

# Multi-Hazard Mitigation Plan Lincoln, NH



Prepared for New Hampshire Homeland  
Security & Emergency Management  
By  
North Country Council, Inc.  
Bethlehem, NH 03574

**June 21, 2010**

Multi-Hazard Mitigation Plan  
&  
Community Wildfire Protection Plan

**ACKNOWLEDGEMENTS**

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US Department of Agriculture: US Forest Service

The Town of Lincoln

North Country Resource Conservation and Development (NC RC&D)

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**Town of Lincoln Multi-Hazard Mitigation Planning Team**

Eleven people have attended meetings and/or been instrumental in the completion of this plan:

- Chief Ted Smith: Emergency Management Director/Police Chief
- Chief Nate Haynes: Fire Chief
- Peter Joseph: Town Manager
- Susan Chenard: Town Administrative Assistant
- Pat Romprey, Chairman, Select Board
- J.D. Hettinger: Planning Board Member
- W. T. Bishop: Zoning Board Member/Community Member
- Bill Willey: Public Works Director
- Paul Hatch: NH Homeland Security Emergency Management
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*Cover: View from Loon Bridge over the East Branch of the Pemigewasset River & the Lincoln Town Offices*

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## Executive Summary

The Lincoln Multi-Hazard Mitigation Plan was compiled to assist Lincoln in reducing and mitigating future losses from natural and man-made hazard events. The Plan was developed by the North Country Council (NCC) and participants from the Town of Lincoln Multi-Hazard Mitigation Team. The Plan contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts.

This plan addresses the following hazards:

- Avalanche (snow)
- Dam Failure
- Drought
- Earthquake
- Levee Failure (Local Protection Project)
- Flood
- Hailstorm
- Hurricane
- Erosion, Landslide & Mudslide
- Tornado & Downbursts
- Severe Winter Storm
- Epidemic/Pandemic
- Extreme Temperatures
- Wildfire
- High Winds (windstorm)
- Hazardous Material Transport
- Lightning
- Extended Power Failure
- Terrorism

This plan also provides a list of critical infrastructure/key resources (CI/KR) categorized as follows: Necessary for Emergency Response Facilities (ERF), Not Necessary for Emergency Response Facilities (NERF), Facilities/Populations to Protect (FPP), and Potential Resources (PR). In addition, this plan addresses the town's involvement in The National Flood Insurance Program (NFIP).

This multi-hazard plan was designed to include a detailed study and analysis of wildfire hazards as part of this planning process. The original goal was to produce two separate plans but that concept produced excessive overlap and cost. To streamline the process, the wildfire plan was fully integrated into this multi-hazard plan. This multi-hazard plan still meets the US Forest Service requirement for a Community Wildfire Protection Plan. Certain parts of this plan are dedicated to the wildfire threat.

The Planning process included reviewing other town hazard and wildfire plans, technical manuals, federal and state laws as well as research data. Combining the elements from these plans, the Team was able to produce this integrated multi-hazard plan. The Lincoln Multi-Hazard Mitigation Plan is considered a work in progress. There are three situations which will prompt revisiting this plan:

- *First, at a minimum, it **will be reviewed annually or after any emergency event** to assess whether the existing and suggested mitigation strategies were successful. This review will focus on the assessment of the Plan's effectiveness, accuracy and completeness in monitoring of the implementation strategy. The review will also address recommended improvements to the Plan as contained in the FEMA plan review crosswalk, and address any weaknesses the town identified that the Plan did not adequately address.*

- *Second, the Plan will be thoroughly **updated** every **five years**. The public will be allowed and encouraged to participate in that revision process.*
- *Third, if the town adopts any major modifications to its land use planning documents, the jurisdiction will conduct a plan review and make changes as applicable.*

Public involvement was encouraged throughout this process and will continue to be stressed in future updates. In the pre-meeting, town officials were given a recommended list of people to invite and participate in the process. A press release was also disseminated which encouraged public involvement. It was also stressed, as part of the Memorandum of Understanding signed by the Select Board, that seeking public attendance is required. Finally, once conditional approval for this plan has been received, a public hearing will be held before the Select Board formally adopts the Plan; the public will have the opportunity for future involvement as the Plan is periodically reviewed and the public will be included in all future reviews/updates to this plan. The public notice will be given by such means as: press releases in local papers, posting meeting information on the town website (if available), sending letters to federal, state, and local organizations impacted by the Plan, and posting notices in public places in the town. There will also be a public hearing before the annual review and before the five year update is sent to FEMA to ensure that public comments and revisions will be considered.

Once final approval is met, copies of the Plan are to be distributed to the Town, HESM, FEMA, DRED and the USFS; the Plan will then be distributed as these entities see fit. Copies of the Plan remain on file at the North Country Council (NCC) in both digital and paper format.

*Items highlighted in pale yellow (such as the box below) represent additional notations added for clarity and understanding.*

Adoption by the local governing body demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in the Plan. Adoption legitimizes the Plan and authorizes responsible agencies to execute their responsibilities. The Plan shall include documentation of the resolution adopting the Plan as per requirement §201.6(c)(5).



*Lincoln Historical Society Building*



## Chapter I: Multi-Hazard Planning Process

### A. Authority & Funding

Lincoln's Multi-Hazard Mitigation Plan was prepared in accordance with the Disaster Mitigation Act of 2000 (DMA), Section 322, and Mitigation Planning, signed into law by President Clinton on October 30, 2000. This multi-hazard plan will be referred to as the "Plan". Lincoln's Multi-Hazard Mitigation Plan was prepared by the Lincoln Multi-Hazard Mitigation Planning Team with the assistance and professional service of North Country Council (NCC) Regional Planning Commission under contract with New Hampshire Homeland Security Emergency Management (HSEM) operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-97 Edition). This plan was funded, in part, by HSEM through grants from FEMA. Funds from town dues and matching funds for team member's time were also part of the funding formula.



Lincoln Library

### B. Purpose & History of the FEMA Mitigation Planning Process

The ultimate purpose of Disaster Mitigation Act of 2000 (DMA) is to:

*"...establish a national disaster hazard mitigation program -*

- To reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and*
- To provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster".<sup>1</sup>*

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section "322 – Mitigation Planning" which states:

*"As a condition of receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government.."<sup>2</sup>*

#### **Mission Statement:**

To make Lincoln less vulnerable to the effects of hazards through the effective administration of hazard mitigation planning, wildfire hazard assessments, and a coordinated approach to mitigation policy and planning activities.

#### **Vision Statement:**

The community of Lincoln will reduce the impacts of wildfires and other potential disasters through implementing mitigation measures, public education and deliberate capital expenditures within the community. Homes and businesses will be safer and the community's ISO rating may be improved.

<sup>1</sup> Disaster Mitigation Act (DMA) of 2000, Section 101, b1 & b2

<sup>2</sup> Disaster Mitigation Act (DMA) of 2000, Section 322a

HSEM's goal is to have all New Hampshire communities complete a local multi-hazard plan as a means to reduce future losses from natural and man-made events before they occur. HSEM outlined a process whereby communities throughout the state may be eligible for grants and other assistance upon completion of this multi-hazard plan. The state's regional planning commissions are charged with providing assistance to selected communities to develop local plans.

Lincoln's Multi-Hazard Mitigation Plan is a planning tool to use to reduce future losses from natural and man-made hazards as required by the Disaster Mitigation Act of 2000; this plan does **not** constitute a section of the town's Master Plan. The Multi-Hazard Mitigation planning process resulted in significant cross-talk regarding all types of natural and man-made hazards by team members.

The DMA places new emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition to receiving Hazard Mitigation Grant Program (HMGP) project grants. Local governments must review yearly and update this plan every five years to continue program eligibility.

Documentation for the Planning process, including public involvement, is required to meet DMA 2000 (44CFR§201. (c) (1) and §201.6 (c) (1)). The Plan must include a description of the Planning process used to develop the Plan, including how it was prepared, who was involved in the process, and how other agencies participated. A description of the Planning process should include how the Planning team or committee was formed, how input was sought from individuals or other agencies who did not participate on a regular basis, what the goals and objectives of the Planning process were, and how the Plan was prepared. The description can be in the Plan itself or contained in the cover memo or an appendix.

### **C. Jurisdiction**

This plan addresses only one jurisdiction - the Town of Lincoln, NH. Once approved by the Planning Team, the Plan will be forwarded to HSEM and FEMA for Conditional Approval. Additionally, this plan will be submitted to the NH Department of Forests & Lands for approval as a Community Wildfire Protection Plan (CWPP) for Lincoln. Upon review and conditional approval by HSEM and FEMA, the Lincoln Select Board will hold a public hearing, consider public comments, and sign a Resolution to Adopt the Plan.

### **D. Scope of the Plan & Federal & State Participation**

A community's multi-hazard mitigation plan often identifies a vast number of natural hazards and is somewhat broad in scope and outline. The scope and effects of this plan were assessed based on the impact of hazards and wildfires on: *critical infrastructure and key resources (CI/KR); current residential buildings; other structures within the town; future development; administrative, technical and physical capacity of emergency response services; and response coordination between federal, state and local entities.*

In seeking approval as a Multi-Hazard Mitigation Plan and a Community Wildfire Protection Plan, the planning effort included participation of Homeland Security and Emergency Management, the US Forest Service, the Department of Resources and Economic Development (DRED), the North Country Resource Conservation and Development Area Councils (NCRC&D) as well as weekly notification of upcoming meetings to the state and federal entities above. Designation as a Community Wildfire Protection Plan will allow a community to gain access to federal funding for hazardous fuels reduction and other mitigation projects supported by the US Forest Service. By merging the two federal planning processes (multi-hazard and wildfire), duplication is eliminated and the town has access to a larger pool of resources for pre-disaster planning.

The Healthy Forest Restoration Act (HFRA) of 2003 includes statutory incentives for the US Forest Service to give



consideration to local communities as they develop and implement forest management and hazardous fuel reduction projects. For a community to take advantage of this opportunity, it must first prepare a CWPP. This multi-hazard mitigation planning process not only satisfies FEMA's criteria regarding wildfires and all other hazards but also addresses the minimum requirements for a CWPP:

- **Collaboration:** *A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.*
- **Prioritized Fuel Reduction:** *A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.*
- **Treatment of Structural Ignitability:** *A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.<sup>3</sup>*

Finally, as required under Code of Federal Regulations (CFR), Title 44, Part 201.6(c) (2) (ii) and 201.6(c) (3) (ii), the Plan must address the community's participation in the National Flood Insurance Program (NFIP), its continued compliance with the program, and, as part of vulnerability assessment, the Plan must address the National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged due to floods.

## E. Multi-Hazard Planning Process

The planning process consisted of eleven specific steps; some steps were accomplished independently while other areas were interdependent. Many factors affected the ultimate sequence of the planning process: length of meetings, community preparation and attendance, and other community needs. All steps were included but not necessarily in the numerical sequence listed. The list of steps is as follows:

§201.6(b) requires that there be an open public involvement process in the formation of a plan. This process shall provide an opportunity for the public to comment on the Plan during its formation as well as an opportunity for any neighboring communities, businesses, and others to review any existing plans, studies, reports, and technical information and incorporation of those in the Plan, to assist in the development of a comprehensive approach to reducing losses from natural disasters.

- Step 01: Team Formation and Orientation, Goal Identification
- Step 02: Formulate Hazard List, Hazard Description and Threat Matrix (Table 3.1)
- Step 03: Profile, List and Map Historic and Potential Hazards, Wildfire, Natural and Man-made
- Step 04: Profile, List and Map Critical Infrastructure and Key Resources
- Step 05: Assess Community's participation in National Flood Insurance Program
- Step 06: Gather Town History, Past Development Trends, Future Development Trends, Town Statistics
- Step 07: List Existing Mitigation Strategies & Brainstorm to Identify Potential Mitigation Strategies
- Step 08: Evaluate and Categorize Potential Mitigation Strategies
- Step 09: Prioritize Mitigation Strategies to Determine Implementation Plan
- Step 10: Team Review of Plan Contents for Submission to HSEM/FEMA
- Step 11: Adopt and Monitor the Plan

<sup>3</sup> Healthy Forest Restoration Act; HR 1904, 2003; Section 101-3-a.b.c; [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108\\_cong\\_bills&docid=f:h1904enr.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf)

## F. Involvement

### (Public, Neighboring Communities, Agencies, Non-profits and other interested parties)

Public involvement was stressed during the initial meeting and community officials were given a matrix of potential team members (see following page). Community officials were urged to contact as many people as they could to participate in the planning process. A press release, stressing the public nature of the process, was also disseminated and sent to area newspapers.

Team composition is expected to be lower in smaller communities because of the small population base and the fact that many people “wear more than one hat”. While much effort was made to include public participation, few general community members took the opportunity to participate.

*North Country Council, Inc.*

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### News Release

FOR IMMEDIATE RELEASE

04-10-09  
Contact: June Garneau  
603-444-6303 ext 13

#### **TOWN OF LINCOLN COMMENCES MULTI-HAZARD MITIGATION PLANNING**

The Town of Lincoln will be conducting a series of Multi-Hazard Mitigation Planning meetings over the next few months.

On April 9, 2009, Peter Joseph, Lincoln's Town Manager and Police Chief Ted Smith met with Paul Hatch, Field Representative from NH Homeland Security & Emergency Management and June Garneau, GIS Planner at North Country Council to discuss the required five-year update to the 2004 Lincoln Hazard Mitigation Plan. Also discussed was the planning process to create a new Multi-Hazard Plan in 2009 that will serve as both a new plan and an update to the 2004 Plan.

North Country Council has been creating All-Hazard, Wildfire and Multi-Hazard Mitigation Plans for communities in the North Country for more than five years. As mandated by the Disaster Mitigation Act of 2000, all communities are required to complete a local hazard mitigation plan in order to qualify for FEMA funding should a natural disaster occur. The new Multi-Hazard Mitigation Plans will not only cover a variety of natural hazards but will also address the history and likelihood of wildfire disasters in the community and the risks of building in flood zones.

Lincoln's Planning Team is currently being formed; all interested parties should contact Police Chief Ted Smith (745-9000) if they wish to be included in the process. Through a series of public meetings, the Planning Team will establish priorities, collaborate on activities, and increase public awareness and participation to reduce the impact of hazards. Discussion will address issues such as flooding, hurricanes, drought, landslides and wildfires; the planning processes are made possible through grants from the Federal Emergency Management Administration (FEMA).

The next scheduled meeting of the Planning Team will be held on Monday, April 20, 9:00 AM at the Lincoln Town Hall; the general public is encouraged to attend all meetings and to assist the Team with firsthand knowledge of historic hazard events.

Hazard mitigation planning is a preparedness tool. In an effort to reduce the costs of suppression and the incidence of potential losses, New Hampshire Homeland Security and Emergency Management has awarded North Country Council funding to assist communities in developing these plans. If you wish to have your community participate in this process please contact June Garneau at 444-6303 ext 13.

Founded in 1973, North Country Council is a non-profit regional planning commission serving 51 communities and 25 unincorporated places in the northern New Hampshire. North Country Council provides planning and economic development professional services and technical assistance to member communities made possible through numerous states, federal and private grant sources and membership dues.

## G. Narrative Description of the Process and Methodology

The Plan was developed with substantial local, state and federal coordination; completion of this new multi-hazard plan required significant planning preparation. All meetings were geared to accommodate brainstorming, open discussion and an increased awareness of potential hazardous conditions in the Town.

### Meeting 1 - April 9, 2009

The meeting began with introductions between Police Chief, Ted Smith, Town Manager, Peter Joseph, Paul Hatch, HSEM Representative and June Garneau, NCC Planner. This initial meeting's purpose was to discuss the formation of a "Team" and the planning steps needed to update the 2004 Hazard Mitigation Plan. Chief Smith and Peter Joseph theorized that the Team would include, but not be limited to the following: Peter Joseph, Town Manager; Police Chief/EMD, Ted Smith; Paul Hatch, HSEM Field Representative; Susan Chenard, Town Administrative Assistant; J.D. Hettinger, Planning Board; Bill Willey, Public Works Superintendent; Nate Hynes, Fire Chief and other interested parties and members of the community. A press release, to be provided by NCC, would be issued by the Town to the Littleton Courier and the White Mountain Shopper. In addition, a Memorandum of Understanding (MOU) was left with Peter Joseph for signature.

The requirement to include the Town's participation in the NFIP was discussed and it was pointed out that the Flood Zoning Ordinance was available on the Town's website. Dams were discussed briefly as were emergency warning systems, mutual aid and other Town facts. Lastly, June was provided with a set of GIS shapefiles representing recent updates to the town boundaries, roads, parcels, imagery, etc.

It was decided that for the next meeting June would prepare a draft Multi-Hazard Plan based on the combination of the Wildfire Plan done in 2007 and the Hazard Mitigation Plan done in 2004 by the next meeting. Work would begin at the next meeting on hazard updating and completion of the Threat Matrix (Table 3.1), acceptance of goals, and discussion of Critical Infrastructure and Key Resources.

### Meeting 2 - April 27, 2009

The meeting began with introductions and then the Team quickly reviewed the current state of the Plan which was a draft combination of the 2004 Hazard Mitigation Plan, the 2007 Wildfire Mitigation Plan, and current 2009 Multi-Hazard Mitigation Plans that have been submitted to FEMA in the past few months. An explanation was made regarding the use of color coding in the Plan to indicate which areas of the Plan required work. Copies of the Hazard (taken from State Hazard Mitigation Plan) and Wildfire Goals were distributed, and after time to review these goals, were approved by the Team. In addition, the signed Memorandum of Understanding was approved by the Team and provided to the NCC Planner.

#### Multi-Hazard Mitigation Potential Team Members

##### **Federal**

US Forest Service

##### **State**

Department of Transportation

DRED

RC&D (Non-Profit)

##### **Local**

Selectmen (Past/Present)

Town Manager/Administrator

Town Planner

Police Chief

Fire Chief

EMD

Emergency Services

Fire Warden

Health Services

Education/School

Recreation Directors

Public Works Director

Road Agent

Water Management

Public Utilities

Waste Management

Dam Operators

Major Employers

##### **Local - Special Interest**

Land Owners

Home Owners

Forest Management

Timber Management

Tourism & Sportsman's Groups

Developers & Builders

##### **Experts**

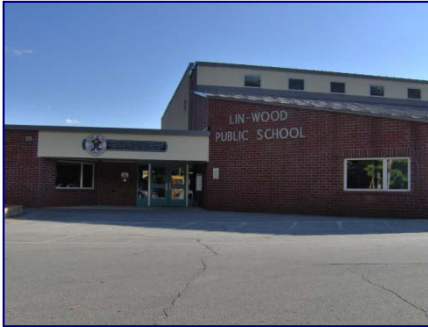
GIS Specialists

Watershed Oversight

Environmentalists

Media

The next step was to address the Hazards by reviewing one-by-one the hazards that were listed in Lincoln's past plans. With a great deal of discussion and brainstorming, it was decided that 19 hazards were to be addressed in the 2009 Multi-Hazard Mitigation Plan Update and the Threat Matrix (Table 3.1) was completed. It should be noted that although Radon and Expansive Soils were discussed at this time by the Team, it was decided that they would not be included in the Threat Matrix as mitigation for both of these hazards falls upon individual property owners. The Team did however, wanted to acknowledge that radon is wide-spread in northern New Hampshire and expansive soils can develop when inadequate construction methods are used.



Upon completion of the Threat Matrix, the Team took a close look at the Critical Facilities and Key Resources. Once again, using past plans, the team was able to establish a list of facilities and resources that would be important during a hazardous event. These facilities were to be included in the current Plan; the mapping of these facilities was scheduled for the next meeting.

Lastly, responsibilities and duties for the Team and NCC were assigned for the next meeting, and the next two meeting dates were set.

### Meeting 3 - May 5, 2009

The main objectives of this meeting were: to review and update actions to date, finalize the Threat Matrix and hazard inclusions, map Critical Facilities and Key Resources, discuss and acknowledge the WUI and to begin to brainstorm implementation strategies.

The meeting began with new introductions with John D. Hettinger, Planning Board, and Bill Willey, Public Works Director, joining the Team. June Garneau provided a quick update of the current status of the Plan and brought the new Team members up-to-date on our progress and the planning process. Homework assignments were reviewed and Bill Willey presented information on the only dam of concern in town to support the inclusion of "dam failure" as a potential hazard.

The next step was to hold a final review of the included hazards and the Threat Matrix. Once again, a discussion took place on the rating system done in the last meeting, and ultimately it was decided that the ratings would remain the same. Two minor changes were made in the table (Table 3.1): *Hazmat/Vehicle* was changed to *Hazardous Material Transport* and *Extreme Heat* was changed to *Extreme Temperatures* in order take in the effects of long sub-zero cold spells. Fixed Hazardous Material was discussed and determined not to be a hazard for the Town of Lincoln. Lastly, a renewed discussion regarding the "levee" on the Upper Pemi was discussed; this issue presented some confusion, as the hazardous state of this structure is dependent on the outcome of the findings of a new base flood elevation for Lincoln.

A considerable amount of time was spent discussing and mapping the Critical Infrastructure and Key Resources (CI/KR). Using a projected GIS map, the Team located and identified the CI/KR that had been outlined in the prior meeting. Each item was added to the NCC's GIS Structure layer and located on a map. Further documentation is found in Chapter IV, Tables 4.1-4.4.

The next item to be discussed was the Wildland Urban Interface (WUI). It was explained that the WUI is the area where structures and other human development meets or intermingles with wildland, forest land or vegetative fuels. According to FEMA, a dichotomy exists in dealing with WUI fires - on the one hand, foresters believe that a natural fire is healthy for our forests; on the other hand, homeowners in these high risk areas expect fire protection for their structures. Fires within this interface pose great challenges to the fire service; firefighting tactics for wildfires differ considerably from those in structural fires. Access to remote areas and the availability of water sources are often limited in the WUI; therefore fire prevention programs in these areas are extremely important. Homeowners must accept a measure of responsibility and be fully aware of the risks when deciding to locate in these areas, and communities need to be aware of the preparation necessary for building in these areas.

A Wildland Urban Interface (WUI) fire is a wildfire in a geographic area where structures and other human development meet or intermingle with wildland or vegetative fuels.

Federal Register, Volume 66. No. 160  
Friday August 17, 2001 - Notice:

Below is a list of communities in the North Country that have been rated as "at risk" for wildfire associated with the White Mountain National Forest.

<i>Bartlett</i>	<i>Campton</i>
<i>Chatham</i>	<i>Conway</i>
<i>Jefferson</i>	<i>Lincoln</i>
<i>Madison</i>	<i>Plymouth</i>
<i>Randolph</i>	<i>Rumney</i>
	<i>Woodstock</i>

The historical development of a WUI definition within the region was discussed, noting FEMA's funding criteria regarding Class I-V roads. It was carefully explained that the team could redefine the WUI within the context of what met the local needs of the community, but if the team's definition included Class VI or private roads, the town needed to develop a process to notify people in those areas that FEMA pre- and post-mitigation funds would not be available for projects in those areas.

Using the map from the previous meeting, June showed the Wildland Urban Interface (WUI) in the Town; the Team reviewed this map of the town and accepted the WUI as outlined, using Class I-V roads.

As part of the WUI based discussion, a projected map reflecting the basic hazard risk assessment data was shown and explained. Lincoln's risk was evaluated based on fuel load, slope, and aspect. Each area of the town was then coded as low (green), medium (yellow), or high (red) risk which is reflected in Chapter III, Section C and Multi-Hazard Map 1.

Historic fires from the 2007 Wildfire Mitigation Plan were shown on a projected map and the need for fire information for 2007 and 2008 was discussed. The Fire Chief agreed to locate data on recent fires and the Team agreed to use part of the next meeting to add those fires to the GIS map layer.

Copies of the implementation strategies used in both the 2007 Wildfire Mitigation Plan and the 2004 Hazard Mitigation Plan were given to each member of the team. As part of their "homework", the Team was asked to review these strategies and assess the need for them in this Plan. The Team was also asked to consider the hazards that are addressed in the Plan and to think about possible mitigation strategies for each.

A final recap of the meeting was held and review of the next meeting date on May 19, 2009, 6 PM in the Town Hall Conference Room.



#### **Meeting 4 - May 19, 2009**

In an effort to increase community involvement and attendance, Meeting 4 was held during the evening; this effort did not result in increased attendance, however John Neely from the USFS was able to attend as were all of the usual Team members.

