Town of Dover
Local Hazard Mitigation Plan

Adopted August 18, 2015

Prepared for the Town of Dover
By the
Windham Regional Commission
# Table of Contents

INTRODUCTION AND PURPOSE .................................................................................. 1
WINDHAM REGION OVERVIEW ............................................................................. 1
DOVER TOWN PROFILE .......................................................................................... 2
   Existing Land Use Map ..................................................................................... 3
   Emergency Services ......................................................................................... 4
   Impact of Resorts .............................................................................................. 4

PLANNING PROCESS
   Documentation of the Planning Process ............................................................. 5
   Public Involvement and Input from Neighboring Communities ....................... 8

RISK ASSESSMENT
   Methodology ..................................................................................................... 9
   Identifying and Profiling Hazards ................................................................... 12
   Flooding and Fluvial Erosion .......................................................................... 12
   Special Flood Hazard Area and River Corridor Mapping ............................... 15
   Severe Winter Storm / Ice Storm .................................................................... 20
   High Winds ...................................................................................................... 25
   Wildfire / Structure Fire .................................................................................. 28
   Landslides ........................................................................................................ 30
   Power Failure ................................................................................................... 31

ASSESSING VULNERABILITY
   Structures in the SFHA .................................................................................... 32
   Repetitive Loss Structures ............................................................................ 33
   Participation in and Compliance with the NFIP ............................................. 33
   Critical Facilities in Dover ............................................................................. 34
   Community Facility Map ................................................................................ 35
   Development Trends ....................................................................................... 36
   Proposed Land Use Map from 2008 Town Plan ............................................ 37
   Transfer of Development Rights Map ............................................................. 38

MITIGATION STRATEGY
   Local Hazard Mitigation Goals ....................................................................... 38
   Relevant Town Plan Policies that Support Mitigation ..................................... 39
   Progress between 2010 and 2014 .................................................................. 40
   Ongoing Efforts ................................................................................................ 41
   Identification of Mitigation Actions ................................................................. 42
   Cost-Benefit Analysis ..................................................................................... 42
   Implementation of Mitigation Actions / Capabilities ..................................... 43
   Mitigation Actions Table ................................................................................ 44
   Existing Planning Mechanisms ....................................................................... 47

PLAN MAINTENANCE PROCESS
   Monitoring and Updating the Plan – Yearly Review ........................................ 49
   Plan Maintenance – 5 Year Update and Evaluation Process .......................... 49
   Post-Disaster Review/Update Procedure ......................................................... 51
   Continued Public Participation ....................................................................... 51

APPENDIX .............................................................................................................. 53
   Adoption Certificate ......................................................................................... 54
INTRODUCTION AND PURPOSE
This Hazard Mitigation Plan is NEW, and has never been approved by FEMA or adopted by the Town of Dover. The purpose of this plan is to assist the town of Dover in identifying all of the hazards facing the town and to identify strategies to begin reducing risks from identified highly likely hazards.

Hazard mitigation is any sustained and proactive action that reduces or eliminates risk for the long term to people and property from natural and human-caused hazards and their effects. Based on the results of previous Project Impact efforts, FEMA and state agencies have come to recognize that it is less expensive to prevent damage from disasters than to repeatedly repair damage after a disaster has struck. This plan recognizes that communities also have opportunities to identify mitigation strategies and measures during all of the other phases of Emergency Management – preparedness, response and recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe and identify what local actions that can be taken to reduce the severity of hazard related damage.

Hazard mitigation strategies and measures alter the hazard by: eliminating or reducing the frequency of occurrence; averting the hazard by redirecting the impact by means of a structure or land treatment; adapting to the hazard by modifying structures or standards; or avoiding the hazard by stopping or limiting development. Mitigation could include projects such as:

- Flood-proofing structures
- Tying down propane/fuel tanks in flood-prone areas
- Elevating furnaces and water heaters
- Identifying and modifying high traffic incident locations and routes
- Ensuring adequate water supply
- Elevating structures or utilities above flood levels
- Identifying and upgrading undersized culverts
- Planning for land use for floodplains and other flood-prone areas
- Proper road maintenance and construction
- Ensuring critical facilities are safely located
- Establishing and enforcing appropriate building codes
- Public information

WINDHAM REGION OVERVIEW
Situated in Vermont’s southeastern corner, the Windham Region consists of 23 towns in Windham County, the neighboring towns of Readsboro, Searsburg, and Winhall in Bennington County, and Weston in Windsor County. The region is bordered by Massachusetts to the south and New Hampshire to the east. At over 920 square miles (590,000 acres), the region accounts for roughly 9.6% of the State’s total land area. The Windham Region has several distinctive identities, largely defined by the diverse natural environment.

The Region’s topography is relatively flat or gently rolling land in the Connecticut River valley in the east, while the western part of the region is characterized by the Green Mountain ridges
and peaks with narrow stream valleys. Stratton Mountain is the highest point in the region at 3,936 feet. The lowest point is along the Connecticut River in Vernon, at 200 feet.

In addition to the Connecticut, other major rivers of the region are the Deerfield, Green, North, Saxtons, West, and Williams, all tributaries of the Connecticut. There are two major flood control reservoirs on the West River, Ball Mountain and Townshend, and two major storage reservoirs for hydropower generation on the Deerfield River, Somerset and Harriman.

DOVER TOWN PROFILE
Community Background
Dover is a rural town of 22,912 acres or 35.8 square miles in southern Windham County. It is characterized by high, mountainous terrain. Significant topographic characteristics of Dover include a mountain ridge that runs north to south across the western border of the community. A second ridge runs down the center of the community from the north, geographically separating the west half of Dover from the east half. Due to its relatively high location and mountainous topography, Dover sometimes experience weather events that don’t affect surrounding towns to the same degree. Dover is bordered to the north by Wardsboro and Stratton, Somerset to the West, by Newfane to East, and by Wilmington to the South. State highway 100 runs north/south through Dover. Dover Hill Road is used by many tourists who travel from RT 30 through Dover to access the Ski Resorts in Wilmington and Dover. Dover’s population as of 2010 was 1,124.

In resort communities, it is important to recognize the consequences of a visitor population. Dover’s population varies significantly from season to season. Once primarily a winter resort town, Dover has experienced an increase in the number of visitors during the summer and fall. The high proportion of vacation units in Dover (approximately 75%) provides a measure of seasonal population flux. In addition, there are approximately 3,600 commercial lodging beds.1

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Land use and settlement patterns have been significantly influenced by the presence of Mount Snow. Most of the residential development that has occurred over the last 30 years is a response to the demand of housing and services by resort users. Much of the commercial development stretches along a 2½ mile portion of Route 100, creating a condition that may be described as sprawl.

Forestland is the most prominent landscape feature in Dover. The Green Mountain National Forest has considerable land holdings in the town. The western boundary of the town is part of the Green Mountain National Forest and has been designated primarily for recreation use. The National Forest Proclamation Boundary extends further into Dover and includes land still in private ownership.

Existing Land Use Map from the 2008 Dover Town Plan

The 2008 Dover Town Plan was readopted in January 2014 with no changes, so it remains the most recent plan.

Emergency Services
Dover currently depends on organizations located inside and outside of the community to provide necessary health care and emergency services. There are medical professionals located throughout the Deerfield Valley. Deerfield Valley Health Center in Wilmington and Mountain Sports Medicine, located at the base of Mount Snow was purchased by Southwestern Vermont Medical Center in 2007, and re-established as Base Camp RapidCare. It will be open during the ski season and during special events to service resort visitors’ injuries and illnesses.

Hospitals serving Dover residents are Grace Cottage Hospital in Townshend, Brattleboro Memorial Hospital in Brattleboro, and Southwestern Vermont Medical Center in Bennington. Some people travel to Hanover, NH and Albany, NY for major medical and surgical needs.

Deerfield Valley Rescue, Inc. (DVR) provides 24 hour ambulance coverage to Dover, Wilmington, Searsburg, Whitingham and Marlboro. DVR is staffed by two full-time paid staff members and volunteers trained in emergency care and transport. They have one ambulance stationed in West Dover. DVR is funded through a combination of subscription services, billing for services rendered, and donations. The East Dover Volunteer Fire Company, Inc. also provides emergency care to East Dover residents and assists DVR with its volunteer rescue squad emergency care attendants.

The Dover Police Department consists of a Police Chief, Sergeant, Investigator, 3 full-time Police Officers, 2 part-time Police Officers, and a Dispatcher/Office Manager. Vermont State Police and other law enforcement agencies assist in providing law enforcement coverage in Dover.

The Town is served by two fire departments: East Dover Volunteer Fire Company, Inc. and the West Dover Fire Department. Both departments participate in a mutual aid program, making personnel and equipment available to neighboring towns in the event of a shortage. Evacuation Plans for an incident at Vermont Yankee Nuclear Power Plant are on file with the Fire Department.

Many of the larger residential and commercial developments in Town have installed water systems for fire protection. In areas that are not served by any water system, the fire department must obtain water from surface waters. In some locations, water sources and dry hydrants have been installed.

There was a problem with communication between East and West Dover. To remedy this, the town radio antenna was moved to a different location for better coverage and a COW was brought in to improve cell communications. There has since been better cell coverage put in by providers.

Impact of Resorts
In winter, the town frequently experiences high winds, heavy wet snows, at least one event where the area is hammered by ice or rain on snow, creating havoc for the area residents. Typically, power outages occur after these types of weather events. At the same time these major snow events are happening, tourists are coming in droves to take advantage of the ski conditions. A small town of less than 1,200 permanent residents quickly turns into a large town with 10,000 – 20,000 residents on a winter weekend. This causes significant impact to the police
and fire departments. Man-power becomes inadequate when a small volunteer department is suddenly faced with a huge temporary increase in population. Additionally, development regulations in town are now allowing 3-4 story buildings, which is not what firefighters are accustomed to facing in rural Vermont.

The Fire Department is also faced with a unique situation in the Mt. Snow ski area. There are many private developments where the town is not responsible for the maintenance of roads, but instead the development is responsible. The roads are usually maintained in winter, but not always. Yet, if there is a structure fire within a private development, and the road has not had efficient snow removal, the Fire Department still has to get through. In those situations they are forced to seek assistance from the Highway Department.

PLANNING PROCESS

Town residents who took part in the planning process for developing the Pre-disaster Hazard Mitigation Plan for Dover tend to be affiliated with more than one association for the town. In rural areas of Vermont, it is typical that people who are most interested in the safety, health and welfare of their community will preside on more than one board, and for example, hold the role of Fire Chief, or school teacher, or be a small business owner, in addition to owning personal property in the town. Therefore, although the meeting may not have as many people in attendance as a more populated community would, those present at the meeting are representing not only a variety of roles, but many roles that would be held by numerous individuals in a more populated area.

Documentation of the Planning Process

This Single Jurisdiction Hazard Mitigation Plan is NEW, and has never been approved by FEMA or adopted by the Town of Dover.

Past Process
Dover began the process of developing this plan in the fall of 2010. Town Officials along with the Road Commissioner, Police Chief and Fire Chief met with the WRC Emergency Planner, Dinah Reed, on October 12, 2010 to discuss the town’s vulnerability to natural and man-made hazards and determine the risks involved as they relate to those hazards. A subsequent meeting took place on October 21, 2010 between Bob Holland, the Road Commissioner, and Dinah to talk about mitigation strategies with regards to road improvements in the town.

Representatives from Dover also participated in two regional public participation planning join events held by the Local Emergency Planning Commission (LEPC 6). Typically, members of most of the regions communities come to the monthly LEPC meeting. These meetings are also publicly advertised and open to the public. In the effort to give those attendees an opportunity to make comment on plans, LEPC programs for both the months of September and October 2010 were dedicated to the Pre-Disaster Mitigation Plan Process for all towns in the Windham Region. A presentation was made at the September meeting explaining the process and the meaning of a hazard analysis, with questions to follow. The October meeting provided an informal map exercise where numerous maps were posted for each town, and comment sheets provided for participants to write ideas/comments about areas in their towns facing potential
negative impacts from hazards. Information and photographs from the October 19 LEPC 6 meeting is included in Appendices 9-10.

Public Participation meetings held:

- September 21, 2010 LEPC 6 meeting – Brattleboro Memorial Hospital – Topic: Local Hazard Mitigation Planning Process
- October 12, 2010 – Dover Town Office public meeting
- September 21 and October 19, 2010 LEPC 6 meetings – Brattleboro Fire Department and Brattleboro Retreat – Topics: Pre-Disaster Hazard Mitigation Plans Overview and Interactive Map Viewing and Hazard Analysis Comments from Local Jurisdictions
- October 21, 2010 – Dover Road Commissioner Office public meeting

A plan was drafted from the information collected at these meetings, but was never completed or submitted for FEMA review. This was primarily because of Tropical Storm Irene. Although Dover suffered major damage from Tropical Storm Irene, other towns in the Windham region suffered more significant damage and had properties with buyouts. This required prioritization of developing hazard mitigation plans, which pushed Dover’s hazard mitigation plan timeline back.

**Current Process**
The Town commenced the planning process again in the fall of 2014 when the draft that was started in 2010 was picked back up for review and update. The Hazard Mitigation Planning participants reconvened on September 29, 2014 at the West Dover Fire Station and met with Alyssa Sabetto, Emergency Planner for the Windham Regional Commission. This meeting was open and advertised to the public. It lasted for several hours and involved:

- a detailed review of the draft document with discussion of more recent hazard events,
- progress made in mitigation efforts that were noted several years ago,
- development of new hazard mitigation projects,
- review of mapping of the town to note where hazard events are causing repeated or large scale damage, and

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3 See appendices 5-6 for sign in sheet and meeting agenda.
There were numerous changes that came out of that meeting. Alyssa Sabetto updated the draft per that meeting, presented the updated draft for review again by plan participants. Rich Werner, the local plan champion, brought the revised draft plan to the November 18, 2014 selectboard meeting where it was reviewed and discussed. There were several corrections that came out of that review and they were incorporated into the draft plan. The draft plan was then put out for public comment. This was done by posting and electronic copy on the town website and having a hard copy of the plan advertised and made available at the town office for public review and comment. It was distributed to adjacent towns for comment via email. No comments were received from either the public or adjacent towns. The plan was then finalized for submittal to VT DEMHS and FEMA.

