public Works		\$17,000	Benefits outweigh the costs
Old Bennington Road (from Country Rd. to Forest Rd.) elevate	Department of Public Works		\$38,000	
School House Road-elevate	Department of Public Works		\$5,700	Benefits outweigh the costs
Informational outreach for hazard mitigation and emergency management	Emergency Management Director & Emergency Personell	July 2015	Less than \$500; Town budget	Very beneficial
Slash monitoring to prevent fires	Board of Selectmen, Town Forester	Annually	Less than \$1,000; Town budget	Beneficial
Private culvert maintenance education program	Department of Public Works	September 2015	\$200; Town budget	Very beneficial
Campfire education	Fire Chief & Fire Warden	Annually	Less than \$100; Town budget	Very beneficial
Have ample supplies and continue operation-level training of Fire and Police	Fire Chief & Police Chief	Annually	Less than \$5,000/year; Town budget)	Benefits outweigh the costs
Continue all flooding hazard mitigation strategies	Department of Public Works	Annually	\$5,000-\$10,000/year; Town budget	Very beneficial
Maintain emergency warning system for Town-wide notification	Emergency Management Director	Annually	Less than \$5,000/year; Town budget)	Beneficial
Add the Hazard Mitigation Plan Update as an appendix in the Master Plan.	Emergency Management Director	October 2014	Less than \$100 Town Budget	Beneficial
Update the Emergency Operations Plan	Emergency Management Director	2014	FEMA grant	Very beneficial
Barbara C. Harris Center: Investigate hazards & property use during an event; obtain map of the grounds	Fire Chief		Less than \$100 Town Budget	Benefits outweigh the costs

<b>Mitigation Action</b>	<b>Who (Leadership)</b>	<b>When (Deadline)</b>	<b>How (Estimated Cost and Funding Source)</b>	<b>Cost/Benefit Comments</b>
Beaver population control and monitoring plan	Department of Public Works/ Conservation Commission	Annually	Less than \$1,000; Town budget	Beneficial
Obtain information from Peterborough on the McDowell Dam	Emergency Management Director		Less than \$100 Town Budget	Benefits outweigh the costs
Wetlands protection regulations- revisit them to see if changes are necessary	Conservation /Planning Board	January 2016	Less than \$100; Town budget	Benefits outweigh the costs
Improve ditching along roads to improve stormwater management	Department of Public Works/	Annually	\$4,500/year; Town budget	Benefits outweigh the costs
Open roads to sunlight to prevent icing (pruning)	Department of Public Works/ Board of Selectmen	Annually	\$4,500/year; Town budget	Beneficial
Tree pruning near powerlines, roads, public structures	Department of Public Works/	Annually	\$1,500/year; Town budget	Very beneficial
Recommend to the Planning Board to consider requiring underground utilities for new subdivisions or site plans	Emergency Management Director	October 2014	Less than \$100 Town Budget	Benefits outweigh the costs

## CHAPTER X: ADOPTION, IMPLEMENTATION, MONITORING & UPDATE

### Adoption

The Greenfield Board of Selectmen adopted the Greenfield Hazard Mitigation Plan Update 2014 on (Date of adoption). A copy of the resolution can be found at the end of this chapter. Adopted policy addresses the actions for implementation set forth in the prioritized implementation schedule (Action Plan) in the previous chapter and in the “Monitoring & Updates” sub-section contained in this chapter. All other sections of this plan are supporting documentation for information purposes only and are not included as the statement of policy.

A copy of the public hearing notice for the Board of Selectmen meeting at which the plan was adopted is included in **Appendix G**. The plan was available to the public via a hard copy at the town offices prior to the Selectmen meeting. Any comments were considered and addressed prior to adoption of the plan.

### Implementation of the Plan through Existing Programs

In addition to work by the Hazard Mitigation Committee and town departments, several other mechanisms exist which will ensure that the Greenfield Hazard Mitigation Plan Update 2014 receives the attention it requires for satisfactory use.

#### Master Plan

Implementation of the Master Plan has been ongoing since its most recent adoption in 2003 with updates to certain chapters in 2013. Where appropriate, recommendations from the Greenfield Hazard Mitigation Plan Update 2014 will be inserted into future updates of the Master Plan. The Local Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to ensure that the Greenfield Hazard Mitigation Plan Update 2014 is adopted as a chapter of the Master Plan or included as an appendix.

#### Zoning Ordinance and Regulations

Some of the implementation strategies proposed involve revisions to the Subdivision Regulations and/or the Site Plan Review Regulations as well as the Zoning Ordinance. The Local Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to develop appropriate language for the recommended modifications.

#### Capital Improvements Program

The Town will continue to update the Capital Improvements Program to protect new buildings and structures from flooding and other relevant hazards where necessary. This is included in the Action Plan in Chapter IX of this plan.

### Continued Public Involvement

On behalf of the Hazard Mitigation Committee, the Emergency Management Director (EMD), under direction of the Board of Selectmen, will be responsible for ensuring that town departments and the public have adequate opportunity to participate in the planning process. Administrative staff may be utilized to assist with the public involvement process. For the yearly update process, techniques that will be utilized for public involvement include:

- Provide personal invitations to Budget Committee members;
- Provide personal invitations to town department heads;
- Post notices of meetings at the Town Office, Library, and local businesses;
- Submit newspaper articles for publication appropriate newspapers and Town Newsletter; and
- Information added to the Town Website.

A number of Implementation Action items which will be undertaken relate to public education and involvement. Additionally, members of the public including area business owners, schools, communities, and organizations will be invited to participate in the yearly process of updating the Greenfield Hazard Mitigation Plan Update 2014. These outreach activities will be undertaken during the Plan's annual review and during any Hazard Mitigation Committee meetings the Board of Selectmen calls to order. For all meetings regarding the Greenfield Hazard Mitigation Plan Update 2014, the public will be noticed and the meetings will be open to the public.

### **Monitoring & Updates**

Recognizing that many mitigation projects are ongoing, and that while in the implementation stage communities may suffer budget cuts, experience staff turnover, or projects may fail altogether, a good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for updates of the Plan where necessary.

In order to track progress and update the Mitigation Strategies identified in the Action Plan (Chapter IX), the Town Hazard Mitigation Team will revisit the Greenfield Hazard Mitigation Plan Update 2014 annually, or after a hazard event. The Emergency Management Director is responsible for initiating this review and will consult with the Board of Selectmen and other key local officials. Changes will be made to the Plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with the timeframe, the community's priorities, and funding resources. Priorities that did not make the implementation list, but identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this Plan to determine feasibility of future implementation. In keeping with the process of adopting the Greenfield Hazard Mitigation Plan Update 2014, a public hearing to receive public comment on plan maintenance and updating will be held during the annual review period and the final product adopted by the Board of Selectmen appropriately.

Monitoring of the plan shall include periodic reports, meetings, site visits, and phone calls. The projects identified in this plan will be evaluated to make sure they are still applicable and practical. When the plan is evaluated, any changes should be incorporated into the plan in the annual update.

**Appendix H** is meant to assist in the monitoring and evaluation of the plan on an ongoing basis.

The Greenfield Hazard Mitigation Plan Update 2014 must be reviewed, revised as appropriate, and resubmitted to FEMA for approval every **five years** in order to maintain eligibility for Pre-Disaster Mitigation Competitive (PDM-C) and Hazard Mitigation Grant Program project grants.

This plan received FEMA final approval on (add date of FEMA final approval).

**CERTIFICATE OF ADOPTION**

**TOWN OF GREENFIELD NEW HAMPSHIRE**

**BOARD OF SELECTMEN**

**A RESOLUTION ADOPTING THE**

**GREENFIELD HAZARD MITIGATION PLAN UPDATE 2014**

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

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

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Greenfield; and

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

WHEREAS, adoption of this Plan will make the Town of Greenfield eligible for funding to alleviate the impacts of future hazards; now therefore be it **RESOLVED** by the Board of Selectmen:

ADOPTED AND SIGNED this \_\_\_\_\_ day of \_\_\_\_\_, 2014

\_\_\_\_\_  
Greenfield Board of Selectmen Chairman

\_\_\_\_\_  
Board of Selectmen

\_\_\_\_\_  
Board of Selectmen

ATTEST

\_\_\_\_\_

# **Appendices**

## **Appendix A: Hazard Descriptions**

The following list describes hazards that have occurred or have the potential to occur in the Town of Greenfield. The descriptions provided are those used in the State of NH Hazard Mitigation Plan (2013).

### Flooding

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and/or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges. Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of the year. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go.

#### *100-year Floodplain Events*

- Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term 100-year flood does not mean that a flood will occur once every 100 years. Rather, it is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase “1% annual chance of flood.” What this means is that there is a 1% chance of a flood of that size happening in a year.

#### *Rapid Snow Pack Melt*

- Warm temperatures and heavy rains cause rapid snowmelt. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

#### *River Ice Jams*

- Rising waters in early spring breaks ice into chunks, which float downstream and often pile up, causing flooding. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice collecting in river bends and against structures presents significant flooding threats to bridges, roads, and the surrounding lands.

#### *Severe Storms*

- Flooding associated with severe storms can inflict heavy damage to property. Heavy rains during severe storms are a common cause of inland flooding.

#### *Beaver Dams and Lodging*

- Flooding associated with beaver dams and lodging can cause road flooding or flooding damage to property.

### Drought

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. Droughts are rare in New Hampshire. They generally are not as damaging and disruptive as floods and are more difficult to define. The effect of droughts is indicated through measurements of soil moisture, groundwater levels, and stream-flow. However, not all of these indicators will be minimal during a drought. For example, frequent minor rainstorms can replenish the soil moisture without raising ground-water levels or increasing stream-flow. Low stream-flow correlates with low ground-water levels because ground-water discharge to streams and rivers maintains stream-flow during extended dry periods. Low stream-flow and low ground-water levels commonly cause diminished water supply.

### Extreme Heat

Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures. These event conditions may impact the health of both humans and livestock.

---

### Wildfire

Wildfire is defined as an uncontrolled and rapidly spreading fire. A forest fire is an uncontrolled fire in a woody area. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. Grass fires are uncontrolled fires in grassy areas.

### Earthquake

New England is considered a moderate risk earthquake zone. An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric, water and phone lines, and often cause landslides, flash floods, fires, and avalanches. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is determined by the use of scales such as the Richter scale and Mercalli scale.

### Subsidence

The collapse of the Earth's surface elevation due to the removal of subsurface support. Events range from broad regional lowering of the land surface that occurs over long periods of time, to sudden localized collapse.

### Radon

Radon is a naturally occurring radioactive gas with carcinogenic properties. The gas is a common problem in many states, including New Hampshire. Data collected by the NH Office of Community and Public Health's Bureau of Radiological Health indicates that one third of the houses in New Hampshire have indoor radon levels that exceed the U.S. Environmental Protection Agency's "action level" of four Pico curies per liter for at least some portion of the year. Radon may also enter homes dissolved in drinking water from drilled wells. A higher level of radon in water from individual drilled wells is a common occurrence in New Hampshire.

### Tornado

A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity, and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage.

The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud "freight train" noise. In comparison to a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

### Hurricane

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. The eye of the storm is usually

20-30 miles wide and may extend over 400 miles. High winds and flooding are primary causes of hurricane-inflicted loss of life and property damage.

### Severe Wind

Significantly high winds occur especially during tornadoes, hurricanes, winter storms and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during severe wind occurrences.

A downburst is a severe, localized wind blasting down from a thunderstorm. These “straight line” winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts fall into two categories:

- Microburst, which covers an area less than 2.5 miles in diameter, and
- Macroburst, which covers an area at least 2.5 miles in diameter.

### Lightning

Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground. As lightning passes through the air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the sun. Fires are a likely result of lightning strikes, and lightning strikes can cause death, injury, and property damage.

### Extreme Winter Weather

Ice and snow events typically occur during the winter months and can cause loss of life, property damage and tree damage.

#### *Heavy Snow Storms*

- A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding, wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

#### *Ice Storms*

- An ice storm involves rain, which freezes on impact. Ice coating at least one-fourth inch of thickness is heavy enough to damage trees, overhead wires and similar objects. Ice storms often produce widespread power outages.

#### *Nor'easter*

- A Nor'easter is a large weather system traveling from South to North passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a Northeasterly direction. The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours (or days) in terms of duration.

### Landslide

A Landslide is the downward or outward movement of slope forming materials reacting under the force of gravity. These include 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.

### Snow Avalanches

A snow avalanche is a slope failure consisting of a mass of rapidly moving, fluidized snow that slides down a mountainside. The flow can be composed of ice, water, soil, rock and trees. Snow avalanches occur on slopes averaging from 25 to 50 degrees, the majority occurring on slopes from 30 to 40 degrees.

### Man-Made Hazards

#### *Hazardous Materials*

- Hazardous materials spills or releases can cause damage of loss to life and property. Short or long-term evacuation of local residents and businesses may be required, depending on the nature and extent of the incident.

*Dam Breach and Failure*

- Dam failure results in rapid loss of water that is normally held by the dam. These kinds of floods are extremely dangerous and pose a significant threat to both life and property.

---

## **Appendix B: Risk Assessment**

The following terms are used to analyze the hazards considered. High, Medium and Low are synonymous with 3, 2 and 1, respectively.

**VULNERABILITY**- An adjective description (High, Medium, or Low) of the potential impact a hazard could have on the town relating to human, business and property impacts. It is the ratio of population, property, commerce, infrastructure and services at risk relative to the entire town. Vulnerability is an estimate generally based on a hazard's characteristics, information obtained by the various town departments.

**HIGH:** The total population, property, commerce, infrastructure and services of the town are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worse case scenario there could be a disaster of major to catastrophic proportions.

**MEDIUM:** (1) The total population, property, commerce, infrastructure and services of the town are exposed to the effects of a hazard of moderate influence; or (2) the total population, property, commerce, infrastructure and services of the town are exposed to the effects of a hazard, but not all to the same degree; or (3) an important segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worse case scenario there could be a disaster of moderate to major, though not catastrophic, proportions.

**LOW:** A limited area or segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worse case scenario there could be a disaster of minor to moderate proportions.