The first order of business was to review the CI/KR and Threat Matrix for final approval. Next, the Team discussed each hazard as it applies to the Town of Lincoln, thus insuring the “local” aspect of the Plan. Based on this session, the hazard descriptions were developed and written for Chapter V of the Plan.

Although not a part of the original agenda, a large portion of this meeting was spent on the discussion of historic wildfires with John Neely. Using GIS technology, areas of particular concern for wildfire were identified as was the relationship between the USFS and the Lincoln Fire Department. It was readily agreed that with a large amount of National Forest in Town and many recreational visitors, the most frequent cause for wildfires is out of control campfires. John agreed to forward GIS shapefiles of recorded USFS fires in Lincoln to June for inclusion in the Historic Wildfire Map (Chapter III, Map 2).

The final few minutes of the meeting was spent discussing potential mitigation strategies; a list of “Potential Mitigation Strategies” was handed out and used as a springboard from which to launch this discussion. Since time was running out, it was decided to continue the discussion of mitigation strategies at the following meeting and, for “homework”, the Team was asked to review the handouts passed out during the previous meeting in order to be prepared to discuss and list changes and updates to the prior Plans. The Team was also encouraged to think about “new strategies”.

#### **Meeting 5 – June 16, 2009**

This mid-afternoon meeting was very productive; with the core Team members in attendance we jumped right into the discussion of mitigation strategies.

Copies of the Existing Mitigation Strategies from the 2007 Wildfire Plan and the 2004 Hazard Mitigation Plan were reviewed and updated to reflect strategies as they exist in Lincoln today. This was a somewhat lengthy process as substantial changes and updates were made.

The next step was to begin to look at the Mitigation Strategies and Implementation Plans of both the 2007 and 2004 plans. Using handouts and a projected Excel spreadsheet, the Team updated, corrected or eliminated each old strategy to reflect its importance to Lincoln today. Once this was complete, using notes from prior meetings and the collective opinions of the Team members, each remaining old strategy and any new strategies were analyzed for their hazard type, affected location, and type of activity. In addition, each strategy was analyzed for its feasibility and effectiveness based on the STAPLEE process (Table 8.1).

This process continued until time ran out and it was decided to finish up the mitigation strategies at the next meeting.

### Meeting 6 – June 25, 2009

The meeting began with a review and recap of the work already done on mitigation strategies and continued with the development of new strategies for the Plan. Existing Strategies were once again reviewed in an effort to locate any areas within this list of items that need improvement. Also, each of the identified hazards were reviewed and compared to the new strategy list to insure that any mitigation projects that could be done to lessen or eliminate each hazard had been included. Each strategy was assessed for its likely timeframe for completion, its priority, funding requirements and oversight.

As part of the prioritizing and ranking systems, the Team determined and categorized which strategies could be completed in: (1): 1-12 months; (2): 12-24 months; (3): 24-36 months or beyond. The final step was to rank each strategy within each category, resulting in a fully prioritized list of strategies (Table 9.1).

The meeting came to a close with the decision that this would most likely be the final meeting. The NCC Planner was to forward digital “draft” copies of the Plan to the core Team members for their final review; once responses were received and any changes made, the Plan was to be forwarded to HSEM and FEMA for approval. No future meeting dates were set.



*Lincoln Catholic Church*

## Meeting Agendas

### Meeting 1 – April 9, 2009

Lincoln Town Offices, 9:00 AM to 11:00 AM

- 1) **Overview**
  - a) Recap of what has happened during the past year at NCC
  - b) Reason for this meeting
- 2) **Discussion on the Hazards**
  - a) Importance of Consistency, (sample plans p 5, p 22, 23, p. 36-38, p. 63)
  - b) Hazards Town would like to include (samples)
- 3) **Meetings**
  - a) How many were held before?
  - b) Schedule future meetings
- 4) **Fact Check**
  - a) Town information
  - b) Assessed value of structures 2998
  - c) Master Plan Status
  - d) EOP Status
  - e) CIP Status
  - f) Road Inventory, does town have DOT Nodal Map
- 5) **National Flood Insurance Program**
  - a) Members since 3/1/95
  - b) How do zoning ordinances address flood zone?
  - c) What does the Town do to mitigate problems in the flood zone?
  - d) Have there been any repetitive loss situations in the Town; if so, where and how often?
  - e) Role of ZBA, Planning Board and Select Board with flood zone and NFIP
  - f) Need for structure values
- 6) **Wildland Urban Interface (WUI)**
  - a) Discussion of its extent (see maps)
  - b) Need for structure values
- 7) **Critical Infrastructure & Key Resources**
  - a) Discussion
  - b) Mapping for next meeting
- 8) **Photos**
  - a) Hazard Photos
  - b) Area photos
  - c) Cover photo
- 9) **Review of next steps**

### Meeting 2 – April 27, 2009

Lincoln Town Offices, 10:00 AM to 12:00 PM

- 1) **Introductions (as needed)**
- 2) **Quick review of combined Plan in draft form**
- 3) **Review State Goals for Hazard Mitigation Planning and seek acceptance**
- 4) **Hazards**
  - a) Update, add or delete hazards used in 2004 Hazard Plan and 2007 Wildfire Plan
  - b) Decide on Hazards to be identified in Updated Plan
  - c) Complete Threat Matrix (Table 3.1)
- 5) **Critical Infrastructure and Key Resources**
  - a) Update, add or delete CI/KR used in 2004 Hazard Plan and 2007 Wildfire Plan
  - b) Complete Tables 4.1 through 4.4
- 6) **Review and seek acceptance of MOU**
- 7) **Assign Team duties and responsibilities for next meeting**
- 8) **Recap and assess NCC duties for next meeting**
- 9) **Set future meeting date(s)**

### Meeting 3 – May 5, 2009

Lincoln Town Offices, 2:00 PM to 4:00 PM

- 1) **Introductions (as needed)**
- 2) **Quick review of last meeting's work**
- 3) **Review of "homework"**
  - a) Nate: List of fires
  - b) June: NFIP section
  - c) June: corrections to town info
  - d) June: get logo from Susan
  - e) Peter/Pat: Paragraph on the LPP
  - f) Chief Smith: Hazard Material Plan? and photos
- 4) **June: Enter CI/KR into GIS**
- 5) **Quick review of Threat Matrix**
  - a) Discuss any changes and omissions
  - b) Explain how severity was determined
- 6) **Mapping the CI/KR**
- 7) **WUI Discussion**
- 8) **Brainstorm Implementation Strategies**
- 9) **Recap and Assign Homework**
- 10) **Review dates for upcoming meetings**

#### Meeting 4 – May 19, 2009

6:00 PM to 8:00 PM

- 1) Introductions (as needed)
- 2) Quick review of last meeting's work
  - a) CI/KR
  - b) Threat Matrix
  - c) Hazard descriptions
- 3) Review of "homework"
  - a) Nate: List of fires
  - b) June: NFIP section
  - c) Peter/Pat: Paragraph on the LPP
  - d) Chief Smith: Hazard Material Plan? and photos
- 4) Existing Mitigation Strategies
- 5) Review Potential Strategies List
- 6) Create Potential Strategies for Lincoln
  - a) Use strategies from past plans
  - b) Add additional strategies
- 7) Recap and Assign Homework
- 8) Review dates for upcoming meetings

#### Meeting 5 – June 16, 2009

2:00 – 4:00 PM

- 1) Introductions (as needed)
- 2) Quick review of last meeting's work
  - a) Existing Mitigation Strategies – Recheck yellow highlights
  - b) Photos?
- 3) Review Potential Strategies List
- 4) Create Potential Strategies for Lincoln
  - a) Use strategies from past plans
  - b) Add additional strategies
- 5) Recap and Assign Homework
- 6) Review dates for upcoming meetings

#### Meeting 6 – June 25, 2009

8:00 AM – 10:00 AM

- 1) Introductions (as needed)
- 2) Quick review of last meeting's work
  - a) Mitigation Strategies already done
  - b) Photos?
- 3) Complete Potential Strategies for Lincoln
  - a) Use strategies from past plans
  - b) Refer to potential strategies list
  - c) Add additional strategies
- 4) Prioritize and Rank Strategies
  - a) Those that can be done in 0-12 months
  - b) Those that can be done in 12-24 months
  - c) Those that can be done in 24-36 months
  - d) Those that can be done in more than 36 months
- 5) Tie up any other loose ends
- 6) Recap and Assign Homework
- 7) Review dates for upcoming meeting(s)



Lincoln Police  
Department

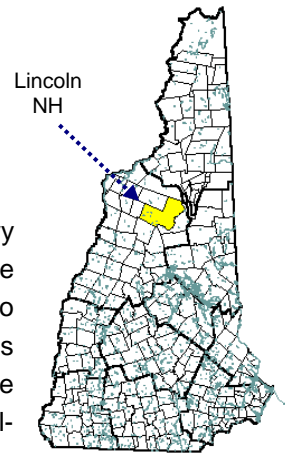
## Chapter II: Community Profile

### A. Introduction

#### The Town of Lincoln<sup>4</sup>



Lincoln is located in Grafton County in the North Country Region. Lincoln is bordered by Franconia and Bethlehem to the north, Easton to the west, Livermore (unincorporated place) to the west and Woodstock and Thornton to the south. Lincoln is situated on the I-93 corridor and most of the town is in the White Mountain National Forest. There are approximately 1,300 full-time residents with a large transient population (about 20,000).



In 1764, Benning Wentworth, the Royal Governor of the Province of New Hampshire, granted 24,000 acres of land to a group of Connecticut residents. However, it was not until 1901 that the final and present boundaries were established making Lincoln the second largest town, in area, in New Hampshire. The population remained very small for most of the 19<sup>th</sup> century, due to poor rocky soil that made farming very difficult. However, there were several small logging and lumber operations at various times. It was not until 1892 when the J.E. Henry & Son Company moved their operations and employees to town, that Lincoln had an industrial base large enough to support a year-round population. J.E. Henry built the East Branch Railroad, the saw mill and the paper mill.

Like many other North Country towns during the Gilded Age, Lincoln became a resort community with numerous hotels and boarding houses. These places mostly catered to summer vacationers, hunters, and fishermen. As the preferred mode of transportation changed from the train to the automobile and, with improved highway access, motels and restaurants eventually replaced the large old hotels. The tourist industry continued to be limited to the summer and fall foliage seasons until 1966 when the Loon Mountain Ski and Recreation Area began operation; this signaled the beginning of an influx of a large number of winter vacationers to Lincoln and surrounding areas. With the arrival of winter activities in town, the development of vacation homes, condominiums, retail shops and many restaurants followed.



*Loon Mountain Ski Area looking across bridge over the East Branch of the Pemigewasset River*

A three-member Select Board governs Lincoln. The Town maintains a full-time Town Manager, Police Department and Public Works Department along with water, sewer, health and recreation departments. The Fire Department, both the Chief and Firefighter positions consists of volunteers. Lincoln is serviced by a private paid on-call ambulance service.

**Population Trends:** Lincoln was one of five communities with a decrease in population over the last five decades. Population change for Lincoln totaled 144, from 1,415 in 1950 down to 1,271 in 2000. The largest decennial

<sup>4</sup> Community Profile Sections A-C derived primarily from 2004 Hazard Plan and 2007 Wildfire Plan with reference to the 2003 Lincoln Master Plan



percent change was a 13 percent decrease between 1950 and 1960. The 2007 Census estimate for Lincoln was 1,331 residents, which ranked 168th among New Hampshire's incorporated cities and towns.

**Population Density, 2007:** There are 10.1 persons per square mile of land area. Lincoln contains 130.8 square miles of land area and 0.2 square miles of inland water area.”<sup>5</sup>

## B. Past Development Trends

The strong economic climate of the 1980's allowed for a period of rapid growth. The construction of more than 1,000 condominium units and vacation homes as well as the development of several shopping centers, created a boomtown atmosphere which still exists.



Loon Mountain Ski Area looking across the East Branch of the Pemigewasset River

While logging operations shaped Lincoln's land use patterns throughout its early history, in the past two decades development has occurred at an accelerated pace. This development has been driven by the major interstate highway, the National and State Forests and Loon Mountain Ski Area. The existing land use patterns in Lincoln consist of an elongated L-shaped developed area surrounded by the National and State Forests.

The Loon Mountain Recreation Area represents about 7.2% of the total land area in Lincoln, not including the area within the White Mountain National Forest. Its opening in the 1960s has greatly influenced the development patterns of the town, especially in the last two decades when the construction of many condominiums has occurred.

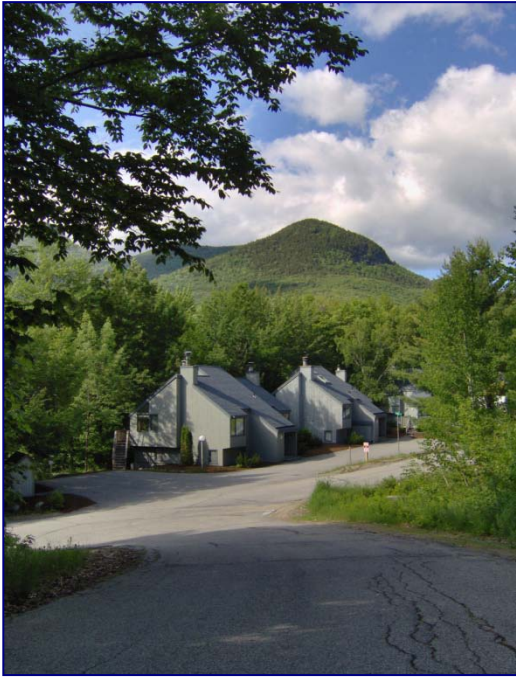
### Housing Statistics 2007

Total Housing Units.....	2,582
Single-Family Units .....	617
Residential Permits.....	22
Multi-Family Units.....	1,875
Residential Permits.....	18
Manufactured Housing Units .....	90

Source: Economic & Labor Market Information Bureau, NH Employment Security, 2008. Community Response Received 08/15/08

<sup>5</sup> Economic & Labor Market Information Bureau, NH Employment Security, 2008. Community Response Received 08/15/08

## C. Current & Future Development Trends



*Mountainside Condo Development*

Residential land uses have been developed throughout the town and are not confined to one specific area. An estimated total of 754 acres of land are developed for residential uses and development accounts for 6.1% or 353 acres of the total non-conservation land area of the town. The majority of Lincoln's new residential or condominium developments are single-family homes and condominiums on 1/3 to 1 acre or larger lots.

Commercial development accounted for 15.1% of the total assessed valuation in 2007. The vast majority of businesses are located along Route 112, from I-93 to the end of Pollard Road. This concentration of commercial development within the Village Center gives residents and tourists easy access to businesses.

The large acreage of the White Mountain National Forest has a profound impact on development patterns, yet Lincoln has little control over the future use of this land. Therefore it is likely that future growth in Lincoln will follow the established patterns of development.

Future residential development is expected to increase in areas where residential uses are predominant. The South Mountain Loon Project approved in 2002 will consist of new ski slopes and approximately 1,500 new housing units.

Future commercial uses are expected to intensify within the Village Center and along Route 3 where hotels, restaurants, tourist attractions, shops, etc. are already established. A small industrial area has been identified by the Planning Board for potential future development of small businesses. Diversification of Lincoln's economic base would be beneficial for the town, which currently relies mostly on tourism-based revenues.

An increase in the number of non-tourism related businesses would benefit the town by ensuring employment and revenues in slow tourism times.



*FCI Burndy Corporation*

## D. Statistics of Interest to Multi-Hazard & Wildfire Planning

Population <sup>6</sup>	2007	2000	1990	1980
Town Lincoln	1,331	1,271	1,230	1,313
Grafton County	85,514	81,826	74,998	65,806

### Regional Coordination

County	Grafton
Regional Planning Commission	North Country Council
Watershed Planning Region	Pemigewasset River Watershed
Tourism Region	White Mountains

### Municipal Services

Type of Government	Town Manager
School Board	Yes - Elected
Appointed Boards	Planning Board; Zoning
Elected Boards	Select Board; Library; Cemetery; Trust Funds; Budget
Master Plan	Yes (2003)
Zoning Ordinances	Yes (2008)
Capital Improvement Plan	Yes (2009)

### Percent of Local Assessed Valuation by Property Type<sup>7</sup>

Residential Buildings	83.7%
Commercial Land & Buildings	15.1%
Other (including Utilities)	1.2%

### Emergency Services & Issues

Police Department	Full-time
Fire Department	Volunteer
Town Fire Insurance Rating	6/9
Emergency Medical Services	Private, paid on-call
Established EMD	Yes

### Utilities

Electric Supplier	NH Electric Co-op
Water Supply	Municipal
Telephone Company	Fairpoint
Nearest Hospitals	Speare Memorial Hospital, Plymouth 23 miles, 25 beds Littleton Regional Hospital, Littleton 24 miles, 25 beds

### Transportation

Evacuation Routes	US Route 3; State Route 112; Interstate 93
Nearest Interstate	I-93, Exits 32, 33 or 34A
Railroad	State owned line
Public Transportation	No
Nearest Airport	Franconia Airport; 2,305'; turf runway; no lights or navigational aids
Nearest Commercial Airport	Manchester-Boston Regional Airport; Manchester, NH 81 Miles; 1 ½ to 2 hour drive



<sup>6</sup> US Census Bureau, taken from <http://www.nh.gov/nhes/elmi/htmlprofiles/lincoln.html>

<sup>7</sup> NH Department of Revenue Administration, taken from <http://www.nh.gov/nhes/elmi/htmlprofiles/lincoln.html>

### **Fire Information**

Fire Stations	One
Fire Warden	Yes
Nearest Fire Tower	None in proximity to Lincoln

### **Fire Statistics**

Lincoln Wildfire Calls 2008	7 Total: 4 Trees on Wires: 3 Forest Fires <sup>8</sup>
Grafton County Fire Statistics 2008	52 Fires
Number of Acres burned	12 Acres
State Forest Fires FY 2008	455 Fires
Number of Acres burned	175 Acres

All information in Section D of this Chapter, unless otherwise noted, was obtained from NH Employment Security and can be found at the ELMB website: <http://www.nh.gov/nhes/elmi/htmlprofiles/lincoln.html> and is based on the Economic & Labor Market Information Bureau, NH Employment Security, 2008. Community Response Received 08/15/08.



*Lincoln Fire Station*

<sup>8</sup> Town of Lincoln Annual Report, 2008



## Chapter III: Hazard Identification

### A. Description of the Hazards

The first step in hazard mitigation is to identify hazards; the Team determined that:

- **Four** hazards that are **most** likely to affect Lincoln are: *Severe Winter Storms, High Winds (windstorm), Wildfire and Hazardous Material-Transport*
- **Nine** hazards that **may** affect Lincoln are: *Severe Thunderstorms & Lightning, Tornado & Downburst, Hurricane, Snow Avalanche, Erosion, Mudslide & Landslide, Epidemic/Pandemic, Earthquake, Extreme Temperatures and Terrorism.*
- **Six** hazards that are **less likely** to affect Lincoln are: *Flood, Extended Power Failure, Drought, Levee (LPP Structure), Dam Failure and Hailstorm.*

Table 3.1 provides estimates of the level of impact each listed hazard could have on humans, property and business and averages them to establish an index of “severity”. The estimate of “probability” for each hazard is multiplied by its severity to establish an overall “relative threat” factor. This matrix also shows the frequency of future occurrence (based on a 25-year window).

Based on this matrix, the most significant disaster threat to Lincoln is Severe Winter Storms. The second most likely disaster is High Winds followed by Wildfire and Hazardous Material Transport.

Appendix B includes more in-depth definitions of these hazards that have occurred or could occur in New Hampshire and/or Lincoln.



View from Flume Gorge Parking Lot





**Table 3.1: Multi-Hazard Threat Analysis**

Hazards that are <b>most</b> likely to affect Lincoln (4)							
Hazards that <b>may</b> affect Lincoln (9)							
Hazards that are <b>less likely to</b> affect Lincoln (6)							
Column	A	B	C	D	E	F	G
Scoring	Probability of death or injury	Physical losses and damages	Interruption of service	Likelihood of this occurring within 25 years	Average of Human, Property & Business Impact	Relative Threat	MH Multi-Hazard 6,8,12,13,14,15,16,17,19,20,23
1 = Low					Columns A + B + D/3	Columns D x E	
2 = Moderate							
3 = High							
Hazard	Human Impact	Property Impact	Business Impact	Probability	Severity	Risk Severity x Probability	Mitigation Strategy Number (p. 55-58)
Severe Winter Storm	3	3	3	3	3.00	9.00	MH
High Winds (windstorm)	3	3	3	3	3.00	9.00	MH
Wildfire	3	2	2	3	2.33	7.00	1-5, 7, 9-11, 21,22,24 & MH
Hazardous Material Transport	3	2	1	3	2.00	6.00	MH
Severe Thunderstorms & Lightning	1	2	1	3	1.33	4.00	MH
Tornado & Downburst	2	2	2	2	2.00	4.00	MH
Hurricane	2	2	2	2	2.00	4.00	MH
Snow Avalanche	1	1	1	3	1.00	3.00	MH
Erosion, Landslide & Mudslide	1	1	1	3	1.00	3.00	18 & MH
Epidemic/Pandemic	3	1	3	1	2.33	2.33	MH
Earthquake	2	2	2	1	2.00	2.00	MH
Extreme Temperatures	2	1	3	1	2.00	2.00	MH
Terrorism	2	1	3	1	2.00	2.00	MH
Flood	2	2	1	1	1.67	1.67	MH
Extended Power Failure	1	1	3	1	1.67	1.67	MH
Drought	1	1	2	1	1.33	1.33	MH
Levee (LPP Structure)	1	2	1	1	1.33	1.33	18 & MH
Dam Failure	1	1	1	1	1.00	1.00	MH
Hailstorm	1	1	1	1	1.00	1.00	MH

## B. Risk Assessment

The next step in hazard mitigation planning was to identify the location of past hazard events and, if possible, what facilities or areas were impacted. The team used Table 3.1, Multi-Hazard Threat Analysis, to identify potential threats and prioritize their threat potential. The team then used a base map that included the 100-year floodplain, political boundaries, water bodies, the road network and aerial photos to locate all of the past hazard events on the base map. This step in the Planning process serves as a stepping stone for predicting where future hazards could potentially occur. The Team identified past events in Lincoln and Grafton County and listed them in Table 3.2, Historic Hazard Identification.

To assess the fire base risk, a formula based on the following criteria was used:

- **Ignitability** – Using the 2001 NH Land Cover Assessment GIS Layer - A value between 0 and 9 was assigned based on ignitability to 23 land cover categories from open water to pitch pine forest.
- **Slope** - A value of 1-10 was assigned to various gradients of slope.
- **Aspect** - A value of 0-8 was assigned to various aspects from flat to southwest facing slopes.