The following people were involved in the hazard mitigation planning process:

<table>
<thead>
<tr>
<th>Participants (2010)</th>
<th>Affiliations</th>
<th>Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nona Monis</td>
<td>Dover Administration</td>
<td>Dover</td>
</tr>
<tr>
<td>Robert Holland</td>
<td>Road Commissioner</td>
<td>Dover</td>
</tr>
<tr>
<td>Robert Edwards</td>
<td>Police Chief</td>
<td>Dover</td>
</tr>
<tr>
<td>Richard Werner</td>
<td>West Dover Fire Chief; Dover School Board; Dover Police Department</td>
<td>Dover</td>
</tr>
<tr>
<td>Jon Abel</td>
<td>East Dover Fire Chief</td>
<td>Dover</td>
</tr>
<tr>
<td>Dinah Reed</td>
<td>Assistant Planner, Windham Regional Commission</td>
<td>Brattleboro</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participants (2014)</th>
<th>Affiliations</th>
<th>Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gerrie Golet</td>
<td>Planning Commission and DRB</td>
<td>Dover</td>
</tr>
<tr>
<td>David Cerchio</td>
<td>Zoning Authority, THO</td>
<td>Dover</td>
</tr>
<tr>
<td>Michelle Mann</td>
<td>Dover Police Department and 911 Coordinator</td>
<td>Dover</td>
</tr>
<tr>
<td>Bob Holland</td>
<td>Road Commissioner</td>
<td>Dover</td>
</tr>
<tr>
<td>Bill Short</td>
<td>Road Foreman</td>
<td>Dover</td>
</tr>
<tr>
<td>Randy Johnson</td>
<td>Dover Police Department</td>
<td>Dover</td>
</tr>
<tr>
<td>Heidi Taylor</td>
<td>Deerfield Valley Rescue</td>
<td>Dover</td>
</tr>
<tr>
<td>Rich Werner</td>
<td>Dover EMC; Dover PD; School Board; West Dover Fire Company</td>
<td>Dover</td>
</tr>
<tr>
<td>Jason Perl</td>
<td>Mount Snow Resort</td>
<td>Dover</td>
</tr>
<tr>
<td>Alyssa Sabetto</td>
<td>Planner, Windham Regional Commission</td>
<td>Brattleboro</td>
</tr>
</tbody>
</table>
Public Involvement and Input from Neighboring Communities

Making the Dover Pre-disaster Hazard Mitigation Plan available for public comment includes the following efforts. Evidence of these efforts is in the appendices of the plan:

- Between 2010 and mid 2014, the Dover Draft Plan was posted on the Windham Regional Commission website for public review and comment. No comments were received during this time.4
- Hard copies of the plan were made available at the Town Office and Library.5
- Hard copies of the plan were made available at the town meeting in March 2011.
- All 2010 meetings were advertised to the public.6
- The September 29, 2014 meeting was advertised twice in the local newspaper.7
- The September 29, 2014 meeting was advertised on the Town website.8
- The meeting was announced by Rich Werner at the September 16, 2014 Selectboard meeting.
- The draft plan was reviewed and discussed at the November 18, 2014 Selectboard meeting and comments were taken on the draft.
- The draft plan was made available to the public on the town website from November 26 until December 12, 2014.9
- The draft plan was made available in hard copy for public review and comment at the town office from November 26 until December 12, 2014.10
- In late 2014, the Town of Dover extended an invitation by letter to neighboring towns to provide a means and opportunity to review and comment on the draft Dover Single Jurisdiction Hazard Mitigation Plan.11 Inter-town communication is nonetheless important and this will repeat for future revisions of this Plan.
- In late March 2015, revisions came back from FEMA on the first draft of the plan. Alyssa Sabetto had a meeting with the Dover Police Chief, Zoning Administrator, Road Foreman, and East Dover Fire Chief to address the revisions, develop several more mitigation actions and get some questions answered. The draft was revised and resubmitted in mid-April.
- Preliminary plan approval from FEMA came in late July 2015.

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4 See appendix 3
5 See appendix 11
6 See appendix 9 and 11
7 See appendix 2
8 See appendices 3-4
9 See appendix 14
10 See appendix 14
11 See appendix 15
**RISK ASSESSMENT**

The risk assessment portion of a Hazard Mitigation Plan contributes to the decision-making process for allocating available resources to mitigation projects. 44 CFR Part 201.6(c)(2) of FEMA’s mitigation planning regulations requires local municipalities to provide sufficient hazard and risk information from which to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

**Methodology**

A *vulnerability analysis* for each community begins with an inventory of possible hazards and an assessment of the risk that they pose. These are the questions to be answered. What hazards can affect your community? How bad can it get? How likely are they to occur? What will be affected by these hazards? How will these hazards affect you? The **Impact** (percentage of the community affected) or magnitude of the impact of the hazard can be classed as follows:

- Negligible: < 10% of properties damaged/Minimal disruption to quality of life.
- Limited: 10% to < 25% of properties damaged/Loss of essential facilities/services for up to 7 days/few (< 1% of population) injuries possible.
- Critical: 25% to 50% of properties damaged/Loss of essential facilities/services for > 7 days < 14 days/Major (< 10% of population) injuries/few deaths possible.
- Catastrophic: > 50% of properties damaged/loss of essential facilities/services for > 14 days/Severe (> 10% of population) injuries/multiple deaths possible.

The **Likelihood**, or frequency of occurrence, is classified as shown:

- Unlikely: < 1% probability in the next 100 years.
- Possible: 1% to 10% probability in the next year, or at least one chance in the next 100 years.
- Likely: 10% to 100% probability in the next year, or at least one chance in the next 10 years.
- Highly Likely: Near 100% probability in the next year.

Additionally, seasonal patterns that may exist are considered, what areas are likely to be affected most, the probable duration of the hazard, the speed of onset (amount of warning time, considered with existing warning systems).

The combination of the impact and the likelihood was used to determine the community vulnerability as **HIGH**, **MODERATE** or **LOW**.

<table>
<thead>
<tr>
<th>Likelihood:</th>
<th>Impact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>U = unlikely</td>
<td>N = negligible</td>
</tr>
<tr>
<td>P = possible</td>
<td>L = limited</td>
</tr>
<tr>
<td>L = likely</td>
<td>CR = critical</td>
</tr>
<tr>
<td>HL = highly likely</td>
<td>CA = catastrophic</td>
</tr>
</tbody>
</table>

The **Likelihood, Impact and Community Vulnerability** for each hazard was discussed at the September 29, 2014 Hazard Mitigation Plan meeting. There was also a review of what was developed in 2010, however the below table, which the participants developed at the most recent meeting was more detailed in terms of areas of vulnerability and current in terms of what has happened in recent years. The participants discussed each potential hazard in detail and
ranked each element for each hazard. The numbers were combined to give each hazard a hazard score. This score was used to determine which hazards the plan would address.

While all hazards were considered by the Committee for inclusion in this plan, it is not feasible to study each in depth. For hazards that are not profiled in this plan, the reader is directed to the Vermont State Hazard Mitigation Plan. The rationale for not addressing all of the hazards is that they are unlikely to occur in Athens, or the town cannot mitigate for them. This plan will only focus on the hazards that Dover has chosen to mitigate for, which are Flooding/Fluvial Erosion, Severe Winter and Ice Storm, High Winds, Wildfire/Structure Fire, and Landslide. Hurricanes will be addressed within both flooding and high winds. They chose to include landslides and wildfires even though the analysis didn’t deem them highly likely. There was an incident related to landslides, and the road foreman mentioned a number of areas where this hazard exists in Dover. There has not been a wildfire in Dover in memory. There are no mapped ice jams in Dover.\textsuperscript{12}

Though the below table shows Highway accidents ranking highly likely, Dover doesn’t feel that they are able to develop further mitigation actions than what the police and VTrans already do to prevent this hazard. Radiological incidents, dam failure, hazardous material spills, drought, terrorism, school safety issues, invasive species infestation, air crash, water supply contamination, earthquake, tornado/microburst, extreme heat, tsunami and volcano are all hazards that ranked low in the below table because they are not likely to occur in Dover. That is why this plan will not cover those hazards.

<table>
<thead>
<tr>
<th>Possible Hazard</th>
<th>Likelihood</th>
<th>Impact</th>
<th>Community Vulnerability</th>
<th>Most vulnerable facilities and populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood / Fluvial Erosion</td>
<td>HL</td>
<td>CR</td>
<td>Moderate to High</td>
<td>Low lying hills, North Branch of the Deerfield River, Ellis Brook, and Cheney Brook</td>
</tr>
<tr>
<td>Structure Fire</td>
<td>HL</td>
<td>N</td>
<td>Moderate</td>
<td>Residences, Businesses</td>
</tr>
<tr>
<td>Power Failure</td>
<td>HL</td>
<td>N</td>
<td>Moderate</td>
<td>Residences, Businesses</td>
</tr>
<tr>
<td>Winter &amp; Ice Storm</td>
<td>HL</td>
<td>L</td>
<td>Moderate</td>
<td>Residences, Businesses</td>
</tr>
<tr>
<td>Highway Accidents</td>
<td>HL</td>
<td>L</td>
<td>Moderate</td>
<td>Route 100, Dunn's Corner is a particular spot of concern</td>
</tr>
<tr>
<td>High Wind</td>
<td>HL</td>
<td>L</td>
<td>Low</td>
<td>Residences, Businesses</td>
</tr>
<tr>
<td>Radiological Incident</td>
<td>U</td>
<td>CA</td>
<td>Moderate</td>
<td>Town-wide</td>
</tr>
<tr>
<td>Dam Failures</td>
<td>U</td>
<td>L</td>
<td>Moderate</td>
<td>North Branch of Deerfield River</td>
</tr>
<tr>
<td>Hazardous material spill</td>
<td>L</td>
<td>L</td>
<td>Moderate</td>
<td>Route 100 and Dover Hill Rd – motor vehicles</td>
</tr>
<tr>
<td>Wildfire</td>
<td>P</td>
<td>L</td>
<td>Moderate</td>
<td>Residents</td>
</tr>
<tr>
<td>Drought</td>
<td>P</td>
<td>L</td>
<td>Moderate</td>
<td>Residents, Farms, Businesses</td>
</tr>
<tr>
<td>Landslide/Mudslide/Rockslide</td>
<td>P</td>
<td>L</td>
<td>Low</td>
<td>Roads, Dorr Fitch Road is in a landslide</td>
</tr>
<tr>
<td>Terrorism</td>
<td>P</td>
<td>N</td>
<td>Low</td>
<td>Potential for Town-wide</td>
</tr>
<tr>
<td>School Safety Issues</td>
<td>L</td>
<td>N</td>
<td>Low</td>
<td>Elementary School; Homes</td>
</tr>
<tr>
<td>Invasive Species Infestation</td>
<td>L</td>
<td>N</td>
<td>Low</td>
<td>Forestlands town-wide</td>
</tr>
<tr>
<td>Air crash</td>
<td>P</td>
<td>N</td>
<td>Low</td>
<td>Deerfield Valley Airport</td>
</tr>
<tr>
<td>Hurricane</td>
<td>P</td>
<td>CR</td>
<td>Low</td>
<td>Town-wide</td>
</tr>
<tr>
<td>Hail Storm</td>
<td>P</td>
<td>N</td>
<td>Low</td>
<td>Town-wide</td>
</tr>
<tr>
<td>Ice Jams</td>
<td>P</td>
<td>N</td>
<td>Low</td>
<td>Route 100 Village area</td>
</tr>
<tr>
<td>Water Supply Contamination (No Town Water Supply)</td>
<td>U</td>
<td>CR</td>
<td>Low</td>
<td>Mt. Snow Ski Area, Businesses and Residents at the intersection of Route 100 and Route 9</td>
</tr>
<tr>
<td>Earthquake</td>
<td>U</td>
<td>CR</td>
<td>Low</td>
<td>Town-wide</td>
</tr>
<tr>
<td>Tornado/Microburst</td>
<td>U</td>
<td>L</td>
<td>Low</td>
<td>All Town Infrastructure</td>
</tr>
<tr>
<td>Extreme Heat</td>
<td>U</td>
<td>N</td>
<td>Low</td>
<td>Town-wide</td>
</tr>
<tr>
<td>Tsunami</td>
<td>U</td>
<td>NA</td>
<td>NA</td>
<td>Vermont has no coastline.</td>
</tr>
<tr>
<td>Volcano</td>
<td>U</td>
<td>NA</td>
<td>NA</td>
<td>There are no active volcanoes in Vermont.</td>
</tr>
<tr>
<td>Railroad Accidents</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
Identifying and Profiling Hazards

The following sections include a narrative with a Description, Geographic Area of the Hazard, Impact, Extent, Probability, and discussion of Past Occurrences of the most likely natural hazards affecting Dover.

Flooding/Fluvial Erosion

Description and Geographic Area of Hazard
Flooding is the most widespread and destructive hazard in the United States. Flooding has also been the most common and costly hazard to affect Dover. Flooding can occur anytime of the year as a result of heavy rains, thunderstorms, tropical storms, hurricanes or Nor’easters. It can result from the overflow of major rivers and their smaller tributaries, or inadequate local drainage. Historically, floods have been a factor in over 80 percent of all federally declared disasters. People living in close proximity to bodies of water such as rivers, lakes, and streams are at greater risk from flooding than those not living in the floodplain. There is a 26 percent chance of experiencing a flood during the life of a 30-year mortgage compared to a 4 percent chance of a fire. Dover has an NFIP compliant floodplain ordinance, which gives residents access to discount flood insurance and enables the Town to regulate development within the Special Flood Hazard Area (SFHA). SFHAs are subject to inundation by the 1% annual chance flood (100-year flood). Maps of these areas can be found in the vault at the Town Office or online at the FEMA Map Service Center.13

Impact
Most of the destruction from flooding in Dover is due to fluvial erosion rather than inundation, which is the type of flooding targeted through the NFIP. Fluvial erosion is the destruction of river banks caused by the movement of rivers and streams. This can range from gradual bank erosion to catastrophic changes in river channel location and dimension during flood events. This occurs when the stream has more energy than is needed to transport its sediment load, due to channel alterations or runoff events that increase water speed in the channel. Fluvial erosion hazard mapping is expected to be released by the state in late 2014. This mapping will assist municipalities in developing bylaws and effective mitigation strategies to regulate development within fluvial erosion hazard zones. Dover does not currently have a fluvial erosion bylaw, but should consider developing one.

Ice jam flooding is fairly common in the early springtime, around March timeframe. The heavy rainfall, combined with runoff from snowmelt due to the mild temperatures, results in flooding of rivers, streams and creeks, mainly from the formation of ice jams. Dover doesn’t have mapped ice jams.

Flash floods typically occur in high elevation drainage areas as a result of summer thunderstorm activity. Damage from flash floods is difficult to predict since flash flood areas are not mapped at this time. Infrastructure and structures along higher elevation streams and drainage areas are most susceptible to damage from flash flooding. Drainage ditches and culverts are the biggest concern for local flash flooding events.