**PROBABILITY OF OCCURRENCE** - An adjective description (High, Medium, or Low) of the probability of a hazard impacting the town within the next 25 years. Probability is based on a limited objective appraisal of a hazard's frequency using information provided by relevant sources, observations and trends.

**HIGH:** There is great likelihood that a hazardous event will occur within the next 25 years (1-2 events each year).

**MEDIUM:** There is moderate likelihood that a hazardous event will occur within the next 25 years (1-2 events each 5-10 years).

**LOW:** There is little likelihood that a hazardous event will occur within the next 25 years (1 event in 25 years).

**SEVERITY** – Calculated by taking the average of the vulnerability for human, business and property impacts of each hazard type.

**RISK** - An adjective description (High, Medium, or Low) of the overall threat posed by a hazard over the next 25 years. It is calculated by multiplying the probability of occurrence and vulnerability.

**HIGH:** (1) There is strong potential for a disaster of major proportions during the next 25 years; or (2) history suggests the occurrence of multiple disasters of moderate proportions during the next 25 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the town's emergency management training/exercise program.

**MEDIUM:** There is moderate potential for a disaster of less than major proportions during the next 25 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be included in the town's emergency management training and exercise program.

**LOW:** There is little potential for a disaster during the next 25 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or mitigate against this hazard. This hazard need not be specifically addressed in the town's emergency management training and exercise program except as generally dealt with during hazard awareness training.

## Appendix C: Water Sources

### Barbara C. Harris Camp

- Otter Lake at Camp Beach

### Beach Road

- Public beach at Otter Lake

### Blanchard Hill Road

- Swamp at Anew Boston Road & East Road
- Ponds at Thomas Road & New Boston Road

### Brantwood Camp Road

- Pool at camp
- Rank Brook on School House Road

### Brooks Drive

- Dry hydrant on NH 136 near Hopkins Lake
- Subset Lake on Crotched Mountain Road

### Campground Road

- Public beach at Otter Lake

### Cart Lane

- Subset Lake on Crotched Mountain Road
- Hydrants at Rehab Center

### Cavender Road

- Contoocook River at end of Cavender Road
- Pond on Old Bennington Road

### Coach Road

- Pond at New Boston Road & Thomas Road
- Dry Hydrant on Old Lyndeborough Mountain Road

### Colonial Drive

- Contoocook River at the old bridge and end of Cavender Road

### Coriss Lane

- Brook on Holden Road
- Dry Hydrant on Old Lyndeborough Mountain Road

### Cornwell Road

- Otter Brook on Cornwell Road
- Knight's Pond on Slip Road

### County Road

- Otter Lake boat launch
- Cilley's hydrant on Muzzey Hill Road just before railroad crossing

### Crotched Mountain Road

- Subset Lake on Crotched Mountain Road
- Hydrant system on the mountain

### Depot Drive

- South Brook on Slip Road
- Dry hydrant at Scribner's

### Dodge Road

- Rand Brook on Dodge Road
- Dry hydrant at Laconte's
- Fleck Pond on Francestown Road

### DPW Drive

- Subset Lake
- Otter Lake at Barbara C. Harris Camp

### Driscoll Road

- Brook on Driscoll Road
- Rand Brook on Schoolhouse Road

### Dunklee Hill Road

- Pond at New Boston Road
- Swamp on New Boston Road

### Early American Drive

- Dry hydrant on East Road before Early American Drive
- Rand Brook on Dodge Road

- Dry hydrant at Laconte's
- East Road
  - Dry hydrant before Early American Drive
  - Rand Brook on Dodge Road
  - Dry hydrant at Laconte's
- Ella Mae Drive
  - Zephyr Lake on Zephyr Lake Road
  - Rand Brook on Miner Road
- Etna Drive
  - Zephyr Lake on Zephyr Lake Road
  - Rand Brook on Miner Road
- Ewing Lane
  - Swamp Brook on Francestown Road
  - Pond on NH 136 just over Francestown line
  - Dry hydrant on NH 136 near Hopkins Lake
- Fletcher Farm Road
  - Zephyr Lake on Zephyr Lake Road
  - Rand Brook on Miner Road
- Forest Road
  - Dry hydrant on East Road near Early American Drive
  - Zephyr Lake on Zephyr Lake Road
  - Dry hydrant on NH 136 near Hopkins Lane
  - Rand Brook on Forest Road
  - South Brook on Slip Road
  - Sunset Lake on Crotched Mountain Road
  - Moe Belmore's pond on Knotwood Drive
  - Otter Lake at Public boat launch
  - Contoocook River at boat launch
- Fox Meadow Lane
  - Hydrant system on Crotched Mountain
  - Subset Lake
- Francestown Road
  - Dry hydrant on NH 136 near Hopkins Lane
  - Fleck Pond off Francestown Road
  - Pond on NH 136 just over Francestown line
- George Lane
  - Whittemore Lake at Camp Winamac & boat launch in Bennington
- Gibbons Lane
  - South Brook on Slip Road
- Gilbert Verney Drive
  - Hydrant system on Mountain
  - Subset Lake on Crotched Mountain Road
- Gould Hill
  - Zephyr Lake on Zephyr Lake Road
- Greenfield Road
  - Brook on NH 136
  - Hydrant on NH 136 near Hopkins Lane
- Gulf Road
  - Knight's Pond on Slip Road
  - Otter Brook on Cornwell Road
  - Rand Brook on Russell Station Road
  - School House Road
- Harry Gregg Lane
  - Sunset Lake
- Hebe Lane
  - Sunset Lake
- Higgins Lane
  - Whittemore Lake at Camp Winamac & boat launch in Bennington
- Holden Road
  - Rand Brook on Holden Road & Forest Road

- Dry hydrant on Old Lyndeborough Mountain Road
- Hopkins Lane
  - Dry hydrant on NH 136
  - Swamp Brook
- Hoyt Lane
  - Otter Brook on Swamp Road
  - Pond on Old Bennington Road at Swamp Road
  - Hydrant on NH 136 at Peterborough line
- Ice House Lane
  - Zephyr Lake on Ice House Lane & Zephyr Lake Road
- Knotwood Drive
  - Moe Belmore's Pond at end of Knotwood Drive
  - Dry hydrant on NH 136 at Peterborough line
- Kyes Lane
  - Sunset Lake
- Lake View Circle
  - Zephyr Lake on Zephyr Lake Road and Icehouse Road
- Longwood Drive
  - Zephyr Lake on Zephyr Lake Road
- Magoon Lane
  - Dry hydrant on NH 136 near Hopkins Lane
- Maintenance Drive
  - Otter Lake at public beach or boat launch
  - Moe Belmore's pond at end of Knotwood Drive
- Miner Road
  - Rand Brook on Miner Road
  - Zephyr Lake on Zephyr Lake Road
  - Rand Brook on Holden Road & Forest Road
- Mountain Road
  - Rand Brook on School House Road
  - Pool at Brantwood Camp & Stone House
- Mud Pond Drive
  - Otter Lake at Public Beach
- Muzzey Hill Road
  - Otter Lake on County Road and at Public Boat Launch
  - Dry hydrant near railroad crossing
- New Boston Road
  - Rand Brook on New Boston Road
- North Pack Lane
  - Brook on North Pack Lane
  - Brook on Driscoll Road
  - Brook on School House Road
  - Pool at Brantwood Camp & Stone House
- Old Bennington Road
  - Boat launch on Contoocook River
  - Pond near Swamp Road
  - Otter Brook on Swamp Road
- Old Lyndeborough Mountain Road
  - Dry hydrant on Old Lyndeborough Mountain Road
  - Rand Brook on Holden Road
- Peterborough Road
  - Dry hydrant at town line
  - Moe Belmore's pond at end of Knotwood Drive
- Pine Ridge Road
  - Swamp Brook on Frankestown Road
  - Hydrant on NH 136 near Hopkins Lane
- River Bend Drive
  - Contoocook River on Cavender Road at old bridge
- Robson Lane
  - Swamp Brook on Frankestown Road

- Pond on NH 136 in Frankestown
- Dry hydrant on NH 136 near Hopkins Lane
- Russell Station Road
  - Rand Brook on Russell Station Road, Forest Road and School House Road
- Savage Road
  - Pond at town forest
- Sawmill Road
  - Dry hydrant on Barbara C. Harris Camp
  - Subset Lake on Crotched Mountain Road
  - Whittemore Lake
- School House Road
  - Rand Brook
- Slip Road
  - Dry Hydrant on NH 136 near Hopkins Lane
  - South Brook
  - Knight's Pond
  - Old Well on Depot Road
  - Zephyr Lake on Zephyr Lake Road
- South View Road
  - Hydrant system on Crotched Mountain
  - Sunset Lake
- Staff House Circle
  - Hydrant system on Crotched Mountain
  - Subset Lake
- State Park
  - Otter Lake at public beach
- Subset lake Road
  - Senset lLake on Crotched Mountain Road
- Swamp Road
  - Otter Brook
- Thomas Road
  - Ponds on Thomas Road & New Boston Road
- Todd Lane
  - Hydrant on NH 136 at Peterborough line
  - Moe Belmore's pond at end of Knotwood Drive
- Top of the World
  - Pool at Cernota Residence
  - Otter Lake at Barbara C. Harris camp
- Townline Road
  - Swamp Brook on Frankestown Road
  - Pond on NH 136 in Frankestown
- Wally Stone Drive
  - Otter Lake at Barbara C. Harris Camp
  - Sunset Lake
- Whitney Drive
  - Otter Brook on Cornwell Road
  - Pool at Brantwood Camp & Stone House
- Winamac Lane
  - Whittemore Lake at Camp Winamac & boat launch in Bennington
- Woodland Hill Road
  - Zephyr Lake on Zephyr Lake Road
- Yankee Way
  - Zephyr Lake on Zephyr Lake Road & Ice House Road
  - South Brook on Slip Road
- Zephyr Lake Road
  - Zephyr Lake on Zephyr Lake Road & Ice House Road
  - South Brook on Slip Road

## Appendix D: 2007 Flood Areas

Map ID	Road Name	Identifier 1	Identifier 2	Length (feet)	Damage	Road Closed
1	New Boston Rd	2/10 from Forest Rd	at Culvert	125	shoulder and partial lane	yes
2	Old Lyndeborough Mt. Rd	Intersection w/ Holden Rd	to box culvert	400	shoulder and partial lane	no
3	Old Lyndeborough Mt. Rd	culvert to road end		600	entire road washout	no
4	New Boston Rd	House #146(?)		50	shoulder	no
5	New Boston Rd	Thomas Dr	to Beaver Pond	300	shoulder and partial lane	no
6	New Boston Rd	Blanchard Hill Rd		50	shoulder and partial lane	no
7	Blanchard Hill Rd	Up from New Boston Rd		60	entire road washout	no
8	Blanchard Hill Rd	on hill		150	entire road washout	no
9	New Boston Rd	Intersection w/ Thomas Dr		20	shoulder and partial lane	no
10	Thomas Dr	Intersection w/ Coach Rd		100	entire road washout	yes
11	Coach Rd	from culvert to top		1200	S. shoulder and partial lane	no
12	Thomas Dr	upper culvert	going east	300		yes
13	Dunklee Hill Rd	Intersection w/ New Boston Rd		50	culvert support replacement	no
14	Dunklee Hill Rd	at Beaver Pond		60	entire road washout	no
15	New Boston Rd	past Gryval's home	eastside		shoulder-both, crossover	no
16	New Boston Rd "Extension"	culvert	to Town Line	400	Washout	yes
17	East Road	Intersection w/ New Boston Rd	going NW	200	shoulder	no
18	East Road	Intersection w/ New Dodge Rd	going east	300	southside shoulder	no
19	Dodge Road	Intersection w/ East Road	to big culvert	500	entire road washout	no
20	Dodge Road	bridge		40	major material loss (bridge repair)	no
21	East Road	Sebastian's home		40	northside shoulder and pavement edge	no
22	East Road	Sebastian's home	going N	250	ditch and shoulder and partial lane	no
23	East Road	saddle below Lehner's		350	entire road washout	no
24	East Road	west of saddle		200	southside ditch and shoulder and pavement edge	no
25	East Road	b/w Early American Dr and Mason	to Early American Dr	75	northside shoulder and pavement edge	no

Map ID	Road Name	Identifier 1	Identifier 2	Length (feet)	Damage	Road Closed
--------	-----------	--------------	--------------	---------------	--------	-------------

Greenfield Hazard Mitigation Plan Update - 2014

26	DPW Drive (apron)	off Route #31		20	shoulder and pavement (apron) edge	No
27	Pine Ridge Road	from Rt #136		350	North shoulder and pavement edge	no
28	Pine Ridge Road	by Paulson (?)		1000	crossover shoulder and pavement edge	no
29	Pine Ridge Road	From Seigars' home East		200	North shoulder and pavement edge	no
30	Francestown Road	off 136	east of Jeff Brook's Home	400	southside ditch & shoulder & one lane & both sides at saddle	no
31	Francestown Road	from Ruth Merrill's (?)		200	shoulder	no
32	Francestown Road			350	Both shoulders (North and South)	no
33	Francestown Road	Piper's (?)	to bridge	500	Both shoulders & one lane	no
34	Francestown Road Bridge	by Fleck Conservation Area		20	washout damage to structure	yes
35	Francestown Road	East of Bridge	to William's home	1100	north shoulder and one lane	no
36	Francestown Road	Town Line	to Sleeper's home	300	north shoulder and one lane	No
37	Francestown Road	Sleeper's West	to Dodge Road	1100	north shoulder and one lane	no
38	Francestown Road	from Dodge Road	to William's home	700	northside shoulder and pavement edge	no
39	Dodge Road	south of Francestown Rd		200	crossover shoulder and pavement edge	no
40	Dodge Road	by Sunbeam Farm	to culvert	1100	washout - north shoulder and one lane	yes
41	County Road	off Forest Rd	to Cahppel's home	1200	westside shoulder and one lane	no
42	Muzzy Hill Road	Sulley home	to pond access	600	entire road washout and ditches	no
43	Muzzy Hill Road	RR tracks to Steerer's home		400	entire road washout and both ditches	no
44	County Rd	West of Muzzy Hill Rd		300	north side shoulder & ditch	
45	County Rd	From Kulgren's house	to culvert	600	south side ditch & north side shoulder & pavement edge	
46	County Rd	culvert		80	cleanout (& possible repair)	
47	Old Bennington Rd	from County Rd	to Stacy home	700	East side ditch & shoulder & partial lane	
48	Old Bennington Rd	At Gotheir's home		60	Partial lane & culvert ??	
49	Old Bennington Rd	at Karen (Day's home ?)		150	East side ditch & shoulder & one lane	
50	Old Bennington Rd	South of County Rd	to Forest Rd	200	East side ditch and one lane	
51	Old Bennington Rd (paved)	from Forest Rd		1200	crossover partial lane	

