For Board of Selectmen Adoption
12-07-15
FEMA APA Granted 10-23-15

TOWN OF ALLENSTOWN
NEW HAMPSHIRE

HAZARD MITIGATION PLAN UPDATE 2015
with the Suncook River Plan

Mount Delight Road, April 2007 Flood
Photo courtesy of Police Department

Riverside Drive Flooded Home, May 2006 Flood
Photo courtesy of NH Homeland Security and Emergency Management

Adopted by the Allenstown Board of Selectmen
December 7, 2015

FEMA APPROVED _____, 2015

Town of Allenstown
New Hampshire

Hazard Mitigation Plan Update 2015
with the Suncook River Plan

Adopted December 7, 2015

FEMA Approved _____, 2015

Town of Allenstown
16 School Street
Allenstown, NH 03275
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Fire Department Phone: (603) 485-9202 (business #)
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Central NH Regional Planning Commission
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Concord, NH 03301
Phone: (603) 226-6020
Web: www.cnhrpc.org

NH Department of Safety
NH Homeland Security and Emergency Management
33 Hazen Drive
Concord, NH 03305 *(Mailing Address)*

Incident Planning and Operations Center
110 Smokey Bear Blvd
Concord, NH 03301 *(Physical Address)*
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Web: www.nh.gov/safety/divisions/hsem

US Department of Homeland Security
Federal Emergency Management Agency
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Web: www.fema.gov

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CERTIFICATE OF ADOPTION
December 7, 2015

TOWN OF ALLENSTOWN, NEW HAMPSHIRE
BOARD OF SELECTMEN
16 SCHOOL STREET, ALLENSTOWN NH 03275

A RESOLUTION ADOPTING THE ALLENSTOWN HAZARD MITIGATION PLAN UPDATE 2015

WHEREAS, the Town of Allenstown has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **HAZARD MITIGATION PLAN UPDATE 2015** including but not limited to flooding, high wind events, severe winter weather, and fire, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Allenstown has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **HAZARD MITIGATION PLAN UPDATE 2015** under the requirements of 44 CFR 201.6; and

WHEREAS, public and Committee meetings were held between March 2013 to May 2015 regarding the development and review of the **HAZARD MITIGATION PLAN UPDATE 2015**; and

WHEREAS, the **PLAN** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Town of Allenstown; and

WHEREAS, the **PLAN** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of Allenstown with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this **PLAN** will make the Town of Allenstown eligible for funding to alleviate the effects of future hazards; now therefore be it

RESOLVED by Town of Allenstown Board of Selectmen:

1. The **HAZARD MITIGATION PLAN UPDATE 2015** is hereby adopted as an official plan of the Town of Allenstown;
2. The respective officials identified in the mitigation action plan of the **PLAN** are hereby directed to pursue implementation of the recommended actions assigned to them;

3. Future revisions and **PLAN** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution; and

4. An annual report on the progress of the implementation elements of the **PLAN** shall be presented to the Board of Selectmen by the Emergency Management Director or designee.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Allenstown this 7th day of December, 2015.

	Jeffery Gryval, Board of Selectmen Chair	date
ATTEST		
	Jason Tardiff, Selectman	date
Kathleen Rodgers, Town Clerk	Kate Walker, Selectman	date

ACKNOWLEDGMENTS

The Allenstown Hazard Mitigation Committee was comprised of these individuals who met from May 2013 to May 2015 to develop the **ALLENSTOWN-SUNCOOK RIVER HAZARD MITIGATION PLAN UPDATE 2015**

- Shaun Mulholland, Allenstown Town Administrator/Emergency Management Director
- Robert Martin, Allenstown Fire Department Chief/Deputy Emergency Management Director
- Michael Stark, Allenstown Police Department Chief/ Deputy Emergency Management Director
- Ronald Pelissier, Allenstown Highway Department Road Agent
- Carl Caporale, Allenstown Wastewater Treatment Facility Sewer Commissioner
- Andrea Martel, Allenstown Planning Board Member/Allenstown Wastewater Treatment Facility Administrative Assistant
- Joyce Welch, Allenstown Health Officer
- Lawrence Anderson, Allenstown Zoning Board/Allenstown Wastewater Treatment Facility Sewer Commissioner
- Richard Daughen, Allenstown Fire Department Member

member of the public

The following Central NH Regional Planning Commission staff contributed to the development of the Hazard Mitigation Plan Update:

- Stephanie Alexander, CNHRPC Senior Planner
- Craig Tufts, CNHRPC Principal Planner (GIS mapping)
- Katie Nelson, CNHRPC Assistant Planner

Others attended one or more Committee meetings and/or offered contributions to the Plan:

- Tom Irczyk, Allenstown School District
- Marc Boisvert, Allenstown Highway Department Foreman
- Nancy St. Laurent, NH Homeland Security and Emergency Management

Committee members and participants of the 2010 / 2002 Plans included:

- Everett Chaput, Fire Chief
- Kelley Collins, Town Administrator
- Jane Hubbard, Hubbard Consulting LLC
- Clifford Jones, Building Inspector
- Bonnie Lockwood, McGrew Management Services LLC
- Robert Martin, Fire Department
- Shaun Mulholland, Police Department
- James A. Rodger, Sewer Dept.
- Chris Roy, Highway/Fire Department
- Robert Martin, Fire Department
- James McGonigle, Police Department
- James Boisvert, Highway Department

Committee members and participants of the 2010 / 2002 Plans included:

- James Rodger, Planning Board/Sewer Commission
- Stephanie Alexander, CNHRPC Principal Planner
- Catherine Coletti, CNHRPC Staff
- Joshua Carter, CNHRPC Intern
- John Vaillancourt, CNHRPC Staff

CHAPTER 1. INTRODUCTION

2015 PLAN UPDATE

The Town's Hazard Mitigation Committee reformed in 2013 to develop an updated Hazard Mitigation Plan that incorporated a ***Suncook River Plan*** and fluvial erosion hazard information. The entire Plan was rewritten from the 2010 version, but includes information from previous Plan versions. This update incorporates the newest changes required by FEMA in addition to Town modifications over the last five years. A brief **COMMUNITY DEMOGRAPHICS** section, a **SUNCOOK RIVER PROFILE** section, a **RECENT HAZARD EVENTS** section, and a **STRUCTURE OF THE HAZARD MITIGATION PLAN UPDATE S**ection were added. Expanded public participation steps were taken and a new plan development procedure was used as documented in the **METHODOLOGY** section.

BACKGROUND

The Hazard Mitigation Plan Update for Allenstown, with the new ***Suncook River Plan*** and fluvial erosion hazard information incorporated, is intended to provide information in the event of a natural disaster, to raise awareness of the vulnerability of facilities and structures of Allenstown to such disasters, and to provide measures to help offset the damages of a future disaster.

In 2000, the President enacted the Disaster Mitigation Act 2000 (DMA) which requires states and municipalities to have local natural hazard mitigation plans in place in order to be eligible for disaster funding programs such as Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program. New Hampshire is awarded funds based upon the completeness of its State Plan and upon the number of local plans in place.

As a result of the DMA, funding was provided to state offices of emergency management to produce local hazard mitigation plans. On **MAY 4, 2004**, Allenstown received its first Hazard Mitigation Plan approval from FEMA, and the Plan was updated with a new approval issued on **JULY 14, 2010.** To remain in compliance with the DMA, the Town is required to submit for FEMA approval a revised Hazard Mitigation Plan Update every five years.

This Plan has been developed and revised in accordance with the Disaster Mitigation Act of 2000 and the FEMA *Local Mitigation Plan Review Guide* dated October 1, 2011 and effective one year later. The most recent Plan development standards provided by FEMA Region I have also been incorporated. The planning effort of the Town is a regular process and this Plan is considered to be a "living document."

The 2015 Allenstown Hazard Mitigation Committee was established and guided the development of the Plan. The Committee consisted of the Town's Fire Department, Health Officer, Town Administrator, Police Department, Highway Department, Planning Board, Zoning Board, Allenstown Waste Water Facility, and Board of Selectmen, The Allenstown Waste Water Facility, the Allenstown School District, Bear Brook State Park, and citizen representatives were specifically invited by the Emergency Management Director to join the Committee discussions. Participation in the process was requested of the Emergency Management Directors of the neighboring communities of Epsom, Deerfield, Hooksett, Bow, and Pembroke and local businesses and organizations of Someday's Floral, Pizza Market, Pento's Automotive, Ed's Automotive, PACE Career Academy, and St. John Catholic Church, and the NH Homeland Security and Emergency Management. The attendees of the meeting process are noted in the **ACKNOWLEDGEMENTS**. The Central NH Regional Planning Commission, of which Allenstown is a member, contributed to the development of this Plan by facilitating the meeting and administrative processes, working with the Committee and its members to obtain information, preparing the document, and handling the submissions to NH Homeland Security and Emergency Management and FEMA.