13 https://msc.fema.gov/portal
Extent
The highest recorded measurement at the nearest stream gauge to Dover on the Deerfield River was 20.17 feet, which was measured both during TS Irene on August 28, 2011 and on September 21, 1938.\(^\text{14}\)

Extent for thunderstorms/heavy rain events: The table below shows the top 10 rain events at the Windham County National Weather Service Cooperative station at Ball Mountain Lake (in the Town of Jamaica). Most stations take their observations in the morning (7 and 8am are the most common times), so the precipitation would have fallen between 7am on the previous date to 7 am on the date listed in the table below. To give context to the below data, for a 1-day period a 50-year event is 3.96-6.15 inches, a 100-year event is 4.40-7.49 inches, a 200-year event is 4.89-9.11 inches, and a 500-year event is 5.63-11.84 inches. If we base on lower confidence limits, the below listed # 1 event that occurred in 1973 is a 500-year event and TS Irene, which is #2 in the table is a 200-year event. It is important to remember that precipitation levels vary throughout the region.

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<td>10</td>
<td>3.02</td>
<td>2000-12-18</td>
</tr>
</tbody>
</table>

Period of record: 1969-05-01 to 2015-04-02

Extent for fluvial erosion:
East Dover - along Goose City Road, about 5900 feet from North Street north to Sherman Road. This section always has trees falling over and there are small slides all through this area. The slope is gradually coming down on a continual basis caused by fluvial erosion along the Rock River. The road is threatened in this area. The area of concern is circled in the below map. This is worst area of fluvial erosion in East Dover.

\(^{14}\) USGS Stream gauge 01168500 DEERFIELD RIVER AT CHARLEMONT, MA <http://waterwatch.usgs.gov/?id=wwchart_fsc&site_no=01168500>
\(^{15}\) Data provided by the NOAA, Northeast Regional Climate Center at Cornell University. http://www.nrcc.cornell.edu/. Courtesy of Jessica Spaccio, Climatologist. 4/3/2015.
West Dover – Bluebrook Road there is an area probably 500 feet in length, from the covered bridge up to the next driveway that is sliding into the brook. The road is threatened in this area because of the slide. The below map identifies the area in the red circle. This area is about 1.5 miles up Bluebrook Road. This is worst area of fluvial erosion in West Dover.
Special Flood Hazard Area (SFHA) and River Corridor Mapping for Dover

Location
The below map was created using the Vermont Agency of Natural Resources (ANR) ‘Natural Resources Atlas’ which is an online mapping tool. This map shows the special flood hazard areas (SFHAs) that FEMA has designated in Dover, as well as the VT ANR defined River Corridors. The SFHAs are shown in orange (the red area is the floodway, which ends at the Wilmington town line. The floodplains shown in these maps are based on the FEMA Flood Insurance Rate Maps (FIRMs) available through the FEMA Map Service Center.17 The map effective date for the latest FIRMs for Windham County is 9/28/2007. River Corridors are areas that are subject to fluvial erosion (along with a 50 foot buffer). Note that the ANR defined River Corridor also includes a 50 foot buffer for all streams with a watershed of less than 2 sq miles.

All SFHAs in Dover are “A” zones, which are the lowest risk flood hazard areas that FEMA maps. There are no floodways, though one can see the red area, just to the south in Wilmington is a mapped floodway. Properties within the SFHA, that have a mortgage, are required to purchase flood insurance. Dover’s participation in the NFIP gives residents access to discount flood insurance through the program. The Flood Hazard Summary Sheets on FloodReady

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16 Vermont Agency of Natural Resources, Natural Resources Atlas <http://anrmaps.vermont.gov/websites/anra/>
Vermont’s website says there are 129 structures in the Special Flood Hazard Area and only 10% of these structures have flood insurance.\(^\text{18}\)

The above map shows the SFHAs and mapped River Corridor in East Dover. SFHAs in this area lie along Dover Hill Road, Taft Brook Road and Goose City Road. Culverts on these roads sometime experience problems. Dover Hill Road, from the school to East Dover Village is subject to flooding. The Rock River, along Goose City Road, north of the Village, gets flooded during major events. A culvert on Holland road needs replaced as it is repeatedly gets damaged when Taft Brook floods. The East Dover Firehouse is in a particularly vulnerable location in the floodplain of the Rock River. One major impact of flooding in Dover is that when Rock River floods Dover Hill Road, it cuts off the eastern route out of town.

West Dover has a significant amount of developed area that lies in SFHA. This is primarily the North Branch of the Deerfield River, which lies just west of Route 100, intersecting with the Bluebrook just to the east of Route 100 and continuing south along Route 100 to Dorr Fitch Road. This leaves a majority of downtown Dover in the SFHA. Route 100 from the town line to Dunn’s Corner experienced flooding during Irene.

Bluebrook Road, which has house along it, runs along Bluebrook and a large portion of the Road is in SFHA. Ellis Brook is the SFHA on the below map, that is east of Route 100. Most of Ellis Brook’s floodplain is undeveloped, except in the northern portion near Valley View Road. The wastewater treatment plant is located in the SFHA along the southern portion of Ellis Brook.

*Probability*
The participants that assisted with putting this plan together have deemed that flooding/fluviial erosion a highly likely hazard in Dover, particularly during the spring snow melt season, any given year. Flash floods typically occur during summer when a large thunderstorm or a series of rain storms result in high volumes of rain over a short period of time. Higher-elevation drainage areas and streams are particularly susceptible to flash floods. Flash floods are likely in Dover, and potential damage to Route 100 could limit access to Town, as it is the major transportation corridor through town. Other areas of concern are higher elevation brooks and streams that have potential to cause severe flooding downstream during a short and intense heavy rain event.

*Past Occurrences*

Since 1996, when National Climatic Data Center detailed records start, there have been 35 flood events in Windham County, Vermont. Dover experience routine spring flooding, but this is not always documented.

Sept. 12, 2013 - A series of cold front moved towards the region on Thursday, September 12th. Despite some periods of cloudiness, a warm and humid air mass ahead of the approaching boundaries allowed for moderate amounts of instability to be in place. Along and ahead of the boundaries, several lines of showers and thunderstorms developed and moved across the region during the afternoon and early evening hours. In addition to a large amount of cloud to ground lightning, a few of the thunderstorms became severe, with damaging wind gusts. Several trees were downed across the region. Some areas that received repeated showers and thunderstorms experienced flash flooding as well, with roads washed out and/or closed as a result. The hardest hit areas were within the town of Brattleboro. Two to four inches of rain in a short period of time was reported in the areas that experienced flash flooding. As the last in the series of cold fronts crossed during the evening hours, the threat for showers and thunderstorms ended.

Aug. 28, 2011 - Tropical Storm Irene – The Federally Declared Disaster DR-4022, Tropical Storm Irene, tracked northeast across eastern New York and western New England during Sunday, August 28th, producing widespread flooding, and damaging winds across the region, including Dover. Route 100 in Windham County was closed due to flooding and wash outs. Portions of Route 100 remained closed after the flood waters receded due to significant damage. The North Branch Deerfield River runs along a portion of Route 100 from the Mount Snow area to Wilmington. The town was cut off for a day and a half from transportation access, phone, and electric. This was particularly concerning because there was no way to get an ambulance in or out of town. Shortage of food and fuel began by the time that the roads were restored the following day. Town workers were out working during the storm and prevented a lot of damage. Along Dover Road, one house was destroyed and floated down the Rock River and other houses were destroyed or significantly damaged. Much of the road was reported washed away, along with power and phone infrastructure that caused almost all of East Dover to be without power and phone for an extended period of time. A woman drowned when the car she was in became trapped by flood waters from the North Branch Deerfield River in Wilmington. Rainfall amounts generally averaged 4 to 8 inches. Much of the rain which fell occurred within a 12 hour period, beginning early Sunday morning, and ending Sunday evening. FEMA gave $539,057 to Dover for damages from Irene. This reflects a federal order from President Obama to raise the federal
match share to 90% from 75% for TS Irene relief, therefore lowering the state and local shares by 7.5% each.

March 6-7, 2011 - A cold front moved gradually southeastward across the region during the day Monday, March 7th, as a wave of low pressure moved northeastward along the boundary. To the south of the boundary, it was mild as the area was in the warm sector of the low pressure system. The storm tapped into both Atlantic and Gulf moisture, resulting in heavy rainfall of 1 1/2 to 3 1/2 inches across southern Vermont Sunday, March 6th, into Monday, March 7th before the precipitation transitioned to a wintry mix then snow early Monday morning. The heavy rainfall, combined with runoff from snowmelt due to the mild temperatures, resulted in flooding of rivers, streams and creeks, mainly from the formation of ice jams. An ice jam on the Rocky River along Dover Road in Town of Newfane caused flooding of some houses.

April 15-21, 2007 – Major spring flooding. Rain and snow caused damage to roads and utility lines across Windham County and Dover. Across, the State, nearly 3.6 million dollars was obligated as part of the FEMA Public Assistance Program. While it is not normal for the town to receive this type of damage from severe flooding and thunderstorms on an annual basis, road washouts and culvert repairs from these associated events have ranged in the ballpark of $200,000 to $400,000 in some communities in Windham County.

March 31 through April 2, 2004 - As much as three inches of rain fell between across southern Vermont. This rain combined with the last of the snow melt to produce an excessive runoff of water.

July 21 through August 18, 2003 nearly constant rain and thunderstorms affected Dover. A tropical air mass was in place over southern Vermont on August 3. With a strong disturbance over the Great Lakes adding weak lift to a very unstable atmosphere, scattered showers and thunderstorms erupted during the afternoon hours. A slow moving storm over Windham County produced doppler radar estimated rainfalls of 3 to 4 inches in about four hours time. The torrential rains took a toll, washing out roads in the city of Londonderry. County Highway 121 was washed out in the Town of Windham. Massive flooding occurred in the city of Grafton at the base of Fire Pond and Hinkley Brook roads, where water, debris and mud washed those roads out. The raging debris knocked a house off its foundation and damaged several other ones. This was the same area affected by the infamous Flood of 96 which was even more severe. Heavy rains also washed away a small covered bridge in Grafton. FEMA Declaration DR – 1488 was associated with this event. Many roads were washed out and culverts needed replacing throughout town.

August 12- September 12, 2004 - Presidential Disaster Declaration DR – 1559 resulted in severe period of flooding and thunderstorms. Flash flooding resulted in washouts of small bridges at Ames Hill, Hescock and Cook Roads. Canoe Brook Road in Dummerston impassable, with a culvert washed away, and a 20-foot wide by 20-foot deep hole in the road. These two 2004 events allowed for funding from the FEMA Public Assistance Program to flow into Windham County and help pay for the costs associated with debris removal and other emergency protective measures.
In the spring of 1987 there was rapid meltdown of snow over frozen ground with 3” of rain flooding the west end of Reed Road. There were a number of roads in Dover that were damaged by this event.

During 1976, flooding occurred throughout New England as a result of Hurricane Belle, causing millions of dollars in damage.

In 1973 there was an extreme rainfall event from June 28-30 that affected all areas of Vermont except the northwest section. Rainfall amounts as much as 6 inches in 24 hours in some locations. This was the largest rain event since the 1927 flood. Highway damage was extensive in the south-central, southeastern, and northeastern areas of the State. The town of Ludlow on the Black River was seriously damaged. Three persons were killed in the 1973 flood, and damage was estimated at $64 million. Sizable crop loss was reported, and damage to State highways was estimated to be $10 million. The entire State was declared a disaster area.¹⁹

The Vermont Flood of 1927 was the deadliest natural disaster in the history of the State; eighty-four people were killed with over $28 million in property damage. The Spring Floods of 1938, which had an effect on all of New England, caused $113 million in damage, killed 24 people and made 77,000 people homeless. During this flood alone, the main street of Hooksett, New Hampshire was 18 to 20 feet underwater.

Sources used
Local town knowledge and town records, National Climatic Data Center storm events database, FEMA’s Presidential Disaster Declarations search page

Severe Winter Storm / Ice Storm

Description and Geographic Area of Hazard
The Region has a long history of severe winter storms and blizzards and usually experiences at least one or two Nor’ easters each year with varying degrees of severity. There have been 209 winter/ice storms in Windham County since 1996.²⁰ A typical event begins as a low-pressure system that moves up the Atlantic Coast, into the Canadian Maritimes, dumping heavy snow across parts of Vermont. Snowfall accumulations are generally three to six inches in the valleys and 6 to 12 inches in the mountains. Winter storms and ice storms can cause power lines to fail, damage trees and impede access to homes and businesses. Dover received $205,187 in assistance from FEMA for recovery from several subsequent and severe ice/winter storms in December 2007. Snow events are assumed to affect the entire Town, where differences affect certain areas, they are noted.

Impact
Heavy wet snows of early fall and late spring, as well as ice storms, often result in loss of electric power, leaving people without adequate heating capability. The other threat from winter storms is downed trees, resulting in power failures and impassable roads or driveways. An ice storm crossed the region in December of 2008 causing widespread downed trees and

²⁰ National Climatic Data Center, 1996-2014 storm events database < http://www.ncdc.noaa.gov/stormevents/>
power outages in Windham County. The total cost of damages across the region surpassed the one million dollar threshold triggering a Presidential Disaster Declaration DR-1816. Damage across the region consisted of roads being blocked for short periods of time due to downed trees and utility lines. Thousands lost power for varying lengths of time and several shelters were opened in Windham County. Compared to neighboring southern New Hampshire communities, Dover and Windham County fared relatively well from the damage inflicted by the ice storm.

Damage from heavy snow and ice storms can vary depending upon wind speeds, snow or ice accumulation, storm duration, and structural conditions (such heavy snow and ice accumulation on large, flat roofed structures). The assessed value of all property in Dover is $976,181,230. Assuming a range of town-wide damage of 1% to 5%, a heavy snow or ice storm could result in $9,761,812 to $48,809,061 of total damage.

There are no mapped ice jams in Dover.21

Availability of salt and sand has been an issue for Dover in the past. The salt shed was enlarged in 2010. Highway accidents are frequent during winter. Before the salt shed was enlarged sand had to be used because salt was not readily available. Elderly and special needs housing that doesn’t have access to generator, including Butterfield Commons, is a concern for the town during each event. There are a lot of inns and lodges in town that don’t have backup generation. There are also a large amount of tourists during the winter months that come up for the resorts. This is another concern for the town.