Map ID	Road Name	Identifier 1	Identifier 2	Length (feet)	Damage	Road Closed
--------	-----------	--------------	--------------	---------------	--------	-------------

Greenfield Hazard Mitigation Plan Update - 2014

52	Old Bennington Rd (paved)	by Rainier's home		500	crossover- both ditches	
53	Cavender Rd	from Old Bennington Rd	to gulley (?)	1000	Crossover partial lane & ditches	
54	Cavender Rd	from Kennedy's fields	to Sparling's home	1800	Entire road and ditches	Yes
55	Cavender Rd	at Burley's home (?)		400	minor shoulder raveling	
56	Colonial Dr	from Riverbend (?)		300	minor shoulder raveling	
57	Swamp Rd	by "big culvert"		150	entire road washout	
58	Swamp Rd	by "burn" house		200	one lane	
59	Swamp Rd	"S" curve		300	entire road washout and shoulders	
60	Swamp Rd	swamp crossing	to NH 136	1000	north side shoulder & ditch	
61	Slip Rd	at South Brook	South toward Cornwall Rd	150	west side shoulder & pavement edge	
62	Cornwell Rd	from Fowler's home (?)	past twin culvers	1400	Crossover partial lane & ditches & shoulders	
63	Cornwell Rd	from 2nd twin crossing	to Coco's loglanding	500	Entire road & ditches	Yes
64	Cornwell Rd	from Gulf Rd	past Creighton's home	1800	One lane & ditch & shoulder	
65	Gulf Rd	from town line	to cornwell rd	500	crossover partial lane & ditches & shoulders	Yes
66	Gulf Rd	from Cornwell Rd	to Laurie May's home	600	crossover- shoulders & ditches	Yes
67	Gulf Rd	at Marshall's home		50	entire road washould & both ditches	Yes
68	Gulf Rd	"hump"	to Slip Rd	400	Crossover partial lane & shoulders	
69	Slip Rd	at Dumas' home		300	Crossover partial lane & shoulders	
70	Slip Rd	by Dumas' home	to big culvert	1800	entire road and shoulders	Yes
71	Slip Rd	Norris home	to Zephyr Lake Rd	300	partial lane & east side shoulder	
72	Zephyr Lake Rd	at Lake View Circle Intersection		50	shoulder & pavement edge	
73	Lake View Circle	"east" loop		200	east side shoulder & partial lane	
74	Zephyr Lake Rd	155 Zephyr Lake Rd	to RR tracks	600	crossover ditches and pavement edges	
75	Gould Hill Rd	from Zephyr Lake Rd	to Longwood Dr	1800	ditch & shoulder & clean out catch basins	
76	Zephyr Lake Rd	Zephyr Lake Beach	to Forest Rd	400	shoulder & pavement edge	
77	Miner Rd	from Etna Dr	to Doctor Miner's home	600	north side shoulder & pavement edge	
78	Etna Drive	from Miner Rd	to Fletcher's log landing	1800	entire road & shoulders	Yes

*Greenfield Hazard Mitigation Plan Update - 2014*

<b>Map ID</b>	<b>Road Name</b>	<b>Identifier 1</b>	<b>Identifier 2</b>	<b>Length (feet)</b>	<b>Damage</b>	<b>Road Closed</b>
79	Fletcher Farm Rd	from Miner Rd	to road end	3900	entire road & road structure & ditches	Yes
80	Miner Rd	from Fletcher Farm Rd	west to Etna Dr	200	partial lane & north side shoulder	
81	Miner Rd	from Fletcher Farm Rd	East to swamp	300	crossover- shoulders & ditches	
82	Miner Rd	Brook/swamp crossing		100	total breach	Yes
83	Gulf Rd	from Russell Station Rd		300	partial lane & shoulders	
84	Russell Station Rd Ext	at Lyndeborough Town Line		50	entire road raveling	
85	Mountain Rd	from Bonner trail	to Mulvies' home	1400	crossover- ditches, shoulders & pavement edges	
86	Mountain Rd	from Mulvies' home	to Brigham	1800	crossover- ditches, shoulders & pavement edges	

## Appendix E: Resources

### Resources Used in the Preparation of this Plan

NH HSEM's State of New Hampshire Natural Hazards Mitigation Plan (2013)  
 SWRPC's Hazard Mitigation Planning for New Hampshire Communities (10/02)  
 FEMA's Local Mitigation Planning Handbook (March 2013)  
 FEMA's Understanding Your Risks: Identifying Hazards and Estimating Losses  
 Town of Greenfield, NH's Master Plan (2013 update)  
 Town of Greenfield Emergency Operations Plan (2009)

### Agencies

**New Hampshire Homeland Security and Emergency Management (HSEM)** ..... (800) 852-3792  
**Federal Emergency Management Agency (FEMA)** ..... (877) 336-2734

#### **NH Regional Planning Commissions:**

Central NH Regional Planning Commission .....226-6020  
 Lakes Region Planning Commission .....279-8171  
 Nashua Regional Planning Commission .....883-0366  
 North Country Council .....444-6303  
 Rockingham Planning Commission .....778-0885  
 Southern New Hampshire Planning Commission .....669-4664  
 Southwest Region Planning Commission .....357-0557  
 Strafford Regional Planning Commission .....742-2523  
 Upper Valley Lake Sunapee Regional Planning Commission .....448-1680

#### **NH Executive Department:**

Governor's Office of Energy and Community Services .....271-2611  
 New Hampshire Office of Energy and Planning .....271-2155

#### **NH Department of Cultural Resources:** .....271-2540

Division of Historical Resources .....271-3483

#### **NH Department of Environmental Services:** .....271-3503

Air Resources .....271-1370  
 Air Toxins Control Program .....271-0901  
 Asbestos Program .....271-1373  
 Childhood Lead Poisoning Prevention Program .....271-5733  
 Environmental Health Tracking Program .....271-4072  
 Environmental Toxicology Program .....271-3994  
 Health Risk Assessment Program .....271-6909  
 Indoor Air Quality Program .....271-3911  
 Occupational Health and Safety Program .....271-2024  
 Radon Program .....271-4764  
 Geology Unit .....271-3503  
 Pollution Preventive Program .....271-6460  
 Waste Management .....271-2900  
 Water Supply and Pollution Control .....271-3414  
 Rivers Management and Protection Program .....271-8801

**NH Office of Energy & Planning (OEP)** .....271-2155

**NH Municipal Association** .....224-7447

<b>NH Fish and Game Department</b> .....	271-3421
Region 1, Lancaster .....	788-3164
Region 2, New Hampton .....	744-5470
Region 3, Durham .....	868-1095
Region 4, Keene .....	352-9669
<b>NH Department of Resources and Economic Development:</b> .....	271-2411
Economic Development .....	271-2629
Travel and Tourism .....	271-6870
Division of Forests and Lands .....	271-2214
Division of Parks and Recreation .....	271-3556
Design, Development, and Maintenance .....	271-2411
<b>NH Department of Transportation</b> .....	271-3734
<b>Northeast States Emergency Consortium, Inc. (NESEC)</b> .....	(781) 224-9876
<b>US Department of Commerce:</b> .....	(202) 482-2000
National Oceanic and Atmospheric Administration:	
National Weather Service; Taunton, Massachusetts .....	(508) 824-5116
<b>US Department of the Interior:</b> .....	202-208-3100
US Fish and Wildlife Service .....	225-1411
US Geological Survey .....	225-4681
US Army Corps of Engineers .....	(978) 318-8087
<b>US Department of Agriculture:</b>	
Natural Resource Conservation Service .....	868-7581
Cheshire County, Walpole .....	756-2988
Sullivan County, Newport .....	863-4297
Hillsborough County, Milford .....	673-2409 Ext. #4

### **FEMA REGION I MITIGATION PLANNING WEBLIOGRAPHY**

Hazard Mitigation is sustained action taken to reduce or eliminate risk to people and their property from natural hazards over the longest possible term.

#### **REGULATORY INFORMATION**

##### **Final Rule**

44 CFR 201.6

<http://www.fema.gov/pdf/help/fr02-4321.pdf>

##### **Disaster Mitigation Act of 2000 (DMA 2K)**

<http://www.fema.gov/library/viewRecord.do?id=1935>

#### **DISASTERS AND NATURAL HAZARDS INFORMATION**

##### **FEMA-How to deal with specific hazards**

<http://www.ready.gov/natural-disasters>

##### **Natural Hazards Center at the University of Colorado**

<http://www.colorado.edu/hazards>

**National Oceanic and Atmospheric Administration (NOAA): Information on various projects and research on climate and weather.**

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

**National Climatic Data Center active archive of weather data.**

<http://lwf.ncdc.noaa.gov/oa/ncdc.html>

**Northeast Snowfall Impact Scale**

<http://www.erh.noaa.gov/rnk/Newsletter/Fall%202007/NESIS.htm>

**Weekend Snowstorm Strikes The Northeast Corridor Classified As A Category 3 "Major" Storm**

<http://www.publicaffairs.noaa.gov/releases2006/feb06/noaa06-023.html>

### **FLOOD RELATED HAZARDS**

**FEMA Coastal Flood Hazard Analysis & Mapping**

<http://www.fema.gov/national-flood-insurance-program-0/fema-coastal-flood-hazard-analyses-and-mapping-1>

**Floodsmart**

<http://www.floodsmart.gov/floodsmart/>

**National Flood Insurance Program (NFIP)**

<http://www.fema.gov/nfip>

**Digital quality Level 3 Flood Maps**

<http://msc.fema.gov/MSC/statemap.htm>

**Flood Map Modernization**

<http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/map-modernization>

Hilliard 2/20/2014 Pg. 2

**Reducing Damage from Localized Flooding: A Guide for Communities, 2005 FEMA 511**

<http://www.fema.gov/library/viewRecord.do?id=1448>

### **FIRE RELATED HAZARDS**

**Firewise**

<http://www.firewise.org>

**NOAA Fire Event Satellite Photos**

<http://www.osei.noaa.gov/Events/Fires>

**U.S. Forest Service, USDA**

<http://www.fs.fed.us/land/wfas/welcome.htm>

**Wildfire Hazards - A National Threat**

<http://pubs.usgs.gov/fs/2006/3015/2006-3015.pdf>

**GEOLOGIC RELATED HAZARDS**

**USGS Topographic Maps**

<http://topomaps.usgs.gov/>

**Building Seismic Safety Council**

<http://www.nibs.org/?page=bssc>

**Earthquake hazard history by state**

<http://earthquake.usgs.gov/earthquakes/states/>

**USGS data on earthquakes**

<http://earthquake.usgs.gov/monitoring/deformation/data/download/>

**USGS Earthquake homepage**

<http://quake.wr.usgs.gov>

**National Cooperative Geologic Mapping Program (NCGMP)**

<http://ncgmp.usgs.gov/>

**Landslide Overview Map of the Conterminous United States**

<http://landslides.usgs.gov/learning/nationalmap/>

Kafka, Alan L. 2008. Why Does the Earth Quake in New England? Boston College, Weston

**Observatory, Department of Geology and Geophysics**

[http://www2.bc.edu/~kafka/Why\\_Quakes/why\\_quakes.html](http://www2.bc.edu/~kafka/Why_Quakes/why_quakes.html)

**Map and Geographic Information Center, 2010, "Connecticut GIS Data", University of Connecticut**

[http://magic.lib.uconn.edu/connecticut\\_data.html](http://magic.lib.uconn.edu/connecticut_data.html)

**2012 Maine earthquake**

[http://www.huffingtonpost.com/2012/10/17/maine-earthquake-2012-new-england\\_n\\_1972555.html](http://www.huffingtonpost.com/2012/10/17/maine-earthquake-2012-new-england_n_1972555.html)

**WIND-RELATED HAZARDS**

**ATC Wind Speed Web Site**

<http://www.atcouncil.org/windspeed/index.php>

Hilliard 2/20/2014 Pg. 3

**U.S. Wind Zone Maps**

<http://www.fema.gov/safe-rooms/wind-zones-united-states>

**Tornado Project Online**

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

**National Hurricane Center**

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

**Community Hurricane Preparedness Tutorial**

<http://meted.ucar.edu/hurrican/chp/hp.htm>

**National Severe Storms Laboratory, 2009, "Tornado Basics",**

[http://www.nssl.noaa.gov/primer/tornado/tor\\_basics.html](http://www.nssl.noaa.gov/primer/tornado/tor_basics.html)

**[DETERMINING RISK AND VULNERABILITY](#)**

**HAZUS**

<http://www.hazus.org>

**FEMA Hazus Average Annualized Loss Viewer**

<http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cb8228309e9d405ca6b4db6027df36d9&extent=-139.0898,7.6266,-48.2109,62.6754>

**Vulnerability Assessment Tutorial: On-line tutorial for local risk and vulnerability assessment**

<http://www.csc.noaa.gov/products/nchaz/htm/mitigate.htm>

**Case Study: an example of a completed risk and vulnerability assessment**

<http://www.csc.noaa.gov/products/nchaz/htm/case.htm>

**[GEOGRAPHIC INFORMATION SYSTEMS \(GIS\) AND MAPPING](#)**

**The National Spatial Data Infrastructure & Clearinghouse (NSDI) and Federal Geographic Data Committee (FGDC) Source for information on producing and sharing geographic data**

<http://www.fgdc.gov>

**The OpenGIS Consortium Industry source for developing standards and specifications for GIS data**

<http://www.opengis.org>

**Northeast States Emergency Consortium (NESEC): Provides information on various hazards, funding resources, and other information**