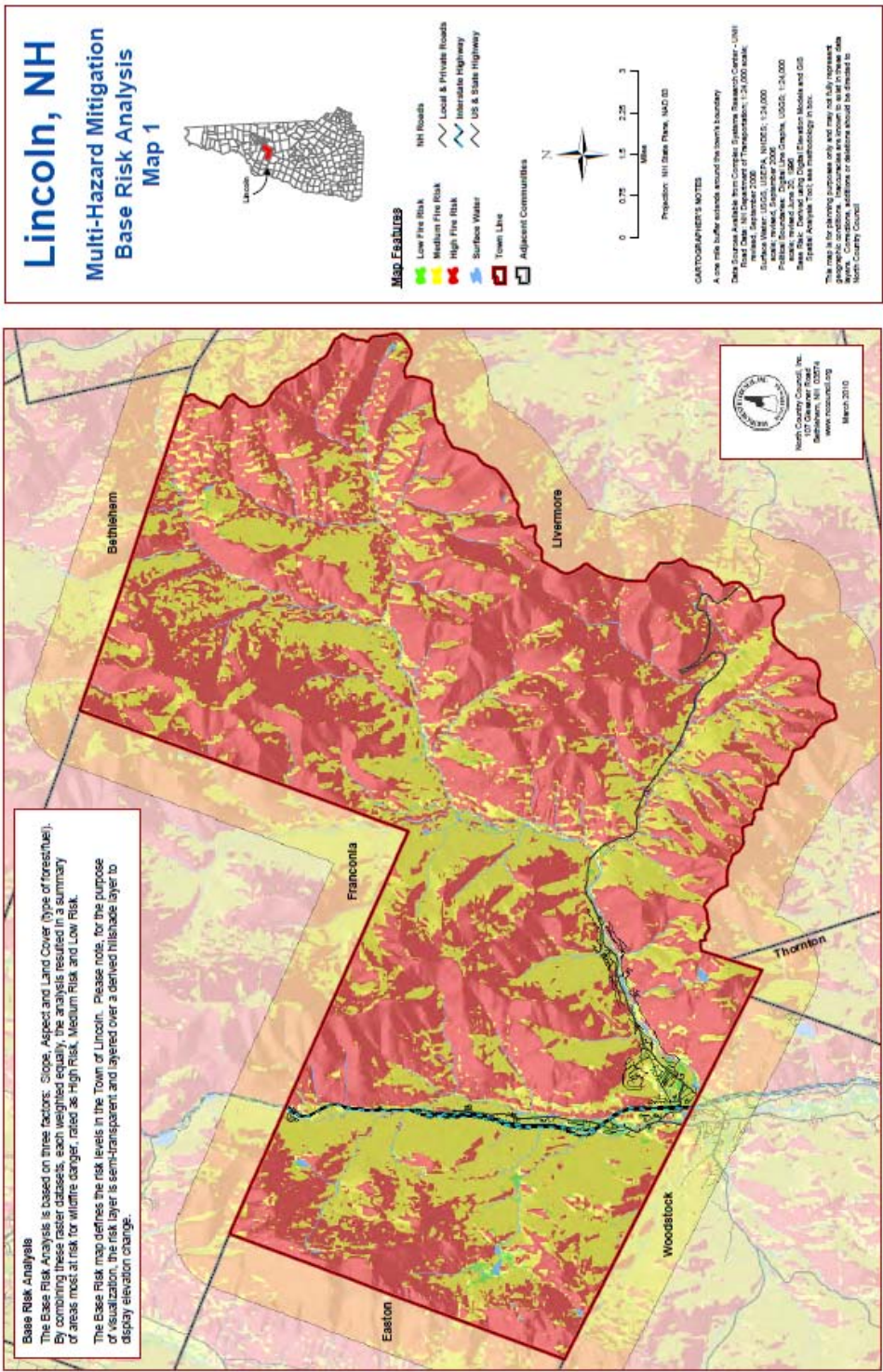
These criteria were combined using GIS analysis and weighted equally to determine risk levels throughout the Town. Once the analysis and mapping was complete in GIS, a matrix was created showing varying risk levels: low, medium, and high. Each risk level was assigned a color and was mapped over the Town of Lincoln (see Map 1 on the following page). It was noted that the town is dominated by National & State Forest lands with approximately 95% of the Town's 131 square miles held by these government entities.



*Hikethewhites.com*

Map 1 - Base Risk Analysis

(11" x 17" maps included in appendix of hard copy plans)



### C. Lincoln National Flood Insurance Program (NFIP) Status

Lincoln has been a member of the National Flood Insurance Program since March 1, 1995 and is a member of Twin State Mutual Aid. Lincoln actively monitors NFIP and related compliance issues and participates in offered trainings by the State of NH or FEMA that address flood hazard planning. The Town reports no identified repetitive loss structures.

In the *“Town of Lincoln, New Hampshire, Land Use Plan Ordinance, Section D – Floodplain Development District”*, the ordinance known as the Town of Lincoln Floodplain Management Ordinance, is the guiding document by which the town complies and enforces NFIP standards. The Planning Board, as the initiator, and the Select Board, as the enforcer, adhere to the rules, regulations and requirements set for in the ordinance. This ordinance meets the minimum requirements of Section 60.3(b) of the National Flood Insurance Program regulations. The ordinance states that it *“shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its Flood Hazard Boundary Maps dated April 20, 2000, which are declared to be a part of this ordinance and are hereby incorporated by reference, and any subsequent revisions thereto.”*

Repetitive Loss means flood-related damage sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred.

<http://www.nh.gov/oep/programs/floodplainmanagement/floodinsurance.htm>

Among other items, this ordinance states that *“All proposed development in any special flood hazard areas shall require a permit”* and that *“The building inspector shall review all building permit applications for new construction or substantial improvement to determine whether proposed building sites will be reasonably safe from flooding.”*<sup>9</sup>

Item V – Certification states:

For all new or substantially improved structures...the applicant shall furnish the following information to the building inspector:

- a. *“The as-built elevation (in relation to NGVD) of the lowest floor (including basement) and include whether or not such structures contain a basement.*
- b. *If the structure has been flood proofed, the as-built elevation (in relation to NGVD) to which the structure was flood proofed.*
- c. *Any certification of flood proofing.”*<sup>10</sup>

Furthermore, in Item VII-Special Flood Hazard Areas, the ordinance goes on to say (among other things) that:

- a. *“All new construction or substantial improvements of residential structures have the lowest floor (including basement) elevated to or above the 100-year flood elevation.*
- b. *That all new construction or substantial improvement of non-residential structures have the lowest floor (including basement) elevated to or above the 100-year flood level; or together with attendant utility and sanitary facilities, shall:*

<sup>9</sup> The Town of Lincoln, New Hampshire, Land Use Plan Ordinance; Article VI; revised March 11, 2008 and available online at [www.lincolnnh.org](http://www.lincolnnh.org)

<sup>10</sup> Ibid; Article VI, Section D, Item V - Certification



- i. *be flood proofed so that below the 100-year flood elevation the structure is watertight with walls substantially impermeable to the passage of water*
- ii. *have structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy; and*
- iii. *be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions in this section.*<sup>11</sup>

In 1968, although well-intentioned government flood initiatives were already in place, Congress established the National Flood Insurance Program (NFIP) to address both the need for flood insurance and the need to lessen the devastating consequences of flooding. The goals of the program are twofold: to protect communities from potential flood damage through floodplain management, and to provide people with flood insurance.

For decades, the NFIP has been offering flood insurance to homeowners, renters and business owners, with the one condition that their communities adopt and enforce measures to help reduce the consequences of flooding.

Source:

[http://www.floodsmart.gov/floodsmart/pages/about/nfip\\_overview.jsp](http://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp)

Based on the requirements of Lincoln's Floodplain Management Ordinance, the Zoning Board of Adjustment shall rule on variances and appeals and issue written notice stating that a variance "...will result in increased premium rates for flood insurance...and that building below the base flood level "increases the risks to life and property".<sup>12</sup>

The Town has determined the need to obtain NFIP pamphlets and booklets and will actively present these to citizens of the community, whether they are proposing to build in the floodplain or not. The Team understands that individual homeowners can purchase flood insurance whether or not they are in the floodplain and will actively seek to bring this knowledge to the public.

## D. Profile of Past, Present & Potential Wildfire Events in Lincoln

NH DRED: Historically, large NH wildland fires run in roughly 50 year cycles. The increased incidence of large wildland fire activity in the late 1940s and early 1950s is thought to be associated, in part, with debris from the Hurricane of 1938. Significant woody "fuel" was deposited in the forests during that event. The Ice Storm of 1998 has left a significant amount of woody debris in the forests of the region that may fuel future wildfires, but is becoming less of a concern.

A significant amount of time was spent trying to identify historic wildfires in Lincoln. The US Forest Service provided information on documented wildfires; the local fire department and team provided the balance of the information. The predominant causes of wildfire events in Lincoln over the past ten years have been campfires and out-of-control burning brush; most of these fires have been Class A (less than .25 Acres), although one significant Class C (13 acre) fire did occur in May 1999.

Historic fires can serve to help residents determine where future fires may occur, understand how the landscape and land use may have changed over time, and assist with determining priorities for future mitigation strategies. Based on the information available, we constructed a complete list of past fires in Lincoln.

<sup>11</sup> Ibid; Article VI, Section D, Item VII – Special Flood Hazard Areas

<sup>12</sup> Ibid; Article IV, Item IX-Variations and Appeals



## E. Probability of Future Potential Disasters

Due to the location of rivers, heavy snow pack, geographic location, and topography, there is a strong possibility of future disasters in Lincoln. Winter storm related events and high wind are the highest on this list; however, hazardous material accidents may also pose a significant threat (see Table 3.1, Multi-Hazard Threat Analysis).

Based on the past wildfire history, there is a high probability that there will be future wildfires in Lincoln. The potential for a large wildfire is evidenced by a 13-acre Class C fire caused by an out of control campfire. Wildfires could occur anywhere in Lincoln because there is no concentrated location pattern and because approximately 93% of the land area is designated as National or State Forest land. Lincoln's situation is further complicated because of a large number of campers and hikers that frequent the White Mountain National Forest.

Table 3.1 and Table 3.2 provide more information on past and potential hazards in Lincoln.

### Table 3.2: Historic Hazard Identification

**Note:** Numbers in parentheses in Table 3.2 represent historic hazards in Lincoln which are reflected on the maps in Map 2 and Map 3.

Blue = Past Events

Green = Past & Potential Events

Type of Event	Date	Location	Impact	Source
<b>Past or Potential Flooding Hazards:</b> Riverine flooding is the most common disaster event in the State of New Hampshire (aside from frequent inconveniences from rather predictable moderate winter storms). Significant riverine flooding impacts upon some areas in the State in less than ten year intervals. The entire State of New Hampshire has a high flood risk.				
Flooding Prior to 1970	1927, 1936, 1938, 1943 (2), 1953, 1955, 1959	State & Town wide	Spring and fall flooding events resulting from severe storms and/or heavy snowmelt	*
Flooding 1970-1979	1972, 1973 (2), 1974, 1976	State & Town wide	Spring and fall flooding events resulting from severe storms and/or heavy snowmelt	*
Flooding 1980-1989	1986, 1987 (2)	State & Town wide	Spring and fall flooding events resulting from severe storms and/or heavy snowmelt	*
Flooding 1990-1999	1990, 1995, 1996 (2), 1998	State & Town wide	Spring and fall flooding events resulting from severe storms and/or heavy snowmelt	*
Flooding 2000-2009	2003, 2005, 2006, 2007, 2008 (2)	State & Town wide	Spring and fall flooding events resulting from severe storms and/or heavy snowmelt	*

Type of Event	Date	Location	Impact	Source
<b>Past or Potential Wildfire Hazards:</b> New Hampshire is heavily forested and is therefore vulnerable to wildfire, particularly during periods of drought. The proximity of many populated areas to the state's forested lands exposes these areas and their populations to the potential impact of Wildfire.				
Wildfire	03-21-06	(01) First ledge at Forest Ridge Development	Campfire (kids)-Class A; Local	Local
Wildfire	03-31-06	(02) Pollard Road	Brush fire (out of control)-Class A; Local	Local
Wildfire	04-15-03	(03) 20 Beechnut Drive	Burning leaves-Class A; Local	Local
Wildfire	04-21-04	(04) Behind Misty Hill Welding/East Spur Rd	Unpermitted burn-Class A; Local	Local
Wildfire	04-26-06	(05) Hancock Campground	Campfire-Class A; Local	Local
Wildfire	04-26-08	(06) Mile Marker 103	Brush fire-Class A; Local	Local
Wildfire	04-29-03	(07) Behind Linwood School/Lincoln Green	Downed power lines-Class A; Local	Local
Wildfire	04-29-07	(08) Maple Street	Campfire-Class A; Local	Local
Wildfire	05-01-99	(09) Otter Rocks	Campfire (Code 4)-Class A; USFS	Local
Wildfire	05-04-08	(10) 247 Route 3	Brush fire-Class A; Local	Local
Wildfire	05-07-05	(11) Bog Brook Road (end)	Burning brush-Class A; Local	Local
Wildfire	05-18-08	(12) Forest Ridge Health Club	Brush fire-Class A; Local	Local
Wildfire	05-19-08	(13) First Ledge	Brush fire-Class B; Local	Local
Wildfire	05-19-89	(14) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	05-23-03	(15) Franconia Notch Motel	Dumping charcoal briquettes-Class A; Local	Local
Wildfire	05-25-05	(16) 1 Mile South of Exit 34A	Smoking material-Class A; Local	Local
Wildfire	05-28-89	(17) Unknown	Miscellaneous (Code 9)-Class B; USFS	USFS
Wildfire	05-28-89	(18) Unknown	Miscellaneous (Code 9)-Class A; USFS	USFS
Wildfire	06-27-03	(19) Behind Lincoln Paper Mill	Children with matches-Class A; Local	Local
Wildfire	06-28-02	(20) Behind Millfront Market Place	Campfire-Class A; Local	Local

Type of Event	Date	Location	Impact	Source
Wildfire	06-30-02	(21) Mile Marker 102/I-93 end of Liberty Rd	Burning brush-Class A; Local	Local
Wildfire	07-01-02	(22) Larue's Trailer Park	Burning brush-Class A; Local	Local
Wildfire	07-08-95	(23) Coolidge Mt	Lightning (Code 1)-Class A; USFS	USFS
Wildfire	07-08-95	(24) Desolation Shelter	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	07-09-95	(25) Unknown	Lightning (Code 1)-Class A; USFS	USFS
Wildfire	07-16-06	(26) Southbound 104.4 and 104.6 on I-93	Fireworks-Class A; Local	Local
Wildfire	07-26-01	(27) Wilderness Trail	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	07-28-01	(28) Greeley Pond	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	08-06-01	(29) Franconia Brook	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	08-08-01	(30) Lincoln Woods Trailhead/Franconia Brook/Kancamagus Highway	Campfire-Class A; Local	USFS
Wildfire	08-08-70	(31) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	08-23-80	(32) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	08-24-02	(33) Lincoln Woods	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	08-24-80	(34) FR 87	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	08-25-04	(35) Behind Indian Head Cabins	Campfire-Class A; Local	Local
Wildfire	08-28-02	(36) Southbound I-93 by Bridge 118	Campfire-Class A; Local	Local
Wildfire	08-30-01	(37) North Fork	Campfire (Code 4)-Class B; USFS	USFS
Wildfire	09-04-05	(38) Residence on Pollard Road	Brush fire (out of control)-Class A; Local	Local
Wildfire	09-08-00	(39) Franconia Falls	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-08-00	(40) Osseo Trail	Campfire (Code 4)-Class C; USFS	USFS
Wildfire	09-08-84	(41) Black Pond	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-09-84	(42) Unknown	Campfire (Code 4)-Class A; USFS	USFS

Type of Event	Date	Location	Impact	Source
Wildfire	09-10-01	(43) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-10-95	(44) Pitcher Falls	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-11-95	(45) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-14-01	(46) Indian Head	Equipment Use (Code 2)-Class B; USFS	USFS
Wildfire	09-15-84	(47) One Mile Brook	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-15-84	(48) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-2000	(49) Long: 044063523/Lat: 071320728	Campfire-Class A; Local	USFS
Wildfire	09-25-84	(50) Pine Brook	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	09-25-84	(51) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	10-10-84	(52) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	10-20-84	(53) Unknown	Campfire (Code 4)-Class A; USFS	USFS
Wildfire	10-20-84	(54) Indian Head Resort at Pollard Brook	Burning construction material-Class A; Local	Local
Wildfire	11-25-05	(55) 5 Miles East of Loon Mt. on Kancamagus	Lightning-Class A; Local	Local
Wildfire	11-25-05	(56) Hancock Campground	Unknown-Class A; Local	Local
Wildfire	1955	(57) Logging railroad east of Black Book	Campfire-Class Unknown; Local	Local
Wildfire	1995	(58) Loon Ski Area	Human Cause-Class A; Local	Local

**Past or Potential Tornado, Downburst, Earthquake & Hurricane Hazards:** Tornadoes are spawned by thunderstorms and, occasionally by hurricanes, and may occur singularly or in multiples. A downburst is a severe localized wind blasting down from a thunderstorm. Downburst activity is very prevalent throughout the State, yet most go unrecognized unless significant damage occurs. Hurricanes develop from tropical depressions which form off the coast of Africa. New Hampshire's exposure to direct and indirect impacts from hurricanes is real, but modest, as compared to other states in New England.

Hurricanes	1938, 1944, 1954 (2), 1985, 1991	State & Town wide	Number 4, Number 7; Carol, Edna, Gloria, Bob	*
Tornadoes	1963, 1970, 1972, 1986 (2)	Carroll County	F1 or F2 on the Fujita Scale	*
Tornadoes	1956, 1966, 1999	Coos County	F1 on the Fujita Scale	*
Tornadoes	1963, 1966, 1969, 1972, 1973	Grafton County	F1 or F2 on the Fujita Scale	*

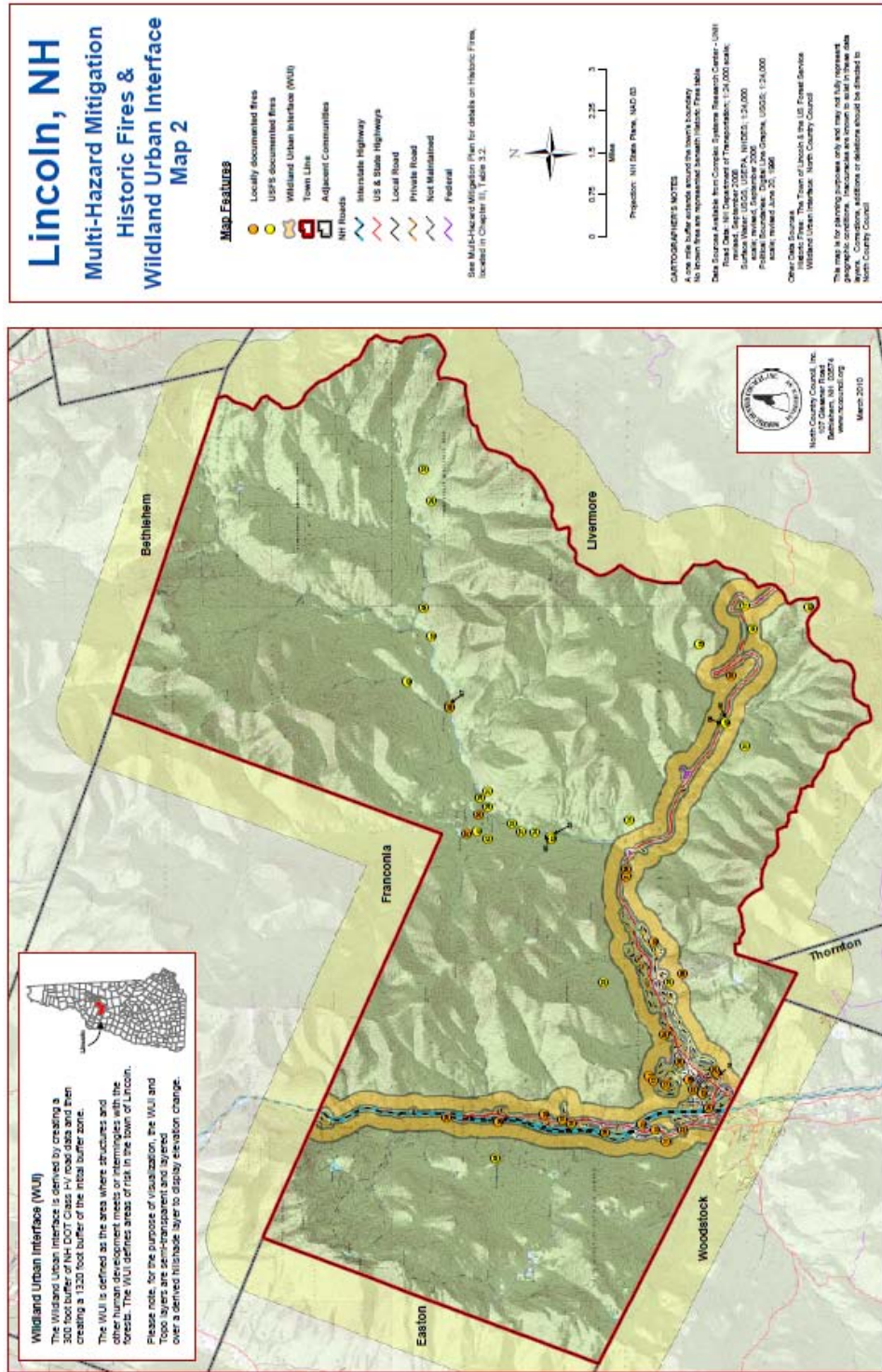
Type of Event	Date	Location	Impact	Source
Earthquakes	Dec-40	Ossipee, NH	Two earthquakes both measuring 5.5 on the Richter Scale; minor structural damage including chimney collapses	*
Downbursts	1999	Merrimack, Grafton, Coos & Hillsborough Counties	Microbursts; roofs blown off structures, downed trees, widespread power outages, damaged utility poles & wires	*
High Wind	2008	Town wide	Roof and tree damage	Local
<b>Past or Potential Severe Winter Weather Hazards:</b> Severe winter weather in New Hampshire may include heavy snow storms, blizzards, Nor'easters, and ice storms. Generally speaking, New Hampshire will experience at least one of these hazards during any winter season. Most New Hampshire communities are well prepared for such hazards.				
Ice Storms	1979; 1998; 2008	State & Town wide	Ice Storms: major disruptions to power; transportation; public and private utilities	*
Severe Winter Storms	1929, 1958, 1960, 1961, 1969, 1978, 1982, 1993, 2001, 2003, 2004, 2005 (3), 2009	State & Town wide	Events marked by snowfalls exceeding 2' in parts of the State; disruptions to power and transportation	*
<b>Past or Potential Drought Hazards:</b> Droughts are generally not as damaging or disruptive as floods, but are more difficult to define. A drought is a natural hazard that evolves over months or even years and can last as long as several years to as short as a few months.				
Drought	1929-1936	State & Town wide	Regional	*
Drought	1939-1944	State & Town wide	Most severe in southeast	*
Drought	1947-1950	State & Town wide	Moderate	*
Drought	1960-1969	State & Town wide	Regionally, longest recorded continuous spell of less than normal precipitation	*
Drought	2001-2002	State & Town wide	Third worst drought on record	*

\*Historic hazard events indicated with an "\*" were derived from the following sources:

- Website for NH Disasters: <http://www3.gendisasters.com/mainlist/newhampshire/Tornadoes>
- FEMA Disaster Information: <https://www.fema.com/femaNews/disasterSearch.do>
- New Changing Climate, Weather and Air Quality; <http://www.neci.sr.unh.edu/neccwaq.html>
- The Tornado Project: <http://www.tornadopproject.com/alltorns/nhtorn.htm>
- The Tornado History Project; <http://www.tornadohistoryproject.com/>
- The Disaster Center (NH); <http://www.disastercenter.com/newhamp/tornado.html>

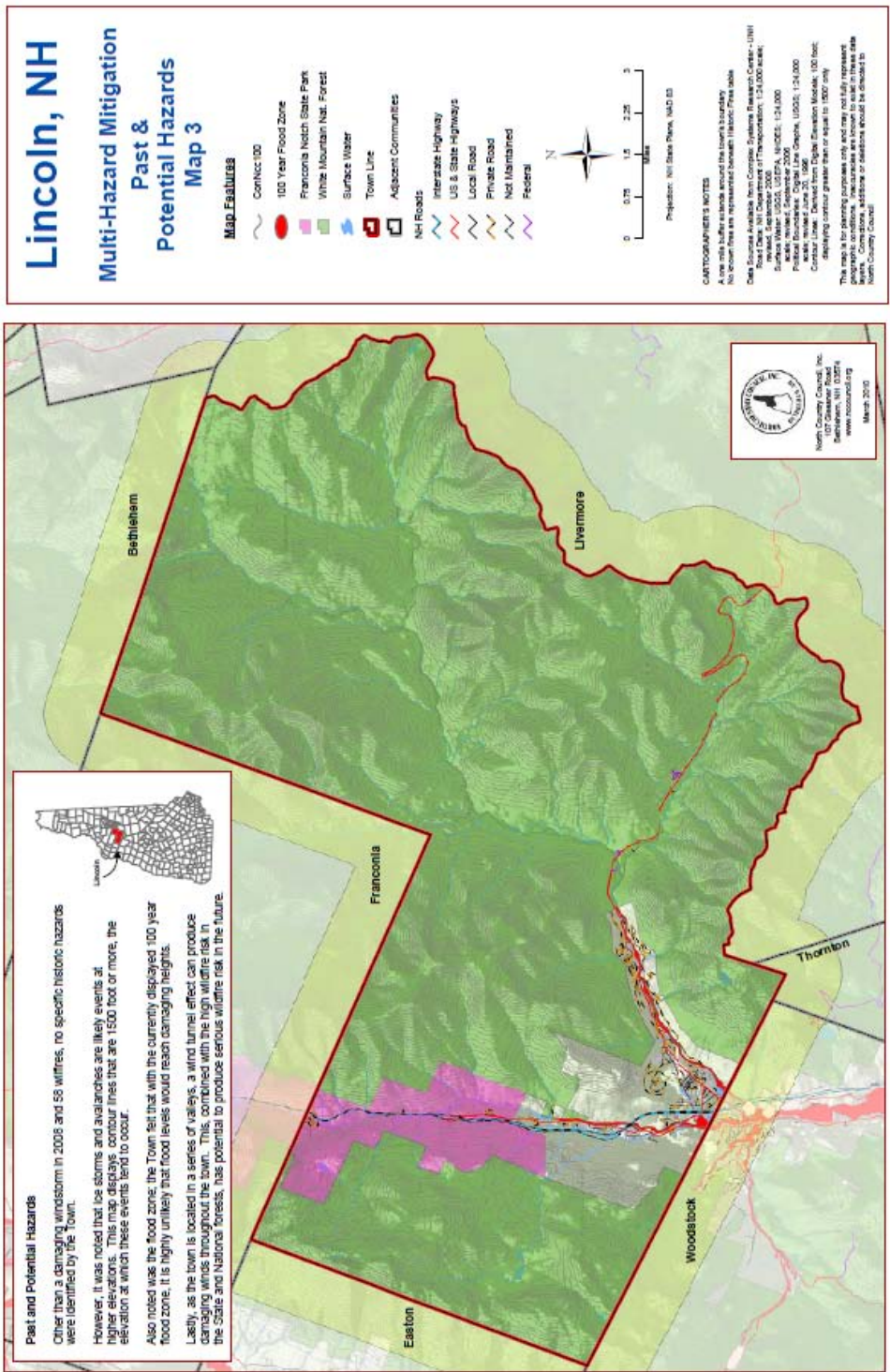


***(11" x 17" maps included in appendix of hard copy plans)***



Map 3 - Past & Potential Areas of Concern

(11" x 17" maps included in appendix of hard copy plans)



## Chapter IV: Critical Infrastructure/Key Resources (CI/KR)

With Team discussion and brainstorming, Critical Infrastructure and Key Resources (CI/KR) within Lincoln were identified and mapped for the multi-hazard plan. The "ID" number in the following lists is also represented in the CI/KR map located in Map 4. (Note: FPPs mapped as ERFs; use the ERF ID numbers)

**Table: 4.1: Emergency Response Facilities (ERF)**

ERF'S are primary facilities and resources that may be needed during an emergency response.