The public process for this Plan included sending out media releases to the Union Leader and the Hooksett Banner newspapers. The colorful public notice poster flyers were posted on the Town's website at www.allenstownnh.gov and in the Town Hall, Police Station, Fire Station, Bi-Wise Market, and Allenstown Elementary School, so all local interests had an opportunity to be present and participate in the meetings.

COMMUNITY DEMOGRAPHICS

The Town of Allenstown is located in the southeastern section of Merrimack County in southern-central New Hampshire. It is bordered by the communities of Epsom to the north, Deerfield to the east, Candia to the southeast, Hooksett to the south, and Bow and Pembroke to the west. The total land area contained within Allenstown is approximately **20.5** square miles. Roughly **51%** of Allenstown is part of the State of New Hampshire Bear Brook State Forest and **30%** is undeveloped . These are the predominant land uses. Residential land use is only **14%** of the community, while commercial and industrial uses together comprise about **5%**.

The Suncook River, which originates in the Town of Gilmanton to the north, flows in a southerly direction forming the western border of Allenstown.

Allenstown is primarily a residential community with most small businesses and commercial development concentrated either in the Suncook Village downtown along Route 3 or along the north-south Route 28. There are limited industrial, excavation or agricultural activities. Allenstown has both shared sewer facilities with Pembroke within the Suncook Village.

The current US Census 2010 population is **4,322** citizens, a *de*crease of **10.8%** since 2000. Housing units are a mix of single family and multi-family, at a total of **1,881** units in 2010, a **4.1%** *de*crease from 2000. When removing Bear Brook State Park from the total available land area (**10.5** square miles), leaving about **10.0** square miles of land area in Allenstown for land uses, population density in 2010 is at **211** people per square mile, down from **236** people per square mile in 2000. Allenstown is considered unique in the Central NH region with the high percentages of both population and housing decreases as well as the large proportion of a State Park in the community which is untaxable land.

New construction permits have decreased over the last seven years. In 2011, **3** new housing permits were issued and **3** new commercial permits were issued. This follows a region-wide trend toward fewer developments and homes being built. Residences are dispersed throughout Allenstown. Further information on the demographics of the community is found in **CHAPTER 5. DEMOGRAPHICS**.

SUNCOOK RIVER PROFILE *Suncook River Plan*

The Suncook River is a tributary of the Merrimack River. The Suncook flows from the Crystal Lake, Upper and Lower Suncook Lakes in Barnstead south through Gilmanton, Pittsfield, Chichester, Epsom, forms the boundary between Allenstown and Pembroke, into the Merrimack River.

According to the ***USGS Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire 2009***, the Suncook River is 30 miles long. No major flood control structures are found on the river. The Pittsfield Mill Dam in Pittsfield is standard, and the Webster, Pembroke, and China Mill Dams in Suncook Village are used for hydro-electric power generation. Seven (7.0) miles of the river is located in Allenstown.

Two stream gages are located on Suncook River for local officials and many others to monitor the river heights and to predict floods. The older North Chichester gage in Chichester is tied into the National Weather Service and the US Geological Survey (USGS) and is used for peak flow and height prediction models and real-time data. Much historical river data is available from this gage. The new Allenstown Route 28 gage installed in July 2011 is monitored by the USGS and specifically by Allenstown emergency management to monitor the real-time river height of the Suncook River flowing into Allenstown. A static height gage is placed on the Allenstown/Pembroke Route 28 bridge for on-site monitoring. Both stream gages are available on the internet for anyone to view real-time data.

From the ***USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire after the May 2006 Flood*** and other sources, on May 15, 2006, an extreme rain event resulted in state-wide flooding. A 25- to 50-year flood impacted the Suncook River, causing the river to breach its banks and change its course (called an avulsion) in Epsom near the Huckins Mill Dam, upstream of Bear Island. Prior to the avulsion, the Suncook River had split into two channels at the Dam, a main west channel and a smaller secondary east channel. The avulsion caused the river to flow through "Cutter's Pit", a gravel excavation site to the northeast of Bear Island, before rejoining a section of the secondary channel. Nearly two miles of former Suncook River channel was abandoned, including most of the primary channel that had formed Bear Island.

The ***USGS Flood Study 2009*** states the floodplains have shifted as a result of the avulsion and developed a new floodplain map layer which is used in the Hazard Mitigation Plan's Maps. The ***USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire after the May 2006 Flood*** models about 100 to 400 tons of sediment per day moving past the Short Falls Road Bridge from Cutter's Pit through Allenstown and into the Merrimack River. Changes in streambed and surface-water elevations are results of this sediment carried downriver from the 2006 avulsion.

RECENT HAZARD EVENTS IN ALLENSTOWN

The Town has been affected by several significant natural disasters within the last decade. Natural hazard events are now occurring more frequently than in the past. Extreme flooding was experienced in October 2005, May 2006, April 2007, August-September 2011, and October 2012. Other severe storms were experienced in Allenstown in February-March 2010, October 2011, summer 2012, and February 2013. While these events severely disrupted the community, their impact was relatively mild as few injuries were reported. FEMA provided funding to the Town for tasks such as cleanup, road repairs, tree and brush cutting, and culvert replacement. Anecdotal descriptions of how the events impacted Allenstown and its residents were provided by the Hazard Mitigation Committee:

Columbus Day Flood in October 2005

The Columbus Day Flood in October 2005 was not a significant event in Allenstown. The EOC was not activated. The Suncook River reached action state, but no damage was done. The USGS Suncook River Stream Gage in North Chichester does not retain data sooner than 2007.

Mother's Day Flood in May 2006

Emergency responders activated the EOC during the Mother's Day Flood in May, 2006. Mandatory evacuations were executed in vulnerable areas of Town. All Departments were on emergency footing. The Town and its residents received significant Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the event.

Flooding in April 2007

The results of this spring 2007 flood were more damaging than the 2006 flood. Emergency responders activated the EOC in April 2007. Mandatory evacuations were executed in vulnerable areas of Town. The Town and its residents received significant Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the event.

From the After Action Report (AAR), the Allenstown Board of Selectmen declared a state of emergency for the Town of Allenstown at 11:30hrs on April 17. The Allenstown Emergency Operations Center (AEOC) was activated at the same time.

This flood resulted in a higher water level causing significant damage throughout the town. A total of 101 residences were evacuated during the flood. Mandatory evacuations were ordered for 61 residences with another 40 voluntary evacuations. The number of condemned homes was 14. A total of 61 homes sustained damage. These residences were located on Riverside Drive, Jill-Erik Road, Albin Avenue, Clement Road, Bourque Road, and Jasper Drive. A residence on Hillside Drive sustained major structural damage from a tree that fell on the mobile home causing it to partially collapse. The AEOC was finally closed on April 21, 2007.

The following roadways were closed as a result of flooding: Route 28, Mount Delight Road, Jill-Erik Road, Riverside Drive, part of Albin Avenue, and Jasper Drive. Roadway damaged occurred on River Road, Deerfield Road, Mount Delight Road, Jill-Erik Road, Riverside Drive, and Granite Street near the Highway Department. The Ferry Street Boat Landing sustained damage as well. The area around the boat landing sustained erosion damage.

Severe Storm, Tornado and Flooding July 2008

Fortunately, the July 2008 tornado that ravaged Epsom, Northwood, and other communities spared Allenstown. Emergency responders responded to Epsom's call for assistance during the response phase. The Highway Department assisted the Town for clean-up duties during the recovery phase.

Ice Storm in December 2008

The Ice Storm of December 11-12, 2008 caused significant power outages in Allenstown. Residents were temporarily sheltering in Concord hotels. The EOC was prepared to activate, but power came back on for essential services and the Village area. It took about 7 days before power was completely restored to the Town. Fallen branches along multiple streets or onto powerlines or homes are reported in addition to reports of utility poles on fire and requests for welfare checks.

From the After Action Report (AAR), on Wednesday, December 10, Allenstown Emergency officials started to receive the first indications of a potential snow/ice event that would eventual have a significant impact on the Town of Allenstown. The snow/ice event that followed resulted in the loss of electricity to 20% of the population or approximately 1,000 residents. Electric power was out of service for a lengthy period of time and was not restored completely until the following Tuesday, December 16. There were several road closures due to power lines and trees in the roadway.