It is also fairly easy for the town’s transportation network to get cutoff because of high elevations, East Dover being in low lying area, and Route 100 getting large volumes of tourist traffic. Blowing snow is also an issue for the roadways in Dover. Rice Hill Road and the top of Handle Road, and Route 100 north of Tannery Road always get hit hard. This is because of open fields in these areas allowing snow to blow onto the roads. Additionally, state highway territories create issues with plowing.

Extent
The severity or magnitude of winter storm to occur in southeast Vermont can range from moderate to very severe. The southeastern region of VT typically receives over 60 inches of snowfall per year, and most Vermonters are prepared to handle large amounts of snowfall. Dover experiences significant snow storms every year but according to the town they are manageable. During the major snowfall of winter 2010-2011, where the region received well over 100 inches of snow, the biggest problem was that snow never melted off during the season, only accumulated, making it difficult to find space to store the mounds of snow. But in the season of 2010-2011, the problem arose with finding locations to deposit huge quantities of snow during the season because there wasn’t the typical mid-season melt off. Snow amounts are not necessarily a problem for Vermonters, but heavy, wet snow, or the event of rain on snow or frozen ground, are usually very problematic. The 2010-11 was the largest storm in recent history, but as the below graph shows, there were two larger seasons of snow in 1907-71 and 1886-87.

Seasonal Snowfall records per the Burlington, VT Weather Service:

Seasonal
(Jul 1st – Jun 30th)

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The worst ice storm/ice accumulation event in memory and in records occurred on March 21, 2008 and produced an inch of ice on everything - A strengthening low pressure system tracked northeast from the Ohio Valley on Tuesday March 18th, to a position along the Maine coast by Thursday morning on March 20th. The low then continued to intensify upon reaching the Canadian Maritimes by Friday morning on March 21st. This storm system initially brought a swath of light to moderate snowfall across southern Vermont from Tuesday into early Wednesday, with accumulations of 1 to 3 inches. The snow then changed to freezing rain across the higher elevations of southern Vermont during Wednesday and lasting into Wednesday night. This produced ice accumulations of one half of an inch, to locally up to an inch. The heavy accumulation of ice led to numerous downed trees and powerlines, as well as power outages. The hardest hit areas were mainly confined to the highest elevations within western Windham County. As a cold northwest flow developed in the wake of this storm system, some lake enhanced snow bands developed Thursday night into Friday morning, which produced additional snowfall amounts of 4 to 9 inches, mainly across higher, west facing slopes in Bennington County.  

Probability

The plan participants in Dover deem winter storm / ice storms to be highly likely any given year. Every winter there is a weather related incident where people in town will lose power for a few days.

Past Occurrences

The Region has a long history of severe winter storms and blizzards and usually experiences at least one or two Nor’easters each year with varying degrees of severity. There have been 105 winter/ice storms in the Region since 1996. Dover seems to be experiencing more ice storms in recent years, which they believe is due to climate change. There have been three winter storms in recent history in Windham County that were Disaster Declarations:

- Ice Storm (DR-1201) – January 6-16, 1998
- Snowstorm (EM-1358) – December 16-18, 2001

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22 National Climatic Data Center, 1996-2014 storm events database <http://www.ncdc.noaa.gov/stormevents/>
23 National Climatic Data Center, 1996-2014 storm events database <http://www.ncdc.noaa.gov/stormevents/>
• Winter Storm (DR-1816) – December 11-18, 2008

EVENTS

January 2-3, 2014 - A long lasting snowstorm occurring across all of eastern upstate New York between the early morning hours of January 2nd and the morning of January 3rd, 2014. A slow moving frontal boundary situated over the mid-Atlantic Region was in place just after midnight on the early morning of Thursday, January 2nd. An area of high pressure situated over southern Quebec allowed Arctic air to move down into the region. As a weak wave of low pressure developed along the front, moisture moved up and over the frontal boundary into the region. As a result, light snow broke out and gradually spread from west to east during the early morning hours of Thursday, January 2nd. The snow evolved into a moderate snowfall for during the daytime hours and it remained quite cold, with temperatures only in the single digits over much of the region. On the evening of Thursday, January 2nd, a new area of low pressure began to form of the mid-Atlantic coast. This brought some moisture from the Atlantic Ocean into the region, and the steady, moderate snowfall continued over the entire area. The snow gradually tapered off to light snow and snow showers from west to east overnight as the low pressure area tracked east northeast away from the region. By the morning hours of Friday, January 3rd, snowfall amounts ranged from 8 to 17 inches. In addition, temperatures remained very cold and with a cold northwest wind, wind chill values were zero to minus 20 degrees.

Feb. 25, 2011 - A storm system produced a widespread swath of heavy wet snow across southern Vermont during the day Friday. Snowfall rates of 1 to 2 inches per hour occurred, beginning during the early morning hours, and persisting until late afternoon. Snowfall amounts of 12 to 17 inches occurred across much of southern Vermont. The heavy wet snow created treacherous travel conditions for both the morning and evening commutes on Friday, and also led to numerous school and business closings.

Jan. 19, 2011 - Snow and sleet accumulations across southern Vermont varied from 3 to 9 inches, with ice accumulations of up to a half of an inch.

Jan. 12, 2011 - Heavy snow fell across southern Vermont with snowfall accumulations ranging from 14 inches up to 3 feet. A mesoscale snowband set up across the western New England, including southern Vermont, Wednesday morning resulting in snowfall rates of 3 to 6 inches an hour.

January-February 2010 - The snow fall during this time was severe, averaging over 100 inches throughout the region, to include the Town of Dover. There were a number of large storms during this timeframe. No reported dollar amount of damage. Trees were down and back roads were cut off.

March 29, 2008 - A low pressure system tracked east northeast, from the central Plains early Thursday morning on March 27th, into central Pennsylvania by Friday morning on March 28th, to a position well off the New England coast by Saturday morning on March 29th. As colder air filtered southward, a mix of rain and wet snow developed Thursday afternoon across southern Vermont. Across the higher elevations, locally heavy snowfall occurred, with accumulations of 6 to 10 inches. This fell mainly across western Windham County. The snow tapered off by Friday evening. The heavy wet snow led to downed tree limbs and power lines across the
higher elevations of Windham County. In addition, approximately 11 accidents were reported
Friday morning on Interstate 91 due to slippery road conditions. The heaviest snowfall fell in
West Dover and Londonderry.

December 13, 2008 - A significant mix of snow, sleet and freezing rain occurred from Thursday
afternoon into early Friday afternoon. Snow and sleet amounts of 1 to 3 inches fell, along with
ice accretion of one half to three quarters of an inch from freezing rain. This led an inch and a
half of ice buildup. Higher elevations, such as Dover, were particularly hit hard. Damage
across the region mostly consisted of road being blocked for short periods of time due to
downed trees and utility lines. Thousands lost power for varying lengths of time and several
shelters were opened in Windham County. Dover was out for five days. Phone lines didn’t
work in East Dover. Fire, Police and Highway departments went door to door to check on
residents. The total cost of damages across the region crossed the one million dollar threshold
which allowed for a Presidential Disaster Declaration DR-1816.

December 2007 - Snow developed during the early morning hours of Sunday, December 16th,
and persisted intermittently before ending early Monday morning on December 17th. The snow
was heavy at times, and also mixed with a bit of sleet Sunday afternoon and evening. Total
snow and sleet accumulations ranged from 8 to 11 inches, with 10.8 inches reported at
Townshend, and 9.6 inches reported at Putney. The heavy snow and sleet resulted in
numerous school and business closings Monday morning, and also created treacherous travel
conditions for the Monday morning commute.

Snow developed during Sunday evening on December 30th, and ended during the mid
morning hours of Monday December 31st. Snowfall amounts ranged from 7 to 9 inches, with 8.5
inches reported at West Wardsboro. The heavy snow led to hazardous driving conditions
during the Monday morning commute. Several accidents also occurred Monday morning,
including a fuel truck rollover in Londonderry on Route 11, which occurred at 3:30 AM LST. In
addition, many businesses were closed, or had delayed openings due to the snowfall. Most
schools were already closed due to the Holiday break.

March 2, 2007 - A significant mixture of snow, sleet and freezing rain began early Friday
morning, and ended Friday evening. Snowfall accumulations of 6 to 10 inches fell during this
storm, with 10 inches reported at Athens, and 6 inches at Brattleboro. In addition, ice accretions
of up to one half inch occurred from freezing rain, mainly within sheltered valley locales.

November 22, 1997 - A low pressure system south of Long Island on November 22, 1997
produced heavy wet snow across southern Vermont. Snowfall averaged 4 to 8 inches in
Bennington and Windham Counties. The heavy wet snow downed trees and power lines, which
produced scattered power outages. The power outages were most widespread in Windham
County.

On November 13 and 14, 1997, a winter storm tracked from the southeast coast north to the
cost of southern New England and then out to sea. Heavy snow fell across southern Vermont,
with an average snowfall of 7 to 10 inches. Some specific snowfall totals included: 9 inches at
Townsend and 6 inches at West Dover in Windham County and 8 inches at Manchester Center
in Bennington County.
March 31-April 1, 1997 - A classic late season nor’easter tracked from the Chesapeake Bay area northeast to central coastal New Jersey then slowly out to sea. This system produced rain across Bennington and Windham Counties during the morning hours of March 31. The rain changed to heavy wet snow by early afternoon. Snowfall amounts were highly elevation dependent. Some specific snowfall totals included: 12 inches at Shaftsbury and 13 inches at Peru in Bennington County and 23 inches at West Wardsboro and 12 inches at Grafton in Windham County. The wet snow brought down many trees and power lines causing widespread power outages and road closures. Some areas remained without power for several days. Route 9, between Bennington and Brattleboro was closed for much of the night.

Nov. 26, 1996 - On November 26, a low pressure system brought a combination of snow and freezing rain to southern Vermont. Over Bennington and Windham Counties, snow and heavy freezing rain downed trees and power lines and caused numerous accidents. Across southern Vermont approximately 10,000 customers lost power.

March 8, 1996 - Heavy snow fell across Bennington and Windham Counties of southern Vermont with 8 to 10 inches common over the area. Some specific snowfall totals included: 9 inches at Dorset and 7 inches at Pownal in Bennington County, 10.5 inches at West Wardsboro and 9.5 inches at West Dover in Windham County.

Jan. 2, 1996 - A major winter storm developed over the Gulf coast states on January 2nd and tracked northeast along the eastern seaboard during January 3rd. Heavy snow fell across southern Vermont with the average snowfall ranging from 10 to 12 inches.

Great Blizzard of ‘78 - This storm is more well known for its impact on coastal New England and Long Island, but it still had quite an impact on eastern New York and western New England. The Green Mountains of Vermont were hit hard, with many areas reporting around two feet of snow. East Wallingford, near Rutland had 30". The Catskills also had quite a bit, with Prattsville reporting 25". Wind also caused quite a bit of drifting of the snow. On the coast, Boston received 26.7" of snow, their largest storm total on record. The storm also produced strong winds...Logan Airport reported an 83 mph gust...and there was a report of 92 mph on Cape Cod.

Sources used
Local town knowledge and records, National Climatic Data Center, CRREL Ice Jam Database, FEMA’s Presidential Disaster Declarations search page, Burlington, VT Weather Service historic weather events page, Albany National Weather Service – major winter storms page

High Winds

Description, Location and Impact
High wind events are highly likely in Dover, with potential for limited damage. The most likely local threats for high winds are from nor’easters, severe thunderstorms, hurricanes, downbursts, tornados, or wind shear. Trees downed by high winds can block roads, and down power and communications lines. Mobile home parks and houses on ridge lines are at greater risk from wind damage. Blowing snow is also an issue of winds during winter months for the roadways in Dover. Rice Hill Road and the top of Handle Road, and Route 100 north of
Tannery Road always get hit hard. This is because of open fields in these areas allowing snow to blow onto the roads. Highly susceptible locations for damage in Dover include manufactured homes. There are 18 manufactured homes in Dover. Most high winds events in Dover have resulted in minor damage from downed trees and power lines. There hasn’t been public assistance for any wind damages in Dover.

Windstorms are high-wind events that are sufficient enough to cause damage to property and can occur at anytime during a year. These include high winds in conjunction with a thunderstorm and high winds that sweep through the Region after the passage of a weather front.

**Extent**
In 1938 winds from Hurricane Igor were recorded at 100 mph and in recent years winds have been recorded at 60 mph in the Southeast region of Vermont, to include the Town of Dover. The Town anticipates high wind events in this realm of magnitude to occur any given year. Extent/magnitudes of Hurricanes and Tropical Storms are ranked using the Saffir-Simpson Scale in the Western Hemisphere, as follows: CAT1=74-95 mph winds, CAT2=96-110 mph winds, CAT3=111-130 mph winds, CAT4=131-155 mph winds, Tropical Storm=39-73 mph winds, Tropical Depression=0-38 mph winds.

Tornado magnitude is measured by the Enhanced Fujita (EF) Scale which is rates strength based on damage caused, EF-0: 65 to 85 mph, EF-1: 86 to 110 mph, EF-2: 111 to 135 mph, EF-3: 136 to 165 mph, EF-4: 166 to 200 mph, EF-5: Over 200 mph.

**Probability**
The participants from Dover that provided input into this plan have stated that high wind events are highly likely in any given year.

**Past Occurrences**
There have been 49 events in Windham County since 1996 that are notated by the National Climatic Data Center as being High Wind, Strong Wind, Thunderstorm Wind or Tornado events. There are no recorded tornados since 1996 to impact Athens according to the National Climatic Data Center, although there have been four recorded tornados in Windham County since 1950.

October 29, 2012 - Strong and gusty winds in association with Hurricane Sandy caused damage to trees and power lines across the region. Although not quite as widespread as areas across southeastern New York and New Jersey, power outages occurred throughout the region. Most of the outages in Vermont were primarily in the western part of the state. Wind gusts of 40 to 60 mph were common from the afternoon of the 29th until the early morning hours of the 30th. The highest wind gust in southern Vermont occurred in Woodford, where a wind gust to 58 mph was reported. Route 9 was closed to traffic due to power lines down in the road near the Molly Stark Motel just west of Brattleboro. Two trees were reported down on Interstate 91 in southern Vermont.

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24 According to the 2014 Dover Grand List
Aug. 28, 2011 - Tropical Storm Irene tracked north northeast across eastern New York and western New England during Sunday, August 28th, producing widespread flooding, and damaging winds across the region. Strong winds occurred across southern Vermont, with frequent wind gusts of approximately 30 mph in Grafton. The strongest winds occurred from the north to northeast during the morning hours, then from the west to northwest during Sunday evening. The combination of strong winds, and extremely saturated soil led to numerous downed trees and power lines across the region. This also resulted in widespread long duration power outages.