EMERGENCY RESPONSE FACILITIES (ERF)		
ID	Facility	Hazard Type
1	Town Hall/Police/EOC/Dispatch	Town Hall & Police
2	Town Garage	Town Garage
3	Beacon Resort (Primary Shelter)	Shelter & Food
4	Lincoln Woods Parking Lot (Helicopter LZ)	Helicopter Landing Zone
5	Linwood High Soccer Field (Helicopter LZ)	Helicopter Landing Zone
6	Lincoln Fire Station	Fire Station
7	Loon Mt. Parking Lot (Helicopter LZ)	Helicopter Landing Zone
8	Lincoln Medical Center	Medical Facility
9	Comfort Inn	Shelter
10	Loon Mountain Bridge	Evacuation Bridge
11	Whitehouse Bridge (N. of Flume by Exit 34A)	Evacuation Bridge
12	Cold Spring Bridge over Bog Brook	Evacuation Bridge
13	Connector Road Bridge over Pemi River by Clark's	Evacuation Bridge
14	Cooper Memorial Bridge	Evacuation Bridge
15	Four Bridge (before Lincoln Woods)	Evacuation Bridge
16	I-93 Bridge over Pemi (just south of Exit 33)	Evacuation Bridge

**Table: 4.2: Non-Emergency Response Facilities (NERF)**

NERF'S are facilities that, although they are critical, are not necessary for the immediate emergency response efforts. This would include facilities to protect public health and safety and to provide backup emergency facilities.

NON-EMERGENCY RESPONSE FACILITIES (NERF)		
ID	Facility	Type of Facility
17	Lincoln/Woodstock Transfer Facility	Solid Waste Facility
18	Linwood School (Shelter/Alternate EOC)	Shelter
19	Cold Spring Well (Route 3)	Well
20	Boyce Brook Pump Station	Pumping Station
21	Forest Ridge Water Tank	Water Tank
22	Father Roger Bilodeau CC (Shelter/Kitchen)	Shelter & Kitchen
23	St. Joseph Parish (Church/Shelter)	Shelter



NON-EMERGENCY RESPONSE FACILITIES (NERF)		
24	Village of Loon Water Tank	Water Tank
25	Water Treatment Plant (below Loon Brook Pond)	Water Treatment
26	Sewerage Pump Sta.Rt3	Sewerage Pump
27	Waste Water Treatment Plant	Water Treatment
28	NH Co-Op Substation	Substation
29	Indian Head Water Tank	Water Tank
30	Infiltration Gallery	Infiltration Gallery

**Table: 4.3: Facilities & People to Protect (FPP)**

FPPs are facilities that need to be protected because of their importance to the town and to residents who may need help during a hazardous event.

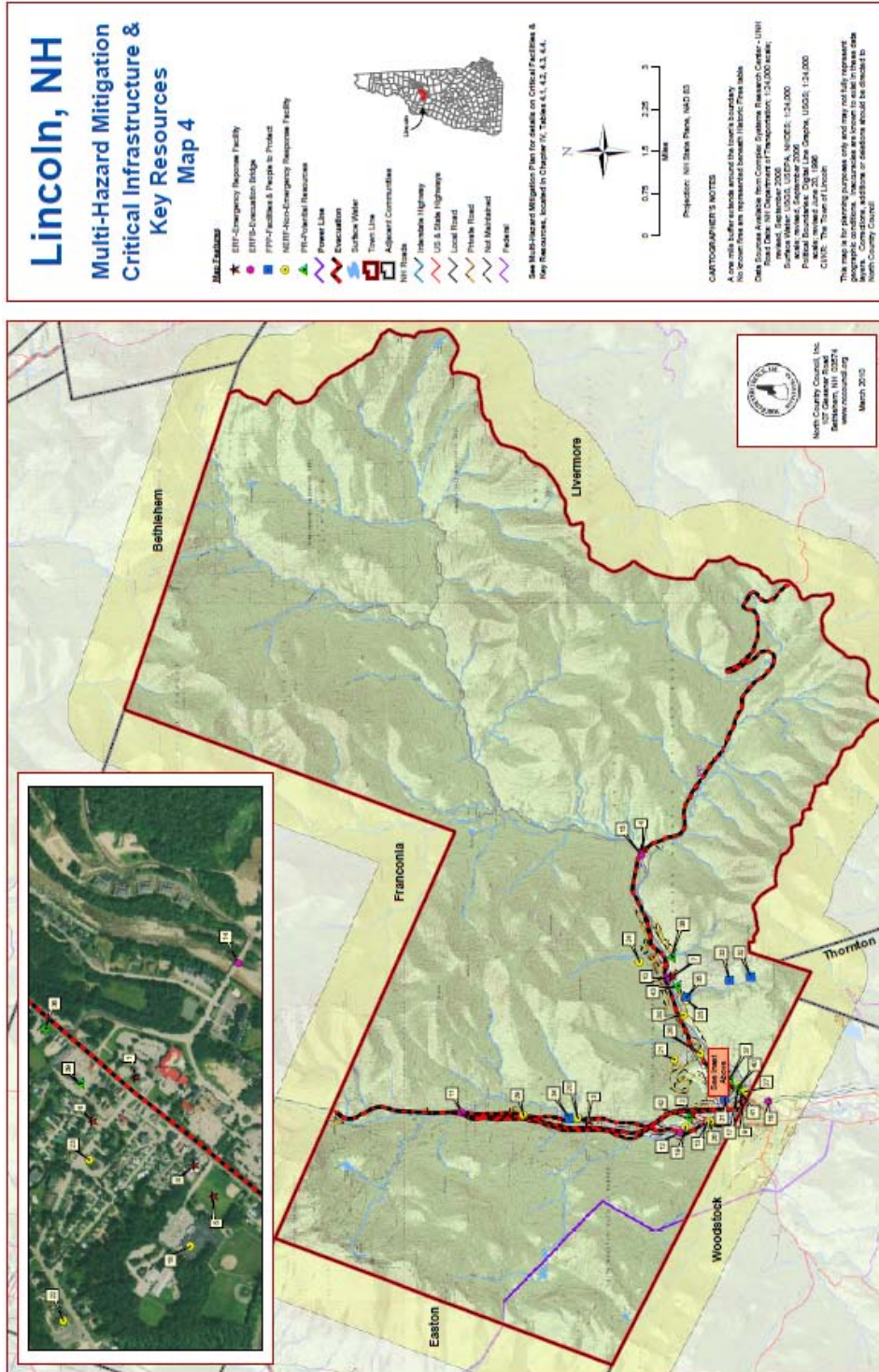
FACILITIES & PEOPLE TO PROTECT (FPP)		
ID	Facility	Type of Facility
31	Lincoln Green Apartments	Persons to Protect
32	Loon Pond	Water Source
33	Little Loon Pond	Water Source
34	Indian Head Pond Dam	Dam
35	Loon Reservoir Dam	Dam

**Table: 4.4: Potential Resources (PR)**

PRs are potential resources that could be helpful for emergency response in the case of a hazardous event.

POTENTIAL RESOURCES (PR)		
ID	Resource	Type of Resource
36	American Legion Post 83	Social Club
37	P & C Groceries	Food
38	Mountain Club at Loon	Shelter
39	Aubuchon Hardware	Hardware Store
40	Rite Aid	Pharmacy
41	Munce's Konvenience Store	Gas & Food
42	DOT Garage	DOT Garage
43	Loon Mt. Maintenance	Equipment

***(11" x 17" maps included in hard copy plans)***





## Chapter V: Multi-Hazard Effects in Lincoln

### ***A. Identifying Vulnerable Structures***

Damages from floods and wildfires are more predictable than damages from other disasters; therefore, it is important to identify the critical facilities and other structures that are most likely to be damaged by these events. To do this, structures falling within the FEMA flood map for the Town are usually reviewed, but since Lincoln has no structures in the 100-year floodplain, this was not done for this Plan.<sup>13</sup>

It was noted that there are 19 structures that fall within the Wildland Urban Interface (WUI) due to long driveways, private roads and the desire to live in uncongested areas (Appendix F). These structures were identified in GIS and discussed with the Team. In Lincoln however, only four Critical Infrastructure and Key Resources fall within the WUI: Cold Spring Well, the Village of Loon Mountain Water Tank, Indian Head Pond Dam and the Infiltration Gallery. Since these Critical Facilities have no applicable structures and each represents a water source, there is no potential monetary loss estimated.

Any new construction in Lincoln is likely to have very little or no risk for flood damage. The location of new construction will be discussed with the Town's Planning Board using the Base Risk Analysis Map (Chapter 3, Map 1) as a guideline. For all other hazards, besides flood and wildfire, the HSEM matrix identified in Table 3.1 is used to evaluate likelihood and potential impact of each hazard on both old and new structures.

### ***B. Calculating the Potential Loss***



Lincoln has been impacted in the past by natural disasters, including flooding, wildfires, river ice jams, severe winter storms and severe wind. It is, however, difficult to ascertain the amount of damage caused by a natural or man-made hazard because the damage will depend on the hazard's extent and severity, making each hazard event somewhat unique.

Generally speaking, it is much easier to determine a specific cost analysis for wildfire and flood because of the defined damage zone and specific structures identified with those zones; flooding and wildfire are discussed in this Plan separate from other hazards.

For the other hazards that are not as clearly defined, we have used the assumption that the impact of these hazards would result in damage to 1-5% of Lincoln's structures. Based on this assumption and the 2008 assessed structure value of **\$695,248,352**, the potential loss from any of these hazards would range from **\$6,952,483 to \$34,762,417**.

Human loss of life was not included in the potential loss estimates, but could be expected to occur, depending on the severity and type of the hazard.

<sup>13</sup> Jennifer Gilbert, CFM, NH Office of Energy & Planning, Jennifer.Gilbert@nh.gov; email dated 8/31/09

## C. Potential Disaster Loss Analysis

### Flooding..... \$0

Flooding is often associated with hurricanes, ice jams, rapid snow melt in the spring and heavy rains. Although Lincoln and the surrounding towns have been impacted in the past by natural disasters such as these (see Table 3.2), the Team's general feeling was that it would take "a 1000 year flood to reach Main Street"<sup>14</sup>. It should be noted that Lincoln is hopeful that new base elevation models will be done in the near future; this could effectively alter the current 100-year flood zone.

In determining percent of damage from flooding, FEMA provides 3 risk levels: high risk assumes incurred damage to total 49% of total structure value, medium risk assumes damage of 28%, and low risk assumes 20%. Based on the Grafton County Flood Plain Map and data received from the NH Office of Energy and Planning, Lincoln has **no** structures in the flood zone and has had no repetitive loss claims<sup>15</sup>. Therefore, the estimated potential loss value of structures in Lincoln is **\$0.00**.

Had structures in the flood zone been identified, based on FEMA's three risk levels, it would have been determined that all structures were within the medium risk category resulting in a total potential damage amount of 28% of the structure value. The **costs for repairing or replacing bridges, railroads, power lines, telephone lines, and contents of structures would not have been** included in this estimate.

### Wildfires<sup>16</sup> ..... \$10,001,434

The WUI definition was determined in collaboration with the NH Division of Forests & Lands and the US Forest Service. It was defined to be approximately a 1/4 mile buffer outside the traditional development pattern of 300 feet off the centerline of a road. All structures within this WUI were assumed to be at some level of risk and, therefore, vulnerable to wildfire.

A complete analysis of wildfires was done by the Town of Lincoln in their 2007 Wildfire Mitigation Plan. Based on that analysis, it was found that 19 structures fell within the WUI, and, based on the risk level that was assigned to each (Map 2, Chapter III) the total potential loss value was estimated to be \$10,001,434. The analysis provided us with the following potential loss estimates. A breakdown of these numbers can be found in Appendix F.

<b>Structures</b>	<b>Assessed Value</b>	<b>% of Damage</b>	<b>Potential Loss</b>
Structures (2) within a high risk area	\$75,930	49%	\$37,205
Structures (17) within a medium risk area	\$35,586,530	28%	\$9,964,228
Structures (0) within a low risk area	\$0	20%	\$0
<b>Totals</b>	<b>\$35,662,460</b>		<b>\$10,001,434</b>

*NOTE: Multi-Hazard plans have traditionally determined wildfire damage at 1—5% of the town's total assessed valuation. The process used to calculate damage in the wildfire plan provides a much more accurate assessment of potential damage than previous calculation methods. This cost analysis is also based on assessed value and not on replacement costs.*

<sup>14</sup> Peter Joseph, Town Manager

<sup>15</sup> Jennifer Gilbert, CFM, NH Office of Energy & Planning, Jennifer.Gilbert@nh.gov; email dated 8/31/09

<sup>16</sup> Lincoln Wildfire Plan, 2007, page 68, Appendix H, Assessed Value of Parcels with the WUI in Lincoln

## Other Identified Hazards

The following cost analysis of potential damage in Lincoln is based on 1%-5% or 0-1% of the total assessed value of building structures within the Town. In Lincoln, the assessed value of all residential and commercial structures in 2008 was **\$695,248,352**. Therefore, assuming **1% to 5%** damage, the resulting potential loss from many of the following could range from **\$6,952,483 to \$34,762,417**. For those hazards that are more localized by nature, a potential loss value was placed at **0%-1%** of the assessed structure value or **\$0 to \$6,952,483**.

### **Severe Winter Storms (including Ice Storms)..... \$0 to \$6,952,483**

Heavy snowstorms typically occur from December through April. New England usually experiences at least one or two heavy snow storms with varying degrees of severity each year. Power outages, extreme cold and impacts to infrastructure are all effects of winter storms that have been felt in Lincoln in the past. All of these impacts are a risk to the community, including isolation, especially of the elderly, and increased traffic accidents. Damage caused as a result of this type of hazard varies according to wind velocity, snow accumulation, duration and moisture content. Yearly accumulation can also be as significant as an individual snowstorm.

Ice storms often cause widespread power outages by downing power lines, making power lines at risk in Lincoln. They can also cause severe damage to trees. In 1998, an ice storm inflicted \$12,466,202 worth of damage to New Hampshire as a whole. Ice storms in Lincoln could be expected to cause damage ranging from a few thousand dollars to several million, depending on the severity of the storm. A potential loss value was placed at 0-1% of the assessed structure value or \$0 to **\$6,952,483**.

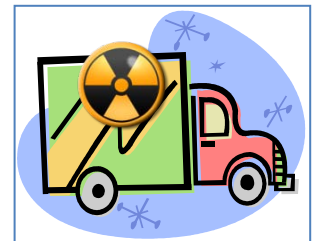
### **High Winds (windstorms)..... \$6,952,483 to \$34,762,417**



Due to the wind tunnel affect of the geographic location of the Town of Lincoln and its proximity to the some of the highest peaks of the White Mountains, isolated high winds and down drafts frequently occur within the Town. These wind events are unpredictable, are hazardous to low flying aircraft and have caused significant timber blow-downs and roof damage in past years. Winds of this magnitude could fall timber which in turn could block roadways, down power lines and impair emergency response. Down drafts effecting aircraft could also create loss of life, hazardous conditions and wildfires.

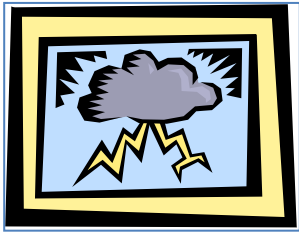
### **Hazardous Material Transport ..... \$0 to \$6,952,483**

One of the more serious hazards of concern is the possibility of a vehicular accident involving hazardous materials. Interstate 93 and Routes 3 and 112 are major thoroughfares in the state that pass directly through Lincoln. These highways are in constant use by large transport vehicles which often carry unknown material to and from Canada and throughout New England. Tractor trailers hauling fuel, chemicals, propane and other hazardous materials are constantly traveling through Lincoln. In addition, UPS, FedEx and other delivery companies are often found on Lincoln roads.



Depending on the exact location of a potential hazardous material vehicular accident, structural damage, wildfire, diminished services and loss of life can occur. Although potential damage could be significant, due to the localized nature of this type of hazard, the potential loss value was determined to be between 0% and 1%.

**Severe Thunderstorms & Lightning..... \$0 to \$6,952,483**



Lightning as a result of severe summer storms or as a residual effect from hurricanes and tornadoes is of medium concern for the Town of Lincoln. Many of the town's structures are older buildings and many structures are surrounded by forest or on very steep slopes. Due to the large amount of dry timber product on the forest floor, the possibility of trees toppled by lightning onto power lines creating sparks and the age of many buildings, lightning is a significant disaster threat.

Lightning could do significant damage to specific structures or injure or kill an individual, but the direct damage would not necessarily be widespread, therefore, the potential loss value was determined to be between 0% and 1%.

**Tornado & Downburst ..... \$0 to \$6,952,483**

Tornadoes are relatively uncommon natural hazards in New Hampshire; on average, about six touch down each year. Damage largely depends on where the tornado strikes. If it strikes an inhabited area, the impact could be severe. In the State of New Hampshire, the total cost of tornadoes between 1950 and 1995 was \$9,071,389 (The Disaster Center). More common in Lincoln would be a Microburst event; these are becoming more and more common in the North Country and could result in significant damage. In fact, in a recent year, one downburst in Lincoln cut an 18-20 inch oak tree in half.

Like lightning and hazardous material transport, the affects of a tornado or downburst would be localized; therefore the potential loss value was determined to be between 0% and 1%.

**Hurricane ..... \$6,952,483 to \$34,762,417**

Wind damage due to hurricane is a medium consideration for the Town of Lincoln. The 1938 hurricane caused major forest damage and hurricane Carol in 1954 caused moderate damage in this region of New Hampshire. Although hurricanes could apply to several different categories (wind and flooding), the Team considered hurricanes to be separate events.

A hurricane could result in wide-spread damage; therefore the potential loss value was determined to be between 1% and 5%.

**Earthquakes..... \$6,952,483 to \$34,762,417**



Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines and are often associated with landslides and flash floods. Four earthquakes occurred in New Hampshire between 1924-1989 having a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of Laconia, and one near the Quebec border. If an earthquake were to impact Lincoln, utilities would be susceptible. In addition, buildings that are not built to a high seismic design level would be susceptible to structural damage.

An earthquake could result in wide-spread damage; therefore the potential loss value was determined to be between 1% and 5%.

**Levee Failure (LPP Structure)..... \$0 to \$6,952,483**

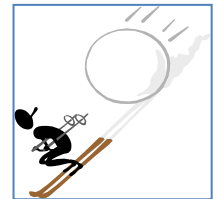
A levee or sorts was built by the Army Corp of Engineers as a “Local Protection Project” (LPP) to protect the paper mill in Lincoln and to help divert logs heading downstream during the peak of the paper industry. Although never a structure to hold back water, this levee did redirect the flow of the East Branch of the Pemigewasset River and protected low lying buildings that existed at that time. For this reason, it was called a levee.

Today this structure is in disrepair and no longer protects low lying structures but it does still redirect the river to some degree. The Town is waiting for a study by the Army Corp of Engineers to determine the base flood elevation for Lincoln at which time they can determine the 100 year flood zone in the area of this so-called levee. In its current condition, this structure does not represent a significant danger, but should be noted as a structure in Town that needs attention.

Damage from the deterioration of this levee would be small and localized. Therefore, the potential loss value was determined to be between 0% and 1%.

**Avalanche (snow) ..... \$0 to \$6,952,483**

Because of the steepness of the terrain and heavy snowfall potential, the Team felt that snow avalanches should be listed, although most areas where avalanche is possible are remote and within forested lands. Of these remote areas, the mountains near the Flume and the roads in Franconia Notch are most susceptible to the affects of avalanche.



The impact on human life, property or business would be minimal if any; only with a unique combination of factors could a snow avalanche cause damage to structures within the town, but the possibility does exist. The potential loss value was determined to be between 1% and 5% due to the expected minimal effect.

**Erosion, Landslides & Mudslides ..... \$0 to \$6,952,483**

In the past, landslide events have not caused significant damage in the Town of Lincoln; however, geological events and heavy rains are often the cause of major landslides, and, due to the topography of Lincoln there is some risk of landslides. Of particular concern are the condominium developments that have been built on steep slopes and the hiking areas within the National Forest, Franconia Notch and along the Kancamagus Highway. Like Avalanche above, only with a unique combination of factors could landslide cause damage to structures in Lincoln; the potential loss value was determined to be between 1% and 5% due to the expected minimal effect.

**Epidemic/Pandemic ..... Potential Structure Loss Could Not Be Estimated**

The Town of Lincoln’s unique geography places it at the intersection of US Routes 3, 112 and Interstate 93, three major roadways in the state, and in the heart of the White Mountains tourist region. As a result, large amounts of both summer and winter visitors pass through or stay in Lincoln. In addition, much of the seasonal staff at the area resorts comes from other parts of the world.

Because of these factors and the Town’s easy access to and from Canada, which brings an added exposure to foreign travel, the team decided that epidemic could present a possible threat to Lincoln. With the occurrence of world-wide pandemics such as SARS, the Swine Flu and the Bird Flu, Lincoln could be susceptible to an epidemic and subsequent quarantine.





**Extreme Temperatures ..... Potential Structure Loss Could Not Be Estimated**



For those who are familiar with Northern New England weather, it is obvious that temperature extremes are very common. Winter temperatures can fall below -30°F and summer temperatures, laden with high humidity can soar to nearly 100°F. In the past, there was more concern for extreme cold temperatures, but with improved heating systems and local communications, most New Hampshire residents are able to cope with extreme cold.

Of more concern today are the extreme heat conditions, becoming more common with global warming. Fewer residents, particularly the elderly, have air conditioners and are less able to cope with extreme heat. It should be both town officials and the community as a whole to be concerned and to look after its citizens to ensure that extreme temperatures do not create a life or property threatening disaster.