Several residents utilized the regional shelter established by the Red Cross on Green Street in Concord. However the majority of residents either spent their time in hotels, with relatives or had generators to power their residents. A fair number of residents needed water which they were able to obtain at either the Police or Fire Stations. The Police Station was established as a warming center that several residents used.

During this event the Board of Selectmen declared a State of Emergency. Although the EOC was not activated several ESFs were operational while others were at a heightened state of readiness. The Fire Department responded to 25 calls for service consisting of arcing wires, wires down, alarm activations and CO2 issues. The Police Department responded to 100 calls for service during the event.

Severe Winter Storm, February 23-March 3, 2010

Allenstown experienced power outages, with trees down on wires, roads, cars, and buildings. The flooding from this storm was worse than the snow and ice damage. Emergency responders activated the EOC. All Departments were on emergency footing. The Town received Public Assistance (PA) grant funds as a result of the event.

Severe Storm/Flooding, March 14-31, 2010

In March 2010, the Suncook River caused moderate flood damage to residences, but was not as extensive as the 2006 and 2007 floods. As a result of these two recent and high impact floods, the Town of Allenstown applied for and was granted a Flood Mitigation Assistance grant for Phase I to acquire 14 homes on Riverside Drive, Albin Drive and Jillerik Road and for Phase II to acquire 3 homes on Riverside Drive.

Tropical Storm Irene, August 26-September 6, 2011

Emergency responders and all Departments prepared for Tropical Storm Irene to hit Allenstown in August, 2011. The EOC was activated, and all Departments were on emergency footing. However, the storm did minimal damage. Road closures occurred for a maximum of 15-20 minutes. Trees fell on multiple homes, many of which were destroyed as a result, but the expected rain and flooding did not occur. The Town and its residents received Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the Tropical Storm Irene.

Halloween Snow Storm, October 2011

Allenstown was covered in nearly two feet of snow, which was removed from the roads and Town parking areas by the Highway Department. The EOC was not activated. The emergency shelter was opened, but no one used it. The Town received Public Assistance (PA) grant funds as a result of the unexpected snow event.

Hurricane Sandy, October 2012

Minor damage to power lines occurred from Tropical Storm Sandy in October, 2012 because of trees down and high winds. Infrastructure damage to traffic signals was experienced at the Main Street and Ferry Street intersections. The EOC was not activated. Overall, Allenstown was not greatly impacted.

Severe Winter Storm, February 8-10, 2013

Allenstown experienced only minor damages from this snow storm. Sporadic power outages were experienced. The EOC was not activated. Only the Police and Fire Departments were on emergency footing. The Highway Department operated normally to remove the snow accumulation. The Town received $10,000 in Public Assistance (PA) grant funds as a result of the event.

November 2014 Thanksgiving Day Snowstorm

Large amount of snowfall fell in a very short period of time ahead of typical seasonal expectations. Power outages were prolific, with a peak of about 200,000 outages, from the Public Service of New Hampshire, Unitil (Concord area), and NH Electric Co-op. Nearby Concord and the towns on the eastern side of the Central NH region accumulated only 6-12" of snow according to PSNH, far less snow than southern and western NH. Allenstown enacted its snow procedure, which includes a staging area off of Deerfield Road for debris removal and plowing since these outlying areas in Bear Brook State Park quickly become cut off from the main Town. This was not a presidentially declared disaster in NH.

January 2015 Blizzard

Snow approached 30" in some areas with heavy snow and 50 mph whiteout wind conditions. To the west of Allenstown, the closest reporting weather station, Concord Airport (CON), had accumulated 29". Allenstown enacted its snow procedure, which includes a staging area off of Deerfield Road for debris removal and plowing since these outlying areas in Bear Brook State Park quickly become cut off from the main Town.

STRUCTURE OF THE HAZARD MITIGATION PLAN UPDATE

The overall purpose [GOAL] of this Plan is to reduce future life and property losses caused by hazard events before they occur by the identification of appropriate Actions that are implemented during the five-year duration of this Plan. In order to achieve this purpose, the Hazard Mitigation Plan Update contains chapters for methodology, hazard and risk inventory, potential losses for natural disasters, demographics, floodplain management, objectives, existing mitigation support strategies and new strategies, Action implementation, Plan evaluation, and an appendix.

The Plan includes tables of data, narrative descriptions, photographs, and maps to both discuss and graphically display Allenstown's inventory components, including hazard event impact and potential, sites, existing strategies, and Actions. How the Suncook River impacts Allenstown sites and potential mitigation Actions are noted. All of this information is reviewed and updated where necessary during the Plan update process. Further information about the individual chapters follows.

A brief overview of the Hazard Mitigation Plan history and demographics in the Town, a summary of the most recent hazard events, and the precise methodology used to develop the Plan are detailed in **CHAPTER 1. INTRODUCTION.**

Review of **41** different past and potential natural, technological, and human hazards which could occur in Town is documented in **CHAPTER 2. HAZARD IDENTIFICATION.** Included are the hazards' magnitude, likelihood for impacting the community in the future, and overall risk in numerical and qualitative format, with the accompanying matrices in the Appendix. Areas and sites where each hazard might impact the Town in the future are discussed.

An inventory of the critical and vulnerable facilities of the community along with the hazards the sites are most susceptible to are discussed in **CHAPTER 3. ASSET IDENTIFICATION**. Included is the potential for future development in hazard areas.

Potential dollar losses for structures only are provided for buildings in the Special Flood Hazard Areas. Losses are provided for other natural hazards by using a percentage range of the net valuation of structures in Town. Technological and human hazards are addressed, although there is no standard for obtaining potential losses. These are all found in **CHAPTER 4. POTENTIAL LOSSES**.

The past and current population and housing trends in the community are detailed in **CHAPTER 5. DEVELOPMENT TRENDS**. Residential housing start trends are provided in addition to the currently available land use data, which is compared, if possible, to previous land use data. Areas vulnerable to specific hazards are addressed in this Chapter.

Floodplain vulnerabilities, including repetitive road washout areas, are described in **CHAPTER 6. FLOODPLAIN MANAGEMENT**. The number of buildings in the floodplain are identified, as are the number of National Flood Insurance Policies and claims. Repetitive losses, if any, are discussed. An overview of the Town's Floodplain Ordinance and latest Community Assistance Visit are discussed as is how the Town might better manage their regulations.

Objectives of the Plan are provided in **CHAPTER 7. LOCAL HAZARD MITIGATION OBJECTIVES**. Both General and Hazard-Specific Objectives are developed. These guide the Committee to develop Actions to meet the mitigation needs of the community.

Existing plans, policies, procedures, programs, training, and strategies are listed by Town Department in **CHAPTER 8. EXISTING MITIGATION SUPPORT STRATEGIES**. These support strategies support the overall hazard mitigation programs and specific Actions of the community.

Actions are identified by primary hazard type under Life and Property Protection, Emergency Services, Public Information and Involvement, Training and Preparation, and Planning and Implementation categories in **CHAPTER 9. NEWLY IDENTIFIED ACTIONS** which have the potential to meet the Town's Objectives.

Actions that have been completed, deleted, or deferred from the previous Plan are identified in **CHAPTER 10. EVALUATION AND IMPLEMENTATION OF ACTIONS** along with the new Actions prioritized and identified from the previous chapter in an Action Plan. A brief cost to benefits analysis is developed.

How the Plan will be regularly evaluated and maintained by the Town on both an annual basis for the Action Plan and the five-year update cycle are described in **CHAPTER 11. PLAN MONITORING, EVALUATING, AND UPDATING**. The agendas for quarterly meetings and the tasks for the both types of update are identified. The Town's mechanisms for incorporating the Plan and its Actions and how the Committee will accomplish this are discussed. The commitment to future public involvement is included.

CHAPTER 12. APPENDIX contains various information on disaster declaration, grant programs, and includes the supporting hazard vulnerability and Action prioritization tables, photographs of disasters, and the supporting paperwork of the Plan update process.

This Hazard Mitigation Plan Update follows the FEMA *Local Mitigation Plan Review Guide* of October 1, 2011 and incorporates all requirements to develop a comprehensive and compliant Hazard Mitigation Plan Update for the community.

METHODOLOGY

The **ALLENSTOWN-SUNCOOK RIVER HAZARD MITIGATION PLAN UPDATE 2015** was developed over several months, with a group of Town staff members and volunteers and the CNHRPC comprising the majority of the Hazard Mitigation Committee. The 2015 methodology for Plan development is summarized in this section.