Mar. 10, 2002 - The pressure gradient between deep low pressure over Ontario, and high pressure off the southeast coast, produced a strong southerly flow across southern Vermont on the evening of March 9. Then, a strong cold front moved across the region shortly after midnight, early on March 10th. A line of showers and embedded thunderstorms accompanied the front. Strong winds ahead of and along the front produced some damage across Windham County. Law enforcement personnel reported a large number of trees and power lines down throughout the county.

Nov. 27, 1997 - The passage of a cold front produced strong winds across southern Vermont during the early morning hours of November 27. Winds gusting to 40-50 miles an hour downed trees and power lines in Bennington and Windham Counties. Approximately 1,500 customers lost power for a six to eight hour period.

Jul 20, 1996 - An unusually intense low pressure system tracked across the northern Great Lakes to Quebec, Canada during July 19 and 20. The system generated strong northwest winds, which downed trees and power lines over parts of Windham County in southern Vermont.

Feb. 24, 1996 - A rapidly deepening low pressure system moved from southern New Jersey northeast to northern Maine by the morning of February 25. This system brought damaging winds to southern Vermont including Bennington and Windham counties, which downed many trees across the area and produced scattered power outages.

Jan 19, 1996 - An intense area of low pressure located over the Mid-Atlantic Region on Friday morning January 19th produced damaging winds across southern Vermont. This storm was associated with a strong southerly flow which resulted in scattered reports of downed trees, limbs and power lines.

July 1995 - High wind-shear occurred in town, which resulted in numerous road obstructions, tree destruction, and damage to town highway #2.

July 14, 1988 - Tornado in Windham County (exact location not known). Traveled 10 yards. Caused $250,000 in damages.

July 5, 1957 - Tornado in Windham County (exact location not known). Traveled 33 yards. Caused $2,500 in damages.

Sept. 21, 1938 - A hurricane Igor hit the region of Southeast Vermont to include the Town of Grafton, paralyzing it for weeks. As it was coming, packing winds over 100 miles an hour,
authorities were unaware of the magnitude so no evacuation procedures were instituted and very few precautions were taken. As a result over 600 people lost their lives and tens of thousands were left homeless. Wind, rain and flash flooding wiped out trees, church steeples and buildings, leaving behind nearly $400 million in damage.

Sources used
Local town knowledge and records, National Climatic Data Center

Wildfire / Structure Fire

Description
Wildfires pose a unique danger to communities and individuals. Wildfires are more likely to occur during dry seasons or dry spells, especially in the spring and summer. As residential areas expand into reforested areas, forest fires increasingly threaten people and residences. Protecting structures in these reforested areas from fire poses special problems, and can stretch firefighting resources to the limit. If heavy rains follow a major forest fire, other natural disasters can occur, including landslides, mudflows, and floods. Once ground cover has been burned away, little is left to hold soil in place on steep slopes and hillsides. A major wildfire can leave a large amount of scorched and barren land, and affected areas might not return to pre-fire conditions for decades. If the wildfire destroys the ground cover, then erosion becomes one of several potential problems.

There are three different classes of wildland fires. A surface fire is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire is usually started by lightning and burns on or sometimes below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildland fires are usually signaled by dense smoke that fills the area for miles around.

Wildfires can spread to residential areas, thus forcing whole communities to evacuate. When fires are followed by heavy rains, the potential for mudslides and flooding is increased. Most of Winhall is heavily forested. Hence, there is potential, given the right conditions, for widespread forest fires. However, wildfire conditions do not occur frequently in Vermont due to the relatively high annual precipitation levels. Northern New England did experience some large forest fires in the late 1940s. Portions of the Vermont forest are now beyond the natural burn cycle which increases the risk of fire. Communities and residents in forested areas should keep this in mind and be careful when doing activities that could lead to fire spreading. Lightning strikes are fairly common and can cause fires anywhere in Dover.

Structure fires are highly likely but not common in Dover. Structure fires can result in loss of property and/or life. They can affect a single residential structure or spread to other homes, businesses or apartment complexes. Residential fires kill more people in the U.S. each year than all natural disasters combined. In Vermont, 12 fatal fires resulting in 22 civilian deaths occurred in 2000. The most significant common factor in fire fatalities in Vermont continues to be the absence of a functioning smoke detector in the sleeping area of residential structures. Fires can be caused by improperly disposing of ashes with live coals from wood stoves or faulty electrical wiring. There are a large number of seasonal homes primarily in East Dover, which are
commonly located in woodland areas and are particularly at risk because they are not occupied year-round. Chimney fires are also a cause of structural fires during the wintertime.

The West Dover Fire department is working on water supply. It continues to be an issue. There is no water supply for fire suppression on Route 100 in the village area.

**Impact**

The impact of damage from wildfires is difficult to project because it depends on when they are discovered and the size of the burn. With a large amount of woodland, including US Forest Service land, in Dover, the potential for large scale impact is there. There is no value listed for the woodland in Dover on the 2014 Grand List, so loss estimates are difficult to project. There were no reported wildfires in Dover in recent years.

Structure fire danger is generally universal and can occur practically at any time. Damage would depend upon the extent of the fire, the number and type of buildings damaged and the contents destroyed within the structures. Structure fires are highly likely event in Dover. According to the graph below, there is an average of around 8 structure fires a year in Dover. With an average home value of $268,455 in 2012, and assuming eight structural fire resulting in the total loss of a structure happens on average every year, structural fires could result in $2,147,640 in damage in an average year.

**Extent**

There were no reported wildfires in Dover in recent years, and no records of historic wildfires, so extent cannot be measured. There is a large amount of woodland in Dover, however, wildfires are not common in Vermont because this area of the country is fairly wet and has a temperate climate.

**Past Occurrences of Structure Fires**

<table>
<thead>
<tr>
<th>Year</th>
<th>East DFD</th>
<th>West DFD</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>2</td>
<td>5</td>
<td>7</td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1997</td>
<td>1</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>1998</td>
<td>0</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
<td>4</td>
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<td>2000</td>
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<td>4</td>
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<td>6</td>
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</tr>
<tr>
<td>2004</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2005</td>
<td>Not reported</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2006</td>
<td>Not reported</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

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26 Data provided by Rich Werner of the West Dover Fire Department
## Landslides

### Description
Landslides are a serious geologic hazard common to almost every state in the United States. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Gravity is the force driving landslide movement. Factors that allow the force of gravity to overcome the resistance of earth material to landslide movement include: saturation by water, steepening of slopes by erosion or construction, alternate freezing or thawing, removal of trees and other vegetation and earthquake shaking. Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Landslides in Dover are related to road cutting and fluvial erosion for the most part.

### Impact
There are several areas in Dover with landslide risks, primarily to roadways that would cut off residences. All of the landslides in Dover that are issues of concern are along roadways and disturbance is more of a risk than letting them alone. Risks with these landslides are to passing drivers and residents being cut off by landslide debris covering roadways.

### Location, Extent and Events
In 1994, along Route 100 around the Dover/Wilmington town border there was a bank failure incident that resulted in rock and rubble blocking Route 100. This caused an automobile accident, when the car drove up onto the rubble pile.

That has been the only “incident”, there are however, several areas of particular risk that the town road crew is keeping an eye on. TS Irene caused a big increase in the number of areas of concern for landslide activity.

Dorr Fitch Road is a particular concern for the Road Commissioner. He says this road only has about three years before it starts sliding. About 600 feet of the road are at risk and keeps sinking. Ledge would be used to keep the road from sinking. This is a major class 2 access road that is well used.

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**Sources used**
Local town knowledge, Town Annual reports, Data from West Dover Fire Chief Rich Werner, Vermont Fire Program Annual Report 2013\(^27\)

There is landslide/fluvial erosion activity where Bluebrook runs close to Bluebrook Road in West Dover. Landslide and debris concerns here. There are a number of concerns in East Dover, particularly where Taft Brook runs along Taft Brook Road, where the Rock River runs along Goose City Road, and in the area of East Dover village. The whole length of the Rock River experiences fluvial erosion. Whites Hill is also an area of concern. Just above Holland Road/Goose City Road intersection bridge, debris from landslide is cause for concern for possible plugging of structure.

There is landslide activity behind Tony’s Pizza along the river. Concern over this landslide contributing debris that may affect the river and/or cause flooding.

**Sources used**
Local town knowledge, ANR Post Irene River and Stream survey

**Power Failure**
Power failure is a common condition associated with high winds, ice storms, downed trees, and other hazards. It can occur anywhere in town. Power failures are typically the result of power lines damaged by high winds or heavy snow/ice storms. Dover Hill Rd., Taft Brook Rd., and North St. are areas of Town where it would be common for power line failures to occur and cause power disruptions to residential dwellings. Power failures may also result from disruptions in the New England or National Power grid, as indicated by the widespread power outages in 2003. Dead or dying trees in close proximity to power lines pose a particular threat for power failure.

There are a lot of businesses that don’t have generators, particularly inns and lodges. Extended power outage would be a problem if there were a lot of tourists that couldn’t leave the area. There is a need for tourists to be alerted not to come to town when bad weather is expected.

TS Irene in 2011 and the December 2008 ice storm were major weather events that caused extended power loss. There was another long power outage during the summertime in the late 1990’s when the power was out for two days due to equipment failure at a substation. Three different power companies in town mean that sometimes only portions of the town are down.

Potential loss estimates are difficult to predict for power failures, which typically are isolated in geographic area and short in duration. Therefore, they often have only minimal impact to people and property. Power failures usually result in minor inconveniences to residents; however, longer duration events can result in the loss of perishable items and business losses. Power outages in winter months can result in the loss of home heating, bursting water pipes and resulting structural water damage.
ASSESSING VULNERABILITY

Structures in the SFHA

There are approximately 129 buildings within FEMA-designated Special Flood Hazard Areas (SFHAs), primarily along the north branch of the Deerfield River. The below map shows structures (red dots on map below) that are located in the SFHA. Most of the 129 structures are located in West Dover along the North Branch of the Deerfield River and Route 100 and along Bluebrook, and in East Dover there is a concentration where the Taft Brook comes into the Rock River. These structures are particularly vulnerable to flooding and fluvial erosion hazards described in this plan.

Properties within SFHAs, that have a mortgage, are required to purchase flood insurance. Dover’s participation in the National Flood Insurance Program (NFIP) gives residents access to discount flood insurance through the National Flood Insurance Program. Flood insurance can still be purchased privately, however it is more expensive. Development in SFHAs must meet additional construction standards as outlined in Dover’s floodplain regulations, which are included in the zoning ordinance revised in 2007.

28 2014 Flood Hazard Summary Sheet for Dover
Repetitive Loss Structures

According to FloodReady.Vermont.gov, Dover has one property that has two repetitive loss claims. This is a non-residential property in downtown Dover along Route 100. A Repetitive loss structure is an NFIP-insured structure that has had at least 2 paid flood losses of more than $1,000 each in any 10-year period since 1978. Severe repetitive loss (SRL) structures are NFIP-insured buildings that, on the basis of paid flood losses since 1978, meet either of the loss criteria described in the SRL section. SRL properties with policy effective dates of January 1, 2007 and later will be afforded coverage (new business or renewal) only through the NFIP Servicing Agent’s Special Direct Facility (SDF) so that they can be considered for possible mitigation activities. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- 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
- 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.

Participation in and Compliance with the National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP) is a voluntary program organized by FEMA that includes participation from 20,000 communities nationwide and 247 Vermont towns and cities. Combined with floodplain mapping and floodplain management at the municipal level, the NFIP participation makes affordable flood insurance available to all homeowners, renters, and businesses, regardless of whether they are located in a floodplain.

The NFIP was instituted in 1968 to make flood insurance available in those communities agreeing to regulate future floodplain development. As a participant in the NFIP, a community must adopt regulations that: 1) require any new residential construction within the 100 year floodplain to have the lowest floor, including the basement, elevated above the 100 year flood elevation; 2) allow non-residential structures to be elevated or dry flood proofed (the flood proofing must be certified by a registered professional engineer or architect); 3) require anchoring of manufactured homes in flood prone areas. The community must also maintain a record of all lowest floor elevations or the elevations to which buildings in flood hazard areas have been flood proofed.

In return for adopting floodplain management regulations, the federal government makes flood insurance available to the citizens of the community. In 1973, the NFIP was amended to mandate the purchase of flood insurance as a condition of any federally regulated, supervised or insured loan on any construction or building within the 100-year floodplain. In 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act to reduce subsidies for

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30 https://www.fema.gov/national-flood-insurance-program/definitions
structures built before the NFIP was instituted (called pre-FIRM structures). Over 50 percent of Vermont’s NFIP policies are pre-FIRM, which means that flood insurance premiums for many will increase over the ensuing years.

While the NFIP floodplain management criteria are administered by States and communities through their floodplain management regulations, FEMA’s role is to provide technical assistance and to monitor communities for compliance with the minimum NFIP criteria. Dover joined the NFIP on July 1, 1991 and is a member in good standing (CID 500127). The latest floodplain ordinance was adopted March 7, 2007 and is part of the zoning ordinance.

The latest record indicates that there are forty (40) active NFIP policies in Dover. These policies have a total value of $7,980,300. There have been thirteen NFIP claims paid in Dover since 1978, totaling $199,853.31

The Town works with the elected officials, Windham Regional Commission, the state and FEMA to correct existing compliance issues and prevent any further NFIP compliance issues through continuous communications, training and education.

**Critical Facilities in Dover**

- West Dover Fire Department
  - Rt. 100 – Primary EOC
- East Dover Fire Department
  - Dover Hill Road – Secondary EOC (in the floodplain)
- Dover Highway Department
  - Dover Hill Road
- North Branch Fire District Treatment Facility
  - Dorr Fitch Road (partially in the floodplain)
- Dover Police Department
  - Rt 100
- Dover Elementary School
  - Dover Hill Rd – Emergency Shelter

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31 FEMA NFIP Insurance Report, Nov 2014

Community Facility Map
Development Trends
The below information is meant to characterize recent development trends in Dover and their impact on the town’s vulnerability to hazards.