**Terrorism ..... \$0 to \$6,952,483**

As terrorism is a fear throughout our country, it is also a fear in Lincoln. People come from all over the world to visit Lincoln and there are often large gatherings of people, most notably at the New Hampshire Highland Games, the largest Scottish cultural festival in the Northeast<sup>17</sup>, held each fall at Loon Mountain Ski Area. Should a terrorist activity occur in Lincoln, it is anticipated that the impact on human life and business could be high, but property damage would be minimal. This is of course dependent on the type of terrorist event, which cannot be predicted. The potential loss value was determined to be between 1% and 5% due to the expected minimal effect on property.

**Extended Power Failure ..... \$6,952,483 to \$34,762,417**

Extended power outages have occurred in the Town, both as a result of local line damage and problems with the power grid. Lincoln's reliance on the power grid, should a major and extended power outage occur, could result in significant economic impact and hardship on individual residents. The Team felt however, that the biggest impact would be on the Town's businesses that rely so heavily on a dependable power source.

**Dam Failure ..... \$0 to \$6,952,483**

The East Branch of the Pemigewasset River rapidly flows through Lincoln and is not controlled by dams. There are however two dams in town, one on the side of Loon Mountain at the Loon Reservoir and another at the Indian Head Resort at Indian Head Pond. Failure of either of these dams is unlikely and any associated damage to structures downstream would be minimal; therefore the potential loss value was determined to be between 1% and 5%.

**Hailstorm ..... \$0 to \$6,952,483**

Hailstorm events, although not common in the town of Lincoln, can occur at any time; the spring and summer of 2009 saw random hailstorm occurrences throughout the northern regions of New Hampshire. Damage from hail could result in failed crops and structure and vehicular damage, thus creating an economic impact for individual citizens. It should be noted however, that Lincoln is not a heavily farmed community. Overall, the Team concurred that a hailstorm event would be unlikely and would cause minimal damage; the potential loss value was determined to be between 1% and 5%.

<sup>17</sup> <http://www.nhscot.org/>

**Drought .....Potential Structure Loss Could Not Be Estimated**

The affects of drought in Lincoln are difficult to calculate as they are primarily an indirect result in the associated fire risk and diminished water supply that may occur. An extended period without precipitation could elevate the risk for wildfire, and with an extreme drought, the water supply and aquifer levels could be threatened. Fortunately, significant droughts rarely occur in New Hampshire or Lincoln; no loss value has been calculated for drought in Lincoln. According to the NH Department of Environmental Services, five significant droughts have occurred since 1929<sup>18</sup>.

**NEW HAMPSHIRE DROUGHT HISTORY**

Dates	Area Affected	Recurrence Interval Yrs	Remarks
1929-1936	Statewide	10 to > 25	Regional
1939-1944	Statewide	10 to > 25	Severe in southeast and moderate elsewhere
1947-1950	Statewide	10 to 25	Moderate
1960-1969	Statewide	> 25	Regional longest recorded continuous spell of less than normal precipitation
2001-2002	Statewide	Not yet determined	Third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942



an official **NEW HAMPSHIRE** government website

**Homeland Security  
and Emergency Management**



<sup>18</sup> <http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>

## Chapter VI: Multi-Hazard Goals & Existing Strategies

### A. Multi-Hazard Mitigation Goals

Before identifying new mitigation actions to be implemented by Lincoln, the team established and adopted the following multi-hazard goals. These goals were based on the State of New Hampshire Natural Hazards Mitigation Plan, which was prepared and is maintained by HSEM.

- *To improve upon the protection of the general population, the citizens of the Town of Lincoln and visitors, from all natural and man-made hazards.*
- *To reduce the potential impact of natural and man-made disasters on Lincoln's critical infrastructure and key resources.*
- *To improve emergency preparedness, disaster response and recovery capabilities.*
- *To reduce the potential impact of natural and man-made disasters on private property.*
- *To reduce the potential impact of natural and man-made disasters on Lincoln's economy.*
- *To reduce the potential impact of natural and man-made disasters on Lincoln's natural environment.*
- *To reduce the Town's potential exposure to risk with respect to natural and man-made hazards in general.*
- *To reduce the potential impact of natural and man-made disasters on the Town's specific historic treasures and interests, as well as other tangible and intangible characteristics that add to the quality of life of the citizens and visitors to the Town.*
- *To identify, introduce and implement improvements to establish and maintain a reliable communication system.*
- *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 and acceptance of hazard mitigation opportunities in general.*<sup>19</sup>

### B. Lincoln Wildfire Mitigation Goals

Before identifying new mitigation actions to be implemented by Lincoln, the team established and adopted the following wildfire goals. These goals were developed from a number of sources to reflect the town's needs and desires.

- *Reduce the potential impacts of wildfires on public and private property.*
- *Reduce the potential impacts of wildfires on Lincoln's infrastructure.*
- *Improve the preparedness and communication network within Lincoln.*
- *Reduce the cost of response and recovery to Lincoln caused by potential wildfires.*
- *Reduce Lincoln's potential liability with respect to wildfires.*
- *Identify and implement cost effective mitigation strategies to accomplish the goals and objectives.*
- *Raise awareness of and acceptance of the wildfire mitigation plan.*
- *Work cooperatively with state and federal agencies in designing a wildfire mitigation plan.*
- *Work cooperatively with the mutual aid system currently in place.*

<sup>19</sup> Goals are based primarily on the State of New Hampshire's Hazard Mitigation Goals (Natural Hazard Mitigation Plan, 2004) and are taken from the 2009 Multi-Hazard Plan format created by NCC

## C. Types of Mitigation Strategies Developed

The following list of mitigation categories and possible strategy ideas was compiled from a number of sources including the USFS, FEMA, other Planning Commissions and past Multi-Hazard Mitigation Plans. This list was used during a brainstorming session to discuss what issues there may be in Town. Team involvement and the brainstorming sessions proved helpful in bringing out new ideas, better relationships and a more in depth knowledge of the community.

### **Prevention**

- Forest fire fuel reduction programs
- Open space preservation initiatives
- Performance standards
- Special management regulations
- Fire Protection Codes NFPA 1
- Culvert and hydrant maintenance

### **Education and Awareness**

- Hazard information centers
- Public education and outreach programs
- Emergency website creation
- “Firewise” training
- Emergency Training for Town officials
- Ongoing training for first responders

### **Property Protection**

- Acquisition or easements
- Current use or other conservation measures
- Relocation of hazard prone areas
- Transfer of development rights

### **Natural Resource Protection**

- Best management practices within the forest
- Forest and vegetation management
- Forestry and landscape management
- Wetlands development regulations

### **Emergency Preparedness**

- Water availability
- Water sustainability
- Emergency Response Plan
- Equipment necessary for response
- Designated evacuation routes
- Hazard warning systems, sirens
- Hazard threat recognition
- EOC location & coordination
- Shelter preparation & management
- School Emergency Operation Plans

### **Emergency Preparedness (continued)**

- Available food and supplies
- Available dam plans
- Emergency generator assessment

### **Emergency Response**

- Emergency medical services
- Hospital & clinic availability
- Fire & police departments
- Mutual aid
- Points of distribution
- Portable EMS potential

### **Infrastructure Protection**

- Critical facilities protection
- Critical infrastructure protection

### **Structure Protection**

- High risk notification for homeowners
- Defensible space brochures
- Real estate disclosures

### **Town Planning**

- Local building codes
- Zoning & subdivision ordinances
- Development regulations
- Density controls
- Driveway standards
- Slope development regulations
- Master Plan
- Capital improvement program
- Water Resource Plan

### **Communication**

- Coordination with other agencies, NC RC&D, USFS, DRED
- Interdepartmental communication needs
- Public hazard notification
- EOC communications

## D. Mitigation Strategies Currently Underway in Lincoln



After researching historic hazards, identifying CI/KR and determining potential hazards, the Team determined what is already being done to limit potential damages from these hazards.

Once identified, the Team addressed each “current” strategy to determine its effectiveness and to determine whether or not improvements were needed. This analysis became one of the tools the Team used to identify new mitigation strategies.

With the knowledge of what regulations the town currently had in place, creating new strategies was less difficult. This process was helpful in identifying those who may be responsible for implementation of mitigation strategies, those strategies that are working well, and those that should be addressed as a “new” strategy. The table that follows, Table 6.1, lists current mitigation strategies and the analysis that resulted from discussion.

*“Plans are nothing; planning is everything.”*  
*Dwight D. Eisenhower*

Below is an abbreviated list of these current mitigation strategies:

- Federal Building Codes
- State Road Design Standards
- USDA-Forest Service
- Burning Index & State Division of Forests & Lands/Fire Permits
- Master Plan (2003)
- Emergency Operation Plan (2009)
- Capital Improvement Plan (2009)
- School Emergency Response Plane (2008)
- All Hazards Mitigation Plan (2004)
- Subdivision Regulations
- Land Use Plan (Flood Ordinance)
- Equipment Contracts
- Wellhead Protection Program
- Police, Fire, EMS Mutual Aid Agreements
- Emergency Generators
- Warning Systems
- Water System Management
- ICS/NIMS
- FCI-Burndy Emergency Operations Plan
- Franconia Notch Emergency Plan
- Floodplain Ordinance
- Storm Water Management
- Life Safety Code

Table 6.1 includes those actions identified that directly or indirectly relate to existing mitigation strategies identified in part through the listing developed in the local all-hazard mitigation plan.

*\* Refer to Table 6.1, the Bibliography, and data in yellow-highlighted boxes in this plan for specific examples. Heavy reliance was placed on previously approved all-hazards mitigation plans and copies of wildfire plans obtained from other towns and counties. A handout was compiled and given to the emergency management director of common data and another with potential mitigation strategies that the town should consider. GIS mapping models and several examples were provided to the Planning team for their general information.*



**Table 6.1: Existing Mitigation Strategies**

Existing Program or Activity	Description	Area of Town Covered	Enforcing Department	Effectiveness	Improvements or Changes Needed
Federal/State: Federal Building Codes	Federal and state regulations to ensure buildings meet energy efficiency codes	Town Wide	Fire Chief	Good	Town needs building code enforcement official
Federal/State: Road Design Standards	Local and state standards	New Construction of Class V or Higher	Planning Board	Good	None needed
Federal: US Forest Service	Federal burn regulations and controlled burn	US Forest Service portions of town	US Forest Service	Very Good	None needed
Federal/State: Burning Index & State Division of Forest & Lands/Fire Permits	The US Forest Service has a burning index, which measures the risk (through signage on Kancamagus) for wildfires through indicating how likely they are to start on a given day. It also evaluates the potential damages wildfires can create, the number of people that will be needed to fight it and the type of equipment that might be needed as well. There are state regulations for open burning	Town Wide	US Forest Service & DRED; Stations in Lancaster & Conway	Good	Additional Smokey the Bear Signage
Master Plan (2003)	Includes goals, objectives and expectations for future development of the town.	Town Wide	Planning Board	Good	Update needed
Emergency Operation Plan (2009)	This plan offers all members of the emergency management team a better understanding of procedures in case of a disasters	Town Wide	EMD	Very Good	Update annually
Capital Improvement Plan (2009)	A phased projection of major equipment and supply purchase/replacement	Town Wide	Capital Improvement Plan Committee	Very Good	Updated annually
School Emergency Response Plan (2008)	Insures preparedness and response for school personnel and town emergency personnel in the instance of a major disaster in the school	School	Superintendent of Schools	Very Good	Updated annually
All Hazards Mitigation Plan (2004)	Addresses all potential hazards including wildfires	Town Wide	EMD	Very Good	Currently being updated
Subdivision Regulations	Includes fire and emergency access, drainage, floodplain and bonding provisions	Town Wide	Planning Board	Very Good	None needed
Land Use Plan	Regulations dealing with land use including rural, residential, agriculture and timber management.	Town Wide	Planning Board & Select Board	Very Good	Continuous amendment process

Existing Program or Activity	Description	Area of Town Covered	Enforcing Department	Effectiveness	Improvements or Changes Needed
Equipment Contracts	Town contracts with local contractors for support of town maintenance operations	Town Wide	Public Works	Very Good	None needed
Wellhead Protection Program	Deals with protection of town drinking water	Town Wide	Public Works Director	Very Good	Recently revised
Police, Fire, EMS Mutual Aid Agreements	Offers access to resources appropriate to the scope of the emergency	Town Wide	EMD (Fire Chief, Police Chief)	Very Good	None needed
Emergency Generators	Provides location of emergency generators	Areas where generators are placed	EMD	Good	Need emergency generators for several town facilities
Warning Systems	Siren at the Town Hall and warning system being developed with TV Channel 3	Town Wide	EMD	Good	Investigation of reverse 911 notification systems in progress
Water System Management	Town Wide system pressure and fire flow management	Town Wide	Planning Board & Public Works	Good	Continue monitoring as changes take place
ICS/NIMS	Ensure effective intergovernmental command, control, and communications during emergencies	Town Wide	EMD	Good	Continuous training & exercises
FCI-Burndy Emergency Operations Plan	Emergency EOP for Burndy Factory	FCI-Burndy Building	FCI-Burndy	Good	Last update in 2008
Franconia Notch Emergency Plan	Details who will respond to an emergency in the Notch	Franconia Notch	Primary Participant Lincoln FD/PD and Franconia FD/PD depending on location; others: State Police, Grafton County Sheriff Department, Ambulance Franconia & Lincoln, NH DOT; any others in Mutual Aid	Very Good	Last update in 2006 and as needed
Floodplain Ordinance	Ordinance regulates the construction of structures in floodplain areas in order to protect people and property, make sure federal flood insurance is available, save tax dollars and avoid liability and law suites	Town Wide	Planning Board	Very Good	The Town of Lincoln passed the floodplain ordinance at the 2004 Town Meeting as per NFIP requirements
Storm water Management	Make sure builders meet DES codes for alteration of terrain and storm water management	Town Wide	Planning Board/DES	Very Good	None needed
Life Safety Code	Fire system sprinkler required in business, commercial and multi-family buildings	Town Wide	Lincoln Fire Department & State Fire Marshall	Very Good	Currently using NFPA

## Chapter VII: Prior Mitigation Plan(s)

### A. Dates of Prior Plans

Town of Lincoln Hazard Mitigation Plan – 2004; North Country Council

Lincoln Wildfire Hazard Mitigation Plan, October 2007; North Country Council

### B. Accomplishments of Prior Plans

**Table 7.1**

Hazard Mitigation Plan 2004 – Mitigation Projects and Action Plan

Project	Responsibility or Oversight	Funding & Support	Timeframe	Completion Status as of November 2009
Incident command training for all public safety departments	Emergency Management Direction	New Hampshire Emergency Management and Town Grant	Within 1 year	Completed and ongoing
Citizens Corps	Emergency Management Direction	Federal Government Citizens Corps Grant	Within 1 year	Carried to 2009 Plan (difficulties getting volunteers)
Communication System & Equipment	Emergency Management Direction	Unknown - Town Budget	Within 1-2 years	95% Complete; to be completed in December 2009
Increase police, fire and ambulance capabilities	Board of Selectmen & Town Manager	Town Budget - Federal Grants	Within 1-2 years	Carried to 2009 Plan (funding concerns as Town grows)
Interconnection of water systems (Lincoln-Woodstock)	Board of Selectmen & Town Manager	Federal Grant was already awarded for feasibility study; Town Budgets and federal grants for implementation; Pre-disaster mitigation program	Within 1 year	Carried to 2009 Plan (may have political differences between towns)
Media Access	Town Manager	Town Budget	Within 1 year; then every year	Completed and ongoing
Traffic congestion mitigation	Planning Board	State Grants	Within 1 year	Ongoing concern; handle traffic situations in response to events
Bank Reinforcement (East Branch of Pemigewasset River)	Board of Selectmen & Town Manager	Grants; Town Budget; Army Corps of Engineers; Hazard Mitigation Grant Program	Within 2 years	Carried to 2009 Plan (funding concerns)
Forest fire Prevention and Monitoring Program	US Forest Service	Federal Appropriation Money	Ongoing	Completed and ongoing

## Chapter VIII: New Mitigation Strategies & STAPLEE

### ***A. Feasibility and Prioritization***

Table 8.1 reflects the newly identified potential multi-hazard and wildfire mitigation strategies as well as the results of the STAPLEE Evaluation as explained below. It should also be noted that although some areas are identified as “Multi-Hazard”, many of these would apply indirectly to wildfire response and capabilities. Many of these potential mitigation strategies overlap.

The goal of each proposed mitigation strategy is reduction or prevention of damage from a multi-hazard event. To determine their effectiveness in accomplishing this goal, a set of criteria was applied to each proposed strategy that was developed by the Federal Emergency Management Administration. The STAPLEE method analyzes the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic and **E**nvironmental 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 discussed in Table 8.1.

**Social:** ..... Is the proposed strategy socially acceptable to the community? Is there an equity issue involved that would result in one segment of the community being 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 it need environmental regulatory approvals?

Each proposed mitigation strategy was then evaluated and assigned a score based on the above criteria. Each of the STAPLEE categories was discussed and was awarded the following scores:

Good ..... 3  
Average..... 2  
Poor ..... 1

An evaluation chart with total scores for each new strategy is shown in Table 8.1.

The ranking of strategies with the scores displayed in the following pages was merely a guideline for further prioritizing. The team then prioritized the strategies and prepared the action plan using additional criteria:

- Does the action reduce damage?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures?
- Can the action be implemented quickly?

The prioritization exercise helped the committee seriously evaluate the new hazard mitigation strategies that they had brainstormed throughout the multi-hazard mitigation planning process. While all actions would help improve the town's multi-hazard and wildfire responsiveness capability, funding availability will be a driving factor in determining what and when new mitigation strategies are implemented.

## ***B. The Team's Understanding of Multi-Hazard Mitigation Strategies***

The team determined that any strategy designed to reduce personal injury or damage to property that could be done prior to an actual disaster would be listed as a potential mitigation strategy. This decision was made even though not all projects listed in Tables 8.1 and 9.1 are fundable under FEMA pre-mitigation guidelines. The team determined that this Plan was in large part a management document designed to assist the Select Board and other town officials in all aspects of managing and tracking potential emergency planning strategies. For instance, the team was aware that some of these strategies are more properly identified as readiness issues. The team did not want to "lose" any of the ideas discussed during these planning sessions and thought this method was the best way to achieve that objective.



*Father Bilodeau Community Center*



**Table 8.1: Lincoln Potential Mitigation Strategies & STAPLEE**

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	T
(1) Site and construct cisterns in new developments with inadequate fire flows	Wildfire	Town Wide Development	Structural Project	3	2	3	3	3	3	3	20
					This would only be a temporary measure						
(2) Gather information relevant for hydrant construction i.e. seasonal water level, area available for apparatus, static lift etc. at Loon Mountain Ski Resort, (L2 Loon Mountain Draft Site)	Wildfire	Loon Mountain	Structural Project	3	2	3	2	3	2	1	16
					This would help, but may not solve all problems		There will be budget concerns		The cost would fall on the Town if a grant is not available	DES Permits would be needed	
(3) Gather information relevant for hydrant construction i.e. seasonal water level, area available for apparatus, static lift etc. at Shadow Lake (L7 Shadow Lake Draft Site)	Wildfire	Town wide	Prevention	3	2	3	2	3	2	3	18
					This would help, but may not solve all problems		There will be budget concerns		The cost would fall on the Town if a grant is not available		
(4) Establish a dry hydrant/fire pond construction and maintenance program that will include records kept of semiannual or annual flow tests on each hydrant and cleaning or maintenance dredging of fire ponds	Wildfire	Town wide	Prevention	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	T
(5) Amend or include money in the Capital Improvement Plan for water drafting, site development, fire apparatus and equipment	Wildfire	Town Wide	Prevention	3	3	3	2	3	3	3	20
							Funding issues				
(6) Consider establishment of a Steep Slopes Ordinance to restrict and/or prohibit development in difficult to reach areas	Multi-Hazards	Town Wide	Prevention	2	3	3	2	3	2	3	18
				The community, particularly developers, have shown reluctance to discuss any ordinance regarding steep slope			The community, particularly developers, have shown reluctance to discuss any ordinance regarding steep slope		Economic Pressure from developers who do not want a steep slope ordinance since there is no other place to build		
(7) Encourage referral to Water Resource Plan and maps by Planning Board when reviewing subdivision requests	Wildfire	Town Wide	Prevention	3	3	3	3	3	3	3	21
(8) Locate & map access, snowmobile, cross country, logging, hiking, railroad beds etc; anything more than Class VI highway	Multi-Hazards	Town Wide	Preparedness	3	3	3	3	3	3	3	21
(9) Implement program to provide training to fire personnel on wildland fire suppression, dry hydrant design, site evaluations of water sources, etc.	Wildfire	Town Wide	Prevention	3	3	3	3	3	3	3	21
(10) Maintain communication with US Forest Service	Wildfire	Town Wide	Communications	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	T
(11) Discuss the risk of building or living on Class VI or private roads with regards to FEMA's policy on receiving wildfire mitigation funds. Decision to be reached as to feasibility of notifying current owners and developers. Get information from FEMA and samples of notification letters from other towns.	Wildfire	Town Wide	Education	3	3	3	3	3	3	3	21
(12) Ensure people building in high risk areas are apprised of the potential risk using maps & other notifications at the time of the request for building permits and site plan review	Multi-Hazards	Town Wide	Education	3	3	3	3	3	3	3	21
(13) Interview & hire Town Building Inspector	Multi-Hazards	Town Wide	Prevention	2 It has been long-standing opinion of the community that a Building Inspector is not needed	3	3	1 There is "recorded" opposition from members of Town Boards	3	2 Funding Concerns	3	17
(14) Update master plan	Multi-Hazards	Town Wide	Planning	3	3	3	3	3	3	3	21
(15) Need emergency generators for several town facilities (school, community center, upgrade one at town hall)	Multi-Hazards	Town Wide	Preparedness & Emergency Services	3	3	3	3	3	2 Funding Concerns	3	20

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	T
(16) Encourage DOT to place emergency mile markers every .2 miles to identify sites along the Kancamagus (Highway 112)	Multi-Hazards	Route 112	Emergency Services & Public Information	3	3	3	3	3	3	3	21
(17) Increase police, fire & ambulance capabilities. More personnel and equipment will be needed as Town continues to grow	Multi-Hazards	Town Wide	Preparedness & Emergency Services	3	3	3	3	3	2	3	20
(18) Bank reinforcement (East Branch Pemigewasset River) and riprap that was done in 1929 may need replacement and expansion depending on redrawing of the flood plain (LPP project)	Erosion	East Branch of the Pemigewasset River	Prevention	3	3	3	2	3	2	1	17
(19) Develop a plan for interconnectivity between Lincoln and Woodstock water systems in case of emergency	Multi-Hazards	Woodstock & Lincoln	Preparedness & Emergency Services	3	3	3	2	3	3	3	20
(20) Recruiting for the Citizens Corps Program	Multi-Hazards	Town Wide	Preparedness & Emergency Services	3	3	3	3	3	3	3	21
(21) Additional Forest Service fire danger sign to be located on Route 112 near I-93 or in middle of town to increase visibility of fire danger	Wildfire	Town Wide	Education	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	T
(22) Add notice to channel 3 regarding fire risks	Wildfire	Town Wide	Education	3	3	3	3	3	3	3	21
(23) Complete establishment of reverse 911 system	Multi-Hazards	Town Wide	Preparedness & Emergency Services	3	2	3	3	3	3	3	20
(24) Table exercise dealing with wildfire with NIMS & ICS	Wildfire	Town Wide	Education	3	3	3	3	3	3	3	21
(25) Road drainage improvements and upgrades to culverts, catch basins & closed drainage systems	Flooding	Town Wide	Infrastructure Protection	3	3	3	3	3	3	3	21



Linwood Medical Center



## Chapter IX: Implementation Schedule for Prioritized Strategies

After reviewing the finalized STAPLEE numerical ratings, the team prepared to develop the Implementation Plan. To do this, team members created three categories into which they would place all the potential mitigation strategies.

- **Category 1** was to include those items under the direct control of town officials, within the financial capability of the town using only town funding, those already being done or planned, and those that could generally be completed within one year.
- **Category 2** was to include those items that the town did not have sole authority to act upon, those for which funding might be beyond the town's capability, and those that would generally take between 13—24 months.
- **Category 3** was to include those items that would take a major funding effort, those that the town had little control over the final decision, and those that would take in excess of 25 months to complete.