Meetings and Duties

The Hazard Mitigation Committee met on May 8, June 3, July 10, August 7, September4 and October 9, 2013. The Committee also met for Work Sessions on May 22, June 19, July 24, September 18, 2013 and May 28, 2015. For each meeting, Town staff prepared attendance sheets and meeting summaries for the Hazard Mitigation Committee. The agendas and meeting materials were prepared by Central New Hampshire Regional Planning Commission staff. The agendas, attendance sheets, and meeting summaries are included in **CHAPTER 12. APPENDIX** of the Plan.

For each meeting, Town staff prepared attendance sheets and meeting summaries for the Hazard Mitigation Committee, and during Work Sessions they developed information to provide to CNHRPC for incorporation into the Plan. Town staff and volunteers documented their time on match tracking timesheets. CNHRPC staff facilitated the regular Committee meetings and Town staff facilitated the Work Sessions. CNHRPC worked on the Plan document and revised the maps per Committee direction.

Opportunity for Public Participation

The public process for this Plan included sending out media releases to the Union Leader newspaper (a state-wide newspaper) and the Hooksett Banner (a regional paper serving nine communities including Concord and Manchester) newspaper. All interested parties were invited to participate, including media, residents, businesses, organizations, local communities, non-profits, and State agencies. The colorful public meeting notice flyers were posted on the Town's website at www.allenstownnh.gov and in the Town Hall, Police Station, Fire Station, Bi-Wise Market, and Allenstown Elementary School, so all local interests had an opportunity to be present and participate in the meetings. Copies of publicity for the Plan are included in **CHAPTER 12. APPENDIX**.

Specific public participation in the process was requested of several local businesses and organizations, including Someday's Floral, Pizza Market, Pento's Automotive, Ed's Automotive, PACE Career Academy, and St. John Catholic Church. The attendees of the meeting process are noted in the **ACKNOWLEDGEMENTS**.

Public Input from the Hazard Mitigation Committee Meetings

Zero (**0**) members of the public attended one or more of the meetings as indicated in the **ACKNOWLEDGEMENTS** and by the Attendance Sheets in **CHAPTER 12. APPENDIX.** In this instance, the public means a person who is not a Town, state, or federal government staff member or other staff person paid for by tax dollars, or who is not a Town volunteer.

Public Input from the Public Information Meeting

The **Public Information Meeting** was held on June 2, 2015. The meeting minutes and attendance sheet are included in **CHAPTER 12. APPENDIX**. The public has had nearly two years to attend the posted meetings and participate. No input from the public was received.

Public Input from the Board of Selectmen Adoption Meeting

The Board of Selectmen meeting to adopt the **HAZARD MITIGATION PLAN** was held on December 7, 2015. Although the Plan's APA had been received, the Board permitted public comment prior to adoption although Plan changes could not be made at this time. *More to be included as necessary*

Overall Tasks

At meetings, information on the Chapters was collected during discussions among Committee members. The new and updated information was described in each Chapter under the **2015 PLAN UPDATE** section. In between meetings, Town staff and volunteers and CNHRPC staff researched and collected information for the Chapters and CNHRPC rewrote sections as appropriate. The Chapters were also updated by revising the document to the current FEMA standards. Maps were reviewed by the Committee and updated as revised by CNHRPC. Various fluvial geomorphic assessment data from the NH Geological Survey (NHGS) was received for the Suncook River and were incorporated and mapped as indicated in the Plan.

Completion of the Plan Steps and Dates

In late May 2015, the Committee made a final draft of this Plan available to **Town Departments and Board Chairs for specific review and comment**, although they had the opportunity to participate in the process. No comments were received.

On June 2, 2015, the Committee held a **Public Information Meeting.** The purpose of the meeting was to obtain review and comment from the public for the Plan. Media releases were sent to the Union Leader newspaper (a state-wide newspaper) and the Hooksett Banner (a regional paper serving nine communities including Concord and Manchester) newspaper. . The colorful **public meeting notice flyers** were posted on the Town's website at www.allenstownnh.gov and in the Town Hall, Police Station, Fire Station, Bi-Wise Market, and Allenstown Elementary School, so all local interests had an opportunity to be present and participate in the meetings.

On June 5, 2015, copies of this Plan were submitted to the NH Homeland Security and Emergency Management (NHHSEM) for their review and revision. When deemed compliant, the Plan was subsequently transmitted by NHHSEM to FEMA for FEMA's approval of the **ALLENSTOWN HAZARD MITIGATION PLAN UPDATE 2015.**

On October 23, 2015, Allenstown received an **Approvable Pending Adoption (APA)** notification from FEMA, stating the Plan will be approved by FEMA after proof of adoption by the local governing body, which is the Board of Selectmen, is submitted.

On December 7, 2015, the Board of Selectmen **adopted the Hazard Mitigation Plan Update** for the Town at a duly noticed public hearing. Copies had been made available at the Town Hall for public review on [Month/day]. Copies of the public notice and flyers are included in **CHAPTER 12. APPENDIX.** The signed Certificate of Adoption was sent to NHHSEM/FEMA.

On [Month/day], 2015, Allenstown received a **Letter of Approval** from FEMA, with the Plan approval granted on [Month/day], 2015. The next Hazard Mitigation Plan update is due five (5) years from this date of approval, on [Month/day], 2020.

Final Plan Dates

The following is a summary of the required dates which guide the adoption and update of the ALLENSTOWN HAZARD MITIGATION PLAN. Included is the history of the Plan approvals and expiration dates.

Original HAZARD MITIGATION PLAN 2004

Date of Adoption Allenstown Board of Selectmen:	February 23, 2004
Date of FEMA Formal Approval:	**May 4, 2004**
Plan Expiration Date:	**May 4, 2009**

HAZARD MITIGATION PLAN UPDATE 2010

Date of Adoption Allenstown Board of Selectmen:	July 12, 2010
Date of FEMA Formal Approval:	**July 14, 2010**
Plan Expiration Date:	**July 14, 2015**

HAZARD MITIGATION PLAN UPDATE 2015

Date of Adoption Allenstown Board of Selectmen:	December 7, 2015
Date of FEMA Formal Approval:	**date, 2015**
Plan Expiration Date:	**date, 2020**

CHAPTER 2.
HAZARD IDENTIFICATION AND RISK ASSESSMENT

2015 PLAN UPDATE

The **41** identified natural, technological, and human hazards that had the potential to impact the Town were reviewed, and new ***Area Events*** were added as applicable. ***Events in Allenstown*** were added to reflect recent or recalled hazard events. he ***Potential Future Hazards*** sections were reviewed and updated to identify locations where the risks may greater. The ***Probability***, ***Magnitude***, and ***Overall Risks*** for each hazard were reviewed and the associated hazard boxes were updated.

INTRODUCTION

The 2010 State of New Hampshire's Hazard Mitigation Plan recommends that municipalities examine the following natural hazards. Two hazards, coastal flooding and snow avalanche, are not discussed in Allenstown's Plan. Other natural hazards, including separate categories of flooding (rapid pack snow melt, river ice jams, stream bank erosion and scouring, debris impacted infrastructure) and biological (epidemic) hazards have been incorporated into this Plan.

Technological hazards including hazardous materials spills, transportation accidents, and power utility failure have the ability to impact Allenstown. Other technological hazards considered include explosion, building collapse, communication systems interruption, and more. Human hazard events in Allenstown could be sabotage, terrorism, hostage situations, civil disturbance, etc, and have also been addressed.

This Chapter seeks to identify hazard events of all three types (natural, technological, and human) that have occurred within the Town and the surrounding area. Narrative descriptions are provided, and additional research has uncovered historical data and data which may indirectly refer to Allenstown from a county- or state-wide context; all of the findings are then summarized in tabular form. The potential for such hazards to recur in Allenstown is offered as well as their likely magnitude.

Many of these **41** hazards discussed will pose little to no threat to the Town. The Town wanted to acknowledge their possibility as opposed to focusing on simply three or four top hazards which will certainly impact the community. Using this broad vision allows Allenstown to contemplate the impact of a variety of hazards and design emergency planning programs as appropriate. Only the most predominant hazards, or even multiple hazards, will have mitigation actions designed to try to reduce the hazards' impact. These are discussed in CHAPTER 9. NEWLY IDENTIFIED MITIGATION ACTIONS and prioritized in CHAPTER 10. EVALUATION AND IMPLEMENTATION OF ACTIONS.