<http://www.nesec.org>

**US Dept of the Interior Geospatial Emergency Management System (IGEMS) provides the public with both an overview and more specific information on current natural hazard events. It is supported by the Department of the Interior Office of Emergency Management.**

<http://igems.doi.gov/>

**FEMA GeoPlatform: Geospatial data and analytics in support of emergency management**

<http://fema.maps.arcgis.com/home/index.html>

## DATA GATHERING

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

<http://nisconsortium.org/>

**The Hydrologic Engineering Center (HEC),** an organization within the Institute for Water Resources, is the designated Center of Expertise for the US Army Corps of Engineers

<http://www.hec.usace.army.mil/>

**National Water & Climate Center**

<http://www.wcc.nrcs.usda.gov/>

**WinTR-55 Watershed Hydrology**

<http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?&cid=stelprdb1042901>

**USACE Hydrologic Engineering Center (HEC)**

<http://www.hec.usace.army.mil/software/>

**Stormwater Manager's Resource Center SMRC**

<http://www.stormwatercenter.net>

**USGS Current Water Data for the Nation**

<http://waterdata.usgs.gov/nwis/rt>

**USGS Water Data for the Nation**

<http://waterdata.usgs.gov/nwis/>

**Topography Maps and Aerial photos**

<http://www.terraserver.com/view.asp?tid=142>

**National Register of Historic Places**

<http://www.nps.gov/nr/about.htm>

**National Wetlands Inventory**

<http://www.fws.gov/wetlands/> ICLUS Data for Northeast Region

[http://www.epa.gov/ncea/global/iclus/inclus\\_nca\\_northeast.htm](http://www.epa.gov/ncea/global/iclus/inclus_nca_northeast.htm)

## PLANNING

**American Planning Association**

<http://www.planning.org>

**PlannersWeb - Provides city and regional planning resources**

<http://www.plannersweb.com>

**FEMA RESOURCES**

**Federal Emergency Management Agency (FEMA)**

[www.fema.gov](http://www.fema.gov)

Hilliard 2/20/2014 Pg. 5

**National Mitigation Framework**

<http://www.fema.gov/national-mitigation-framework>

**Federal Insurance and Mitigation Administration (FIMA)**

<http://www.fema.gov/fima>

**Community Rating System (CRS)**

<http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-rating-system>

**FEMA Building Science**

<http://www.fema.gov/building-science>

**National Flood Insurance Program (NFIP)**

<http://www.fema.gov/national-flood-insurance-program>

**Floodplain Management & Community Assistance Program**

<http://www.fema.gov/floodplain-management>

**Increased Cost of Compliance (ICC): ICC coverage allows homeowners whose structures have been repeatedly or substantially damaged to cover the cost of elevation and design requirements for rebuilding with their flood insurance claim up to a maximum of \$30,000.**

<http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage>

**National Disaster Recovery Framework**

<http://www.fema.gov/national-disaster-recovery-framework>

**Computer Sciences Corporation: contracted by FIMA as the NFIP Statistical Agent, CSC provides information and assistance on flood insurance to lenders, insurance agents and communities**

[www.csc.com](http://www.csc.com)

**Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan: A Guidebook for Local Governments**

<https://www.fema.gov/ar/media-library/assets/documents/89725>

**Mitigation Best Practices Portfolio**

<http://www.fema.gov/mitigation-best-practices-portfolio>

**FEMA Multi-Hazard Mitigation Planning Website** <http://www.fema.gov/multi-hazard-mitigation-planning>

**FEMA Resources Page** <http://www.fema.gov/plan/mitplanning/resources.shtm>

Hilliard 2/20/2014 Pg. 6

**Local Mitigation Plan Review Guide** <http://www.fema.gov/library/viewRecord.do?id=4859>

**Local Mitigation Planning Handbook complements and liberally references the Local Mitigation Plan Review Guide above**

<http://www.fema.gov/library/viewRecord.do?id=7209>

### [HAZUS](#)

<http://www.fema.gov/protecting-our-communities/hazus>

**Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards**

<http://www.fema.gov/library/viewRecord.do?id=6938>

**Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials**

<http://www.fema.gov/library/viewRecord.do?id=7130>

IS-318

**Mitigation Planning for Local and Tribal Communities**

**Independent Study Course**

<http://training.fema.gov/EMIWeb/IS/is318.asp>

### [REGION I MITIGATION PLANNING CONTACTS](#)

#### **Marilyn Hilliard**

Senior Planner

Phone: (617) 956-7536

Email: [marilyn.hilliard@fema.dhs.gov](mailto:marilyn.hilliard@fema.dhs.gov)

#### **Nan Johnson**

Community Planner

Phone: 617-956-7672

Email: [nan.johnson@fema.dhs.gov](mailto:nan.johnson@fema.dhs.gov)

Massachusetts; Rhode Island; Vermont

#### **Brigitte Ndikum-Nyada**

Community Planner

Phone: 617-956-7614

Email: [brigitte.ndikum-nyada@fema.dhs.gov](mailto:brigitte.ndikum-nyada@fema.dhs.gov)

Connecticut; Maine; New Hampshire

Hilliard 2/20/2014 Pg. 7

### OTHER FEDERAL RESOURCES

**U.S. Army Corps of Engineers: Provides funding for floodplain management planning and technical assistance and other water resources issues.**

[www.nae.usace.army.mil](http://www.nae.usace.army.mil)

**Natural Resources Conservation Service: Technical assistance to individual land owners, groups of landowners, communities, and soil and water conservation districts.**

[www.nrcs.usda.gov](http://www.nrcs.usda.gov)

### **NOAA Coastal Services Center**

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

**Rural Economic and Community Development:** Technical assistance to rural areas and smaller communities in rural areas on financing public works projects.

[www.rurdev.usda.gov](http://www.rurdev.usda.gov)

**Farm Service Agency:** Manages the Wetlands Reserve Program (useful in open space or acquisition projects by purchasing easements on wetlands properties) and farmland set aside programs

[www.fsa.usda.gov](http://www.fsa.usda.gov)

**National Weather Service:** Prepares and issues flood, severe weather and coastal storm warnings. Staff hydrologists can work with communities on flood warning issues; can give technical assistance in preparing flood-warning plans.

[www.weather.gov](http://www.weather.gov)

**Economic Development Administration (EDA):** Assists communities with technical assistance for economic development planning

[www.osec.doc.gov/eda/default.htm](http://www.osec.doc.gov/eda/default.htm)

**National Park Service:** Technical assistance with open space preservation planning; can help facilitate meetings and identify non-structural options for floodplain redevelopment.

[www.nps.gov](http://www.nps.gov)

**Fish and Wildlife Services:** Can provide technical and financial assistance to restore wetlands and riparian habitats.

[www.fws.gov](http://www.fws.gov)

### **Department of Housing & Urban Development**

[www.hud.gov](http://www.hud.gov)

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

[www.sba.gov/disaster](http://www.sba.gov/disaster)

**Environmental Protection Agency**

[www.epa.gov](http://www.epa.gov)

**SUSTAINABILTY/ADAPTATION/CLIMATE CHANGE**

**Why the Emergency Management Community Should be Concerned about Climate Change:** A discussion of the impact of climate change on selected natural hazards

Hilliard 2/20/2014 Pg. 8

<http://www.cna.org/sites/default/files/research/WEB%2007%2029%2010.1%20Climate%20Change%20and%20the%20Emergency%20Management%20Community.pdf>

**Resilient Sustainable Communities:** Integrating Hazard Mitigation& Sustainability into Land Use

<http://www.earth.columbia.edu/sitefiles/file/education/documents/2013/Resilient-Sustainable-Communities-Report.pdf>

**U.S. EPA**

<http://www.epa.gov/climatechange/>

**NOAA National Ocean Service (NOS)**

<http://oceanservice.noaa.gov/>

**The Northeast Climate Research Center (NRCC)** folks were heavily involved in climate data in the NCA, below. They have a wealth of historic climate data and weather information, trends, etc.

<http://www.nrcc.cornell.edu/>

**NOAA RISA for the Northeast** (Regional Integrated Sciences and Assessments)

<http://ccrun.org/home>

**Community and Regional Resilience:** Perspectives from hazards, disasters, and emergency management

[http://www.resilientus.org/library/FINAL\\_CUTTER\\_9-25-08\\_1223482309.pdf](http://www.resilientus.org/library/FINAL_CUTTER_9-25-08_1223482309.pdf)

**National Fish, Wildlife and Plants Climate Adaptation Strategy** [www.wildlifeadaptationstrategy.gov](http://www.wildlifeadaptationstrategy.gov)

**ICLEI Local Governments for Sustainability**

<http://www.icleiusa.org/>

**Kresge Foundation Survey**

<http://www.kresge.org/news/survey-finds-communities-northeast-are-trying-plan-for-changes-climate-need-help-0>

**New England's Sustainable Knowledge Corridor**

<http://www.sustainableknowledgecorridor.org/site/>

**The Strategic Foresight Initiative (SFI)**

[http://www.fema.gov/pdf/about/programs/oppa/findings\\_051111.pdf](http://www.fema.gov/pdf/about/programs/oppa/findings_051111.pdf)

**Northeast Climate Choices**

[http://www.climatechoices.org/ne/resources\\_ne/nereport.html](http://www.climatechoices.org/ne/resources_ne/nereport.html)

**Northeast Climate Impacts Assessment**

<http://www.northeastclimateimpacts.org/>

**Draft National Climate Assessment Northeast Chapter released early 2013**

<http://ncadac.globalchange.gov/>

**Northeast Chapter of the National Climate Assessment of 2009:**

<http://www.globalchange.gov/images/cir/pdf/northeast.pdf>

Hilliard 2/20/2014 Pg. 9

NEclimateUS.org

**ClimateNE**

[www.climatenortheast.com](http://www.climatenortheast.com)

**Scenarios for Climate Assessment and Adaptation**

<http://scenarios.globalchange.gov/>

**Northeast Climate Science Center**

<http://necsc.umass.edu/>

**FEMA Climate Change Adaptation and Emergency Management**

<https://www.llis.dhs.gov/content/climate-change-adaptation-and-emergency-management-0>

**Climate Central**

<http://www.climatecentral.org>

**OTHER RESOURCES**

**New England States Emergency Consortium (NESEC):** NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Resources are available on earthquake preparedness, mitigation, and hurricane safety.

[www.nesec.org](http://www.nesec.org)

**Association of State Floodplain Managers (ASFPM):** ASFPM has developed a series of technical and topical research papers, and a series of Proceedings from their annual conferences.

[www.floods.org](http://www.floods.org)

**National Voluntary Organizations Active in Disaster (VOAD)** is a non-profit, nonpartisan membership organization that serves as the forum where organizations share knowledge and resources throughout the disaster cycle—preparation, response, recovery and mitigation.

<http://www.nvoad.org/>

## **Mitigation Funding Resources**

Hazard Mitigation Grant Program (HMGP).....	NH Homeland Security and Emergency Management
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 <sup>‡</sup> .....	NH Homeland Security and Emergency Management
Emergency Watershed Protection (EWP) Program.....	USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP) .....	NH HSEM, NH OEP
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) <sup>†</sup> .....	NH OEP, NH HSEM
Power of Prevention Grant by NESEC <sup>‡</sup> .....	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 208 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 and Economic Development
Wetlands Programs .....	NH Department of Environmental Services

<sup>‡</sup>NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NH HSEM for more information.

<sup>†</sup> Note regarding **National Flood Insurance Program (NFIP)** and **Community Rating System (CRS)**:

The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community's floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners. The NH Office of Energy & Planning can provide additional information regarding participation in the NFIP-CRS Program.

## Additional Websites

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	<a href="http://www.colorado.edu/hazards/">http://www.colorado.edu/hazards/</a>	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	<a href="http://wxp.eas.purdue.edu/hurricane">http://wxp.eas.purdue.edu/hurricane</a>	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	<a href="http://nemaweb.org">http://nemaweb.org</a>	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center “Disaster Finder:	<a href="http://www.gsfc.nasa.gov/ndrd/disaster/">http://www.gsfc.nasa.gov/ndrd/disaster/</a>	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	<a href="http://ltpwww.gsfc.nasa.gov/ndrd/main/html">http://ltpwww.gsfc.nasa.gov/ndrd/main/html</a>	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	<a href="http://www.statelocal.gov/">http://www.statelocal.gov/</a>	General information through the federal-state partnership.
National Weather Service	<a href="http://nws.noaa.gov/">http://nws.noaa.gov/</a>	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	<a href="http://h2o.usgs.gov/public/realtime.html">http://h2o.usgs.gov/public/realtime.html</a>	Provisional hydrological data
Dartmouth Flood Observatory	<a href="http://www.dartmouth.edu/artsci/geog/floods/">http://www.dartmouth.edu/artsci/geog/floods/</a>	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	<a href="http://www.fema.gov/fema/csb.htm">http://www.fema.gov/fema/csb.htm</a>	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	<a href="http://www.met.fsu.edu/explores/tropical.html">http://www.met.fsu.edu/explores/tropical.html</a>	Tracking and NWS warnings for Atlantic Hurricanes and other links
National Lightning Safety Institute	<a href="http://lightningsafety.com/">http://lightningsafety.com/</a>	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	<a href="http://www.ghcc.msfc.nasa.gov/otd.html">http://www.ghcc.msfc.nasa.gov/otd.html</a>	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	<a href="http://www.wep.es.llnl.gov/www/wep/ghp.html">http://www.wep.es.llnl.gov/www/wep/ghp.html</a>	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	<a href="http://www.tornadoroject.com/">http://www.tornadoroject.com/</a>	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	<a href="http://www.nssl.uoknor.edu/">http://www.nssl.uoknor.edu/</a>	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster Risk Map	<a href="http://www.iaa.ix.com/ndcmap.htm">http://www.iaa.ix.com/ndcmap.htm</a>	A multi-disaster risk map.
Earth Satellite Corporation	<a href="http://www.earthsat.com/">http://www.earthsat.com/</a>	Flood risk maps searchable by state.
USDA Forest Service Web	<a href="http://www.fs.fed.us/land">http://www.fs.fed.us/land</a>	Information on forest fires and land management.
FEMA, NFIP Public Awareness (Free) Materials Orders Web Site	<a href="http://www.fema.gov/library/">http://www.fema.gov/library/</a>	FEMA website to order free educational materials
Firewise Communities	<a href="http://www.firewise.org/">http://www.firewise.org/</a>	Information to help reduce risk of wildland fires.
Municipal Research and Services Center of Washington (State) Web Site on Wildfire Prevention	<a href="http://www.mrsc.org/subjects/pubsafe/wildfire.aspx">http://www.mrsc.org/subjects/pubsafe/wildfire.aspx</a>	Excellent number of resources related to wildfire prevention
Franklin County (Washington) Emergency Management, Fact Sheet on Wildland Fires	<a href="http://www.franklinem.org/wildfires.html">http://www.franklinem.org/wildfires.html</a>	Provides information related to reducing risk of wildland fires.