Each potential mitigation strategy was placed in one of the four categories and then those strategies were prioritized within each category.

Once this was completed, the team developed an implementation plan that outlined who is responsible for implementing each strategy, as well as when and how the actions will be implemented. The following questions were asked in order 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?

In addition to the prioritized mitigation projects, Table 9.1 includes the responsible party (WHO), how the project will be supported (HOW), and what the timeframe is for implementation of the project (WHEN).

Some projects, including most training and education of residents on emergency and evacuation procedures, could be tied into the emergency operation plan and implemented through that planning effort.

**Table 9.1: Implementation Plan**

Priority	New Mitigation Project	Responsibility and/or Oversight	Funding and/or Support	Timeframe	Type of Hazard	Affected Location	Type of Activity
01-01	(17) Increase police, fire & ambulance capabilities. More personnel and equipment will be needed as Town continues to grow	Select Board/Town Manager/EMD	Local	As needed	Multi-Hazards	Town Wide	Emergency Preparedness
01-02	(21) Additional Forest Service fire danger sign to be located on Route 112 near I-93 or in middle of town to increase visibility of fire danger	Town Manager & DRED	USFS	08/31/09	Wildfire	Town Wide	Education and Awareness
01-03	(22) Add notice to channel 3 regarding fire risks	Town Manager/School District/Forest Service	NA	08/31/09	Wildfire	Town Wide	Education and Awareness
01-04	(24) Table exercise dealing with wildfire with NIMS & ICS	EMD	Local	11/30/09	Wildfire	Town Wide	Education and Awareness
01-05	(20) Recruiting for the Citizens Corps Program	EMD	NA	Ongoing	Multi-Hazards	Town Wide	Emergency Preparedness
01-06	(10) Maintain communication with US Forest Service	Select Board/Town Manager	NA	Ongoing	Wildfire	Town Wide	Communications
01-07	(12) Ensure people building in high risk areas are apprised of the potential risk using maps & other notifications at the time of the request for building permits and site plan review	Planning Board & Planning Administrator	Local	05/31/10	Multi-Hazards	Town Wide	Education and Awareness
01-08	(25) Road drainage improvements and upgrades to culverts, catch basins & closed drainage systems	DPW/Town Manager/CIP Committee	Local	Ongoing	Flooding	Town Wide	Infrastructure Protection
01-09	(16) Encourage DOT to place emergency mile markers every .2 miles to identify sites along the Kancamagus (Highway 112)	EMD	NA	06/30/10	Multi-Hazards	Route 112	Emergency Preparedness

Priority	New Mitigation Project	Responsibility and/or Oversight	Funding and/or Support	Timeframe	Type of Hazard	Affected Location	Type of Activity
01-10	(7) Encourage referral to Water Resource Plan and maps by Planning Board when reviewing subdivision requests	Planning Board	NA	Ongoing	Wildfire	Town Wide	Prevention
01-11	(11) Discuss the risk of building or living on Class VI or private roads with regards to FEMA's policy on receiving wildfire mitigation funds. Decision to be reached as to feasibility of notifying current owners and developers. Get information from FEMA and samples of notification letters from other towns	Select Board/Town Manager/EMD	Local	05/31/10	Wildfire	Town Wide	Education and Awareness
01-12	(5) Amend or include money in the Capital Improvement Plan for water drafting, site development, fire apparatus and equipment	CIP Committee/Select Board/Budget/Town Meeting	Local	Ongoing	Wildfire	Town Wide	Town Planning
01-13	(9) Implement program to provide training to fire personnel on wildland fire suppression, dry hydrant design, site evaluations of water sources, etc.	Fire Chief & EMD	Grants/Local	Ongoing	Wildfire	Town Wide	Education & Awareness
01-14	(1) Site and construct cisterns in new developments with inadequate fire flows	Planning Board & Fire Chief	Developer	Depending on future development	Wildfire	Town Wide Development	Emergency Preparedness
01-15	(6) Consider establishment of a Steep Slopes Ordinance to restrict and/or prohibit development in difficult to reach areas	Planning Board	NA	Discussed Annually	Multi-Hazards	Town Wide	Town Planning
02-01	(23) Complete establishment of reverse 911 system	EMD	Local	07/31/10	Multi-Hazards	Town Wide	Emergency Preparedness

Priority	New Mitigation Project	Responsibility and/or Oversight	Funding and/or Support	Timeframe	Type of Hazard	Affected Location	Type of Activity
02-02	(8) Locate & map access, snowmobile, cross country, logging, hiking, railroad beds etc; anything more than Class VI highway	EMD	Local	12/31/10	Multi-Hazards	Town Wide	Emergency Preparedness
02-02	(15) Need emergency generators for several town facilities (school, community center, upgrade one at town hall)	EMD/Town Manager/Select Board	Grants/Local	12/31/11	Multi-Hazards	Town Wide	Emergency Preparedness
02-05	(18) Bank reinforcement (East Branch Pemigewasset River) and riprap that was done in 1929 may need replacement and expansion depending on redrawing of the flood plain (LPP project)	Select Board/FEMA	Grants/Local	07/31/10	Erosion	East Branch of the Pemigewasset River	Prevention
02-07	(13) Interview & hire Town Building Inspector	Select Board	Local	07/31/10	Multi-Hazards	Town Wide	Town Planning
03-01	(4) Establish a dry hydrant/fire pond construction and maintenance program that will include records kept of semiannual or annual flow tests on each hydrant and cleaning or maintenance dredging of fire ponds	Fire Chief	N/A	07/31/11	Wildfire	Town wide	Emergency Preparedness
03-02	(19) Develop a plan for interconnectivity between Lincoln and Woodstock water systems in case of emergency	Public Works/Select Board/Town Manager	Local	06/30/14	Multi-Hazards	Woodstock & Lincoln	Emergency Preparedness
03-03	(2) Gather information relevant for hydrant construction i.e. seasonal water level, area available for apparatus, static lift etc. at Loon Mountain Ski Resort, (L2 Loon Mountain Draft Site)	Fire Chief	Grant/Local	07/31/13	Wildfire	Loon Mountain	Emergency Preparedness

Priority	New Mitigation Project	Responsibility and/or Oversight	Funding and/or Support	Timeframe	Type of Hazard	Affected Location	Type of Activity
03-04	(3)Gather information relevant for hydrant construction i.e. seasonal water level, area available for apparatus, static lift etc. at Shadow Lake (L7 Shadow Lake Draft Site	Fire Chief	N/A	07/31/13	Wildfire	Town wide	Emergency Preparedness
03-05	(14) Update master plan	Planning Board	NA	10/31/13	Multi-Hazards	Town Wide	Town Planning



*The Mountain Club at Loon*



## Chapter X: Monitoring, Evaluation and Updating the Plan

### ***A. Introduction***

A good mitigation plan must allow for updates where and when necessary, particularly since communities may suffer budget cuts or experience personnel turnover during both the planning and implementation states. A good plan will incorporate periodic monitoring and evaluation mechanisms to allow for review of successes and failures or even just simple updates.

### ***B. Multi-Hazard Plan Monitoring, Evaluation and Updates***

To track programs and update the mitigation strategies identified through this process, the town will review the multi-hazard mitigation plan annually or after a hazard event. Additionally, the Plan will undergo a formal review and update at least every five years and obtain FEMA approval for this update or any other major changes done in the Plan at any time. The Emergency Management Director is responsible for initiating the review and will consult with members of the multi-hazard mitigation planning team identified in this plan. The public will be encouraged to participate in any updates. Public announcements will be made through advertisements in local papers, postings on the town website, and posters disseminated in town. A formal public hearing will be held before reviews and updates are official.

Changes will be made to the Plan to accommodate projects that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community's priorities or funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, will be reviewed as well during the monitoring and update of the plan to determine feasibility of future implementation. In keeping with the process of adopting this multi-hazard mitigation plan, a public hearing to receive public comment on plan maintenance and updating will be held during the annual review period and before the final product is adopted by the Select Board. Chapter XII contains a representation of a draft resolution for Lincoln to use once a conditional approval is received from FEMA.

Prior to initiating this process, Lincoln entered into a Memorandum of Understanding (MOU) stating that they would follow up on this process and ensure that the funds necessary for certain mitigation strategies were addressed.

### ***C. Integration with Other Plans***

This multi-hazard plan will only enhance mitigation if balanced with all other town plans. This plan will be integrated with all other town planning documents based on the town's regularly scheduled revision of those documents. All plans will be modified as necessary to incorporate multi-hazard and/or wildfire issues as identified in this or subsequent multi-hazard plans. The Select Board ensures this process will be followed.

## Chapter XI: Signed Community Documents and Approval Letters

### ***A. Memorandum of Understanding***

#### **Multi-Hazard Mitigation Plan**

#### **Memorandum of Understanding**

#### **Between the town of Lincoln and North Country Council, Inc.**

##### **I. Purpose**

As part of the Multi-Hazard Mitigation Plan Program, a Memorandum of Understanding (MOU) will be executed between the Town of Lincoln and the North Country Council, the region's planning organization. The plans created as a result of this MOU will be presented to the Planning Board and/or Selectmen for adoption.

When adopted, the Plan provides guidance to the Town, commissions, and departments. Adopted plans serve as a guide and do not include a specific financial commitment by the Town. All adopted plans should address mitigation strategies for reducing the risk of natural, man-made, and wildfire disasters on life and property within the Town.

The intent of this MOU is to ensure that the mitigation plans are developed in an open manner involving community stakeholders, federal and state organizations whose mission it is to prepare and respond to emergencies and wildfires in the region and local officials. It is also the intent of this MOU that it is consistent with Town policies and is an accurate reflection of the community's values and is integrated within other community planning initiatives. Its purpose is to form a working relationship between citizens of the Town of Lincoln and the Town of Lincoln's planning team for the Multi-Hazard Mitigation Plan.

This MOU sets out the responsibilities of all parties. It identifies the work to be performed by the planning team and the community. Specific tasks, schedules and finished products are identified within the Plan.

##### **II. Responsibilities**

##### **LINCOLN'S MULTI-HAZARD MITIGATION PLANNING TEAM RESPONSIBILITIES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:**


- ❖ Ensure that the planning team includes representatives such as community stakeholders, the local Emergency Management Director, the local Fire and Police Chief(s), representatives from the federal and state organizations whose mission is to prepare and respond to all natural and man-made emergencies and wildfires in the region, local officials, property owners, and relevant businesses or organizations.
- ❖ Determine a planning coordinator that will be the lead contact to the North Country Council.
- ❖ Offer assistance to the North Country Council in developing the work program which will produce the Multi-Hazard Mitigation Plan.
- ❖ Organize regular meetings for the planning team in coordination with North Country Council.
- ❖ Assist North Country Council with organizing public meetings to develop the plan.
- ❖ Identify the community resources available to support the planning effort, including people who will have access to and can provide pertinent data. Examples include, but are not limited to, town team members, such as the Fire or Police Chief or Road Agent, who is able to identify historic wildfires and past hazardous situations, research the assessed values of buildings within the Wildland Urban Interface and research existing town planning documents to identify existing mitigation strategies in hazard and wildfire areas.
- ❖ Assist with recruiting participants for planning meetings, including the development of mailing lists when and if necessary, distribution of flyers, and placement of meeting announcements in the community.
- ❖ Gain the support of stakeholders for the recommendations found within the plan.
- ❖ Keep the Town informed and offer opportunity for their review at various stages of the planning process.
- ❖ Forward local information to North Country Council such as anecdotal information from the community to be incorporated into the proposed plan.
- ❖ Submit the proposed plan to the Town Planning Board and/or Select Board for consideration and adoption.

Lincoln Multi-Hazard Mitigation Plan, 2009  
Memorandum of Understanding  
Page Two

- ❖ After adoption of the Multi-Hazard Mitigation Plan, the Town will:
  - Develop a team to monitor and work toward plan implementation.
  - Publicize the Plan to the Town and ensure community members are aware of the Plan and its contents.
  - Urge the Planning Board to incorporate those priority projects found most important into the community's Capital Improvement Plan.
  - Integrate mitigation strategies and priorities for all these plans into other town plans.

**NORTH COUNTRY COUNCIL'S RESPONSIBILITIES:**

- ❖ Collect data necessary to complete the Multi-Hazard Mitigation Plan in a comprehensive manner.
- ❖ Coordinate and facilitate community meetings with the assistance of the local planning committee.
- ❖ Provide any materials, handouts, displays, and tools necessary for the public to fully understand the planning process.
- ❖ Work with the Planning Team to collect and analyze data. Take public input from community members and ensure that this input becomes part of the Multi-Hazard Mitigation Plan.
- ❖ Facilitate the development of goals and objectives and implementation strategies for the Multi-Hazard Mitigation Plan.
- ❖ Coordinate with other federal, state and local agencies throughout the process. Ensure that a collaborative environment is created with all interested parties.
- ❖ Assist the Planning Team with presentation of the Plan to the town Planning Board and/or Select Board.
- ❖ Assist the Planning Team with understanding the process of monitoring implementation, educating the public and incorporating the plan with the Town's Capital Improvement Plan.
- ❖ Delineate the community's Wildland Urban Interface (WUI) zone for the Multi-Hazard Mitigation Plan.
- ❖ Create a Multi-Hazard Threat Analysis that outlines the severity of hazard risk throughout the community.
- ❖ Write, edit and prepare the Plan for review and final publication.
- ❖ Ensure that the Plan receive approval from FEMA and New Hampshire Homeland Security & Emergency Management (HSEM).
- ❖ Ensure the wildfire mitigation portion of the Plan receives approval from the US Forest Service as a Community Wildfire Protection Plan.

Town of Lincoln, NH  
  
 Signature  
 PETER JOSEPH  
 Print Name  
 4/20/09  
 Date

North Country Council, Inc.  
  
 Signature  
 Michael King  
 Michael King, Executive Director  
 4/21/09  
 Date

## ***B. Conditional Approval Letter from FEMA***

*Conditional approval received via email, June 7, 2010*

June,

Please add the Town of Lincoln to your list of conditionally approved plans. They may now adopt the plan. Please send me a copy of the signed adoption certificate so I can forward it to FEMA for final approval. You will have several more plans approved this week. Our planner is leaving on the 12<sup>th</sup> so he is making an effort to clear the books before he leaves. If you have any others that are close we can now get them approved rather quickly.

Thanks,

**Lance D. Harbour**  
**Hazard Mitigation Planner**  
**NH Homeland Security and Emergency Management**  
**33 Hazen Drive**  
**Concord, NH 03305**  
**Office: (603) 223-3633**  
**Cell: (603) 419-0313**  
**Fax: (603) 223-3609**  
**Toll-Free: 1-800-852-3792**

**C. Signed Certificate of Adoption****CERTIFICATE OF ADOPTION**

Town of Lincoln, New Hampshire

Board of Selectmen

**A Resolution Adopting the Lincoln Multi-Hazard Mitigation Plan**

Plan Dated: March 3, 2010  
 Conditionally Approved: June 21<sup>st</sup> 2010

WHEREAS, the Town of Lincoln received funding from the NH Office of Homeland Security and Emergency Management under a Flood Mitigation Assistance Project Grant and assistance from North Country Council in the preparation of the Lincoln Multi-Hazard Mitigation Plan; and

WHEREAS, several public planning meetings were held between April 9, 2009 to June 25, 2009 regarding the development and review of the Lincoln Multi-Hazard Mitigation Plan; and

WHEREAS, the Lincoln Multi-Hazard Mitigation Plan contains several potential future projects to mitigate hazard damage in the Town of Lincoln; and

WHEREAS, a duly-noticed public meeting was held by the Lincoln Board of Selectmen on 6/21, 2010 to formally approve and adopt the Lincoln Multi-Hazards Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Lincoln Board of Selectmen adopts the Lincoln Multi-Hazard Mitigation Plan.

ADOPTED AND SIGNED this day of 6/21, 2010

Peter E. Moore

Lincoln Board of Selectmen

Chair

Town Seal or Notary

Brook Steiner

Date June 21, 2010





**D. Final Approval Letter from FEMA**

U.S. Department of Homeland Security  
 Region I  
 99 High St, 6th Floor  
 Boston, MA 02110-2320



**FEMA**

September 10, 2010

Peter Moore, Chairman  
 Lincoln Board of Selectmen  
 Selectmen's Office  
 PO Box 25  
 Lincoln, NH 03251

Dear Mr. Moore:

Thank you for the opportunity to review the Town of Lincoln's Multi-Hazard Mitigation Plan Update. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I has evaluated the plan for compliance with the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR Parts 201 and 206). The plan satisfactorily meets all of the mandatory requirements set forth by the regulations. Congratulations on this achievement!

With this plan approval, the Town of Lincoln is eligible to apply for Mitigation Grants administered by FEMA. Requests for mitigation funding will be evaluated individually according to the specific eligibility and requirements of each of these programs. It is important to note, however that a specific mitigation activity or project identified in your community's plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under the programs referenced above.

The Town Lincoln's Multi-Hazard Mitigation plan must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within five years of the **plan approval date of June 21, 2010** in order to maintain eligibility as an applicant for mitigation grants. Over the next five years, we encourage the Town of Lincoln to continue updating the plan's assessment of vulnerability, adhere to its maintenance schedule, and begin implementing, when possible, the mitigation actions proposed in the plan.

Once again, thank you for your continued dedication to public service demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please do not hesitate to contact Marilyn Hilliard at (617) 956-7536.

Sincerely,

Don R. Boyce  
 Regional Administrator

Enclosure

Cc: Richard Verville, State Hazard Mitigation Officer, NH  
 Lance Harbour, Hazard Mitigation Planner, NH  
 June Garneau, Planner, North Country Council, Inc.



**E. CWPP Approval Letter from DRED**

Lincoln, NH  
 A Resolution Approving the  
 Lincoln Multi-Hazard Mitigation Plan  
 As a Community Wildfire Protection Plan

Several public meetings and committee meetings were held between April 9, 2009 to June 25, 2009 regarding the development and review of the Lincoln Multi-Hazards Mitigation Plan. The Lincoln Multi-Hazards Mitigation Plan contains potential future projects to mitigate hazard and wildfire damage in the town of Lincoln.

The Fire Chief along with the Select Board and EMD desire that this Plan and be accepted by the Department of Resources and Economic Development (DRED) as a Community Wildfire Protection Plan, having adhered to the requirements of said Plan.

The Select Board, EMD and the Lincoln Fire Chief approve the Lincoln Multi-Hazards Mitigation Plan and understand that with approval by DRED, this Plan will also serve as a Community Wildfire Protection Plan.

For the Town of Lincoln

APPROVED and SIGNED this day, 6/21, 2010.

Peter E. Moore  
 Chairman Select Board  
[Signature]  
 Emergency Management Director  
Wah Haynes  
 Lincoln Fire Chief

For the Department of Resources and Economic Development

APPROVED and SIGNED this day, 10/25, 2010.

Steven Sherman  
 Forest Ranger – NH Division of Forest and Lands, DRED

APPROVED and SIGNED this day, 10/28, 2010.

[Signature]  
 Director – NH Division of Forest and Lands, DRED

## Appendices

APPENDIX A: BIBLIOGRAPHY

APPENDIX B: ALPHABETICAL LIST OF HAZARD DEFINITIONS

APPENDIX C: SUMMARY OF POSSIBLE MULTI-HAZARD MITIGATION STRATEGIES

APPENDIX D: LIST OF CONTACTS

APPENDIX E: TECHNICAL AND FINANCIAL ASSISTANCE FOR MULTI-HAZARD MITIGATION

*Hazard Mitigation Grant Program (HMGP)*

*Pre-Disaster Mitigation (PDM)*

*Flood Mitigation Assistance (FMA)*

*Repetitive Flood Claims (RFC)*

*Severe Repetitive Loss (SRL)*

APPENDIX F: WILDFIRE PLANNING

*Wildfire Terminology*

*Wildfire Funding*

*Assessed Value of WUI Damages – 2007 Wildfire Plan*

APPENDIX G: FLOOD HAZARD PLANNING

*Assessed Value of Floodplain Damages*

APPENDIX H: ACRONYMS

MAP DOCUMENTS

*Map 1 – Base Risk Analysis*

*Map 2 – Historic Fires & the Wildland Urban Interface (WUI)*

*Map 3 – Past & Potential Hazardous Areas*

*Map 4 – Critical Infrastructure & Key Resources*

## Appendix A: Bibliography

### Documents

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## Appendix B: Alphabetical List of Hazard Definitions

**Note:** Hazards identified in this Plan are indicated with an asterisk \*

### Civil Disturbance

The character of many Northern New Hampshire communities is quite rural and much of the population is armed. In addition, this rural character fosters a sense of independence. Worsening economic conditions and friction over zoning and other community regulations can create tension. Long winters also can result in a type of "cabin fever" and the temperament of summer residents and visitors is often unknown. Several roads serve as a corridor between NH and Canada, and as such, are attractive back road corridors in or out of the USA. Based on all of these factors and the history of civil disturbances in nearby communities, there is some concern for the potential risk of civil disturbances in parts of the North Country.

### \*Dam 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.

In the State of New Hampshire there are both structural dams and earthen dams.

### \*Drought

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects the growing season or living conditions of plants and animals. 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 drought 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 groundwater levels or increasing stream flow. Low stream flow also correlates with low groundwater levels because groundwater discharge to streams and rivers maintains stream flow during extended dry periods. Low stream flow and low groundwater levels commonly cause diminished water supply.

### \*Earthquake

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 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.

### \*Epidemic/Pandemic

The Center for Disease Control's (CDC) official definition of an epidemic is: "The occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time."<sup>20</sup>

### \*Erosion, Landslide & Mudslide

#### Erosion and Mudslides

Erosion is the process of wind and water wearing away soil. Typically in New Hampshire, the land along rivers is relatively heavily developed. Mudslides may form when a layer of soil atop a slope becomes saturated by significant precipitation and slides along a more cohesive layer of soil or rock.

Erosion and mudslides become significant threats to development during floods. Floods speed up the process of erosion and increase the risk of mudslides.

#### Landslide

A landslide is the downward or outward movement of slope-forming materials reacting under the force of gravity and includes: mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides and earth flows. Landslides have damaged or destroyed roads, railroads, pipelines, electrical and telephone lines, mines, oil wells, buildings, canals, sewers, bridges, dams, seaports, airports, forests, parks and farms.

<sup>20</sup> Slate; <http://www.slate.com/id/2092969/>



### Expansive Soils

According to the USGS, expansive soils are soils that shrink or swell as the moisture content decreases or increases. Structures built on these soils may experience shifting, cracking, and breaking damage as soils shrink and subside or expand.

Soils freezing during winter and thawing in spring may result in some structural damage in New Hampshire, primarily in the form of foundation cracks and potholes on the state's roads.

### \*Extended Power Failure

Extended power failure as intended in this Plan is power failure that lasts for periods of one week or more. Power failure can be caused by many things: downed power lines (due to storm, wind, accident, etc); failure of public utilities to operate or failure of the national grid. Extended power failure can present not only lighting difficulties but also heating, water supply and emergency services. Extended power failure is particularly hazardous in remote areas and for elderly populations.

### \*Extreme Temperatures

**Extreme Heat:** A Heat Wave is a "Prolonged period of excessive heat, often combined with excessive humidity." Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.

Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

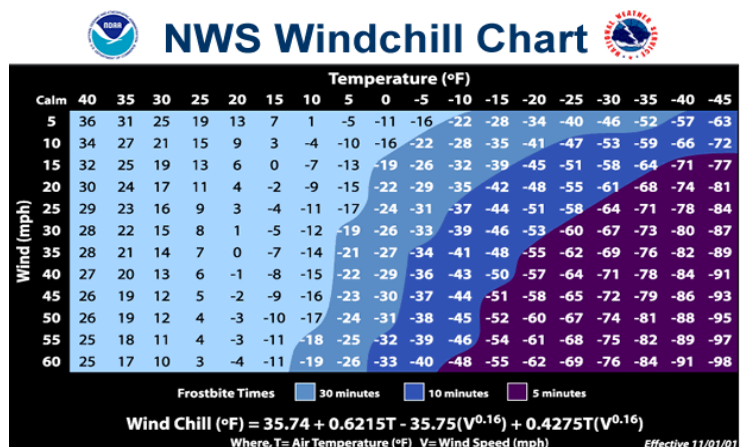
Category	Heat Index	Possible heat disorders for people in high risk groups
Extreme Danger	130°F or higher (54°C or higher)	Heat stroke or sunstroke likely.
Danger	105 - 129°F (41 - 54°C)	Sunstroke, muscle cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme Caution	90 - 105°F (32 - 41°C)	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	80 - 90°F (27 - 32°C)	Fatigue possible with prolonged exposure and/or physical activity.

Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."<sup>21</sup>

The chart above explains possible health conditions that may result from high heat.<sup>22</sup>

**Extreme Cold:** What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly; these weather related conditions may lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people, without shelter or who are stranded, or who live in a home that is poorly insulated or without heat.<sup>23</sup>

The National Weather Service Chart shows Windchill as a result of wind and temperature.<sup>24</sup>



<sup>21</sup> NOAA, Index/Heat Disorders; <http://www.srh.noaa.gov/ssd/html/heatwv.htm>

<sup>22</sup> FEMA; <http://www.fema.gov/hazard/heat/index.shtm>

<sup>23</sup> CDC; [http://emergency.cdc.gov/disasters/winter/pdf/cold\\_guide.pdf](http://emergency.cdc.gov/disasters/winter/pdf/cold_guide.pdf)

<sup>24</sup> National Weather Service; <http://lwf.ncdc.noaa.gov/oa/climate/conversion/windchill.html>

**\*Flood**

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 flood will occur once every 100 years. 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 flood". What this means is that there is a 1% chance of a flood of that size happening in any year.

**Rapid Snow Pack Melt**

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

**River Ice Jams**

Rising waters in early spring often breaks ice into chunks that float downstream and pile up, causing flooding behind them. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice in riverbeds and against structures presents a significant flooding threat 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.

**\*Hailstorm**

Hailstones are balls of ice that grow as they're held up by winds, known as updrafts that blow upwards in thunderstorms. The updrafts carry droplets of super-cooled water – water at a below-freezing temperature that is not yet ice. The super cooled water droplets hit the balls of ice and freeze instantly, making the hailstones grow. The faster the updraft, the bigger the stones can grow. Most hailstones are smaller in diameter than a dime, but stones weighing more than a pound have been recorded. Details of how hailstones grow are complicated, but the results are irregular balls of ice that can be as large as baseballs, sometimes even bigger. While crops are the major victims, hail is also a hazard to vehicles and windows.

**\*Hazardous Material - Fixed Location and/or \*Transport (transportation accident)**

Chemicals are found everywhere; they purify drinking water, increase crop production, and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. A community is at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work, or play.

Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites. Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States--from major industrial plants to local dry cleaning establishments or gardening supply stores.

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in plants.<sup>25</sup>

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<sup>25</sup> FEMA; <http://www.fema.gov/hazard/hazmat/index.shtml>

**\*High Winds (windstorm)**

**As stated by NOAA, wind is defined as** "The horizontal motion of the air past a given point. Winds begin with differences in air pressures. Those pressures which are higher at one place than another place set up a force pushing from the high pressure toward the low pressure; the greater the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air is accelerated. Meteorologists refer to the force that starts the wind flowing as the "pressure gradient force." High and low pressures are relative. There's no set number that divides high and low pressure. Wind is used to describe the prevailing direction from which the wind is blowing with the speed given usually in miles per hour or knots." In addition, NOAA's issuance of a Wind Advisory takes place when sustained winds reach 25 to 39 mph and/or gusts to 57 mph.<sup>26</sup>

Below is the Beaufort Wind Scale, showing expected damage based on wind (knots), developed in 1805 by Sir Francis Beaufort of England, and posted on NOAA's Storm Prediction Center website.<sup>27</sup>

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

<sup>26</sup> NOAA; <http://www.nws.noaa.gov/glossary/index.php?letter=w>

<sup>27</sup> NOAA, Storm Prediction Center, <http://www.spc.noaa.gov/faq/tornado/beaufort.html>

**\*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 the storm may extend over 400 miles. High winds are a primary cause of hurricane-inflicted loss of life and property damage.

Flooding is often caused from the coastal storm surge of the ocean and torrential rains, both of which may accompany a hurricane; these floods can result in loss of lives and property.

**Land Subsidence**

As stated by USGS, "land subsidence is a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of earth materials. Subsidence is a global problem and, in the United States, more than 17,000 square miles in 45 States, an area roughly the size of New Hampshire and Vermont combined, have been directly affected by subsidence."<sup>28</sup>

"The principal causes are aquifer-system compaction, drainage of organic soils, underground mining, hydro compaction, natural compaction, sinkholes, and thawing permafrost. More than 80 percent of the identified subsidence in the Nation is a consequence of our exploitation of underground water, and the increasing development of land and water resources threatens to exacerbate existing land-subsidence problems and initiate new ones."<sup>29</sup>

**\*Levee Failure**

A levee is a natural or artificial slope or wall, usually earthen and often parallel to the course of a river. The main purpose of an artificial levee is to prevent flooding of the adjoining countryside; however, they also confine the flow of the river, resulting in higher and faster water flow.

Levees can fail in a number of ways; the most frequent (and dangerous) form of levee failure is a breach. A breach is when part of the levee actually breaks away, leaving a large opening for water to flood the land protected by the levee. A breach can be a sudden or gradual failure that is caused either by surface erosion or by a subsurface failure of the levee.

Sometimes levees are said to fail when water overtops the levee, usually when flood waters exceed the crest of the levee. Overtopping, as this is called, can lead to significant landside erosion of the levee or be the cause of a complete breach.

**Radon**

Radon is a cancer-causing radioactive gas. You cannot see, smell or taste radon, but it may be a problem in your home. The Surgeon General has warned that radon is the second leading cause of lung cancer in the United States today. If you smoke and your home has high radon levels, you're at high risk for developing lung cancer. Some scientific studies of radon exposure indicate that children may be more sensitive to radon. This may be due to their higher respiration rate and their rapidly dividing cells, which may be more vulnerable to radiation damage. The diagram to the right shows how radon enters a house.<sup>30</sup>

Since many of NH residents rely on well water and/or live in older homes that are not sealed for radon protection, radon levels are a concern in many communities. Home testing kits may be purchased for a reasonable fee at local hardware and home improvement stores.

**\*Severe Thunderstorms & Lightning**

All thunderstorms contain lightning. During a lightning discharge, the sudden heating of the air causes it to expand rapidly. After the discharge, the air contracts quickly as it cools back to ambient temperatures. This rapid expansion and contraction of the air causes a shock wave that we hear as thunder, which can damage building walls and break glass.

Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground. As lightning passes through air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the sun.

Although thunder that is heard during a storm cannot hurt you, the lightning that is associated with the thunder can not only strike people but also strike homes, out-buildings, grass and trees sparking disaster. Wildfires and structure loss are at a high risk during severe lightning events.

<sup>28</sup> USGS, <http://water.usgs.gov/ogw/subsidence.html>

<sup>29</sup> Ibid

<sup>30</sup> How radon enters a house; [www.homeprocanada.ca/radon/HP\\_radon.htm](http://www.homeprocanada.ca/radon/HP_radon.htm)

Smaller than areas affected by hurricanes and winter storms, a typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Nearly 1,800 thunderstorms are happening at any moment around the world.

Although thunderstorms and their associated lightning can occur any time of year, they are most likely to occur in the summer months and during the later afternoon or early evening hours and may even occur during a winter snowstorm.

#### \*Severe Winter Storms

##### Ice & Snow Events

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 that freezes upon impact. Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires and similar objects. Ice storms often produce widespread power outages.

#### Small Plane Crashes

Occasionally, small airports are located within or near communities; these airports usually have turf or dirt runways, no navigational aids and no lights. Small airports often cater to light sport aircraft, ultralights, gliders, single engine planes and amateur built aircraft. The Code of Federal Regulations defines small aircraft to be "...aircraft of 12,500 pounds or less, maximum certificated takeoff weight."<sup>31</sup>

Although small plane accidents are infrequent, personal injury or death as well as a significant amount of structural damage can result. The Federal Aviation Administration (FAA) and the National Transportation Safety Board (NTSB) define an accident as "...an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, AND in which any person suffers death or serious injury or in which the aircraft receives substantial damage."<sup>32</sup>

#### \*Snow Avalanche

As defined by The American Heritage® Science Dictionary, an avalanche is the sudden fall or slide of a large mass of material down the side of a mountain. Avalanches may contain snow, ice, rock, soil, or a mixture of these materials. Avalanches can be triggered by changes in temperature, by sound vibrations, or by vibrations in the earth itself.<sup>33</sup>

Avalanche occurrence in the State of New Hampshire is primarily limited to the slopes of the Presidential Range where there is little or no tree cover.

#### \*Terrorism

Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom.

Terrorists often use threats to: *create fear among the public; try to convince citizens that their government is powerless to prevent terrorism; get immediate publicity for their causes.*

Acts of terrorism include: *threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons.*

<sup>31</sup> Code of Federal Regulations; Title 14, Aeronautics and Space; Part 1, Definitions and Abbreviations; <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=c758d3e7827620dab69ad30c6f7c8eab&rgn=div5&view=text&node=14:1.0.1.1.1&idno=14>

<sup>32</sup> Federal Aviation Administration; [http://faa.custhelp.com/cgi-bin/faa.cfg/php/enduser/std\\_adp.php?p\\_faaid=337&p\\_created=1215117735&p\\_sid=bpgT\\*cNj&p\\_accessibility=&p\\_lva=&p\\_sp=cF9zcmNoPSZwX3NvcnRfYnk9JnBfZ3JpZHNvcnQ9JnBfcm93X2NudD0mcF9wcm9kc20mcF9jYXRzPSZwX3B2PSZwX2N2PSZwX3BhZ2U9MQ\\*\\*&p\\_li=&p\\_topview=1](http://faa.custhelp.com/cgi-bin/faa.cfg/php/enduser/std_adp.php?p_faaid=337&p_created=1215117735&p_sid=bpgT*cNj&p_accessibility=&p_lva=&p_sp=cF9zcmNoPSZwX3NvcnRfYnk9JnBfZ3JpZHNvcnQ9JnBfcm93X2NudD0mcF9wcm9kc20mcF9jYXRzPSZwX3B2PSZwX2N2PSZwX3BhZ2U9MQ**&p_li=&p_topview=1)

<sup>33</sup> Avalanche; derived from The American Heritage® Science Dictionary Copyright © 2005 by Houghton Mifflin Company; posted online by The Free Dictionary, definition 1; <http://www.thefreedictionary.com/avalanche>

High-risk targets for acts of terrorism include: *military and civilian government facilities, international airports, large cities, and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers.* Further, terrorists are capable of spreading fear by sending explosives or chemical and biological agents through the mail.

Within the immediate area of a terrorist event, you would need to rely on police, fire, and other officials for instructions. However, you can prepare in much the same way you would prepare for other crisis events.<sup>34</sup>

#### \*Tornado & Downburst

A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. Tornadoes 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.

A downburst is a strong downdraft which causes damaging winds on or near the ground according to NOAA. Not to be confused with downburst, the term "microburst" describes the size of the downburst. A comparison of a microburst and the larger macroburst shows that both can cause extreme winds.

A microburst is a downburst with winds extending 2 ½ miles or less, lasting 5 to 15 minutes and causing damaging winds as high as 168 MPH.

A macroburst is a downburst with winds extending more than 2 ½ miles lasting 5 to 30 minutes. Damaging winds, causing widespread, tornado-like damage, could be as high as 134 MPH.

#### Violent Crime

The definition of violence as defined by US Legal Definitions states that "violence is a behavior by persons, against persons or property that intentionally threatens, attempts, or actually inflicts physical harm." In addition, US Legal Definitions goes on to say that the "most common violent crimes are aggravated assault, arson, assault and battery, domestic violence, hate crimes, homicide, manslaughter, mayhem, murder, terrorism and theft/larceny."<sup>35</sup> Homicides are considered to be the most serious of all violent crimes.

New Hampshire Crime Rates 2002 - 2008<sup>36</sup>

Year	Population	Violent	Property	Murder	Forcible Rape	Robbery	Aggravated Assault	Burglary	Larceny-Theft	Vehicle Theft
2002	1,274,405	2,056	26,250	12	446	413	1,185	4,838	19,468	1,944
2003	1,288,705	1,937	26,456	17	438	480	1,002	4,589	19,934	1,933
2004	1,299,169	2,202	26,658	17	466	500	1,219	4,979	19,723	1,956
2005	1,306,819	1,761	24,031	19	406	365	971	4,192	18,493	1,346
2006	1,314,895	1,824	24,642	13	344	423	1,044	4,358	18,862	1,422
2007	1,315,828	1,807	24,896	15	333	432	1,027	4,986	18,611	1,299
2008	1,315,809	2,069	27,526	13	391	419	1,246	4,286	21,853	1,387

<sup>34</sup> FEMA; <http://www.fema.gov/hazard/terrorism/info.shtm>

<sup>35</sup> US Legal, Inc.; <http://definitions.uslegal.com/v/violent-crimes/>

<sup>36</sup> The Disaster Center; selected years from <http://www.disastercenter.com/crime/nhcrime.htm>



**\*Wildfire**

"The threat of wildland fires for people living near wildland areas or using recreational facilities in wilderness areas is real. Dry conditions at various times of the year and in various parts of the United States greatly increase the potential for wildland fires.

Advance planning and knowing how to protect buildings in these areas can lessen the devastation of a wildland fire. There are several safety precautions that you can take to reduce the risk of fire losses. Protecting your home from wildfire is your responsibility. To reduce the risk, you'll need to consider the fire resistance of your home, the topography of your property and the nature of the vegetation close by."<sup>37</sup>



## ***Appendix C: Summary of Possible Multi-Hazard Mitigation Strategies***

### **I. RIVERINE MITIGATION**

#### **A. Prevention**

Prevention measures are intended to keep the problem from occurring in the first place, and/or keep it from getting worse. Future development should not increase flood damage. Building, zoning, planning, and/or code enforcement offices usually administer preventative measures.

**1. Planning and Zoning** - Land use plans are put in place to guide future development, recommending where - and where not - development should occur and where it should not. Sensitive and vulnerable lands can be designated for uses that would not be incompatible with occasional flood events - such as parks or wildlife refugees. A Capital Improvements Program (CIP) can recommend the setting aside of funds for public acquisition of these designated lands. The zoning ordinance can regulate development in these sensitive areas by limiting or preventing some or all development - for example, by designating floodplain overlay, conservation, or agricultural districts.

**2. Open Space Preservation** - Preserving open space is the best way to prevent flooding and flood damage. Open space preservation should not, however, be limited to the floodplain, since other areas within the watershed may contribute to controlling the runoff that exacerbates flooding. Land Use and Capital Improvement Plans should identify areas to be preserved by acquisition and other means, such as purchasing easements. Aside from outright purchase, open space can also be protected through maintenance agreements with the landowners, or by requiring developers to dedicate land for flood flow, drainage and storage.

**3. Floodplain Development Regulations** - Floodplain development regulations typically do not prohibit development in the special flood hazard area, but they do impose construction standards on what is built there. The intent is to protect roads and structures from flood damage and to prevent the development from aggravating the flood potential. Floodplain development regulations are generally incorporated into subdivision regulations, building codes, and floodplain ordinances.

**Subdivision Regulations:** These regulations govern how land will be divided into separate lots or sites. They should require that any flood hazard areas be shown on the plat, and that every lot has a buildable area that is above the base flood elevation.

**Building Codes:** Standards can be incorporated into building codes that address flood proofing for all new and improved or repaired buildings.

**Floodplain Ordinances:** Communities that participate in the National Flood Insurance Program are required to adopt the minimum floodplain management regulations, as developed by FEMA. The regulations set minimum standards for subdivision regulations and building codes. Communities may adopt more stringent standards than those set forth by FEMA.

#### **4. Stormwater Management**

Development outside of a floodplain can contribute significantly to flooding by covering impervious surfaces, which increases storm water runoff. Storm water management is usually addressed in subdivision regulations. Developers are typically required to build retention or detention basins to minimize any increase in runoff caused by new or expanded impervious surfaces, or new drainage systems. Generally, there is a prohibition against storm water leaving

<sup>37</sup> FEMA, Types of Disasters, Wildfires, <http://www.fema.gov/hazard/wildfire/index.shtml>

the site at a rate higher than it did before the development. One technique is to use wet basins as part of the landscaping plan of a development. It might even be possible to site these basins based on a watershed analysis. Since detention only controls the runoff rates and not volumes, other measures must be employed for storm water infiltration - for example, swales, infiltration trenches, vegetative filter strips, and permeable paving blocks.

### 5. Drainage System Maintenance

Ongoing maintenance of channel and detention basins is necessary if these facilities are to function effectively and efficiently over time. A maintenance program should include regulations that prevent dumping in or altering water courses or storage basins; regrading and filling should also be regulated. Any maintenance program should include a public education component, so that the public becomes aware of the reasons for the regulations. Many people do not realize the consequences of filling in a ditch or wetland, or regrading.

## B. Property Protection

Property protection measures are used to modify buildings subject to flood damage, rather than to keep floodwaters away. These may be less expensive to implement, as they are often carried out on a cost-sharing basis. In addition, many of these measures do not affect a building's appearance or use, which makes them particularly suitable for historical sites and landmarks.

**1. Relocation** - Moving structures out of the floodplain is the surest and safest way to protect against damage. Relocation is expensive, however, so this approach will probably not be used except in extreme circumstances. Communities that have areas subject to severe storm surges, ice jams, etc. might want to consider establishing a relocation program, incorporating available assistance.

**2. Acquisition** - Acquisition by a governmental entity of land in a floodplain serves two main purposes: 1) it ensures that the problem of structures in the floodplain will be addressed; and 2) it has the potential to convert problem areas into community assets, with accompanying environmental benefits. Acquisition is more cost effective than relocation in those areas that are subject to storm surges, ice jams, or flash flooding. Acquisition, followed by demolition, is the most appropriate strategy for those buildings that are simply too expensive to move, as well as for dilapidated structures that are not worth saving or protecting. Acquisition and subsequent relocation can be expensive, however, there are government grants and loans that can be applied toward such efforts.

**3. Building Elevation** - Elevating a building above the base flood elevation is the best on-site protection strategy. The building could be raised to allow water to run underneath it, or fill could be brought in to elevate the site on which the building sits. This approach is cheaper than relocation, and tends to be less disruptive to a neighborhood. Elevation is required by law for new and substantially improved residences in a floodplain, and is commonly practiced in flood hazard areas nationwide.

**4. Floodproofing** - If a building cannot be relocated or elevated, it may be floodproofed. This approach works well in areas of low flood threat. Floodproofing can be accomplished through barriers to flooding, or by treatment to the structure itself.

**Barriers:** Levees, floodwalls and berms can keep floodwaters from reaching a building. These are useful, however, only in areas subject to shallow flooding.

**Dry Floodproofing:** This method seals a building against the water by coating the walls with waterproofing compounds or plastic sheeting. Openings, such as doors, windows, etc. are closed either permanently with removable shields or with sandbags.

**Wet Floodproofing:** This technique is usually considered a last resort measure, since water is intentionally allowed into the building in order to minimize pressure on the structure. Approaches range from moving valuable items to higher floors to rebuilding the floodable area. An advantage over other approaches is that simply by moving household goods out of the range of floodwaters, thousands of dollars can be saved in damages.

**5. Sewer Backup Protection** - Storm water overloads can cause backup into basements through sanitary sewer lines. Houses that have any kind of connection to a sanitary sewer system - whether it is downspouts, footing drain tile, and/or sump pumps, can be flooded during a heavy rain event. To prevent this, there should be no such connections to the system, and all rain and ground water should be directed onto the ground, away from the building. Other protections include:

- Floor drain plugs and floor drain standpipe, which keep water from flowing out of the lowest opening in the house.
- Overhead sewer - keeps water in the sewer line during a backup.
- Backup valve - allows sewage to flow out while preventing backups from flowing into the house.

**6. Insurance** - Above and beyond standard homeowner insurance, there is other coverage a homeowner can purchase to protect against flood hazard. Two of the most common are National Flood Insurance and basement backup insurance.

**National Flood Insurance:** When a community participates in the National Flood Insurance Program, any local insurance agent is able to sell separate flood insurance policies under rules and rates set by FEMA. Rates do not change after claims are paid because they are set on a national basis.

**Basement Backup Insurance:** National Flood Insurance offers an additional deductible for seepage and sewer backup, provided there is a general condition of flooding in the area that was the proximate cause of the basement getting wet. Most exclude damage from surface flooding that would be covered by the NFIP.

### C. Natural Resource Protection

Preserving or restoring natural areas or the natural functions of floodplain and watershed areas provide the benefits of eliminating or minimizing losses from floods, as well as improving water quality and wildlife habitats. Parks, recreation, or conservation agencies usually implement such activities. Protection can also be provided through various zoning measures that are specifically designed to protect natural resources.

**1. Wetlands Protection** - Wetlands are capable of storing large amounts of floodwaters, slowing and reducing downstream flows, and filtering the water. Any development that is proposed in a wetland is regulated by either federal and/or state agencies. Depending on the location, the project might fall under the jurisdiction of the U.S. Army Corps of Engineers, which in turn, calls upon several other agencies to review the proposal. In New Hampshire, the N.H. Wetlands Board must approve any project that impacts a wetland. Many communities in New Hampshire also have local wetland ordinances.

Generally, the goal is to protect wetlands by preventing development that would adversely affect them. Mitigation techniques are often employed, which might consist of creating a wetland on another site to replace what would be lost through the development. This is not an ideal practice since it takes many years for a new wetland to achieve the same level of quality as an existing one, if it can at all.

**2. Erosion and Sedimentation Control** - Controlling erosion and sediment runoff during construction and on farmland is important, since eroding soil will typically end up in downstream waterways. Because sediment tends to settle where the water flow is slower, it will gradually fill in channels and lakes, reducing their ability to carry or store floodwaters.

**3. Best Management Practices** - Best Management Practices (BMPs) are measures that reduce non-point source pollutants that enter waterways. Non-point source pollutants are carried by storm water to waterways, and include such things as lawn fertilizers, pesticides, farm chemicals, and oils from street surfaces and industrial sites. BMPs can be incorporated into many aspects of new developments and ongoing land use practices. In New Hampshire, the Department of Environmental Services has developed Best Management Practices for a range of activities, from farming to earth excavations.

### D. Emergency Services

Emergency services protect people during and after a flood. Many communities in New Hampshire have emergency management programs in place, administered by an emergency management director (very often the local police or fire chief).

**1. Flood Warning** - On large rivers, the National Weather Service handles early recognition. Communities on smaller rivers must develop their own warning systems. Warnings may be disseminated in a variety of ways, such as sirens, radio, television, mobile public address systems, or door-to-door contact. It seems that multiple or redundant systems are the most effective, giving people more than one opportunity to be warned.

**2. Flood Response** - Flood response refers to actions that are designed to prevent or reduce damage or injury, once a flood threat is recognized. Such actions and the appropriate parties include:

- Activating the emergency operations center (emergency director)
- Sandbagging designated areas (public works department)
- Closing streets and bridges (police department)
- Shutting off power to threatened areas (public service)
- Releasing children from school (school district)
- Ordering an evacuation (selectmen/city council/emergency director)
- Opening evacuation shelters (churches, schools, Red Cross, municipal facilities)

These actions should be part of a flood response plan, which should be developed in coordination with the persons and agencies that share the responsibilities. Drills and exercises should be conducted so that the key participants know what they are supposed to do.

**3. Critical Facilities Protection** - Protecting critical facilities is vital, since expending efforts on these facilities can draw workers and resources away from protecting other parts of town. Critical facilities fall into two categories:

**Buildings or locations vital to the flood response effort:**

- Emergency operations centers
- Police and fire stations
- Hospitals
- Highway garages
- Selected roads and bridges
- Evacuation routes

**Buildings or locations that, if flooded, would create secondary disasters:**

- Hazardous materials facilities
- Water/wastewater treatment plants
- Schools
- Nursing homes

All such facilities should have their own flood response plan that is coordinated with the community's plan. Nursing homes, other public health facilities, and schools will typically be required by the state to have emergency response plans in place.

**4. Health and Safety Maintenance** - The flood response plan should identify appropriate measures to prevent danger to health and safety. Such measures include:

- Patrolling evacuated areas to prevent looting
- Vaccinating residents for tetanus
- Clearing streets
- Cleaning up debris

The Plan should also identify which agencies will be responsible for carrying out the identified measures. A public information program can be helpful to educate residents on the benefits of taking health and safety precautions.