RATINGS OF PROBABILITY, MAGNITUDE, AND RISK

Forty-one (**41**) natural, technological, and human hazards are evaluated within this Plan. The hazards could be primary, such as a winter snow storm, or secondary as a result of the event, such as utility failure or traffic accidents from that snow storm, with no distinction made in the Plan. Some hazards will be more likely to occur in the community than others based on past events and current conditions, and some hazards will have a greater effect than other hazards. How vulnerable Allenstown could be to each of the **41** hazards can be measured in terms of **Overall Risk**. **The Hazard Mitigation Committee examined each hazard for its Probability of occurrence and its potential Magnitude effecting humans, businesses, and property, based on past personal recollections and community hazard trends to determine the Overall (future) Risk to the community.**

To obtain the **Overall Risk** numerical score of each hazard, scores for **Probability** and **Magnitude** of an event are estimated using a corresponding scale/numerical system of **HIGH/3**, **MODERATE/2**, and **LOW/1** which are then multiplied together.

Probability of Each Hazard

The first score is calculated by gauging the likelihood of a particular hazard occurring in the Town of Allenstown within the next 25 years. The **Probability** (of occurrence) score is based on a Committee consensus, a limited objective appraisal using information provided by relevant sources, observations, and trends. The resulting numeric score is expressed using the scale system of **HIGH**, **MODERATE**, and **LOW**.

Probability Ratings	Likelihood of Occurrence Within the Next 25 Years	Numeric Score
HIGH	**67%-100%** probability of a hazard event occurrence	3
MODERATE	**34%-66%** probability of a hazard event occurrence	2
LOW	**0%-33%** probability of a hazard event occurrence	1

Magnitude of Each Hazard

The hazard **Magnitude** scores are calculated for its likelihood of magnitude scenarios **human population injury or death, business interruption, and property damage** within the next 25 years. The individual figures are then averaged to obtain the final potential **Magnitude** score, indicating the likelihood of magnitude a hazard could have on Allenstown from these three categories. The **Magnitude** score is based on a Committee consensus, a limited objective appraisal using information provided by relevant sources, observations, and trends. The resulting numeric scale score is expressed using the scale system of **HIGH**, **MODERATE**, and **LOW**.

Magnitude Ratings	Likelihood of Magnitude *(Human Injury or Death, Business/ Service Interruption, or Property Damage)* Within the Next 25 Years	Numeric Score
HIGH	**67%-100%** chance of extreme magnitude scenario, worst case = major to catastrophic effects	3
MODERATE	**34%-66%** chance of great magnitude scenario, worst case = moderate to major effects	2
LOW	**0%-33%** chance of limited magnitude scenario, worst case = minor to moderate effects	1

After averaging the three individual magnitude scores (human, property, and business impacts), the **Probability** and **Magnitude** score ranges established to determine the conversion from the numerical system to the scale system are:

> 2.5	**HIGH**
1.6 - 2.5	**MODERATE**
< 1.6	**LOW**

Risk Assessment Scores

The **Overall Risk** numeric score is one which can help the community weigh the hazards against one another to determine which hazards are most detrimental to the community and which hazards should have the most Actions developed to try to mitigate those hazards. The **Overall Risk** is calculated by multiplying the **Probability** of occurrence numeric score by the average (of human, property, and business impacts) of the **Magnitude** numeric score.

This score is expressed using the numerical system. The highest numeric score is **9.0**, which indicates that the **Overall Risk** is the greatest; the lowest numeric score is **1.0** when a hazard is thought to pose little risk to the Town. The entire scoring matrices of the Natural, Technological, and Human Hazards are displayed in **Figures 1**, **2**, and **3.**

*Source for **Figure 1**, **Figure 2**, and **Figure 1**: Allenstown Hazard Mitigation Committee 2015*

Figure 1
Natural Hazard Risk Assessment Matrix

Allenstown, NH 2015	Probability	*Human Impact*	*Property Impact*	*Business Impact*	Magnitude	OVERALL RISK
Natural Hazard Events	Likelihood the hazard will occur in 25 years	Likelihood of injury or death in 25 years	Likelihood of physical losses or damages in 25 years	Likelihood of service interruption in 25 years	CALCULATED Average of Human + Property + Business Impact	
	0= NA 1= Low 2= Moderate 3= High	0=NA 1=Low 2=Moderate 3=High	0=NA 1=Low 2=Moderate 3=High	0=NA 1=Low 2=Moderate 3=High	<1.6= Low 1.6-2.5= Moderate >2.5= High	CALCULATED Probability x Magnitude
Flooding	3	2	3	3	2.67	8.00
Suncook River	3	2	3	3	2.67	8.00
Hurricanes and Severe Storms	3	2	2	2	2.00	6.00
Rapid Snow Pack Melt	2	1	1	1	1.00	2.00
River Ice Jams	2	1	1	1	1.00	2.00
Dam Breach and Failure	1	1	1	1	1.00	1.00
Fluvial Erosion	3	2	3	3	2.67	8.00
Debris Impacted Infrastructure	2	3	3	3	3.00	6.00
Tornadoes	1	3	3	3	3.00	3.00
Downbursts	3	2	2	2	2.00	6.00
Lightning	3	2	2	2	2.00	6.00
Wildfire	1	3	3	3	3.00	3.00
Severe Winter Weather	3	2	2	2	2.00	6.00
Earthquake	1	3	3	3	3.00	3.00
Landslide	1	1	1	1	1.00	1.00
Drought	1	2	2	2	2.00	2.00
Radon	3	3	3	3	3.00	9.00
Biological	2	3	3	3	3.00	6.00

The short version of the risk assessment scores is displayed beside each of the **41** hazards evaluated within this **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT.** They are represented as **Probability** and **Magnitude** scores using the **HIGH**, **MODERATE**, or **LOW** scale and the **Overall Risk** score is numeric.

Figure 2

Technological Hazard Risk Assessment Matrix

Allenstown, NH 2015	Probability	*Human Impact*	*Property Impact*	*Business Impact*	Magnitude	OVERALL RISK
Technological Hazard Events	Likelihood the hazard will occur in 25 years	Likelihood of injury or death in 25 years	Likelihood of physical losses or damages in 25 years	Likelihood of service interruption in 25 years	CALCULATED Average of Human + Property + Business Impact	CALCULATED Probability x Magnitude
	0= NA 1= Low 2= Moderate 3= High	0=NA 1=Low 2=Moderate 3=High	0=NA 1=Low 2=Moderate 3=High	0=NA 1=Low 2=Moderate 3=High	<1.6= Low 1.6-2.5= Moderate >2.5= High	
Hazardous Materials	1	3	3	3	3.00	3.00
Explosion/Fire	1	2	2	2	2.00	2.00
Transportation Accident	1	1	1	1	1.00	1.00
Building/Structure Collapse	1	2	2	2	2.00	2.00
Power/Utility Failure	**3**	**2**	**2**	**2**	**2.00**	**6.00**
Extreme Air Pollution	1	2	2	2	2.00	2.00
Radiological Accident	1	3	3	3	3.00	3.00
Fuel/Resource Shortage	1	2	2	2	2.00	2.00
Strike	1	1	1	1	1.00	1.00
Business Interruption	1	1	1	1	1.00	1.00
Financial Issues, Economic Depression, Inflation, Financial System Collapse	1	3	3	3	3.00	3.00
Communications Systems Interruptions	1	2	2	2	2.00	2.00

Figure 3

Human Hazard Risk Assessment Matrix

Allenstown, NH 2015	Probability	*Human Impact*	*Property Impact*	*Business Impact*	Magnitude	OVERALL RISK
Human Hazard Events	Likelihood the hazard will occur in 25 years	Likelihood of injury or death in 25 years	Likelihood of physical losses or damages in 25 years	Likelihood of service interruption in 25 years	CALCULATED Average of Human + Property + Business Impact	CALCULATED Probability x Magnitude
	0= NA 1= Low 2= Moderate 3= High	0=NA 1=Low 2=Moderate 3=High	0=NA 1=Low 2=Moderate 3=High	0=NA 1=Low 2=Moderate 3=High	<1.6= Low 1.6-2.5= Moderate >2.5= High	
Economic Threats	**3**	**1**	**3**	**1**	**1.67**	**5.00**
General Strike	1	1	1	1	1.00	1.00
Terrorism	**2**	**3**	**3**	**2**	**2.67**	**5.33**
Sabotage	1	2	3	3	2.67	2.67
Cyberterrorism	**3**	**2**	**3**	**3**	**2.67**	**8.00**
Hostage Situation	1	2	1	1	1.33	1.33
Civil Disturbance / Public Unrest	1	1	1	1	1.00	1.00
Enemy Attack	1	1	1	1	1.00	1.00
Arson	**2**	**3**	**3**	**3**	**3.00**	**6.00**
Mass Hysteria	1	1	1	1	1.00	1.00
Special Events	1	1	1	1	1.00	1.00

NATURAL HAZARD EVENTS IN ALLENSTOWN *Suncook River Plan components*

A compilation of hazards that have affected Allenstown in the past appears in the following section. Within Allenstown, the risk of each hazard has been identified as a **HIGH**, **MODERATE**, or **LOW Probability** of occurrence based on past and potential events as indicated in the following Chapters and as mapped on ***Map 1: Potential Hazards*** and ***Map 2: Past Hazards***. Potential **Magnitude** of each hazard based upon the same assumptions through the research and indicated by the **HIGH**, **MODERATE**, or **LOW** scale is also provided.