## **Appendix F: Hazard Mitigation Resource Profiles**

The following are fact sheets about the various hazard mitigation grant programs

# HAZARD MITIGATION RESOURCE PROFILES

The following are resources that can be used in Hazard Mitigation projects:

## U.S. Army Corps of Engineers

### Contacts:

John Kennelly, Chief, Special Studies Section (for Flood Plain Management Services activities),  
Phone: (978) 318-8505, Fax: (978) 318-8080, E-mail: [John.R.Kennelly@usace.army.mil](mailto:John.R.Kennelly@usace.army.mil)

Mike Keegan, Chief, Project Planning Section (for Section 14, 103, and 205 authorities),  
Phone: (978) 318-8087, Fax: (978)318-8080, E-mail: [Michael.F.Keegan@usace.army.mil](mailto:Michael.F.Keegan@usace.army.mil)

**Address:** US Army Corps of Engineers  
New England District  
696 Virginia Road  
Concord, Massachusetts 01742-2751

### Description and Mission:

The Corps of Engineers is a multi-disciplinary engineering and environmental organization that has been identifying and meeting the water resources needs of the nation. These needs have been in the areas of flood damage reduction, flood plain information and management, navigation, shore protection, environmental restoration, water supply, streambank protection, recreation, and fish and wildlife resources conservation, as well as technical assistance in other water resources areas.

The New England District (NAE) of the Corps of Engineers is responsible for managing the Corps' civil responsibilities in a 66,000 square-mile region encompassing the [six New England states](#) east of the Lake Champlain drainage basin. The District and its [leadership](#) are headquartered in Concord, Massachusetts. The missions of the New England District are many and varied. They include:

- flood damage reduction
- navigation improvements and maintenance
- natural resource management
- streambank and shoreline protection
- disaster assistance
- environmental remediation and engineering
- engineering and construction management support to other agencies

### Flood Mitigation Involvement:

As a result of the catastrophic floods in 1936, 1938 and 1955, the Corps was called upon to undertake a comprehensive flood damage reduction program. Since then the Corps has built

many flood control structures throughout New England. These include 35 dams and reservoirs, five hurricane protection barriers (two are operated by the Corps) and approximately 60 local flood protection projects. The New England District has also completed two nonstructural projects involving the relocation of flood prone property and the acquisition of natural flood storage areas. The Corps also provides technical assistance to states and municipalities in locally constructed flood damage mitigation projects and to promote wise and informed use of floodplain and natural retention areas in order to minimize potential future flood damages.

**Mitigation Goals and Objectives:**

The New England District has two primary mitigation objectives with respect to flood damage reduction. The first objective is the operation and maintenance of the 35 flood control reservoirs and two hurricane barriers that provide protection to the Connecticut, Merrimack, Thames, Naugatuck, and Blackstone River Basins. The second objective is to continue to work with the states and communities in New England to address flooding problems affecting the region.

***Projects Desired:*** *The Corps of Engineers has several programs available under its Civil Works authorities to address flooding problems. These programs provide assistance either through the construction of structural and nonstructural projects to mitigate the flooding problem or by providing technical information to assist mitigation performed at the state or local level. Flood damage reduction projects constructed by the Corps of Engineers must demonstrate, based on current Federal guidelines, that the flood damages prevented by the project's construction exceed its total cost. The Corps must also demonstrate that the 10-year frequency flood discharge at the point of concern is equal to or greater than 800 cubic-feet per second (cfs). Technical assistance provided by the Corps does not need to meet the above criteria.*

**COE Resources with Respect to Hazard Mitigation:**

The New England Division assists in meeting national, regional and local needs through a variety of means. Congressionally authorized water resources investigations have resulted in the planning, design and implementation of many flood control and flood damage reduction projects. Work conducted under a Congressional authorization can be extensive and there is currently no monetary limit of funding. Typically there is a 1-2 year minimum delay in the identification of a proposed investigation and the funding of that work. The first phase of study, the Reconnaissance investigation, is 100 percent Federally funded and must be completed within twelve months. The second phase, the Feasibility investigations, must be cost-shared with a local sponsor where the sponsor provides 50 percent of the cost of the feasibility study. Congress in a Water Resources Development Act must specifically authorize construction of any project resulting from a General Investigation study. The cost of implementation for flood damage reduction projects is generally 65 percent Federal and 35 percent non-Federal.

Through the Continuing Authorities Programs of the Corps many structural and non-structural local protection project reducing or eliminating damages from flooding have been constructed. Investigations initiated under the Corps Continuing Authorities do not require specific congressional authorization are initiated simply with a request from the State or community to the New England District. The following is a list of Continuing Authorities applicable to flood mitigation:

**Section 14 - Emergency Stream Bank & Shoreline Protection:** This work consists of evaluating alternatives to provide emergency protection to public facilities, such as highways and bridges that are threatened due to erosion. The current Federal limit on Section 14 projects is \$500,000. The local sponsor is required to provide 25 percent of the cost of developing plans and specifications and of construction.

**Section 103 - Beach Erosion:** Investigations conducted under this authority are to determine methods of protecting public facilities that have been threatened by beach erosion. Currently there is a Federal limit of \$2,000,000 and the local sponsor is required to contribute 35 percent of plans, specifications and construction. The local sponsor is also required to cost-share equally the cost of the feasibility investigation that exceeds \$100,000. The first \$100,000 is at full Federal expense.

**Section 205 - Flood Damage Reduction:** Investigations are conducted under this program to assist local communities to identify flooding problems and to formulate and construct alternatives for flood damage reduction. The local sponsor is required to cost-share equally in the cost of the feasibility investigation that exceeds \$100,000 and the Federal limit is \$5,000,000. The local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

**Section 208 - Snagging and Clearing:** This emergency program is designed to reduce flood damage potential by identifying and removing obstructions that contribute to flooding by causing higher flood stages in the floodways. The Federal limit under this program is \$500,000 and the local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

The New England Division also has two Planning Assistance Programs, which provide opportunities for the States to obtain assistance in addressing water resource issues. These programs are the Section 22, Planning Assistance to the States (PAS) program and the Section 206, Flood Plain Management Services (FPMS) program.

**Planning Assistance to States Program (PAS):** The Planning Assistance to States Program is designed to assist the States in developing comprehensive plans to meet State planning goals. The program is extremely flexible in the type and the methodology of investigations. Studies conducted under the PAS program require a 50/50 cost share with a local sponsor. The existing funding limits are \$300,000 per state and a national budget not to exceed \$5,000,000.

**Flood Plain Management Services (FPMS):** The FPMS Program is designed for the Corps to assist States and local communities improve management of flood plains by performing technical assistance and conducting special investigations. Cost recovery has been implemented in this program effective in FY 1991. Under cost recovery, assistance provided to Federal agencies and private interests must be fully reimbursed by those customers. States and local communities are still provided technical assistance at 100 percent Federal cost. One of the major efforts being conducted under the FPMS program at this time is the preparation of Hurricane Evacuation Studies. These studies are jointly funded with the Federal Emergency Management Agency.

## **Ice Engineering Research Division U.S. Army Cold Regions Research and Engineering Laboratory**

**Contact:**

Dr. J-C Tatinclaux, Chief, Ice Engineering Research Division  
Phone: (603) 646-4187 Fax: (603) 646-4477

---

E-mail: [Jean-Claude.Tatinclaux@crl02.usace.army.mil](mailto:Jean-Claude.Tatinclaux@crl02.usace.army.mil)

Website: <http://www.crrel.usace.army.mil/ierd/>

**Address:** US Army Cold Regions Research and Engineering Laboratory  
Ice Engineering Research Division  
72 Lyme Road  
Hanover, NH 03755-1290

### **Description and Mission:**

The US Army Cold Regions Research and Engineering Laboratory (CRREL) is a Corps of Engineers' research laboratory that is dedicated to multi-disciplinary engineering and research that addresses the problems and opportunities unique to the world's cold regions. CRREL exists largely to solve the technical problems that develop in cold regions, especially those related to construction, transport, and military operations. Most of these problems are caused by falling and blowing snow, snow on the ground, ice in the air and in the ground, river ice, ice on seas and lakes, and ice affects on manmade materials. CRREL serves the Corps of Engineers and its clients in three main areas:

- Traditional military engineering, which deals with problems that arise during conflict;
- Military construction and operations technology, i.e., the building and maintenance of military bases, airfields, roads, ports, and other facilities; and
- Civil works, which involves the Corps in such things as flood protection, navigation on inland waterways and coastal engineering.

CRREL also deals with cold regions problems for the other defense services, for civilian agencies of the federal government, and to some extent for state agencies, municipalities, and private industry.

CRREL's Ice Engineering Research Division (IERD) was created to research, analyze and solve ice problems in and around water bodies, including ice jam flooding and ice accumulation in lock chambers, to ice buildup at water intakes and the destructive forces that moving ice exerts on riverine or coastal structures. In cooperation with the New England District (NAE) of the Corps of Engineers (located in Concord, MA), IERD personnel provide technical assistance before, during, and after ice jam flood emergencies. IERD research has resulted in the design and construction of a number of low-cost ice control structures as well as nonstructural mitigation measures. IERD also provides instruction on dealing with river ice problems to local emergency management agencies.

### **Flood Mitigation Involvement:**

IERD is frequently called upon by the various Corps Districts to provide technical assistance to states and municipalities in the form of emergency mitigation. IERD is also involved with Corps and local agencies in developing locally constructed flood damage mitigation projects and promoting wise and informed use of floodplain areas in order to minimize potential future flood damages.

---

### **Mitigation Goals and Objectives:**

The IERD has two primary mitigation objectives with respect to flood damage reduction. The first objective is to work with the Corps and other federal, state, and local agencies to design and implement ice control methods to reduce ice-related flood potential. The second is to work with the states and communities in nationwide as well as in New England to address ice-related emergency flooding problems affecting the region.

***Projects Desired:*** CRREL and IERD are a national resource ready to apply our unique facilities and capabilities to solve problems and conduct innovative, state-of-the-art research and technical support. There are a number of mechanisms that enable IERD and the rest of CRREL to partner with various Federal, non-DoD and private sector entities. The Federal Technology Transfer Act of 1986 (15 USC 3710a) allows CRREL to collaborate with any non-Federal partner on research and technical support consistent with the mission of the laboratory. The Intergovernmental Cooperation Act (31 USC 6505) lets CRREL work with state and local governments on a broad range of reimbursable projects. Under the "Authority to Sell" (10 USC 2539b), CRREL can provide test and evaluation services to the states and the private sector. This includes the testing and evaluation of materials, equipment, models, computer software, and other items. The laboratory can also provide support to other Federal agencies via the Economy in Government Act (31 USC 1535) through MOUs/MOAs that establish a framework for the partnership and provide a concise description of the planned work. CRREL's 35 active Cooperative Research and Development Agreements (CRADAs) with industry and academia and 17 Intergovernmental Cooperation Agreements with states and local governments in 1998 demonstrate a robust program in this area and the relevance of CRREL's research to many segments of American society beyond DoD.

The Corps of Engineers has several programs available under its Civil Works authorities to address flooding problems. These programs provide assistance either through the construction of structural and nonstructural projects to mitigate the flooding problem or by providing technical information to assist mitigation performed at the state or local level. Flood damage reduction projects constructed by the Corps of Engineers must demonstrate, based on current Federal guidelines, that the flood damages prevented by the project's construction exceed its total cost. The Corps must also demonstrate that the 10-year frequency flood discharge at the point of concern is equal to or greater than 800 cubic-feet per second (cfs). Technical assistance provided by the Corps does not need to meet the above criteria. Through the Corps, IERD has been involved in Section 205 Flood Damage Reduction program, Section 22 Planning Assistance to States Program (PAS)) projects, the Section 206 Flood Plain Management Services (FPMS) program funded jointly with FEMA, and numerous instances of technical assistance.

### **CRREL IERD Resources with Respect to Hazard Mitigation:**

**Corps:** CRREL works jointly with the Corps' New England Division to address regional and local ice-related hazard mitigation needs through a variety of means. Congressionally authorized water resources investigations have resulted in the planning, design and implementation of many flood control and flood damage reduction projects. Work conducted under a Congressional authorization can be extensive and there is currently no monetary limit of funding. Typically there is a 1-2 year minimum delay in the identification of a proposed investigation and the funding of that work. The first phase of study, the Reconnaissance investigation, is 100 percent Federally funded and must be completed within twelve months. The second phase, the Feasibility investigations, must be cost-shared with a local sponsor where the sponsor provides 50 percent of the cost of the feasibility study. Congress in a Water Resources Development Act must specifically authorize construction of any project resulting from a General Investigation

study. The cost of implementation for flood damage reduction projects is generally 65 percent Federal and 35 percent non-Federal.

Through the Continuing Authorities Programs of the Corps many structural and non-structural local protection project reducing or eliminating damages from flooding have been constructed. Investigations initiated under the Corps Continuing Authorities do not require specific congressional authorization are initiated simply with a request from the State or community to the New England District. The following is a list of Continuing Authorities applicable to flood mitigation:

**Section 205 - Flood Damage Reduction:** Investigations are conducted under this program to assist local communities to identify flooding problems and to formulate and construct alternatives for flood damage reduction. The local sponsor is required to cost-share equally in the cost of the feasibility investigation that exceeds \$100,000 and the Federal limit is \$5,000,000. The local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

**Section 22 - Planning Assistance to States Program (PAS):** The Planning Assistance to States Program is designed to assist the States in developing comprehensive plans to meet State planning goals. The program is extremely flexible in the type and the methodology of investigations. Studies conducted under the PAS program require a 50/50 cost share with a local sponsor. The existing funding limits are \$300,000 per state and a national budget not to exceed \$5,000,000.