The latest Mount Snow master plan was approved through Act 250 in July 2011. They are permitted to build up to 900 residential units, mostly around the current base lodge area and Carinthia. Some of these buildings could be multiple stories. The town is requiring them to have backup power generation, sprinklers and backup water supply. Carinthia is the first phase of residential and resort development that they plan to do and it is located on Handle Road. The residential development associated with Mount Snow is mostly for second home owners. This table is in the Housing section of Dover’s current Town Plan:

<table>
<thead>
<tr>
<th>Unit type</th>
<th>1990</th>
<th>2000</th>
<th>Growth 1990-2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>seasonal</td>
<td>1,697</td>
<td>2,044</td>
<td>20%</td>
</tr>
<tr>
<td>owner occupied</td>
<td>252</td>
<td>448</td>
<td>78%</td>
</tr>
<tr>
<td>renter occupied</td>
<td>138</td>
<td>163</td>
<td>18%</td>
</tr>
<tr>
<td>vacant</td>
<td>363</td>
<td>94</td>
<td>-74%</td>
</tr>
<tr>
<td><strong>total units</strong></td>
<td><strong>2,450</strong></td>
<td><strong>2,749</strong></td>
<td><strong>12%</strong></td>
</tr>
</tbody>
</table>

Mount Snow is currently in the permitting process for the creation of West Lake. Construction is expected to begin in summer 2015. The plan for West Lake is to fill two ponds along Cold Brook Road (East Pond and West Pond) and reconfigure Cold Brook to its original path. West Lake will be a 12 acre pond located north of the current East Pond. An inflatable dam will be put in the Cold Brook with the pump house along Cold Brook Road. The creation of West Lake and taking Snow Lake, the current snow making pond, out of commission for snowmaking, will be a good thing for water management at the resort. The development proposed in the new master plan will not cause increased land disturbance, but will improve stormwater management (and potentially lower flooding risks) at the resort.

Outside of Mount Snow’s influence, Dover has not seen much new development in recent years. Mount Snow has significantly influenced the land use and settlement patterns of Dover, and will continue to do so. Most of the new development, both residential and commercial that was seen more so in previous years, was due to the presence of Mount Snow. With the planned expansion of Mount Snow, this influence will continue and Dover could see increased growth in the coming years. Another nearby resort is the Hermitage. Most of the Hermitage development lies in Wilmington, however.

The Hermitage, another nearby resort, is planning to expand their regional airport. This small airport could be used for emergency services if needed. Having an airport also means that there is an increased risk from plane crashes. Part of the airport expansion is meant to elongate the runway and make the airport safer for planes.

As the below Proposed Land Use map from the 2008 Dover Town Plan shows, most of Dover will be maintained as open forest land. Dover values its rural character, which also adds to its
tourism appeal. Much of the open land in Dover is held by the Green Mountain National Forest and additional lands fall within the proclamation boundary that establishes lands that the Forest Service would like to acquire in the future.

Proposed Land Use Map from 2008 Town Plan

There has not been new commercial development in recent years. And outside of Mount Snow, there hasn’t been much new residential development either. There have been five residential building permits issued in Dover between January and August 2014. Slow and mostly residential development is the trend. Dover does have zoning which helps to steer development to where the town feels is most appropriate. Most new development in Dover lies around Route 100 in West Dover. This area near downtown Dover lies in the floodplain of the north branch of the Deerfield River, which is a concern for current and potential future development.
Transfer of Development Rights Map (adopted 2007)

Dover utilizes transfer of development rights to protect certain valuable conservation land in town. The second map on the subsequent page shows where the sending and receiving areas are in Dover. The receiving areas are located partially in mapped floodplain, which would increase their vulnerability. This should be a consideration when deciding where to transfer development and how it is to be built.

Overall, Dover has not seen significant changes that affect its vulnerability level as a community. Vulnerability remains essentially the same in Dover as it was at the last plan update.

MITIGATION STRATEGY

Local Hazard Mitigation Goals

The Hazard Mitigation Goals as outlined below were agreed up by consensus among the Hazard Mitigation Planning participants during meetings for the development of this plan.
General Goals

- Reduce the loss of life and injury resulting from all hazards.
- Reduce the impact of hazards on the town’s water bodies, natural resources, and historic resources.
- Reduce the economic impacts from hazard events.
  - Minimize disruption to the road network and maintain access
  - Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters.
  - Ensure that community infrastructure is not significantly damaged by a hazard event.
- Encourage hazard mitigation planning to be incorporated into other community planning projects, such as the Town Plan, Capital Improvement Plan, and Town Basic Emergency Operation Plan
- Ensure that members of the general public continue to be part of the hazard mitigation planning process.

Relevant Town Policies that Support Mitigation

Though hazard mitigation is not discussed particularly in the current Dover Town Plan, certain policies that are in effect do address hazard mitigation. This may be in what they promote, encourage, or mandate.

Land Use Policies
3.3 - Encourage the maintenance of open land in order to provide a diversity of habitat, protection of sensitive areas, and maintenance of rural character.

4.1 - Require that development projects integrate natural features and resources into the site design so that the losses are minimized.

Natural Resource Policies
1.2 - Maintain or enhance the chemical, physical and biological quality Dover’s surface waters.

1.5 - Retain wetland areas in their natural state for wildlife habitat protection, as retention areas of surface runoff, and for recreational and resource values.

Community Facility Policies
1.5 - Maintain a quality level of police, fire, and ambulance services.

1.7 - Promote the development of state of the art communication facilities of all types to meet the long-range needs of the community and for economic development.

Transportation Policies
1.2 - Coordinate with local, regional, and state entities to plan for Dover’s transportation needs in a comprehensive manner.

Energy Policies
1.2 - Promote the use of alternative forms of energy that respect the built and natural environment.

2.1 - Support efforts to upgrade the electrical infrastructure in Dover.

**Community Resource Policies**

1.3 - Provide adequate and safe opportunities to travel as a pedestrian or bicyclist, both for recreation and transportation purposes.

**Progress between 2010 and 2014**

Though there was no hazard mitigation plan in place, Dover was busy doing things to make their town a safer place to live and visit. These are some of the main achievements they have made.

1) Taft Road Bridge – Cement Culvert Replacement
   The cement culvert was too narrow, at 15’ wide. This culvert needed to be wider based on Stream Geomorphic Assessments (SGA) that shows that sediment is being deposited upstream of the culvert, scouring is occurring under the structure, and embankment armoring is failing. Many culverts in East Dover, where the roads are steep and narrow, have been placed at incorrect angles for the topography. The incorrect angles are causing the force of water to flow in an un-natural flow, fostering stream erosion.

2) Tree Assessment
   Many trees along the major corridors in Dover are dead or dying or were compromised during the 2008 ice storm. These trees pose potential hazards in the inevitable future situation of major wind, snow and ice events. Trees would topple and take out power lines or block roads. This mitigation strategy was to do an extensive tree inventory along all roads, as a first phase, and a tree removal as a second phase. Once the initial tree removal was accomplished, it would be a matter of maintenance when needed. Additionally, Dover is faced with a substantial fuel load in the understory of forests adjacent to buildings. Drought conditions were a natural hazard event in Southern Vermont the summer of 2010. If high winds had occurred at the same time as a careless cigarette tossed from a car, or campfire out of control, the conditions would have been perfect for a forest fire. If drought conditions persist into the future, potential forest fires are ever present in the minds of the Fire Department in Dover.

3) Website - Preparedness page
   Educating residents and tourists about emergency preparedness planning can go a long way toward general safety and welfare. The Town of Dover already has a website which provides an excellent source of information about the area. The town would like to add a page to their site that will provide preparedness tips in the case of inclement weather. It will include; “what should go in an emergency kit” that everyone should keep in their car, general education about sheltering in place, contacts for further information, what you should do if your car breaks down, and other such things.

<table>
<thead>
<tr>
<th>2010 Mitigation Action</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Assessment</td>
<td>The Highway Department completed this in late 2011 for the first time. This is now a continuous maintenance activity.</td>
</tr>
<tr>
<td>Emergency Preparedness</td>
<td>Completed. The link is <a href="http://www.doververmont.com/emergency-preparedness">http://www.doververmont.com/emergency-preparedness</a></td>
</tr>
<tr>
<td>Educational page on the town</td>
<td></td>
</tr>
<tr>
<td>website</td>
<td></td>
</tr>
<tr>
<td>Taft Road Bridge / Culvert</td>
<td>Completed.</td>
</tr>
<tr>
<td>Replacement</td>
<td></td>
</tr>
</tbody>
</table>

The above actions are more preparedness than mitigation and since the last plan update, the town has learned more about the difference between preparedness and mitigation.

**Ongoing Efforts**

1) Dover participates in the National Flood Insurance Program (NFIP) which gives residents access to discount flood insurance.

2) Dover has a yearly fire prevention program at the elementary school to educate students about what fire smells like, how to prevent fires, and what to do if they find themselves in a fire.

3) A yearly fire protection reminder is sent with funding request from both fire departments to residents.

4) The town maintains hazard prevention information that residents need to be aware of on the town website.

5) The Planning Commission has revised floodplain regulations in the zoning ordinance to be more restrictive than the state minimums for preventing development in the floodplain. Built development in floodplains is prohibited unless a special permit is granted by the Zoning Hearing Board.

6) One disaster drill is held per year between East and West Dover Fire Departments and Deerfield Valley Rescue.

7) Deerfield Valley Rescue is working on first responder agency for West Dover. This is because ambulance times can sometimes be lengthy (primary response ambulance is in Wilmington).
Identification of Mitigation Actions

The participants in the Dover Hazard Mitigation Plan effort identified the following hazard mitigation activities based on an evaluation of hazard event vulnerability not addressed by existing hazard mitigation initiatives and the feasibility of new activities. As a part of the ongoing plan process, these were updated in 2014 by the Hazard Mitigation Plan participants to reflect progress and new ideas.

Mitigation actions are listed in priority order by hazard. Actions were prioritized by the plan participants. These are new actions so any shifts in prioritization of actions came out through the multi-year plan development process. The following criteria were used in establishing project priorities. The ranking of these criteria is largely based on the best available information and best judgment as many projects are not fully scoped out at this time. Prioritization was done during the meetings for the plan development in discussions among participants and guided by WRC’s Emergency Planner.

- Does the action reduce damage?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures or structures critical to town operations?
- Can the action be implemented quickly?
- Is the action socially acceptable?
- Is the action technically feasible?
- Is the action administratively possible?
- Is the action politically acceptable?
- Is the action legal?
- Does the action offer reasonable benefits compared to its cost of implementation?
- Is the action environmentally sound?

Cost-Benefit Analysis

At the time of applying for FEMA’s PDM-C, FMA or HMGP grant programs, each project listed below will undergo full benefit-cost analysis (BCA) methodology, version 4.5 or higher to maximize savings.

As part of public involvement discussions, there was a rough cost/benefit analysis done for each action listed in the table and those results are shown in the table. The below cost and benefits tables address the priorities for the mitigation strategies that are stated in the Mitigation Actions Table.

<table>
<thead>
<tr>
<th>Cost Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
</tr>
<tr>
<td>= &gt;$100,000</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>= $25,000 – 100,000</td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td>= &lt; $25,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefit Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
</tr>
<tr>
<td>Public Safety</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Infrastructure/ Functionality</td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td>Aesthetics/ General Maintenance</td>
</tr>
</tbody>
</table>
Implementation of Mitigation Actions / Capabilities

Though Dover has a low population, they have a fulltime staff and high capabilities relative to other towns of their size. They have a planning and zoning department, a Zoning Administrator and a Town Administrator. They also have a six person highway department, two fire departments, and a police department. Capabilities are boosted by a full time staff and active zoning, planning and emergency management personnel.

Area where capabilities could be improved is training and better recognition of the floodplain administrator. Additionally, like most small towns, there are limited number of volunteers to fill a number of positions that need to be filled. There are few people that participate and there is trouble getting more. It is difficult to get participants for long term needs, including town commissions and volunteer organizations. Capabilities are limited by human and financial resources available to carry out projects and programs. Whenever possible, Dover will utilize 406 mitigation funding.

East Dover is a private fire department, and West Dover used to be, but then Town took over the West Dover department.

Roles, responsibilities and timeframes for each action were defined through Town involvement and are laid out in the mitigation actions table. The Emergency Management Director, who championed this plan, along with the Road Commissioner are the primary entities responsible for carrying out the actions. They were the most active town staff involved with putting the plan together.
## Mitigation Actions Table