Hazard events were researched using a wide variety of sources for the original **ALLENSTOWN HAZARD MITIGATION PLAN 2004** which were the basis for the past events and updated to the present. Sources and techniques included interviewing local townspeople, researching Town Histories and related documents, and collecting information from governmental or non-profit websites. Presidentially declared disasters or other significant hazard events were described within this Chapter for the surrounding area or Merrimack County for the **HAZARD MITIGATION PLAN UPDATE 2015** and some of them may have affected the community. These disasters were also considered by the Committee when determining the risk evaluation.

Committee member experiences, knowledge, and recollections generally comprise the local ***Events in Allenstown*** sections. While additional hazards might have occurred in Town, those events in the Plan are what the Committee chose to list, or were familiar with to list, to comprise the hazard events within the local ***Events in Allenstown*** sections over the various versions of the Hazard Mitigation Plan. The same is true for the ***Potential Future Hazards*** sections.

Central NH Region Major Disaster Declarations, 1973-2015

The Central NH region, which encompasses parts of Merrimack County (**18** communities) and Hillsborough County (**2** communities), has been damaged by **21** multiple presidentially-declared major disasters in the last 42 years, between 1973 and 2015. These are displayed in **Table 1**.

While a natural disaster typically befalls multiple counties in New Hampshire, only those damaging either Merrimack County or Hillsborough County were identified in this section. Over the last **10** years (**2005-2015**), the number of presidentially-declared natural major disasters have increased significantly compared to the first severe storm and floods of **1973** to the **1998** ice storm (**25** years).

Table 1
Central NH Region Major Disaster Declarations, 1973 to 2015

FEMA DR-	Local Disaster Name	Incident Period	FEMA Disaster Name	*Includes* County of M / H*
4209	**2015** Blizzard	Jan 26-28, 2015	Severe Winter Storm and Snowstorm	H
4105	**2013** Severe Snowstorm	Feb 8-10, 2013	Severe Winter Storm and Snowstorm	HM
4049	**2011** Halloween Snow Storm	Oct 29-30, 2011	Severe Storm and Snowstorm	H
4026	**2011** Tropical Storm Irene	Aug 26-Sep 6, 2011	Tropical Storm Irene	M
1913	**2010** Severe Storms and Flooding	Mar 14-31, 2010	Severe Storms and Flooding	HM
1892	**2010** Severe Wind and Winter Storm	Feb 23-Mar 3, 2010	High Winds, Rain, Snow	HM
1812	**2008** December Ice Storm	Dec 11-23, 2008	Severe Winter Storm (I/S/R/St Winds)	HM
1799	**2008** Fall Flood	Sep 6-7, 2008	Heavy Rains and Floods	HM
1782	**2008** July Tornado	Jul 24, 2008	Tornado, Severe Winds, Heavy Rains	HM
1695	**2007** April Flood	Apr 15-23, 2007	Severe Storms and Flooding	HM
1643	**2006** Mother's Day Flood	May 12-23, 2006	Severe Storms and Flooding	HM
1610	**2005** Columbus Day Flood	Oct 7-18, 2005	Severe Storms and Flooding	HM
1231	**1998** Severe Storms and Flooding	Jun 12-Jul 2, 1998	Severe Storms and Flooding	HM
1199	**1998** Ice Storm	Jan 7-25, 1998	Ice Storms	HM
1144	**1996** Severe Storms and Flooding	Oct 20-23, 1996	Severe Storms and Flooding	HM
1077	**1995** Flood	Oct 20-Nov 15, 1995	Storms and Floods	M
917	**1991** Hurricane Bob	Aug 18-20, 1991	Severe Storm	H
876	**1990** Flooding and Severe Storm	Aug 7-11, 1990	Flooding and Severe Storm	HM
789	**1987** Severe Storms and Flooding	Mar 30-Apr 11, 1987	Severe Storms and Flooding	HM
771	**1986** Severe Storms and Flooding	Jul 29-Aug 10, 1986	Severe Storms and Flooding	H
399	**1973** Severe Storms and Flooding	Jul 11, 1973	Severe Storms and Flooding	HM

Source: http://www.fema.gov/disasters through January 2015

Between 2005 and 2015, the most recent round of major disasters affecting the two Central NH Region counties, a total of **12** natural disasters within **19** years occurred, **5** of which were floods, **5** snow/ice storms, and **2** rain/wind storms.

Between 1973 and 1998, a total of **9** natural disasters within **25** years occurred, **4** of which were floods, **1** snow/ice storm, and **4** rain/wind storms.

Most of these disasters will be described within the following **NATURAL HAZARD EVENTS** sections.

Flooding - *Suncook River Plan*

ALLENSTOWN FLOODING EVENTS	
PROBABILITY -	HIGH
SEVERITY -	HIGH
OVERALL RISK -	8.0

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and/or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges. However, floods can be beneficial to the low lying agricultural areas which are used for active farm lands by enriching the soil.

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

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of year. A sudden thaw during the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go.

Flooding is the most common natural disaster to affect New Hampshire, a common and costly hazard. They are most likely to occur in the spring due to the increase in rainfall and the melting of snow. However, they can occur anytime of the year as a result of heavy rains, hurricane, or a Nor'easter.

Homes in the floodplain would be at risk during these types of events. Currently, there a total of **94** buildings in the floodplain, including **72** single family homes, **3** multi-family homes, **8** manufactured homes, and **11** non-residential buildings located within the Special Flood Hazard Areas (floodplains) in Allenstown.

Area Events

Numerous flooding events in recent history have occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town.

- *March 11-21, 1936*
  In March, 1936, simultaneous high snowfall totals, heavy rains, and warm weather combined to impact Allenstown and all of New England. These floods killed 24 people, caused $133,000,000 in damage, and made 77,000 people homeless throughout New England. *Concord Monitor*

  The New Hampshire State Board of Health requested health officers throughout New Hampshire to issue warnings that all water should be boiled before it be consumed (*The Union Leader, March 16, 1936)*. Many private wells throughout the state were flooded; it is likely that some residents of Allenstown had to boil their water before drinking it. *NH Homeland Security and Emergency Management*

- *March 1936*
  In Canterbury, J. Ralph Graham saved 60 head of cattle by putting them in his home during severe flooding; however, he lost 300 chickens. Canterbury and surrounding towns were significantly impacted. President Roosevelt ordered emergency relief be sent to New Hampshire. *History of Canterbury: 1933-1983*

- *September 21, 1938*
  New Hampshire and Southern New England were affected by the hurricane, which included isolated flooding.

- *Spring 1976*
  The entire region experienced spring flooding.

- *July 1986 – August 10, 1986*
  During severe summer storms with heavy rains, tornadoes, flash floods, and severe winds, the road network was impacted statewide.