**Section 206 - Flood Plain Management Services (FPMS):** The FPMS Program is designed for the Corps to assist States and local communities improve management of flood plains by performing technical assistance and conducting special investigations. Cost recovery has been implemented in this program effective in FY 1991. Under cost recovery, assistance provided to Federal agencies and private interests must be fully reimbursed by those customers. States and local communities are still provided technical assistance at 100 percent Federal cost. One of the major efforts being conducted under the FPMS program at this time is the preparation of Hurricane Evacuation Studies. These studies are jointly funded with the Federal Emergency Management Agency.

**Personnel:**

IERD was created to research, analyze and solve ice problems in and around water bodies. The technical experience of the staff and their in-depth research and field capabilities combine with CRREL's unique Ice Engineering Facility to form one of the premier ice engineering organizations in the world. IERD has a staff of 15 engineers and technicians experienced in technical analyses, methods, and engineering solutions to ice problems -- that is, any situation where the effects of ice cause flooding, increase operational and maintenance requirements of water control projects, impede navigation, or adversely impact the environment in cold regions.

**Equipment and Facilities:**

The Ice Engineering Facility was built to increase the research capabilities of the U.S. Army Cold Regions Research and Engineering Laboratory. It is a two-story building approximately 160 by 210 feet containing three primary cold spaces: the test Basin, Flume, and Research Area. We have recently designed and built a new Wind Tunnel Facility. In addition there is a machine room in the basement, an instrumentation corridor separating the flume and test basin spaces, a shop/storage area, and one sample-storage cold room.

The Test Basin was designed primarily for large-scale work on ice forces on structures, such as drill platforms and bridge piers, and for tests using model icebreakers. The Basin is 30 feet wide, 8 feet deep and 120 feet long. The room is designed to operate at any temperatures between +65° and -10°F with very even temperature distribution, which results in uniform ice thickness. Other studies conducted in the Test Basin concern the formation of ice pressure ridges, ice problems in and around navigation locks, and vertical uplift forces.

The Flume is situated in a room where the temperature can be regulated between +65° and -20° F. The Flume is 2 by 4 feet in cross section and 120 feet long. It can tilt from +2° to -1° slope, have a flow capacity of nearly 14 cubic feet per second and have a refrigerated bottom. Some other studies conducted in the Flume are the formation of ice covers and frazil ice, the hydraulics of ice-covered rivers, the formation of ice jams, and the effect of ice covers on sediment transport and scour.

Possibly the most versatile portion of the Ice Engineering Facility is the Research Area. This room is 80 by 160 feet clear span and has a temperature range of +65° to -10°F. Piping capable of providing a flow of 1, 2, 4 or 8 cubic feet per second is located on one side of the room, and a large drain trough is on the other. The floor is designed for loads up to 400 pounds per square foot. Models of reaches can be constructed in this area to test ways to alleviate ice jams through channel modification. Tests of the bearing capacity of large ice sheets and cold-testing of vehicles and structures are a few of the other potential uses of this space. Tests conducted in this room will help to alleviate much of the flooding caused by ice jams.

## **USDA, Natural Resources Conservation Service**

### **Contacts:**

Gerald J. Lang, Technology Leader; Phone: (603) 868-7581, Fax: (603) 868-5301  
E-mail: [gerald.lang@nh.usda.gov](mailto:gerald.lang@nh.usda.gov)

Edward Hansalik, Civil Engineer; Phone: (603) 868-7581, Fax: (603) 868-5301  
E-mail: [ehansalik@nh.usda.gov](mailto:ehansalik@nh.usda.gov)

**Address:** Federal Building  
2 Madbury Road  
Durham, NH 03824

### **Description and Mission:**

The Natural Resources Conservation Service (NRCS) is a Federal agency within the US Department of Agriculture. The mission of the NRCS is to help people conserve, improve and sustain our natural resources and environment. NRCS, formerly the Soil Conservation Service, is the lead federal agency for conservation on private land. NRCS provides conservation technical assistance through local conservation districts and Resource Conservation and Development (RC&D) Councils to individuals, communities, watershed groups, tribal governments, federal, state, and local agencies, and others. NRCS has an interdisciplinary staff of professional engineers, planners, biologists, foresters, agronomists, and soil scientists working together to provide the necessary

technical assistance to solve resource or environmental problems. NRCS products typically include conservation plans, study reports, engineering designs, and resource maps.

**Authorities and Funding:**

NRCS state and field offices derive funding from two possible sources, direct Federal appropriations and reimbursable agreements with agencies and units of government. NRCS manages several programs; Environmental Quality Incentive Program (EQIP), Wildlife Habitat Incentives Program (WHIP), Wetland Reserve Program (WRP), Forestry Incentives Program (FIP), and Farmland Protection Program (FPP) which provide cost-share assistance to landowners and users (primarily agricultural or forestry land) to install conservation practices to restore and protect natural resources. NRCS can also provide technical assistance ranging from preliminary reviews to complete detail designs to landowners/users solving resource problems even if financial assistance is not being provided for the installation of conservation practices. This assistance is dependant on staff availability and priorities.

NRCS also manages the Emergency Watershed Protection (EWP) program, which can provide financial and technical assistance to units of government and groups to repair damages sustained from a natural disaster (flood, fire, hurricane, tornado) creating an imminent hazard to life and property. The restoration efforts must be environmentally and economically cost effective and typically includes clearing debris from clogged stream channels, stabilizing eroded stream banks and restoring vegetation for stabilization purposes. NRCS can also provide technical assistance to watershed associations or groups to develop comprehensive plans for improving or protecting the watershed environment (water quality, flood reduction, wildlife habitat).

**Mitigation Involvement:**

The NRCS can provide technical assistance to conduct inventories, to complete watershed or site-specific plans, or to develop detail engineering and construction designs for conservation applications that will help reduce future damages from natural disasters. Some examples of past mitigation efforts include: floodplain management studies for towns, site assessments of stream flow impairments, stabilization designs to protect structures which could sustain severe damages from another storm event, and small watershed plans addressing flooding problems. Some of these products can be provided through other conservation assistance efforts. However, the major jobs would require a reimbursable agreement with the state or towns to complete the work.

**Mitigation Goals and Objectives:**

With respect to hazard mitigation, the goal of the NRCS in New Hampshire is to meet the needs of the State and local governments by providing timely technical assistance to support recovery and restoration efforts. NRCS can contribute this technical assistance by interacting directly with NHOEM at the state level and having our field staff working directly with Town Emergency Management officials at the local level. Short-term goals are to establish contacts with local officials and the conservation districts at the field office level to facilitate quicker response times. Intermediate and long-term objectives

are to improve the cooperative efforts of working with NHOEM and establish additional contacts for providing timely technical assistance at the local level.

**Projects/Planning Desired:**

NRCS would like to work with local watershed associations to develop comprehensive plans addressing resource and environmental needs and opportunities in the priority watersheds as identified in the Unified Watershed Assessment. These plans can provide the basis for targeting and requesting special funding to meet the needs of the local watershed association. Technical assistance for planning and designing along with public information dissemination are the typical activities our agency can provide in this effort.

## **NRCS Resources with respect to Hazard Mitigation**

**Personnel:**

NRCS in New Hampshire has a workforce of 45 staff members along with 5 multi-state staff members. Approximately 22 staff members consisting of engineers, biologists, foresters, conservation planners, and technicians are available to provide some assistance in mitigation efforts. Support staff of a GIS specialist, computer specialist, and public information specialist could assist in providing information for public outreach. This staff is available to provide limited assistance under our present program funding authorities. However, larger projects would require reimbursement for planning and design assistance.

**Equipment, Physical Facilities and Other Capabilities:**

All of our field offices and State office have computers and access to the internet. All of the field offices have survey equipment and all engineers have the use of CADD software. All field offices have access to small meeting rooms and access to the Federal Telecommunications System. Government vehicles are located at all field offices for use by government employees and could be made available in emergencies.

## **Northeast States Emergency Consortium (NESEC)**

**Contacts:**

Edward S. Fratto, Executive Director: Phone: (781) 224-9876, Fax: (781) 224-4350  
E-Mail: [www.nesec.org](http://www.nesec.org)

**Address:** Northeast States Emergency Consortium  
419 Main Street, Suite 5  
Wakefield, MA 01880

**Organization Description:**

The Northeast States Emergency Consortium, Inc. (NESEC) is a 501(c)(3) not-for-profit natural disaster mitigation and emergency management organization, located in

Wakefield, Massachusetts. NESEC is the only multi-hazard consortium of its kind in the country and is supported and funded by the Federal Emergency Management Agency (FEMA). The eight Northeast States of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont form the consortium. NESEC has a full-time Executive Director, and Assistant. It is governed by a Board of Directors. The Board is comprised of the Directors of the State Emergency Management Agencies from each of the six New England States and the States of New York and New Jersey.

**Organization Mission:**

NESEC works in partnership with government and private organizations to reduce losses of life and property from natural disasters in the Northeast United States. The Northeast States are vulnerable to most of the natural hazards, including hurricanes, earthquakes, coastal and inland flooding, tornadoes and micro-bursts, forest fires, drought, lightning, blizzards and other forms of severe weather. Our developed urban areas and the desire to build and live on waterfront property have increased our degree of risk from natural hazards.

**Mitigation Programs:**

**Grants:** NESEC raises funds from government and private sources to support local mitigation projects. These funds are awarded on a competitive basis in the form of grants in the range of \$500-5,000. The name of this program is called the *Power of Prevention*. This program was funded at about \$50,000 in 1998 and \$35,000 in 1997. NESEC is pursuing 1999 funding. The program is presently unfunded. All grant programs are administered in cooperation with the New Hampshire Office of Emergency Management (NHOEM). Communities interested in participating should contact NHOEM.

**HAZUS:** NESEC assists FEMA PROJECT IMPACT Communities in the use of HAZUS as a planning platform for incorporating multi-hazard disaster prevention initiatives. NESEC can produce a HAZUS report using default data for each of the initial PROJECT IMPACT Communities. Priority is given to PROJECT IMPACT communities, however assistance may be provide to other communities as resources allow. This report provides an excellent starting point for communities wishing to utilize HAZUS to identify potential hazards. The NESEC HAZUS Report is multi-hazard and usually contains information on earthquakes, tornadoes, flood and wind.

There is no fee or charge for producing the default HAZUS Report and meeting with the community to discuss the results. All HAZUS support is arranged in cooperation with the New Hampshire Office of Emergency Management (NHOEM). Communities interested in participating should contact NHOEM.

**Emergency Generators:** NESEC assists communities to establish a partnership with their electric utilities and service companies. The partnership would conduct an energy efficiency audit of the community, recommend cost saving measures, and implement a cost saving plan. Monthly savings could be used to fund emergency generator(s) for local critical facilities. The utility or energy service company could then lease, install, and maintain generator(s) in a community.

The community would pay a monthly charge for the lease agreement. This charge would not exceed the savings derived through energy efficiency measures, so there would be no capital outlay or additional cost to the community. In fact, some communities may be able to reduce their monthly electric bills in an amount that exceeds the cost of the generator(s) lease agreement.

Monthly savings and utility participation will vary from state to state and community-to-community depending on present electric power usage and efficiency measures and deregulation. There is no fee or charge for assisting communities in establishing partnerships with electric utilities. NESEC assistance will be provided as resources allow. All emergency generator support is arranged in cooperation with the New Hampshire Office of Emergency Management (NHOEM). Communities interested in participating should contact NHOEM.

## **Federal Mitigation Grant Programs**

### **I. Pre-Disaster Mitigation Grant Program**

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.

Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

<http://www.fema.gov/government/grant/pdm/index.shtm>

### **II. Hazard Mitigation Grant Program**

The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

<http://www.fema.gov/government/grant/hmgrp/index.shtm>

### **III. Flood Mitigation Assistance (FMA) Program**

The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the [National Flood Insurance Program](#) (NFIP).

---

FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program. <http://www.fema.gov/government/grant/fma/index.shtm>

#### IV. **Repetitive Flood Claims Program**

The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al).

Up to \$10 million is available annually for FEMA to provide RFC funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the [National Flood Insurance Program \(NFIP\)](http://www.fema.gov/government/grant/rfc/index.shtm).  
[www.fema.gov/government/grant/rfc/index.shtm](http://www.fema.gov/government/grant/rfc/index.shtm)

#### V. **Severe Repetitive Loss Program**

The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the [National Flood Insurance Program](http://www.fema.gov/government/grant/rfc/index.shtm) (NFIP).

The definition of severe repetitive loss as applied to this program was established in Section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a **residential property** that is covered under an NFIP flood insurance policy and:

- (a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten year period, and must be greater than 10 days apart.  
<http://www.fema.gov/government/grant/srl/index.shtm>



FEMA

Program  
Information

# Mitigation



## Hazard Mitigation Assistance

The Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance (HMA) programs present a critical opportunity to reduce the risk to individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds.

### A Common Goal

While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to natural hazards.

### Funding Disaster Recovery Efforts

The Hazard Mitigation Grant Program (HMGP) may provide funds to States, Territories, Indian Tribal governments, local governments, and eligible private non-profits following a Presidential major disaster declaration.

## The Unified Hazard Mitigation Assistance Grant Programs

The Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, United States Code (U.S.C.) 5170c. The key



purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMGP is available, when authorized under a Presidential major disaster declaration, in the areas of the State requested by the Governor. The amount of HMGP funding available to the Applicant is based upon the total Federal assistance to be provided by FEMA for disaster recovery under the Presidential major disaster declaration.

### The Pre-Disaster Mitigation (PDM)



program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM program is designed to assist States, Territories, Indian Tribal governments, and local communities in implementing a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters.

### The Flood Mitigation Assistance (FMA)

program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).



### The Repetitive Flood Claims (RFC)

program is authorized by Section 1323 of the NFIA, 42 U.S.C. 4030, with the goal of reducing flood damages to individual properties for which one or more claim payments for losses have been made under flood insurance coverage and that will result in the greatest savings to the National Flood Insurance Fund (NFIF) in the shortest period of time.