<table>
<thead>
<tr>
<th>HAZARD</th>
<th>ACTION</th>
<th>RESPONSIBLE PARTY</th>
<th>TIME-FRAME</th>
<th>FUNDING SOURCE</th>
<th>MITIGATION OR PREPAREDNESS</th>
<th>COST / BENEFIT</th>
<th>PRIORITY</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Hazards</td>
<td>Generator-Police Department - critical facility power generation</td>
<td>Emergency Management Director</td>
<td>Pending grant funds; start Summer 2015 complete Summer 2016</td>
<td>HMGP potentially, and town funds</td>
<td>P – problem of frequent outages</td>
<td>Low/High</td>
<td>High</td>
<td>Grant applied for</td>
</tr>
<tr>
<td>All Hazards</td>
<td>Generator-West Dover Fire Department - critical facility power generation</td>
<td>Emergency Management Director</td>
<td>Pending grant funds; start Summer 2015 complete Summer 2016</td>
<td>HMGP potentially, and town funds</td>
<td>P – problem of frequent outages</td>
<td>Medium/High</td>
<td>High</td>
<td>Looking for funding source</td>
</tr>
<tr>
<td>All Hazards</td>
<td>Generator-Highway Garage - critical facility power generation</td>
<td>Emergency Management Director</td>
<td>Pending grant funds; start Summer 2015 complete Summer 2016</td>
<td>HMGP potentially, and town funds</td>
<td>P – problem of frequent outages</td>
<td>Medium/High</td>
<td>High</td>
<td>Grant applied for</td>
</tr>
<tr>
<td>All Hazards</td>
<td>Generator- East Dover Fire Department - critical facility power generation</td>
<td>Emergency Management Director</td>
<td>Pending grant funds; start Summer 2015 complete Summer 2016</td>
<td>HMGP potentially, and town funds</td>
<td>P – problem of frequent outages</td>
<td>Medium/High</td>
<td>High</td>
<td>Grant applied for</td>
</tr>
<tr>
<td>All Hazards</td>
<td>Purchase portable storage for emergency preparedness supplies for emergency shelter</td>
<td>Emergency Management Director</td>
<td>Start Fall 2015; Finish end of 2015</td>
<td>FEMA grant; DEMHS grant</td>
<td>P</td>
<td>Low/High</td>
<td>High</td>
<td>Pending funding</td>
</tr>
<tr>
<td>All Hazards</td>
<td>Purchase and stockpile gallon containers for distribution during disasters</td>
<td>Emergency Management Director</td>
<td>Start Winter 2016; Finish Spring 2016</td>
<td>FEMA grant; DEMHS grant</td>
<td>P</td>
<td>Low/High</td>
<td>Medium</td>
<td>Pending funding</td>
</tr>
<tr>
<td>All Hazards</td>
<td>Material Availability - Salt, sand, gravel, ledge, stone all need stockpiled to allow for quicker recovery time after disaster.</td>
<td>Road Commissioner</td>
<td>Started Fall 2014; Finish Fall 2017</td>
<td>HMGP Grant Funding or VTrans funding</td>
<td>P</td>
<td>Low/Low</td>
<td>Medium</td>
<td>In progress; Ledge has been purchased</td>
</tr>
<tr>
<td>Flood</td>
<td>Replace Bridge with larger bridge on Dover Hill Road by the East Dover Fire House</td>
<td>Road Commissioner</td>
<td>Pending funding start 2016; finish fall 2017</td>
<td>HMGP Grant Funding or VTrans funding</td>
<td>M</td>
<td>High/Medium</td>
<td>High</td>
<td>Looking for designs</td>
</tr>
<tr>
<td>Flood</td>
<td>Update culvert assessment</td>
<td>Road Commiss. / WRC</td>
<td>Start spring 2015; finish Summer 2015</td>
<td>Town budget; Better Back Roads</td>
<td>M</td>
<td>Low/High</td>
<td>High</td>
<td>In discussion with WRC now</td>
</tr>
<tr>
<td>HAZARD</td>
<td>ACTION</td>
<td>RESPONSIBLE PARTY</td>
<td>TIME-FRAME</td>
<td>FUNDING SOURCE</td>
<td>MITIGATION OR PREPAREDNESS</td>
<td>COST / BENEFIT</td>
<td>PRIORITY</td>
<td>STATUS</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------</td>
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<td>-------------------------------------</td>
<td>----------------------------</td>
<td>----------------</td>
<td>----------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Flood</td>
<td>Culvert upgrade at Taft Brook Road 1/5 mile north east of Town Hall</td>
<td>Road Commissioner</td>
<td>Start and Finish</td>
<td>HMGP Grant Funding or VTrans funding</td>
<td>M</td>
<td>Medium / High</td>
<td>Medium</td>
<td>Waiting for hydraulic study before grant app</td>
</tr>
<tr>
<td>Flood</td>
<td>Culvert upgrade at Barlett Residence on Holland Road</td>
<td>Road Commissioner</td>
<td>Summer 2015, start</td>
<td>Town funding</td>
<td>M</td>
<td>High / High</td>
<td>Medium</td>
<td>In planning stage now</td>
</tr>
<tr>
<td>High Winds</td>
<td>Develop program for assessing and removing potentially hazardous tree limbs near power lines</td>
<td>Road Commissioner and Power Company</td>
<td>Annually check each fall and spring</td>
<td>Town budget and power company</td>
<td>P</td>
<td>Low / High</td>
<td>Medium</td>
<td>Continuous and as needed</td>
</tr>
<tr>
<td>Winter Storm / Ice Storm</td>
<td>Fill Salt Shed</td>
<td>Road Commissioner</td>
<td>Start and end winter 2015/2016</td>
<td>HMGP Grant Funding/ VTRANS</td>
<td>P</td>
<td>High/High</td>
<td>Medium</td>
<td>Continuous, plan for is for it always to be near capacity</td>
</tr>
<tr>
<td>Winter Storm / Ice Storm</td>
<td>Develop program for assessing and removing potentially hazardous tree limbs near power lines</td>
<td>Road Commissioner and Power Company</td>
<td>Annually each fall, and spring</td>
<td>Town budget and power company</td>
<td>P</td>
<td>Low/High</td>
<td>Medium</td>
<td>Continuous</td>
</tr>
<tr>
<td>Structure Fire</td>
<td>Install pressurized water supply for fire fighting in West Dover – needed to allow for quicker response – piping about three miles</td>
<td>Road Commissioner</td>
<td>Start Summer 2015, Complete 2020</td>
<td>Town budget; potentially grant funded</td>
<td>P and M</td>
<td>Medium/High</td>
<td>Medium</td>
<td>In planning phase</td>
</tr>
<tr>
<td>Landslide</td>
<td>Bank stabilization - Rock River - Trees are sliding into river; banks need stabilized - road is at risk</td>
<td>Road Commissioner</td>
<td>Start Spring 2018 / complete within 1 season</td>
<td>Town funding; potentially grant funded</td>
<td>M</td>
<td>Medium/High</td>
<td>Low</td>
<td>In planning phase</td>
</tr>
<tr>
<td>Landslide</td>
<td>Bank stabilization - Bluebrook - particular area just above the covered bridge - landslide issue</td>
<td>Road Commissioner</td>
<td>Start Spring 2018 / complete within 1 season</td>
<td>Town funding; potentially grant funded</td>
<td>M</td>
<td>Low/High</td>
<td>Low</td>
<td>In planning phase</td>
</tr>
<tr>
<td>Landslide</td>
<td>Bank/Road stabilization - Dorr Fitch Road - Road itself is sinking because the bank is eroding - Road in a landslide, but no alternative road</td>
<td>Road Commissioner</td>
<td>Start June 2017 / Finish Fall 2017</td>
<td>Vtrans grant funding</td>
<td>M</td>
<td>High/high</td>
<td>Low</td>
<td>In planning phase</td>
</tr>
<tr>
<td>HAZARD</td>
<td>ACTION</td>
<td>RESPONSIBLE PARTY</td>
<td>TIME-FRAME</td>
<td>FUNDING SOURCE</td>
<td>MITIGATION OR PREPAREDNESS</td>
<td>COST / BENEFIT</td>
<td>PRIORITY</td>
<td>STATUS</td>
</tr>
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<td>------------</td>
<td>-------------------------------------------------------------------------</td>
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<td>----------------</td>
<td>---------------------------</td>
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<td>---------------------------------</td>
</tr>
<tr>
<td>All hazards</td>
<td>Fire Chief and Police Chief to get VTAlert training; subsequently do outreach to residents through the town website and tax bills to sign up for VTAlert for town notifications</td>
<td>Fire Chief / Police Chief</td>
<td>Start June 2015 / Finish Fall 2015</td>
<td>Town budget</td>
<td>M</td>
<td>Low / High</td>
<td>Medium</td>
<td>Training scheduled for early June 2015</td>
</tr>
<tr>
<td>Flood</td>
<td>Bylaw update to include River Corridors in the Floodplain bylaw</td>
<td>Planning Commission</td>
<td>Start prior to Town Meeting Day 2016 / Vote for approval TMD 2017</td>
<td>Town budget</td>
<td>M</td>
<td>Low / High</td>
<td>High</td>
<td>Zoning update planned Spring 2016</td>
</tr>
<tr>
<td>Flood</td>
<td>Floodplain Administrator will get further training</td>
<td>Floodplain Administrator / WRC</td>
<td>Summer / Fall 2015 attend training series</td>
<td>Town budget</td>
<td>M</td>
<td>Low / High</td>
<td>High</td>
<td>Training in planning stage now with WRC</td>
</tr>
</tbody>
</table>
Existing Planning Mechanisms

The following policies, programs and activities related to hazard mitigation are currently in place and/or being implemented in the Town of Dover. The Hazard Mitigation Planning participants analyzed these programs for their effectiveness and noted improvements needed. Dover uses all of the tools listed below to help plan for current and future activities with the town. For example: the Local Emergency Operation Plan has a contact list that is used for response purposes in the case of a hazard event, and is updated every year after Town Meeting. Town Road and Bridge Standards are followed by the town and Dover plans to update their culvert inventory. In the development of this plan, the latest 2008 Town Plan was used.

As Dover goes through the update process for the planning mechanisms outlined in the table below, they will look to the Hazard Mitigation Plan’s Table of Actions and Risk and Vulnerability Assessments to help guide land use district decisions, and guide goals and policies for those districts. At the Town Meeting every March, policies and action items in the Town Plan are reviewed and integrated into hazard mitigation as needed. The Local Emergency Operations Plan contact list is updated after Town Meeting each year, including updates to vulnerable geographic locations, as well as locations of vulnerable populations. Updates to each of the planning mechanisms outlined in the table below are handled by the identified by the responsible party identified in the table. There is no timeframe for updating the below referenced plans and regulations to better incorporate hazard mitigation, however, as each document is updated the hazard mitigation plan will be reviewed for incorporation. The goals of this hazard mitigation plan will be incorporated in the upcoming town plan update to ensure that emergency preparedness and mitigation planning efforts are included in the Town Plan, with particular attention to including the projects in the Mitigation Actions Table. This will assist with ensuring that this plan is utilized and project follow-through occurs.

Since the last plan update – The town plan was re-adopted in 2014, but unchanged from 2008. The zoning ordinance was last updated in 2011. Currently, Dover is in the midst of updating the town plan, which will include a new flood resiliency element. The hazard mitigation plan will be considered and incorporated as seen appropriate. The zoning ordinance is planned to be updated started in 2015 and that update will include a Fluvial Erosion Hazard bylaw. The LEOP is updated yearly and was updated last in 2014. Other mitigation/emergency planning related documents and their status are outlined in the below table:

<table>
<thead>
<tr>
<th>Type of Existing Protection</th>
<th>Description</th>
<th>Effectiveness/Enforcement /Hazard that is addressed</th>
<th>Gaps in Existing Protection/Improvements Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Plan</td>
<td>Plan for coordinated town-wide planning for land use, municipal facilities, etc.</td>
<td>Flooding Addressed</td>
<td>Town Plan adopted in 2008 and re-adopted in 2014; Mitigation is not addressed in the plan; it should be included in the next update.</td>
</tr>
<tr>
<td>Town Local Emergency Operation Plan</td>
<td>Municipal procedures and contacts for use during a disaster</td>
<td>Incident Command; 3 Emergency shelter locations</td>
<td>Maps are lacking; few emergency contacts; responsible agencies not noted</td>
</tr>
</tbody>
</table>

---

33 November 24, 2014 discussion with planning commission member Tim Chock.
<table>
<thead>
<tr>
<th>School Emergency Response Protocol</th>
<th>School procedures for emergency response</th>
<th>School Crisis Plan</th>
<th>School Crisis Planning Team Facilitator has met with schools and First Responders to assess gaps and offer solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEPC 6 Hazardous Materials Plan</td>
<td>Procedures for hazmat emergency response at regional level</td>
<td>LEPC 6 has the plan</td>
<td>Continued involvement with the LEPC</td>
</tr>
<tr>
<td>Mutual Aid – Emergency Services</td>
<td>Agreement for regional coordinated emergency services</td>
<td>Keene (NH) Mutual Aid – written agreement/contract for Fire/Ambulance and HazMat</td>
<td>None identified</td>
</tr>
<tr>
<td>Mutual Aid – Public Works</td>
<td>Agreement for regional coordinated emergency highway maintenance services</td>
<td>Public Works MAA signed 05/06/03</td>
<td>None identified</td>
</tr>
<tr>
<td>Road Standards</td>
<td>Design and construction standards for roads and drainage systems</td>
<td>Adopted State of Vermont Codes and Standards for Roads</td>
<td>No major gaps identified</td>
</tr>
<tr>
<td>Culvert and Bride Assessment</td>
<td>Maintenance and condition checklist</td>
<td>Town bridge and culvert inventory was updated in 2003</td>
<td>This needs updated; Road Foreman should contact WRC to assist with this update.</td>
</tr>
<tr>
<td>Subdivision Regulations</td>
<td>Regulates the division of land, standards for site access and utilities</td>
<td>Enforced by Zoning Administrator and Zoning Hearing Board</td>
<td>None Identified</td>
</tr>
<tr>
<td>Sewage Regulations</td>
<td>Regulates on-site sewage systems</td>
<td>State Regulations apply</td>
<td>None Identified</td>
</tr>
<tr>
<td>Flood Hazard Area Regulations</td>
<td>Regulates development in FEMA flood hazard areas</td>
<td>Town Zoning Bylaw attachment; exceeds state minimums</td>
<td>Revised in 2007 to include new FEMA DFIRM’s; regulations should be revisited with WRC emergency planner</td>
</tr>
<tr>
<td>Site Plan Review (SPR)</td>
<td>Site development standards</td>
<td>Town Zoning Regulations</td>
<td>None Identified</td>
</tr>
<tr>
<td>National Flood Insurance Program (NFIP)</td>
<td>Provides ability for residents to acquire discount flood insurance</td>
<td>NFIP member in good standing</td>
<td>None Identified</td>
</tr>
<tr>
<td>Building Code</td>
<td>Regulates building construction standards</td>
<td>Through Labor and Industry</td>
<td>None Identified</td>
</tr>
</tbody>
</table>
Wetland protection – VT Wetland Rules

Protected by 1990 Vermont Wetland Rules

Protection of environment, water resources, wildlife, biota

None Identified

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**PLAN MAINTENANCE PROCESS**

**Monitoring and Updating the Plan – Yearly Review**

Once the plan is approved and adopted, the Emergency Management Director in Dover, along with interested and appointed volunteers, in Dover will continue to work with the Windham Regional Commission to monitor, evaluate, and update the plan throughout the next 5 year cycle. The plan will be reviewed annually at an April Selectboard meeting along with the review of the town’s Local Emergency Operations Plan (LEOP). This meeting will allow town officials and the public to discuss the town’s progress in implementing mitigation actions and determine if the town is interested in applying for grant funding for projects that can help mitigate future hazardous events; e.g. bridge and culvert replacements, road replacements and grading, as well as buying out any repetitive loss structures that may be in the Special Flood Hazard Area, and revise the plan as needed. Windham Regional Commission’s emergency planner will assist the Dover Emergency Management Director with this review, as requested by the Town. Progress on actions will be kept track using a table that WRC will provide to the Emergency Committee to update. There will be no changes to the plan, unless deemed necessary by the Town. If so, the post disaster review procedure will be followed.

**Plan Maintenance – 5 Year Update and Evaluation Process**

The Hazard Mitigation Plan is dynamic. To ensure that the plan remains current and relevant, it is important that it undergo a major update periodically as required in 44 CFR § 201.6(c)(4)(i). This update process will be thorough and occur every five years. This update will include a thorough evaluation of the plan and incorporate any new requirements that FEMA has for Hazard Mitigation Plans. Participants outlined below will work with the Emergency Planner at the Windham Regional Commission (WRC) in accordance with the following procedure:

1. The Dover Selectboard will appoint a team to convene a meeting of the hazard mitigation planning committee. The town’s Emergency Management Director will chair the committee, and other members should include local officials such as Selectboard members, fire chief, zoning administrator, constable/police chief, road commissioner, Planning Commission members, health officer, etc. The Emergency Management Director will work with the Windham Regional Commission Emergency Planner and be the point person for the Town.