- *April 16, 1987*
  Flooding caused by snowmelt and intense rain was felt in seven counties, including Merrimack County. Declared FEMA Disaster #789, nearly $5 million in damage occurred. *NH Homeland Security and Emergency Management*

- *August 7-11, 1990* *(see also* ***Hurricanes and Severe Storms****)*
  Flooding caused by a series of storm events with moderate to heavy rains impacted eight counties, including Merrimack County. Declared FEMA Disaster #876, over $2 million in damage occurred. *NH Homeland Security and Emergency Management*

- *October 1996* *(see also* ***Hurricanes and Severe Storms****)*
  Six counties experienced flooding due to heavy rains in FEMA Disaster Declaration #1144, causing $2.3 million dollars in damage. *NH Homeland Security and Emergency Management*

- *June 16, 1998*
  One to three inches of rain caused already swollen rivers, streams and lakes to rise, flooding roads and homes and causing $200,000 of property damage. *National Climatic Data Center*

- *July 1998*
  Flooding from severe storms in six counties, including Merrimack County, resulted in $3.4 million in damages in FEMA Disaster #1231. *NH Homeland Security and Emergency Management*

- *October 7-18, 2005*
  Extensive flooding caused by severe storms impacted five counties in FEMA Disaster Declaration #1610. *NH Homeland Security and Emergency Management and FEMA*

- *May 13-17, 2006*
  Extensive flooding caused by severe storms impacted seven counties in FEMA Disaster Declaration #1643. The USGS recorded the highest flows on record for several rivers including the Contoocook River in Davisville village, Soucook in Concord, and Piscataquog in Goffstown. *FEMA*

- *April 13-27, 2007*
  Extensive flooding caused by severe storms impacted seven counties in FEMA Disaster Declaration #1695. *FEMA*

- *September 6-7, 2008, Severe Storms and Flooding*
  FEMA-1799-DR. In Merrimack County, damage to road systems by flooding totaled the equivalent of $1.48 per capita (146,455 people in 2010) for town reimbursement. Hillsborough County's damage was much higher at $6.90 per capita (400,721 people in 2010). *fema.gov*

- *February 23-March 3, 2010, Severe Winter Storm*
  FEMA-1892-DR. This severe weather event included high winds, rain, and snow over a week-long period. The primary impact was debris removal and repair reimbursement for fallen trees and powerlines. In Merrimack County, the reimbursement to communities was the equivalent of $10.39 per capita (146,455 people in 2010), with Hillsborough County at $3.68 per capita (400,721 people in 2010). In the Concord area, 21,000 Unitil customers were out of power at the peak outage period. *fema.gov, Unitil Energy Systems, 2010*

- *March 14-31, 2010, Severe Storms and Flooding*
  FEMA-1913-DR. Severe storms and flooding occurred over a two-week period which caused damage to roads and bridges. In Merrimack County, the reimbursement to towns for repair was $0.28 per capita (146,455 people in 2010), and in Hillsborough County damages reimbursed were $1.80 per capita (400,721 people in 2010). *fema.gov*

- *August 26- September 6, 2011, Tropical Storm Irene*
  FEMA DR-4026. Carroll, Coos, Grafton, and Merrimack Counties suffered severe impacts to roads and bridges as a result of flooding from Tropical Storm Irene. In Merrimack County, the reimbursement to towns for repair was $4.29 per capita (146,455 people in 2010). As of 07/18/12, over $11 million of public assistance money was allocated, and over $1.2 million of individual assistance money was allocated. *fema.gov*

- *October 26-November 8, 2012, Hurricane Sandy*
  FEMA-4095-DR. Belknap, Carroll, Coos, Grafton, and Sullivan counties experienced severe damage from heavy winds and moderate flooding, although the entire state was affected. "Perfect storm" or "Superstorm" Sandy was the fourth-rated storm in NH in terms of power loss, with 218,000 customers in the dark at peak. Fallen trees and debris closed roads and caused building and vehicle damage. *FEMA, Nashua Telegraph*

Events in Allenstown

Currently, there are **96** buildings located within the Special Flood Hazard Areas (floodplains) in Allenstown as detailed in **CHAPTER 4. POTENTIAL LOSSES**. The following events were found to have impacted Allenstown.

- *March, 1936*
  In central New Hampshire, the flood of 1936 caused the Suncook River and Merrimack River to overflow. The Merrimack River flooded homes near the Sewer Plant on Ferry Street and also flooded homes on Main Street in Allenstown. *Allenstown Town Historian 2004*

- *Spring, 1976*
  In the spring of 1976, the Suncook River flooded in Allenstown, causing flooding on Albin Avenue, Canal Street, and Ferry Street. People living on Albin Avenue were evacuated. Brookside Trailer Park was also flooded. *Allenstown Hazard Mitigation Committee and Town Historian 2004*

- *July, 1998*
  In Allenstown, Brookside Trailer Park was flooded. *Undocumented Source 2004*

- *October 7-18, 2005*
  The Columbus Day Flood in October 2005 was not a significant event in Allenstown. The EOC was not activated. The Suncook River reached action state, but no damage was done. The USGS Suncook River Stream Gage in North Chichester does not retain data sooner than 2007. *Allenstown Hazard Mitigation Committee 2015*

- *May 13, 2006*
  Emergency responders activated the EOC during the Mother's Day Flood in May, 2006. Mandatory evacuations were executed in vulnerable areas of Town. All Departments were on emergency footing. The Town and its residents received significant Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the event. *Allenstown Hazard Mitigation Committee 2015*

  The USGS Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire 2009 states the peak flow

- *April 15-23, 2007*
  The 2007 flood resulted in a higher water level than 2006, causing significant damage throughout the town. The area of Riverside Drive was particularly affected. A total of 101 residences were evacuated during the flood. Mandatory evacuations were ordered for 61 residences with another 40 voluntary evacuations. There were a total of 14 condemned homes and 61 homes with substantial damage. *Allenstown Hazard Mitigation Committee 2009*

  The results of this spring 2007 flood were more damaging than the 2006 flood. Emergency responders activated the EOC in April 2007. Mandatory evacuations were executed in vulnerable areas of Town. The Town and its residents received significant Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the event. *Allenstown Hazard Mitigation Committee 2015*

- *February 23 – March 3, 2010 Flooding / Severe Winter Storm*
  Allenstown experienced power outages, with trees down on wires, roads, cars, and buildings. The flooding from this storm was worse than the snow and ice damage. Emergency responders activated the EOC. All Departments were on emergency footing. The Town received Public Assistance (PA) grant funds as a result of the event. *Allenstown Hazard Mitigation Committee 2015*

- *March 14-31, 2010 Severe Storm/Flooding*
  In March 2010, in Allenstown, the Suncook River caused moderate flood damage to residences, but was not as extensive as the 2006 and 2007 floods. As a result of these two recent and high impact floods, the Town of Allenstown applied for and was granted a Flood Mitigation Assistance grant for Phase I to acquire 14 homes on Riverside Drive, Albin Drive and Jillerik Road and for Phase II to acquire 3 homes on Riverside Drive. Allenstown chose to break down the overall, long-term project into several phases, because there are so many homes affected by the flooding. The Town is focusing on conducting a well executed acquisition program for Phase III. *Town of Allenstown FY-2011 FMA Property Acquisition Funding Grant Application*

- *August 26-September 6, 2011(Flooding) Tropical Storm Irene*
  Emergency responders and all Departments prepared for Tropical Storm Irene to hit Allenstown in August, 2011. The EOC was activated, and all Departments were on emergency footing. However, the storm did minimal damage. Road closures occurred for a maximum of 15-20 minutes. Trees fell on multiple homes, many of which were destroyed as a result, but the expected rain and flooding did not occur. The Town and its residents received Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the Tropical Storm Irene. *Allenstown Hazard Mitigation Committee 2015*

Magnitude of Flooding

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Several brooks and streams have flooded roads in Allenstown from undersized culverts or lack of ditching during flooding events; driveways and yards can also flood during heavy rain or flooding events from lack of adequate drainage. The watercourses in Town; the Suncook River, Merrimack River, Catamount Brook, Little Bear Brook, Boat Meadow Brook, Bear Brook, and Pease Brook, Bear Hill Pond, Catamount Pond, Hall Mountain Pond, Smiths Pond, and Hayes Marsh are among the main standing bodies of water. Storm water run-off and discharge during storms are problematic on certain roads (see ***Events in Allenstown*** and ***Potential Future Hazards*** sections).

Homes and other buildings in the floodplain would be at risk during flooding events. At present count, there are thought to be **72** single family homes, **3** multi-family homes, **8** manufactured homes, and **11** non-residential building located within the Special Flood Hazard Areas in Allenstown. These buildings were counted using the process described in the beginning of **CHAPTER 4. POTENTIAL LOSSES**.

The 2010 FEMA **Digital Flood Insurance Rate Maps (DFIRMs)** for Allenstown identify the locations of Special Flood Hazard Areas (SHFA), also generally known as floodplains. There are **9** individual DFIRMs covering the Town, all of which **9** have SFHAs. The SFHA **Zones** located in Allenstown are displayed in **Table 2**.