### The Severe Repetitive Loss (SRL)

program is authorized by Section 1361A of the NFIA, 42 U.S.C. 4102a, with the goal of reducing flood damages to residential properties that have experienced severe repetitive losses under flood insurance coverage and that will result in the greatest amount of savings to the NFIF in the shortest period of time.



Additional HMA resources, including the HMA Unified Guidance, may be accessed at [www.fema.gov/government/grant/hma/index.shtml](http://www.fema.gov/government/grant/hma/index.shtml)

## Program Comparisons

### Cost Sharing

In general, HMA funds may be used to pay up to 75 percent of the eligible activity costs. The remaining 25 percent of eligible costs are derived from non-Federal sources.

The table below outlines the Federal and State cost share requirements.

#### COST SHARE REQUIREMENTS

Programs	Mitigation Activity Grant (Percent of Federal/ Non-Federal Share)
HMGP	75/25
PDM	75/25
PDM (subgrantee is small impoverished community)	90/10
PDM (Tribal grantee is small impoverished community)	90/10
FMA	75/25
FMA (severe repetitive loss property with Repetitive Loss Strategy)	90/10
RFC	100/0
SRL	75/25
SRL (with Repetitive Loss Strategy)	90/10

### Eligible Applicants and Subapplicants

States, Territories, and Indian Tribal governments are eligible HMA Applicants. Each State, Territory, and Indian Tribal government shall designate one agency to serve as the Applicant for each HMA program. All interested subapplicants must apply to the Applicant.

The table below identifies, in general, eligible subapplicants.

#### ELIGIBLE SUBAPPLICANTS

Subapplicants	HMGP	PDM	FMA	RFC	SRL
State agencies	✓	✓	✓	✓	✓
Indian Tribal governments	✓	✓	✓	✓	✓
Local governments/communities	✓	✓	✓	✓	✓
Private non-profit organizations (PNPs)	✓				

✓ = Subapplicant is eligible for program funding

Individuals and businesses are not eligible to apply for HMA funds, however, an eligible subapplicant may apply for funding to mitigate private structures. RFC funds are only available to subapplicants who cannot meet the cost share requirements of the FMA program.

#### Available Funding

PDM, FMA, RFC, and SRL are subject to the availability of appropriations funding, as well as any directive or restriction made with respect to such funds.

HMGP funding depends on Federal assistance provided for disaster recovery.

#### General Requirements

All mitigation projects must be cost-effective, be both engineering and technically feasible, and meet Environmental Planning and Historic Preservation requirements in accordance with HMA Unified Guidance. In addition, all mitigation activities must adhere to all relevant statutes, regulations, and requirements including other applicable Federal, State, Indian Tribal, and local laws, implementing regulations, and Executive Orders.

**All Applicants and subapplicants must have hazard mitigation plans that meet the requirements of 44 CFR Part 201.**

## Eligible Activities

The table below summarizes eligible activities that may be funded by HMA programs. Detailed descriptions of these activities can be found in the HMA Unified Guidance.

### ELIGIBLE ACTIVITIES

Mitigation Activities	HMGP	PDM	FMA	RFC	SRL
<b>1. Mitigation Projects</b>	✓	✓	✓	✓	✓
Property Acquisition and Structure Demolition or Relocation	✓	✓	✓	✓	✓
Structure Elevation	✓	✓	✓	✓	✓
Mitigation Reconstruction					✓
Dry Floodproofing of Historic Residential Structures	✓	✓	✓	✓	✓
Dry Floodproofing of Non-Residential Structures	✓	✓	✓	✓	
Minor Localized Flood Reduction Projects	✓	✓	✓	✓	✓
Structural Retrofitting of Existing Buildings	✓	✓			
Non-Structural Retrofitting of Existing Buildings and Facilities	✓	✓			
Safe Room Construction	✓	✓			
Infrastructure Retrofit	✓	✓			
Soil Stabilization	✓	✓			
Wildfire Mitigation	✓	✓			
Post-Disaster Code Enforcement	✓				
5% Initiative Projects	✓				
<b>2. Hazard Mitigation Planning</b>	✓	✓	✓		
<b>3. Management Costs</b>	✓	✓	✓	✓	✓

✓ = Mitigation activity is eligible for program funding

## Management Costs

**For HMGP only:** The Grantee may request up to 4.89 percent of the HMGP allocation for management costs. The Grantee is responsible for determining the amount, if any, of funds that will be passed through to the subgrantee(s) for their management costs.

**Applicants for PDM, FMA, RFC, or SRL** may apply for a maximum of 10 percent of the total funds requested in their grant application budget (Federal and non-Federal shares) for management costs to support the project and planning subapplications included as part of their grant application.

**Subapplicants for PDM, FMA, RFC, or SRL** may apply for a maximum of 5 percent of the total funds requested in a subapplication for management costs.

## National Flood Insurance Program (NFIP) Participation

There are a number of ways that HMA eligibility is related to the NFIP:



**SUBAPPLICANT ELIGIBILITY:** All subapplicants for FMA, RFC, or SRL must currently be participating in the NFIP, and not withdrawn or suspended, to be eligible to apply for grant funds. Certain non-participating political subdivisions (i.e., regional flood control districts or county governments) may apply and act as subgrantee on behalf of the NFIP-participating community in areas where the political subdivision provides zoning and building code enforcement or planning and community development professional services for that community.

**PROJECT ELIGIBILITY:** HMGP and PDM mitigation project subapplications for projects sited within a Special Flood Hazard Area (SFHA) are eligible only if the jurisdiction in which the project is located is participating in the NFIP. There is no NFIP participation requirement for HMGP and PDM project subapplications located outside of the SFHA.

**PROPERTY ELIGIBILITY:** Properties included in a project subapplication for FMA, RFC, and SRL funding must be NFIP-insured at the time of the application submittal. Flood insurance must be maintained at least through completion of the mitigation activity.

## Application Process

Applications for HMGP are processed through the National Emergency Management Information System (NEMIS). Applicants use the Application Development Module of NEMIS, which enables each Applicant to create project applications and submit them to the appropriate FEMA Region in digital format for the relevant disaster.

Applications for PDM, FMA, RFC, and SRL are processed through a web-based, electronic grants management system (eGrants), which encompasses the entire grant application process. The eGrants system allows Applicants and subapplicants to apply for and manage their mitigation grant application processes electronically. Applicants and subapplicants can access eGrants at <https://portal.fema.gov>.

## Application Deadline

The PDM, FMA, RFC, and SRL application period is from early June through early December. Applicants must submit a grant application to FEMA through the eGrants system. The HMGP application deadline is 12 months after the disaster declaration date and is not part of the annual application period. Details can be found in the HMA Unified Guidance.

## FEMA Review and Selection

All subapplications will be reviewed for eligibility and completeness, cost-effectiveness, engineering feasibility and effectiveness, and for Environmental Planning and Historical Preservation compliance. Subapplications that do not pass these reviews will not be considered for funding. FEMA will notify Applicants of the status of their subapplications and will work with Applicants on subapplications identified for further review.



Details about the HMA Grant Application process can be found in the Hazard Mitigation Assistance Unified Guidance, which is available at [www.fema.gov/government/grant/hma/index.shtm](http://www.fema.gov/government/grant/hma/index.shtm)



## GovDelivery Notifications

Stay up-to-date on the HMA Grant Programs by subscribing to GovDelivery notifications. Have updates delivered to an e-mail address or mobile device. To learn more, visit [www.fema.gov](http://www.fema.gov)

## Contact Information

HMA Helpline: Tel 866-222-3580, or e-mail [hmagrantshelpline@dhs.gov](mailto:hmagrantshelpline@dhs.gov)

Contact Information for FEMA Regional Offices is provided at [www.fema.gov/about/contact/regions.shtm](http://www.fema.gov/about/contact/regions.shtm)

Contact Information for each State Hazard Mitigation Officer (SHMO) is provided at [www.fema.gov/about/contact/shmo.shtm](http://www.fema.gov/about/contact/shmo.shtm)



## **Appendix G: Documentation of the Planning Process**

Greenfield Hazard Mitigation Committee Agendas, Sign- in Sheets, and Public Notices

## **Greenfield Hazard Mitigation Team**

**Meeting #1**

### **AGENDA**

**September 24, 2013**

**6:30 p.m.**

**Stephenson Memorial Library**

**761 Forest Road**

**Greenfield, NH**

- 1. Introduction**
- 2. Identify Past and Potential Hazards**
  - 1) Go through each hazard type and other information on the chart provided in Chapter III of existing plan
    - a. Add any new hazards that have occurred since the existing plan was adopted
    - b. Add any “potential hazard” concerns
  - 2) Make changes to Hazard Mitigation Map
- 3. Risk Assessment**
  - 1) Rank each hazard according to Human Impact, Property Impact, Business Impact, Probability, Severity, and Risk using Risk Assessment Chart (Chapter IV)
- 4. Critical Facilities**
  - 1) Review and update the Critical Facilities listed in the existing plan (Chapter V)
- 5. Assessing Vulnerability**
  - 1) Update Potential Losses Chart and assessed value amount (Chapter VI)
- 6. Review of Existing Mitigation Strategies**
  - 1) Review Existing Mitigation Strategies from existing plan (Chapter VII)
  - 2) Identifying Gaps in Coverage
- 7. Discussion of possible future meeting dates- October 29, November 26, December 17**

**GREENFIELD HAZARD MITIGATION  
MEETING # 1**

September 24, 2013

SIGN – IN SHEET

NAME	AFFILIATION or DEPARTMENT	CONTACT INFORMATION
Louise Gryval	Heritage District Commission	Ljslle@yahoo.com
Karen Day	Greenfield Selectboard	<a href="mailto:riverqueen@pobox.com">riverqueen@pobox.com</a>
John Gryval	EMD	<a href="mailto:jgryval@aol.com">jgryval@aol.com</a>
Bob Marshall	Planning Board	<a href="mailto:Bmarshall11@myfairpoint.net">Bmarshall11@myfairpoint.net</a>
Neal Brown	Library Trustees	<a href="mailto:Neal.brown@glssynthesis.com">Neal.brown@glssynthesis.com</a>
Tim Murray	Greenfield DPW	<a href="mailto:Greenfield.nh.dpw@myfairpoint.net">Greenfield.nh.dpw@myfairpoint.net</a>
Loren White	Greenfield Fire Dept.	Ldw13@myfairpoint.net

## **Greenfield Hazard Mitigation Team**

**Meeting #2**

### **AGENDA**

**October 29, 2013**

**6:30 p.m.**

**Stephenson Memorial Library**

**761 Forest Road**

**Greenfield, NH**

- 1. Critical Facilities** (Chapter V)
  - 1) Continue to review and update the Critical Facilities listed in the existing plan. Begin with Category 3- Facilities/populations to Protect (page 3 of packet)
- 2. Assessing Vulnerability**
  - 1) Update Potential Losses Chart and assessed value amount (page 6 of packet)
- 3. Review of Existing Mitigation Strategies** (page 8 of packet)
  - 1) Review Existing Mitigation Strategies from existing plan (Chapter VII)
  - 2) Identifying Gaps in Coverage
- 4. Proposed Mitigation Strategies-** (page 10 of packet)
  - 1) Review Chapter VIII of the existing plan and update necessary information
- 5. Mitigation Strategy Update** (page 12 of packet)
  - 1) Review existing "Mitigation Actions" to determine existing status (new chart)  
Determine if each action has been completed, deleted, or deferred
- 6. Hazard Mitigation Goals** (page 13 of packet)
  - 1) Review NH Hazard Mitigation Goals- check for consistency with Greenfield's goals

**Next meeting: November 26**

**GREENFIELD HAZARD MITIGATION  
MEETING # 2**

October 29, 2013

SIGN – IN SHEET

NAME	AFFILIATION or DEPARTMENT	CONTACT INFORMATION
Louise Gryval	Heritage District Commission	Ljslle@yahoo.com
Karen Day	Greenfield Selectboard	<a href="mailto:riverqueen@pobox.com">riverqueen@pobox.com</a>
Glenn Roberge	Greenfield Police Dept.	greenfieldnhpolice@myfairpoint.net
John Gryval	EMD	<a href="mailto:jgryval@aol.com">jgryval@aol.com</a>
Bob Marshall	Planning Board	<a href="mailto:Bmarshall11@myfairpoint.net">Bmarshall11@myfairpoint.net</a>
Neal Brown	Library Trustees	<a href="mailto:Neal.brown@glsynthesis.com">Neal.brown@glsynthesis.com</a>
Tim Murray	Greenfield DPW	<a href="mailto:Greenfield.nh.dpw@myfairpoint.net">Greenfield.nh.dpw@myfairpoint.net</a>
Loren White	Greenfield Fire Dept.	Ldw13@myfairpoint.net

## **Greenfield Hazard Mitigation Plan Update**

### **Meeting #3**

### **AGENDA**

**November 26, 2013**

**6:30 p.m.**

**Stephenson Memorial Library**

**761 Forest Road**

**Greenfield, NH**

**1. Assessing Vulnerability**

1) Update Chapter VI of the existing plan -Potential Losses Chart and assessed value amount

**2. Continue Proposed Mitigation Strategies-**

1) Continue review Chapter VIII of the existing plan and update necessary information

**3. Mitigation Strategy Update**

1) Review existing "Mitigation Actions" to determine existing status (new chart)  
Determine if each action has been completed, deleted, or deferred

**4. Hazard Mitigation Goals**

1) Review NH Hazard Mitigation Goals- check for consistency with Greenfield's goals

**5. STAPLEE Chart**

1) Determine new Hazard Mitigation Action Items and prioritize using the STAPLEE chart.

**6. Action Plan**

1) Prepare the Action Plan using action items from the STAPLEE chart.  
2) Determine the Who, When, and How for each item in the chart.