## E. Structural Projects

Structural projects are used to prevent floodwaters from reaching properties. These are all man-made structures, and can be grouped into the six types discussed below. The shortcomings of structural approaches are:

- They can be very expensive
- They disturb the land, disrupt natural water flows, and destroy natural habitats.
- They are built to an anticipated flood event, and may be exceeded by a greater-than expected flood
- They can create a false sense of security.

**1. Reservoirs** - Reservoirs control flooding by holding water behind dams or in storage basins. After a flood peaks, water is released or pumped out slowly at a rate the river downstream can handle.

Reservoirs are suitable for protecting existing development, and they may be the only flood control measure that can protect development close to a watercourse. They are most efficient in deeper valleys or on smaller rivers where there is less water to store. Reservoirs might consist of man-made holes dug to hold the approximate amount of floodwaters, or even abandoned quarries. As with other structural projects, reservoirs:

- are expensive
- occupy a lot of land
- require periodic maintenance
- may fail to prevent damage from floods that exceed their design levels
- may eliminate the natural and beneficial functions of the floodplain.

Reservoirs should only be used after a thorough watershed analysis that identifies the most appropriate location, and ensures that they would not cause flooding somewhere else. Because they are so expensive and usually involve more than one community, they are typically implemented with the help of state or federal agencies, such as the Army Corps of Engineers.

**2. Levees/Floodwalls** - Probably the best known structural flood control measure is either a levee (a barrier of earth) or a floodwall made of steel or concrete erected between the watercourse and the land. If space is a consideration, floodwalls are typically used, since levees need more space. Levees and floodwalls should be set back out of the floodway, so that they will not divert floodwater onto other properties.

**3. Diversions** - A diversion is simply a new channel that sends floodwater to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During flood flows, the stream spills over the diversion channel or tunnel, which carries the excess water to the receiving lake or river. Diversions are limited by topography; they won't work everywhere. Unless the receiving water body is relatively close to the flood prone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive. Where topography and land use are not favorable, a more expensive tunnel is needed. In either case, care must be taken to ensure that the diversion does not create a flooding problem somewhere else.

**4. Channel Modifications** - Channel modifications include making a channel wider, deeper, smoother, or straighter. These techniques will result in more water being carried away, but, as with other techniques mentioned, it is important to ensure that the modifications do not create or increase a flooding problem downstream.

**Dredging:** Dredging is often cost-prohibitive because the dredged material must be disposed of in another location; the stream will usually fill back in with sediment. Dredging is usually undertaken only on larger rivers, and then only to maintain a navigation channel.

**Drainage Modifications:** These include man-made ditches and storm sewers that help drain areas where the surface drainage system is inadequate or where underground drainage ways may be safer or more attractive. These approaches are usually designed to carry the runoff from smaller, more frequent storms.

**5. Storm Sewers** - Mitigation techniques for storm sewers include installing new sewers, enlarging small pipes, street improvements, and preventing back flow. Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving body of water can absorb the increased flows without increased flooding. In many developments, streets are used as part of the drainage system, to carry or hold water from larger, less frequent storms. The streets collect runoff and convey it to a receiving sewer, ditch, or stream. Allowing water to stand in the streets and then draining it slowly can be a more effective and less expensive measure than enlarging sewers and ditches.

## F. Public Information

Public information activities are intended to advise property owners, potential property owners, and visitors about the particular hazards associated with a property, ways to protect people and property from these hazards, and the natural and beneficial functions of a floodplain.

**1. Map Information** - Flood maps developed by FEMA outline the boundaries of the flood hazard areas. These maps can be used by anyone interested in a particular property to determine if it is flood-prone. These maps are available from FEMA, the NH Homeland Security and Emergency Management (HSEM), the NH Office of Energy and Planning (OEP), or your regional planning commission.

**2. Outreach Projects** - Outreach projects are proactive; they give the public information even if they have not asked for it. Outreach projects are designed to encourage people to seek out more information and take steps to protect themselves and their properties. Examples of outreach activities include:

- Presentations at meetings of neighborhood groups
- Mass mailings or newsletters to all residents
- Notices directed to floodplain residents
- Displays in public buildings, malls, etc.
- Newspaper articles and special sections
- Radio and TV news releases and interview shows
- A local flood proofing video for cable TV programs and to loan to organizations
- A detailed property owner handbook tailored for local conditions. Research has shown that outreach programs work, although awareness is not enough. People need to know what they can do about the hazards, so projects should include information on protection measures. Research also shows that locally designed and run programs are much more effective than national advertising.

**3. Real Estate Disclosure** - Disclosure of information regarding flood-prone properties is important if potential buyers are to be in a position to mitigate damage. Federally regulated lending institutions are required to advise applicants that a property is in the floodplain. However, this requirement needs to be met only five days prior to closing, and by that time, the applicant is typically committed to the purchase. State laws and local real estate practice can help by making this information available to prospective buyers early in the process.

**4. Library** - Your local library can serve as a repository for pertinent information on flooding and flood protection. Some libraries also maintain their own public information campaigns, augmenting the activities of the various governmental agencies involved in flood mitigation.

**5. Technical Assistance** - Certain types of technical assistance are available from the NFIP Coordinator, FEMA, and the Natural Resources Conservation District. Community officials can also set up a service delivery program to provide one-on-one sessions with property owners.

An example of technical assistance is the *flood audit*, in which a specialist visits a property. Following the visit, the owner is provided with a written report detailing the past and potential flood depths and recommending alternative protection measures.

**6. Environmental Education** - Education can be a great mitigating tool if people can learn what not to do before damage occurs. The sooner the education begins the better. Environmental education programs for children can be taught in the schools, park and recreation departments, conservation associations, or youth organizations. An activity can be as involved as course curriculum development or as simple as an explanatory sign near a river.

Education programs do not have to be limited to children. Adults can benefit from knowledge of flooding and mitigation measures; decision makers, armed with this knowledge, can make a difference in their communities.

## II. EARTHQUAKES

### A. Preventive

1. Planning/zoning to keep critical facilities away from fault lines
2. Planning, zoning and building codes to avoid areas below steep slopes or soils subject to liquefaction
3. Building codes to prohibit loose masonry overhangs, etc.

### B. Property Protection

1. Acquire and clear hazard areas
2. Retrofitting to add braces, remove overhangs
3. Apply Mylar to windows and glass surfaces to protect from shattering glass
4. Tie down major appliances, provide flexible utility connections
5. Earthquake insurance riders

### C. Emergency Services

1. Earthquake response plans to account for secondary problems, such as fires and hazardous material spills

### D. Structural Projects

1. Slope stabilization

## III. DAM FAILURE

### A. Preventive

1. Dam failure inundation maps
2. Planning/zoning/open space preservation to keep area clear
3. Building codes with flood elevation based on dam failure
4. Dam safety inspections
5. Draining the reservoir when conditions appear unsafe

### B. Property Protection

1. Acquisition of buildings in the path of a dam breach flood
2. Flood insurance

### C. Emergency Services

1. Dam condition monitoring
2. Warning and evacuation plans based on dam failure



**D. Structural Projects**

1. Dam improvements, spillway enlargements
2. Remove unsafe dams

**IV. WILDFIRES****A. Preventive**

1. Zoning districts to reflect fire risk zones
2. Planning and zoning to restrict development in areas near fire protection and water resources
3. Requiring new subdivisions to space buildings, provide firebreaks, on-site water storage, wide roads, multiple accesses
4. Building code standards for roof materials and spark arrestors
5. Maintenance programs to clear dead and dry brush, trees
6. Regulation on open fires

**B. Property Protection**

1. Retrofitting of roofs and adding spark arrestors
2. Landscaping to keep bushes and trees away from structures
3. Insurance rates based on distance from fire protection

**C. Natural Resource Protection**

1. Prohibit development in high-risk areas

**D. Emergency Services**

1. Fire Fighting

**V. WINTER STORMS****A. Prevention**

1. Building code standards for light frame construction, especially for wind-resistant roofs

**B. Property Protection**

1. Storm shutters and windows
2. Hurricane straps on roofs and overhangs
3. Seal outside and inside of storm windows and check seals in spring and fall
4. Family and/or company severe weather action plan & drills:
  - include a **NOAA** Weather Radio
  - designate a shelter area or location
  - keep a disaster supply kit, including stored food and water
  - keep snow removal equipment in good repair; have extra shovels, sand, rock, salt and gas
  - know how to turn off water, gas, and electricity at home or work

**C. Natural Resource Protection**

1. Maintenance program for trimming trees and shrubs

**D. Emergency Services**

1. Early warning systems/NOAA Weather Radio
2. Evacuation plans

## Appendix D: List of Contacts

**NH Homeland Security & Emergency Management**  
Hazard Mitigation Section .....271-2231

**Federal Emergency Management Agency (Boston)** 877-336-2734

### NH Regional Planning Commissions:

Central NH Regional Planning Commission.....226-6020  
Lakes Region Planning Commission.....279-8171  
Nashua Regional Planning Commission.....424-2240  
North Country Council RPC .....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 RPC .....448-1680

### NH Executive Department:

New Hampshire Office Energy & Planning.....271-2155

**NH Department of Cultural Affairs** .....271-2540  
Division of Historical Resources.....271-3483

**NH Department of Environmental Services**.....271-3503  
Air Resources.....271-1370  
Waste Management.....271-2900  
Water Resources .....271-3406  
Water Supply and Pollution Control .....271-3434  
Rivers Management and Protection Program .....271-8801  
Bureau of Dams .....271-3503

**NH Fish and Game Department**.....271-3421

**NH DRED** .....271-2411  
Natural Heritage Inventory .....271-3623  
Division of Forests and Lands.....271-2214  
Division of Parks and Recreation .....271-3556

**NH Department of Transportation** .....271-3734

### US Department of Commerce:

National Oceanic and Atmospheric Administration:  
National Weather Service; Gray, Maine..... 207-688-3216

**US Department of Interior:**  
US Fish and Wildlife Service.....223-2541

**US Geological Survey** .....225-4681

**US Department of Agriculture:**  
Natural Resource Conservation Service .....868-7581

**New Hampshire State Police** .....846-3333

### Additional Websites of Interest

Natural Hazards  
Research Center, U. of Colorado  
<http://www.colorado.edu/hazards/>

National Emergency Management Association  
<http://nemaweb.org>

NASA-Earth Observatory  
[http://earthobservatory.nasa.gov/NaturalHazards/category.php?cat\\_id=12](http://earthobservatory.nasa.gov/NaturalHazards/category.php?cat_id=12)

NASA Natural Disaster Reference  
Reference of worldwide natural disasters  
<http://gcmd.nasa.gov/records/NASA-NDRD.html>

National Weather Service  
Weather Warnings, 60 Second Updates  
<http://nws.noaa.gov>

FEMA, National Flood Insurance  
Program, Community Status Books  
<http://fema.gov/business/nfip/>

Florida State & NWS University Atlantic  
Hurricane Site  
<http://www.met.fsu.edu/orgs/explores/>

National Lightning Safety Institute  
List of Lightning Safety Publications  
<http://lightningsafety.com>

NASA Optical Transient Detector  
Space-based sensor of lightning strikes  
<http://www.gr.ssr.upm.es/~jambrina/rayos/thunder.msfc.nasa.gov/otd.html>

LLNL Geologic & Atmospheric Hazards  
General Hazard Information  
<https://www.llnl.gov/>

The Tornado Project Online  
Recent tornado information & details  
<http://www.tornadopproject.com/>

National Severe Storms Laboratory  
Information & tracking of severe storms  
<Http://www.nssl.noaa.gov/>

USDA Forest Service  
Forest Fire & Land Management Information  
<http://www.fs.fed.us/fire>

## Appendix E: Technical and Financial Assistance for Multi-Hazard Mitigation

FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs<sup>38</sup>:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims (RFC)
- Severe Repetitive Loss (SRL)

FEMA's HMA grants are provided to eligible Applicants (States/Tribes/Territories) that, in turn, provide sub-grants to local governments and communities. The Applicant selects and prioritizes subapplications developed and submitted to them by subapplicants. These subapplications are submitted to FEMA for consideration of funding. Prospective subapplicants should consult the office designated as their Applicant for further information regarding specific program and application requirements. Contact information for the FEMA Regional Offices and State Hazard Mitigation Officers is available on the FEMA website, [www.fema.gov](http://www.fema.gov).

**Table 2: Eligible Subapplicants**

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

*Eligibility Chart taken from the FY 2010 Hazard Mitigation Assistance (HMA) Unified Guidance<sup>39</sup>*

### HMA Grant Programs

The HMA grant programs provide funding opportunities for pre- and post-disaster mitigation. 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. Brief descriptions of the HMA grant programs can be found below. For more information on the individual programs, or to see information related to a specific Fiscal Year, please click on one of the program links.

### A. Hazard Mitigation Grant Program (HMGP)

HMGP assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities.

#### What is the 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. Authorized under Section 404 of the Stafford Act and administered by FEMA, HMGP was created to reduce the loss of

<sup>38</sup> Information in Appendix E is taken from the following website and links to specific programs unless otherwise noted; <http://www.fema.gov/government/grant/hma/index.shtm>

<sup>39</sup> FY 2010 Hazard Mitigation Assistance (HMA) Unified Guidance; <http://www.fema.gov/library/viewRecord.do?id=3649>

life and property due to natural disasters. The program enables mitigation measures to be implemented during the immediate recovery from a disaster.

#### **Who is eligible to apply?**

Hazard Mitigation Grant Program funding is only available to applicants that reside within a presidentially declared disaster area. Eligible applicants are

- State and local governments
- Indian tribes or other tribal organizations
- Certain non-profit organizations

Individual homeowners and businesses may not apply directly to the program; however a community may apply on their behalf.

#### **How are potential projects selected and identified?**

The State's administrative plan governs how projects are selected for funding. However, proposed projects must meet certain minimum criteria. These criteria are designed to ensure that the most cost-effective and appropriate projects are selected for funding. Both the law and the regulations require that the projects are part of an overall mitigation strategy for the disaster area.

The State prioritizes and selects project applications developed and submitted by local jurisdictions. The State forwards applications consistent with State mitigation planning objectives to FEMA for eligibility review. Funding for this grant program is limited and States and local communities must make difficult decisions as to the most effective use of grant funds.

For more information on the **Hazard Mitigation Grant Program (HMGP)**, go to:  
<http://www.fema.gov/government/grant/hmgp/index.shtm>

## **B. Pre-Disaster Mitigation (PDM)**

PDM provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects prior to a disaster. The goal of the PDM program is to reduce overall risk to the population and structures, while at the same time, also reducing reliance on Federal funding from actual disaster declarations.

#### **Program Overview**

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.

## C. Flood Mitigation Assistance (FMA)

FMA provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program.

### Program Overview

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.

### Types of FMA Grants

Three types of FMA grants are available to States and communities:

- **Planning Grants** to prepare Flood Mitigation Plans. Only NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project grants
- **Project Grants** to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. States are encouraged to prioritize FMA funds for applications that include repetitive loss properties; these include structures with 2 or more losses each with a claim of at least \$1,000 within any ten-year period since 1978.
- **Technical Assistance Grants** for the State to help administer the FMA program and activities. Up to ten percent (10%) of Project grants may be awarded to States for Technical Assistance Grants

## D. Repetitive Flood Claims (RFC)

RFC provides funds on an annual basis to reduce the risk of flood damage to individual properties insured under the NFIP that have had one or more claim payments for flood damages. RFC provides up to 100% federal funding for projects in communities that meet the reduced capacity requirements.

### Program Overview

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).

### Federal / Non-Federal Cost Share

FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the Applicant has demonstrated that the proposed activities cannot be funded under the Flood Mitigation Assistance (FMA) program.

## E. Severe Repetitive Loss (SRL)

SRL provides funds on an annual basis to reduce the risk of flood damage to residential structures insured under the NFIP that are qualified as severe repetitive loss structures. SRL provides up to 90% federal funding for eligible projects.

### Program Overview

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 (NFIP).

### Definition

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.

### Purpose:

To reduce or eliminate claims under the NFIP through project activities that will result in the greatest savings to the National Flood Insurance Fund (NFIF).

### Federal / Non-Federal cost share:

75 / 25 %; up to 90 % Federal cost-share funding for projects approved in States, Territories, and Federally-recognized Indian tribes with FEMA-approved Standard or Enhanced Mitigation Plans or Indian tribal plans that include a strategy for mitigating existing and future SRL properties.



## ***Appendix F: Wildfire Planning***

### **A. Wildfire Terminology**

**Aspect** - Direction toward which a slope faces.

**At-Risk Community** - Group of homes or other improvements within or adjacent to federal land in which conditions are conducive to a large-scale wildland fire and pose a significant threat to human life or property.

**Cistern** - A tank that stores water.

**Community Wildfire Protection Program** - A plan developed by a community at risk from wildfire directed by a planning process outlined by the US Forest Service.

**Defensible Space** - A designated area around a home that is intentionally maintained to be free of features that would increase the risk or damage from wildfire.

**Dry Hydrant** - A non-pressurized pipe system permanently installed in existing lakes, ponds, and streams that provides means of suction supply of water to a tank truck. The dry hydrant system gives the trucks access to water sources from a main road.

**Fire Break** - A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

**Fuel** - Combustible material includes vegetation, such as grass, leaves, ground litter, plants, shrubs and trees that feed a fire.

**Fuel Loading** - The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

**Mitigation** - An effort to reduce or eliminate the impacts of injury or damage from a hazard or disaster.

**Mutual Aid Agreement** - Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, by furnishing personnel and equipment.

**Prescribed Fire (RX Burn)** - Any fire ignited by management actions under certain, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition on Federal land.

**Red Flag Warning** - Term used by fire weather forecasters to alert forecast users to an ongoing or eminent critical fire weather pattern.

**Slash** - The remnants of tree limbs, thinning, and ground fuel reduction.

**Slope** - The variation of terrain from the horizontal; the number of feet rise or fall per 100 feet measured horizontally, expressed as a percentage.

**Suppression** - The work of extinguishing or containing a fire, beginning with its discovery.

**Surface Fuels** - Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity.

**Wildfire** - An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

**Wildland Fire** - A wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities.

**Wildland/Urban Interface (WUI)** - The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

## B. Wildfire Funding

This funding chart provides information about key grant programs and a number of sources that could be beneficial to implementation of the wildfire portion of the Multi-Hazard Mitigation Plan. Funding sources from many federal, state and local sources may change periodically, be discontinued or new programs could be developed after the publication of this planning document. For the most up-to-date information, the Town should always consult the source itself before applying for funding. This chart attempts to identify, to best ability, the most local contact information, however, this information can also change over time. As a part of updating this plan in the future, this chart should be revised

TITLE	DEPARTMENT	CONTACT INFORMATION	PURPOSE	GRANT AMOUNT
<b>Rural Fire Assistance</b>	Department of the Interior	FWS Steve Hubner 757-986-3409 ext 104 steve_hubner@fws.gov	The RFA program provides funds for RFDs that: <ul style="list-style-type: none"> <li>•Protect rural, wildland-urban interface communities</li> <li>•Play a substantial cooperative role in the protection of federal lands</li> <li>•Are cooperators with the Department of the Interior (DOI) managed lands through cooperative agreements with the DOI, or their respective state, tribe, or equivalent</li> <li>•Are less than 10,000 in population</li> </ul>	Maximum Award \$20,000
<b>Assistance to Firefighters Grant</b>	Dept. of Homeland Security Office of Grants and Training	www.firegrantsupport.com	Awards one-year grants directly to fire dept. and nonaffiliated emergency medical service org. in order to enhance their ability with respect to fire and fire-related hazards.	varies
<b>Fire Prevention and Safety</b>	Dept. of Homeland Security	1-866-274-0960 www.firegrantsupport.com	The purpose is to reduce losses due to fire related hazards through public education, arson prevention, code enforcement, wildfire prevention/awareness and education, data collection and analysis.	Federal share limited to \$1M
<b>Staffing For Adequate Fire and Emergency Response Grant</b>	Dept. of Homeland Security	www.firegrantssupport.com	To provide funding directly to fire departments and volunteer firefighter interest organizations to help increase the number of firefighters. To enhance the ability of fire departments to attain staffing and to have adequate protection.	
<b>Fire Management Assistance Grant</b>	FEMA	Region I Boston, MA 877-336-2734	Disaster assistance grant program available to states, local governments, and Indian tribes with mitigation, management, and control fires burning on publicly or private forests that threaten such destruction as would constitute a major disaster.	

**C. Assessed Value of WUI Damages – 2007 Wildfire Plan**

Lincoln WUI Cost Analysis Data		
Name/Address	Assessed Value	Potential Loss Value
<b>High Risk Level</b>		
34 Crooked Mountain Road	\$59,580.00	\$29,194.20
Cold Spring Well (Route 3)	\$16,350.00	\$8,011.50
<b>High Risk Totals</b>	<b>\$75,930</b>	<b>\$37,206</b>

<b>Medium Risk Level</b>		
116 Woodland Loop	\$789,000.00	\$220,920.00
50 Parker Road	\$1,439,800.00	\$403,144.00
98 Woodland Loop	\$2,049,240.00	\$573,787.19
130 Woodland Loop	\$785,500.00	\$219,940.00
128 Woodland Loop	\$785,500.00	\$219,940.00
126 Woodland Loop	\$392,750.00	\$109,970.00
124 Woodland Loop	\$7,855,000.00	\$2,199,400.00
122 Woodland Loop	\$739,580.00	\$207,082.41
118 Woodland Loop	\$788,500.00	\$220,780.00
25 Queens Way	\$196,220.00	\$54,941.60
112 Woodland Loop	\$757,890.00	\$212,209.20
110 Woodland Loop	\$781,200.00	\$218,736.00
109 Woodland Loop	\$112,720.00	\$31,561.60
100 Woodland Loop	\$1,108,740.00	\$310,447.19
26 White Oak Lane	\$15,488,600.00	\$4,336,808.00
114 Woodland Loop	\$782,760.00	\$219,172.80
120 Woodland Loop	\$733,530.00	\$205,388.41
<b>Medium Risk Totals</b>	<b>\$35,586,530</b>	<b>\$9,964,228</b>

<b>Low Risk Level</b>		
<b>Low Risk Totals</b>	<b>\$0</b>	<b>\$0</b>

<b>Summary</b>		
Total Structures in WUI		<b>19</b>
Total Assessed Value		<b>\$35,662,460</b>
Total Loss Value		<b>\$10,001,434</b>

## ***Appendix G: Flood Hazard Planning***

### **Assessed Value of Flood Plain Damages**

There were no identified structures in Lincoln's 100-year Flood Zone; therefore, no assessed value of potential damage was needed.

However, it should be noted that Lincoln is hopeful that new base elevation models will be done in the near future; this could effectively alter the current 100-year flood zone.

## Appendix H: Acronyms

### Multi-Hazard Mitigation Planning List of Acronyms

EOC .....	Emergency Operations Center
EMD .....	Emergency Management Director
HSEM.....	Homeland Security & Emergency Management (NH)
FEMA .....	Federal Emergency Management Administration
NCC .....	North Country Council
WUI .....	Wildland Urban Interface
NFS .....	National Forest Service
USFS.....	United States Forest Service
WMNF.....	White Mountain National Forest
CI/KR.....	Critical Infrastructure & Key Resources
EMS .....	Emergency Medical Services
ERF .....	Emergency Response Facility
NERF .....	Non-Emergency Response Facility
FPP .....	Facilities & Populations to Protect
PR .....	Potential Resources
LEOP.....	Local Emergency Operations Plan
CIP .....	Capital Improvements Program
DRED .....	Department of Resources & Economic Development
NCRC & D.....	North Country Resource Conservation & Development District
NFIP .....	National Flood Insurance Program
GIS .....	Geographic Information System
USGS .....	United States Geological Society
NHDOT .....	NH Department of Transportation
MOU.....	Memorandum of Understanding
SPNHF .....	Society for the Protection of New Hampshire Forests
USDA .....	US Department of Agriculture
NIMS .....	National Incident Management System
ICS .....	Incident Command System

## ***Map Documents***

**The following 11" x 17" maps are included in hard copy plans:**

Map 1 –Base Risk Analysis

Map 2 – Historic Wildfires & Wildland Urban Interface

Map 3 – Past & Potential Areas of Concern

Map 4 – Critical Infrastructure and Key Resources



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