2. The WRC Emergency Planner will guide the Committee through the update process. This update process will include several advertised public meetings. At these meetings the Committee will use the existing plan and update as appropriately guided by the WRC Emergency Planner to address:

   - Update of hazard events and data gathered since the last plan update.
• Changes in community and government processes, which are hazard-related and have occurred since the last review.
• Changes in community growth and development trends.
• Progress in implementation of plan initiatives and projects.
• Incorporation of new mitigation initiatives and projects.
• Effectiveness of previously implemented initiatives and projects.
• Evaluation of the plan for its effectiveness at achieving its stated purpose and goals.
• Evaluation of unanticipated challenges or opportunities that may have occurred between the date of adoption and the date of the report.
• Evaluation of hazard-related public policies, initiatives and projects.
• How mitigation strategy has been incorporated into other planning mechanisms
• Review and discussion of the effectiveness of public and private sector coordination and cooperation.

3. From the information gathered at these meetings, and other interactions the Emergency Planner has with the Town, along with data collected independently during research for the update, the WRC Emergency Planner will prepare the updated draft in conformance with the latest FEMA Region 1 Local Hazard Mitigation Plan Review Crosswalk document.

4. The Selectboard will review the draft report. Consensus will be reached on changes to the draft. Emphasis in plan updates will be put on critically looking at how the plan can become more effective at achieving its stated purpose and goals.

5. Changes will be incorporated into the Plan by the WRC Emergency Planner.

6. The Selectboard will notify the public that the draft is available for public comment and review. The Town will advertise and make available the draft plan for provide comments both electronically and in hard copy. The draft plan will simultaneously be distributed electronically to adjacent towns for review and comment.

7. Public and adjacent town comments will be incorporated by the WRC Emergency Planner. The final draft will be provided to the Emergency Management Director (EMD), and others closely involved with plan development, for final review and comment, with review comments provided separately and incorporated into the plan.

8. WRC Emergency Planner will finalize the plan with any remaining comments from the EMD and submit electronically to DEMHS and FEMA.

9. The Plan will be reviewed by the DEMHS State Hazard Mitigation Officer (SHMO) and FEMA Region 1.

10. SHMO and FEMA comments will be addressed in the plan by the WRC Emergency Planner.
11. The plan will be resubmitted as needed until the plan is approved pending adoption. Once the plan is approved by FEMA, it will be ready for adoption.

12. The Selectboard will adopt the plan and distribute to interested parties.

13. The final adopted plan will be submitted by the WRC Emergency Planner to DEMHS and FEMA.

14. FEMA will issue final approval of the adopted plan and the five year clock will begin again.

**Post-Disaster Review/Update Procedure**

Should a declared disaster occur, a special review will occur amongst the Selectboard, the Emergency Management Coordinator, the WRC Emergency Planner, and those involved in the five year update process described above. This review will occur in accordance with the following procedures:

1. Within six months of a declared emergency event, the town will initiate a post disaster review and assessment. Members of the State Hazard Mitigation Committee will be notified that the assessment process has commenced.

2. This post disaster review and assessment will document the facts of the event and assess whether existing Hazard Mitigation projects effectively lowered community vulnerability/damages. New mitigation projects will be discussed, as needed.

3. A draft After Action Report of the review and assessment will be distributed to the hazard mitigation committee.

4. A meeting of the committee will be convened by the Selectboard to make a determination of whether the plan needs to be amended. If the committee determines that NO modification of the plan is needed, then the report is distributed to local communities.

5. If the committee determines that modification of the plan IS needed, then the committee drafts an amended plan based on the recommendations and forwards to the Selectboard for public input.

6. The Selectboard adopts the amended plan after receiving approval-pending-adoption notification from FEMA.

**Continued Public Participation**

Maintenance of this plan and implementation of the mitigation strategy will require the continued participation of local citizens, agencies, and other organizations. To keep the public aware of and involved in local hazard mitigation efforts, the town will take the following measures:
- Provide hazard mitigation information at Town Meeting
- Post the hazard mitigation plan on the town website
- Selectboard will review past hazard mitigation committee members and consider whether new members should be added. Representatives of local businesses, nonprofits, academia, etc. should especially be considered.
- Notify the public of committee meetings through town bulletin board, website, newsletter, newspaper, Facebook, Front Porch Forum, etc.
APPENDIX

1. Adoption Sheet
2. Newspaper advertisements (ran September 18 and 25) for September 29, 2014 mitigation plan meeting
3. Dover website advertisement for Hazard Mitigation meeting
4. Verbiage from pdf link in above advertisement
5. Sign in sheet from the September 29, 2014 hazard mitigation plan meeting
6. Agenda from the September 29, 2014 Mitigation Plan meeting
7. Sign in sheet from October 21, 2010 Road Foreman/Mitigation planning ideas meeting
8. Sign-in sheet from LEPC 6 October 19, 2010 Meeting with program about Pre-Disaster Hazard Mitigation Plans, where Jon Abel, Fire Chief from Dover attended meeting
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PREREQUISITES

Adoption by the Local Governing Body

Certificate of Adoption
Town of Dover, VT
Selectboard

A Resolution Adopting the Local Hazard Mitigation Plan, for the Town of Dover, VT

WHEREAS, the Town of Dover, VT has worked with the Windham Regional Commission to identify natural hazards, analyze past and potential future damages due to natural disasters, and identify strategies for mitigating future damages; and

WHEREAS, The Town of Dover, VT Local Hazard Mitigation Plan analyzes natural hazards and assesses risks within the community; and

WHEREAS, the Town of Dover, VT Local Hazard Mitigation Plan recommends the implementation of action(s) specific to the community to mitigate against damage from natural hazard events; and

WHEREAS, the Town of Dover, VT is committed to an on-going hazard mitigation effort for the purposes of long term risk reduction and increased community resiliency;

NOW, THEREFORE BE IT RESOLVED that the Town of Dover, VT adopts the Town of Dover Local Hazard Mitigation Plan.

Duly adopted this 15 day of AUGUST, 2015.

Selectboard

Randall Terk, Chair

Linda Holland

Joseph Mahon

ATTEST

Jeannette Eckert, Assistant Town Clerk

Victoria Capitani, Vice Chair

Tom Baltrus
2. Newspaper advertisements (ran September 18 and 25) for September 29, 2014 mitigation plan meeting
3. Dover website advertisement for Hazard Mitigation meeting

![Dover, Vermont website advertisement](image)

Public Meeting for Dover Hazard Mitigation Plan

Public meeting to be held Monday, September 29th from 3-6pm at the West Dover Firehouse

Dover Hazard Mitigation Plan Meeting.pdf

4. Verbiage from pdf link in above advertisement

Notice - Public meeting for the Dover Hazard Mitigation Plan update to be held on Monday, September 29th from 3:00-6:00 PM at the West Dover Fire Department. Alyssa Sabetto, Planner from the Windham Regional Commission, will be gathering input on hazards facing the Town, mitigation actions, and experiences from past hazard events for the plan update. The public is encouraged to attend. For more information contact Rich Werner at 802-380-7731 or Alyssa Sabetto at 802-257-4547 ext 109.
5. Sign in sheet from the September 29, 2014 hazard mitigation plan meeting

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gene Calet</td>
<td><a href="mailto:gcalet@seabrook.net">gcalet@seabrook.net</a></td>
<td>Planning and Zoning</td>
</tr>
<tr>
<td>David Cochran</td>
<td></td>
<td>ZA, TNO</td>
</tr>
<tr>
<td>Michelle Mann</td>
<td>michelle.mann@</td>
<td>Dover Police</td>
</tr>
<tr>
<td></td>
<td>state.vt.us</td>
<td></td>
</tr>
<tr>
<td>Bob Holland</td>
<td>don.holland@</td>
<td>Dover</td>
</tr>
<tr>
<td></td>
<td>stowe.vt.us</td>
<td></td>
</tr>
<tr>
<td>Bill Short</td>
<td></td>
<td>Dover Police</td>
</tr>
<tr>
<td>Randy Johnson</td>
<td>randy.johnson@</td>
<td>Dover Police</td>
</tr>
<tr>
<td></td>
<td>state.vt.us</td>
<td></td>
</tr>
<tr>
<td>Heidi Taylor</td>
<td><a href="mailto:heidi@chamrecom.com">heidi@chamrecom.com</a></td>
<td>Deerfield Valley Railroad</td>
</tr>
<tr>
<td>Rich Waring</td>
<td><a href="mailto:rwo@vermont.com">rwo@vermont.com</a></td>
<td>Dover Police</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:rwo@stowe.vt.us">rwo@stowe.vt.us</a></td>
<td>School Board</td>
</tr>
<tr>
<td>Jason Perl</td>
<td><a href="mailto:jperl@vermont.com">jperl@vermont.com</a></td>
<td>Mount Sunw Resort</td>
</tr>
</tbody>
</table>
6. Agenda from the September 29, 2014 Mitigation Plan meeting

Hazard Mitigation Plan – Update & Plan Development
West Dover Fire Station – September 29, 2014

Agenda

1. Introduce the Hazard Mitigation Plan
   a) Purpose
   b) Process
   c) Review of what’s been done to date

2. Hazard Identification
   a) Review hazard ranking developed before
      a. Are the key threats still what we want to focus on? Flash Flood, Winter Storm/Ice Storm,
         Wildfire and structure fire, power failure and High Wind

3. Hazard Events
   a) Discuss events that have happened that aren’t included in the plan
   b) Impacts that aren’t already addressed in the plan
   c) Mapping of vulnerable areas

4. Mitigation Actions
   a) Review Mitigation Actions table developed by Dover in 2010
   b) Discuss Existing Hazard Mitigation Projects, Programs & Activities
   c) Update Mitigation Actions Table

5. Other Updates
   a) Review of other elements of the draft plan and questions that weren’t discussed
   b) Development trends
   c) Existing planning mechanisms table
   d) Plan maintenance process

6. Next Steps
7. Sign in sheet from October 21, 2010 Road Foreman/Mitigation planning ideas meeting

<table>
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<tbody>
<tr>
<td>Lee Chambria</td>
<td>Dover</td>
<td><a href="mailto:chambria@newbrook.org">chambria@newbrook.org</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Donald Zurburk</td>
<td>Brookline</td>
<td><a href="mailto:zurburk@northstar.net">zurburk@northstar.net</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deal Elliott</td>
<td>Marlboro VT</td>
<td><a href="mailto:deal@deal.com">deal@deal.com</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gary Coon</td>
<td>Marlboro VT</td>
<td><a href="mailto:gcoongmail@gmail.com">gcoongmail@gmail.com</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ted Baker</td>
<td>Marlboro VT</td>
<td><a href="mailto:ted@ted.com">ted@ted.com</a></td>
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SAFE COMMUNITIES—RESILIENT TOWNS

Meeting Oct. 19th—Windham Region VT Towns Pre-Disaster Hazard Mitigation Plans

WHAT’S HAPPENING?
The Windham Regional Commission is working with 18 towns to complete their Pre-Disaster All Hazard Mitigation Plans. The plans will address flooding, winter storms, wildfire/structure fire, power failures, high winds and other emergencies that towns may face.

WHY PARTICIPATE?
Local Knowledge is important!
We want to know:
The hazards of greatest concern to you;
How have natural hazards affected you or your community in the past;
How you think damage can be prevented or mitigated in the future?

HOW CAN YOU PARTICIPATE?
Come to the LEPC 6 Meeting on Tuesday, October 19th
5-5:30 pm LEPC Business Meeting
5:30—8 pm Public Participation Opportunity
5:30 pm: Dinner Buffet (Complementary)
5-7 pm: View New Red Cross Moving Shelter

9. Flyer advertising LEPC 6 October 19, 2010 Meeting with program about Pre-Disaster Hazard Mitigation Plans
10. Photographs from the October 19, 2010 LEPC 6 meeting with program about Pre-Disaster Hazard Mitigation Plans, showing public interaction and making town plans available for comment.
11. Advertisement used by Town of Dover to make public aware of plan availability for review at the town office, library and online

Are you ready to weather the next ice storm? Flood event? Extended power outage due to high winds?

The Town of Dover is developing a comprehensive Pre-Disaster Natural Hazard Mitigation Plan to address potential hazards in our community before they occur.

As the Town is taking action to be prepared for whatever hazard event strikes, won’t you join us in preparations? Your input is important! We would like to know your feedback regarding this important document. Let us know if you have suggestions or solutions about how risk and negative impacts as a result of hazards can be lessened, and how we can recover more quickly in the aftermath.

Hazard Mitigation Goals

- Reduce the loss of life and injury resulting from all hazards.
- Reduce the impact of hazards on the town’s water bodies, natural resources, and historic resources.
- Reduce the economic impacts from hazard events.
  - Minimize disruption to the road network and maintain access,
  - Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters,
  - Ensure that community infrastructure is not significantly damaged by a hazard event.
- Ensure that members of the general public continue to be part of the hazard mitigation planning process.

The Plan is available for review at the following locations:

- Town Office – Hard Copy available - see Town Clerk
- Library – Hard Copy available
- http://doververmont.com/

After you have taken a look, please return comments to any of the following:

- Nona Monis, Town Administrator 464-8000 ext. 3, doverto@sover.net
- Or mail in your comments to:
- Dinah Reed, Assistant Planner for the Windham Regional Commission, or phone/email - (802) 257-4547 ext. 109, dreed@sover.net
12. Sign-in sheet from the October 12, 2010 Hazard Mitigation plan meeting

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<tr>
<td>Robert Holland</td>
<td>Road Commissioner</td>
<td>604-8722</td>
<td>dover.sje.us @gmail.com</td>
</tr>
<tr>
<td>Robert Edwards</td>
<td>Police Chief</td>
<td>604-8722</td>
<td>dover.sje.us @gmail.com</td>
</tr>
<tr>
<td>Richard Wenne</td>
<td>W. Dover Fire Chief</td>
<td>441-8722</td>
<td>dover.sje.us @gmail.com</td>
</tr>
<tr>
<td>Derek Reed</td>
<td>WIC Assistant Planner</td>
<td>6070</td>
<td>dover.sje.us @gmail.com</td>
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14. Town of Dover website advertisement for commenting on the draft hazard mitigation plan and flyer that was posted at the town office, library and post offices. These posting were from 11/26/14 through 12/12/14.

The draft Dover Hazard Mitigation Plan is now available for public review at the Dover Town Office and on the town website www.doververmont.com

The Plan will be available for comment until the end of the public comment period on December 12, 2014.

Anyone who would like to comment on the plan should contact Alyssa Sabetto at the Windham Regional Commission. She can be reached via phone at 802-257-4547 x109 or email at asabetto@windhamregional.org. We encourage your review and participation!
15. Email sent of November 25, 2014, along with the draft plan, to adjacent towns soliciting comment by December 12, 2014. No comments were received.