**Next meeting- December 17 at 6:30 p.m.**

**GREENFIELD HAZARD MITIGATION  
MEETING # 3**

November 26, 2013

SIGN – IN SHEET

NAME	AFFILIATION or DEPARTMENT	CONTACT INFORMATION
Glen Roberge	Greenfield Police Dept..	
Karen Day	Selectboard	<a href="mailto:riverqueen@pobox.com">riverqueen@pobox.com</a>
Louise Gryval	Heritage District Comm.	<a href="mailto:ljslle@yahoo.com">ljslle@yahoo.com</a>
Bob Marshall	Planning Board Chair	<a href="mailto:Bmarshall11@myfairpoint.net">Bmarshall11@myfairpoint.net</a>
Neal Brown	Library Trustee	<a href="mailto:Neal.brown@glsynthesis.com">Neal.brown@glsynthesis.com</a>
Loren White	Greenfield Fire Dept	<a href="mailto:Ldw13@myfairpoint.net">Ldw13@myfairpoint.net</a>

**Greenfield Hazard Mitigation Team**

**Meeting #4**

**AGENDA**

**January 14, 2014**

**6:30 p.m.**

**Stephenson Memorial Library**

**761 Forest Road**

**Greenfield, NH**

- 1.** STAPLEE Chart
  - 1) Determine new Hazard Mitigation Action Items and prioritize using the STAPLEE chart.
- 2.** Action Plan
  - 1) Prepare the Action Plan using action items from the STAPLEE chart.
  - 2) Determine the Who, When, and How for each item in the chart.
- 3.** Final Review & Edits of Hazard Mitigation Map

Next Meeting: January (to be determined)

**GREENFIELD HAZARD MITIGATION  
MEETING # 4**

January 14, 2014

SIGN – IN SHEET

NAME	AFFILIATION or DEPARTMENT	CONTACT INFORMATION
Louise Gryval	Heritage District Comm.	Ljslle@yahoo.com
Karen Day	Greenfield Selectboard	<a href="mailto:riverqueen@pobox.com">riverqueen@pobox.com</a>
John Gryval	EMD	<a href="mailto:jgryval@aol.com">jgryval@aol.com</a>
Bob Marshall	Planning Board	<a href="mailto:Bmarshall11@myfairpoint.net">Bmarshall11@myfairpoint.net</a>
Neal Brown	Library Trustees	<a href="mailto:Neal.brown@glssynthesis.com">Neal.brown@glssynthesis.com</a>
Tim Murray	Greenfield DPW	<a href="mailto:Greenfield.nh.dpw@myfairpoint.net">Greenfield.nh.dpw@myfairpoint.net</a>
Loren White	Greenfield Fire Dept.	Ldw13@myfairpoint.net
Danielle Morse	NHHSEM	

**Greenfield Hazard Mitigation Team**

**Meeting #5**

**AGENDA**

**February 25, 2014**

**6:30 p.m.**

**Stephenson Memorial Library**

**761 Forest Road**

**Greenfield, NH**

- 1.** Edit STAPLEE Chart
  - 1) Add any new Hazard Mitigation Action Items and prioritize using the STAPLEE chart.
- 2.** Edit Action Plan
  - 1) Add any new action items from the STAPLEE chart.
  - 2) Determine the Who, When, and How for each item in the chart.
- 3.** Final Review & Edits of Hazard Mitigation Map
- 4.** Review Draft Plan

**GREENFIELD HAZARD MITIGATION  
MEETING # 5**

February 25, 2014

SIGN – IN SHEET

NAME	AFFILIATION or DEPARTMENT	CONTACT INFORMATION
Louise Gryval	Heritage District Comm.	Ljslle@yahoo.com
Karen Day	Greenfield Selectboard	<a href="mailto:riverqueen@pobox.com">riverqueen@pobox.com</a>
John Gryval	EMD	<a href="mailto:jgryval@aol.com">jgryval@aol.com</a>
Bob Marshall	Planning Board	<a href="mailto:Bmarshall11@myfairpoint.net">Bmarshall11@myfairpoint.net</a>
Danielle Morse	NHHSEM	
Tim Murray	Greenfield DPW	<a href="mailto:Greenfield.nh.dpw@myfairpoint.net">Greenfield.nh.dpw@myfairpoint.net</a>
Loren White	Greenfield Fire Dept.	Ldw13@myfairpoint.net

This is an example of a notice of a public meeting of the Greenfield Hazard Mitigation Committee. This was emailed to neighboring communities, county, businesses, and academia and reached approximately 430 addresses.



## Happenings

from Southwest Region Planning Commission

### In This Issue

[Save the Date: NH Broadband Conference](#)

[Northeast Climate Change Preparedness Conference](#)

[2014 Recreational Trails Program Grants Now Available](#)

[Quabbin-to-Cardigan Trail Grants Program](#)

[RTAP Survey for Rural Transit Providers](#)

### Upcoming Meetings

**February 25:** The **SWRPC Board of Directors** will meet at 4:00 p.m. at Papagallos Restaurant in Swanzey, NH. For more information, please contact [Becky Baldwin](#).

**February 25:** The **Winter Commission Meeting** will begin at 4:30 p.m. at Papagallos Restaurant in Swanzey, NH. For more information, please contact [Becky Baldwin](#).

**February 25:** The **Greenfield Hazard Mitigation Plan Update** meeting will be held at 6:30 p.m. at the Greenfield Public Library. For more information, please contact [Lisa Murphy](#).

**March 3:** The **Bennington Hazard Mitigation Plan Update** meeting will be held at 2:00 p.m. at the Bennington Town Hall. For more information, please contact [Lisa](#)



February 21, 2014

Dear Friends & Neighbors,

This periodic e-communication is intended to keep you apprised of happenings in and around our region related to planning, land use, and community. You are welcome to participate in these meetings, workshops, and other activities. For additional information on any of these events or notices, please contact us at Southwest Region Planning Commission at 357-0557 or [admin@swrpc.org](mailto:admin@swrpc.org).

Sincerely,

Tim Murphy  
Executive Director

### Save the Date: NH Broadband Conference

The NH Broadband Conference is scheduled for Friday, May 16, 2014 at the Grappone Conference Center in Concord, NH. The purpose of the conference is to bring together a variety of stakeholders to discuss what is happening to expand broadband access, adoption, and use throughout New Hampshire. The conference is intended for municipal officials; legislators; community leaders; internet service providers; representatives from business, health/medical, education and public safety sectors; and NH residents. For more information, click [here](#).

### Northeast Climate Change Preparedness Conference

The Northeast Climate Change Preparedness Conference takes place May 19-21, 2014 in Manchester, NH. The first two days of the event are about Building Resilient Communities. This event is co-sponsored by Antioch University New England and the

[Murphy](#).

**March 4:** The **Monadnock Region Coordinating Council** will meet at 2:00 p.m. at the SWRPC office. For more information, please contact [Tara Germond](#).

**March 5:** The **Route 12 Corridor Advisory Committee** will meet at 1:30 p.m. at the SWRPC office. For more information, please contact [Lisa Murphy](#).

### Quick Links

[Commission Highlights](#)

[SWRPC Web Site](#)

[Broadband Speed Test](#)

Environmental Protection Agency. To register and for more information, click [here](#). Travel grants are available. Applications must be submitted by February 26, 2014. See the website above for details.

### 2014 Recreational Trails Program Grants Now Available

The New Hampshire Department of Resources and Economic Development has announced that limited grants are available for motorized, non-motorized and diversified trails. Eligible projects include maintenance and restoration of existing trails, purchase and lease of trail construction and maintenance equipment, construction of new trails, development and rehabilitation of trailside and trailhead facilities, trail linkages, and acquisition of easements or property for trails. Applicants may be non-profit organizations, private groups or government entities. Applications are due March 7, 2014. For more information, click [here](#).

### Quabbin-to-Cardigan Trail Grants Program

The application window for the 2014 round of Quabbin-to-Cardigan Trail Grants is now open. The program makes grants of up to \$10,000 to support the development, improvement, maintenance and permanent protection of hiking trails in the Q2C region. Grants are awarded through a competitive process, and are available for projects in both the New Hampshire and Massachusetts portions of the Q2C region. Funded projects must be completed by the end of 2014, and there is a **25% minimum cash match requirement**. The written permission of relevant landowner(s) is required at the time of application. **Completed applications for the 2014 grant round must be received no later than 5:00 p.m. on Friday March 14, 2014.** Successful grant applicants will be notified in early April. The RFP and application materials can be found [here](#). For questions regarding the grant program and the application process, contact Chris Wells of the Society for the Protection of NH Forests at 224-9945 ext. 355 or [cwells@forestsociety.org](mailto:cwells@forestsociety.org).

### RTAP Survey for Rural Transit Providers

New Hampshire Department of Transportation (NHDOT) contracted with RLS to administer the Rural Transit Assistance Program (RTAP), effective July 2013. It is the goal of NHDOT to provide the best possible training and technical assistance to our rural transit providers and partners throughout the state. In an effort to determine how NHDOT and RLS can best serve you, we are requesting your assistance by having rural transit providers

complete a needs assessment survey by **March 15, 2014**. You can access the survey [here](#). Should you have any issues accessing the survey, please contact Zach Kincade at [zkincade@rlsandassoc.com](mailto:zkincade@rlsandassoc.com) or [manager@newhampshirertap.com](mailto:manager@newhampshirertap.com), if you need to speak with someone please call 731-5196.

The Southwest Region Planning Commission (SWRPC) is one of New Hampshire's nine regional planning agencies. SWRPC serves a planning district of 35 towns covering approximately 1,000 square miles and comprising the Southwest Region of the State.

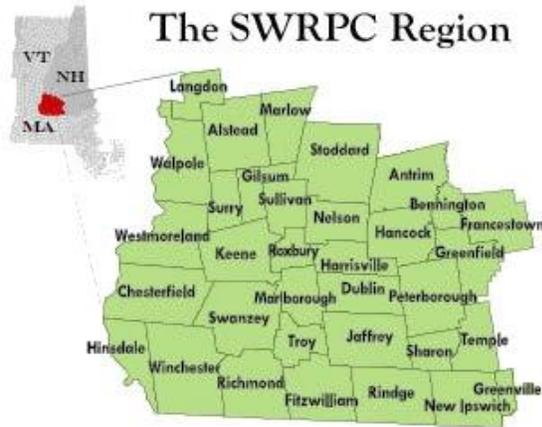
Our work program includes the following:

- Local planning assistance
- Natural resources planning
- Community and economic development
- Transportation planning
- Emergency management planning
- Data management and mapping

SWRPC is a membership organization serving the communities of Southwest New Hampshire. Through member support along with various federal, state, and local grants and contracts, SWRPC is able to assemble the resources and expertise needed to provide technical assistance and programs to which our member municipalities have direct access. This model represents efficiency through pooling the resources of many for the overall benefit of the Region.

SWRPC is governed by Commissioners appointed by member communities and a 15-member Board of Directors. We have a very capable and dedicated staff - a group I am privileged to work with on a daily basis. The diversity of the agency work program reflects the Commission's dynamic nature and ability to address new challenges and opportunities. For more information about the Commission, visit our web site at [www.swrpc.org](http://www.swrpc.org).

Tim Murphy  
Executive Director  
Southwest Region Planning Commission



**Public Notice for Review of Draft Plan**

*PUBLIC NOTICE  
TOWN OF GREENFIELD – N.H.*

*The Town of Greenfield Hazardous Mitigation Plan is available for public comment. The plan may be reviewed at the Greenfield Town Office. Any comments should be directed to Sarah Patriquin at Southwest Regional Planning Commission [spatriquin@swrpc.org](mailto:spatriquin@swrpc.org)*

*Per order of the Emergency Management Director*

**Public Notice Public Hearing for Plan Adoption**

**TOWN OF GREENFIELD  
Public Hearing Notice  
Harzardous Mitigation Plan**

The Greenfield Board of Selectmen will hold a Public Hearing on Tuesday, September 2, 2008 at 6:15 pm at the town offices in Greenfield, New Hampshire, to hear public comment on:

1. The Hazardous Mitigation Plan to be utilized in the event of potential future hazard damage to the Town of Greenfield.
2. The Board will adopt the current plan as written.

The public is welcomed to attend this hearing, for persons with special needs, provisions can be made by contacting Debra Davidson via telephone (547-3442) or mail, at least five days prior to the public hearing.

Greenfield Board of Selectmen  
7 Sawmill Road  
Greenfield, New Hampshire 03047  
(603) 547-3442

## Appendix H: Emergency Landing Zones

### HELICOPTER LANDING ZONES

**Following locations have been selected for Helicopter Landing Zones for Emergency Responders:**

<b>Landing Zone #</b>	<b>Location</b>	<b>North Coordinate</b>	<b>South Coordinate</b>
13LZ1	Barbara C. Harris Camp- ballfield	<b>42 57.88</b>	<b>71 53.66</b>
13LZ2	Sawmill Road- behind Town Offices	<b>42 57.08</b>	<b>71 52.42</b>
13LZ3	Cavender Road/Riverbend Dr. Intersection	<b>42 56.65</b>	<b>71 56.68</b>
13LZ4	East Road- across from Lehnrs	<b>42 57.00</b>	<b>71 50.35</b>
13LZ5	971 Forest Rd.(Rt 31)- Yankee Farmer	<b>42 57.07</b>	<b>71 53.37</b>
13LZ6	171 Forest Road (Rt 31)- Oak Park	<b>42 55.14</b>	<b>71 50.51</b>
13LZ7	Francestown Rd (Rt 31)- field behind dry hydrant	<b>42 57</b>	<b>71 51</b>
13LZ8	Gilbert Varney Dr. Crotched Mountain Rehabilitation	<b>42 58.66</b>	<b>71 52.70</b>
13LZ9	Mountain Road- Brantwood Camp		
13LZ10	Mountain Road- Plowshare Farm		
13LZ11	Muzzey Hill Road- field before railroad crossing	<b>42 58</b>	<b>71 54</b>
13LZ12	Old Bennington Road- Robinson Farm field		
13LZ13	Old Bennington Road- Swamp Road intersection	<b>42 56</b>	<b>71 53</b>
13LZ14	Sawmill Road- American Steel parking lot	<b>42 58</b>	<b>71 53</b>
13LZ15	Sawmill Road- DOT parking lot		

## **Appendix I: Project Status Sheets**

The following form can be used to keep track of projects identified in the hazard mitigation plan that are in progress or that have been completed.