Table 2
Special Flood Hazard Area (SFHA) Zones on 2010 DFIRMS

Special Flood Hazard Areas on Allenstown DFIRMs	
Zone A	<u>1% annual chance of flooding</u> • **100-year** floodplains *without* Base Flood Elevations (BFE)
Zone AE	<u>1% annual chance of flooding</u> • **100-year** floodplains *with* Base Flood Elevations (BFE) • identified as **floodways** with stream channel, and/or adjacent floodplain areas • areas must be kept free of encroachment so 1% annual chance of flood will not substantially increase flood heights
Zone X	<u>0.2% annual chance of flooding</u> • **500-year** floodplain *without* Base Flood Elevations (BFE) • sheet flow flooding less than 1 foot deep • stream flooding where the contributing drainage area is less than 1 square mile • areas protected from 100-year floodplains by levees • OR areas determined to be outside the 0.2% annual chance of flood (see DFIRMs)

Sources: FEMA and NH Geographically Referenced Analysis and Transfer System (NH GRANIT) websites

Base Flood Elevations (BFEs) are abundant along the Suncook River and Merrimack River on the DFIRMs. The primary DFIRMs identifying floodplains in Allenstown, which are along these Rivers, are NH (**D33013C**) **#0564**, **#0566**, **#0567**, **#0568**, and **#0677**. These five (**5**) DFIRMs include regular BFEs along their entire span through Town and have SHFA **Zone AE** (1% annual risk of flooding) with floodways. These are highlighted gray in **Table 3**.

Four (**4**) other DFIRMs, **#0569**, **#0590**, **#0685**, and **#0705**, provide other SHFA **Zone A** (1% annual risk of flooding) and **Zone X** (0.2% annual risk of flooding) locations. **Table 3** provides this information.

Table 3
Locations of Allenstown Special Flood Hazard Areas (SFHA) on 2010 DFIRMS

Panel NH (D33013C)	Flood Zones	Base Flood Elevations (BFEs)	Water Body Areas	Community Location
#0564	AE with floodway, X	198,199,200,201,205, 213,237,239,262,269, 284,286,288	Suncook River and Merrimack River	Southwestern corner - Suncook River runs the border of Allenstown and Pembroke. Suncook River enters the Merrimack River and acts as Allenstown's most western town boundary.
#0566	AE with floodway, X	294,295,299	Suncook River	Northwest - Small section of Suncook River where the river intersects with Route 28.
#0567	A, AE with floodway, X	295,299,302,303,304	Suncook River, Catamount Pond, and Bear Brook	Northwestern corner - Northern section of where the Suncook River enters through Epsom and east towards Catamount Pond.
#0568	A, AE and with floodway, X	289,291,294	Suncook River and Boat Meadow Brook	West - section comprising the middle of the town boundary with Pembroke.

Table 3, continued
Locations of Allenstown Special Flood Hazard Areas (SFHA) on 2010 DFIRMS

Panel NH (D33011C)	Flood Zones	Base Flood Elevations (BFEs)	Water Body Areas	Community Location
#0677	AE with floodway, X	197,198	Merrimack River	Southwestern corner - small portion of Merrimack River where Allenstown intersects with Bow and Hooksett.
#0569	A, X	N/A	Catamount Brook, Boat Meadow Brook, and a swamp area	Central - A section of Bear Meadow Brook near the Cold Spring Pond Dam Site. Contains Catamount Brook and swamp area near Bear Brook State Park.
#0590	A, X	N/A	Bear Brook, Little Bear Brook, Pease Brook, Smiths Pond, and a swamp area.	Northeastern corner - Bear Brook bordering the top of Bear Brook State park. Smith's Pond and a swamp area in Bear Brook State Park. Pease Brook running from Bear Brook towards the town boundary with Epsom. Little Bear Brook running parallel north of Bear Brook.
#0685	A, X	N/A	Boat Meadow Brook	Southern - Two brooks unlabeled along the border of Hooksett. Boat Meadow Brook in Bear Brook State Park.
#0705	A, X	N/A	Bear Hill Pond	Southeastern corner - Bear Hill Pond located in southeastern corner near the border with Hooksett and Deerfield.

Sources: FEMA and NH Geographically Referenced Analysis and Transfer System (NH GRANIT) websites

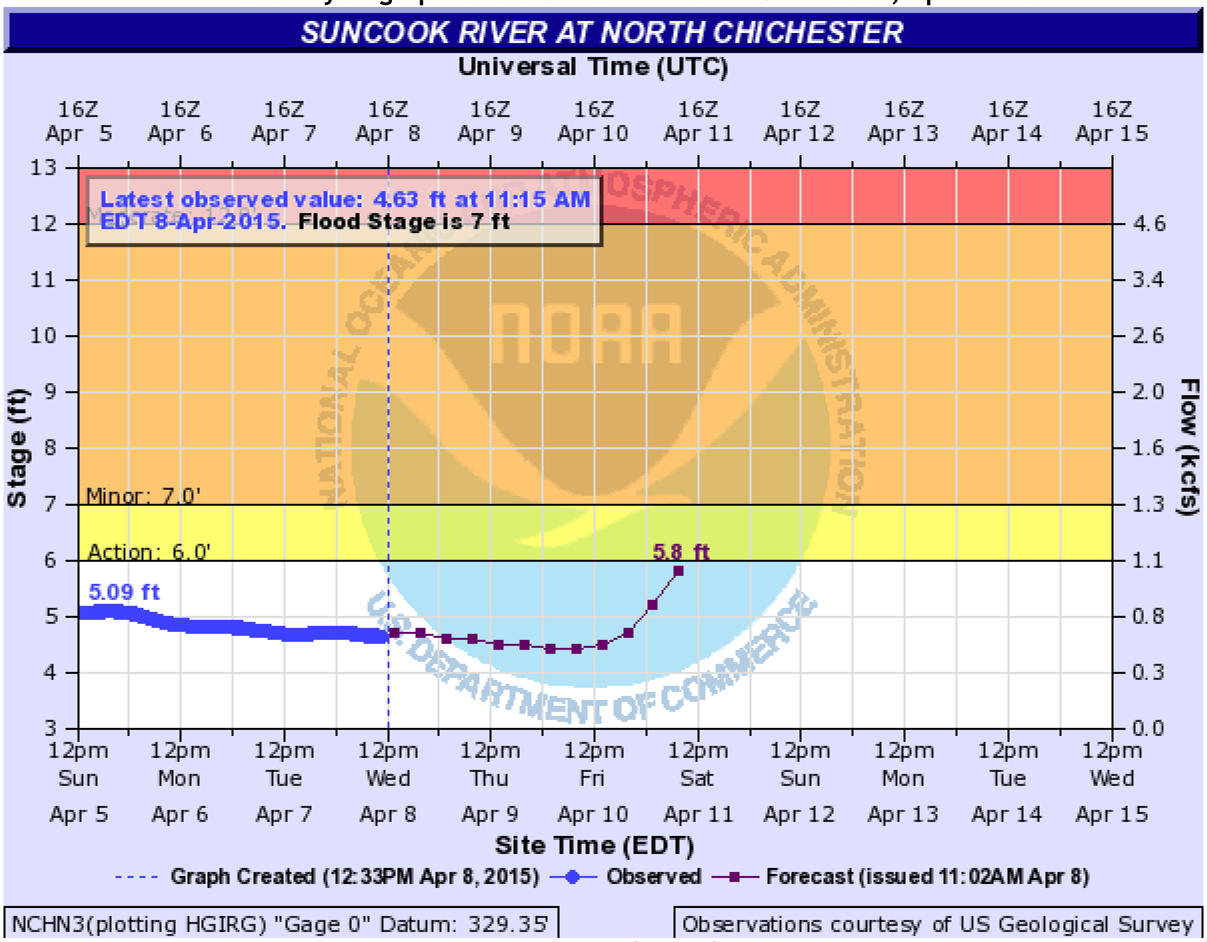
These **Allenstown DFIRMs** can be viewed online at and downloaded from the NH Geographically Referenced Analysis and Transfer System (NH GRANIT) website. Alternatively, the DFIRMs' respective paper FEMA 2010 Floodplain Maps in the Town Office could be consulted. Should the **Zone A** or **Zone AE** Suncook River and Merrimack River, Catamount Pond, Bear Brook, Boat Meadow Brook, Pease Brook, Little Bear Brook, Smiths Pond, or any of the swamp areas identified in **Table 3** flood to either the 100-year or 500-year level, the DFIRM areas will help **measure the location of the floodplain and potential magnitude of the flood.**

The flood stage, which is the height of water above a defined level, is the unit of flooding needed by emergency managers to make decisions about evacuation, sandbagging, road closings, and other protection methods. Flood stage determines the level of casualties and damage. Neither the Suncook River nor the Merrimack River in Allenstown have a real-time **river monitoring gage** to measure the dynamic heights of the rivers. However, other gages are located on both rivers **further upstream or downstream**. Gage monitoring data is displayed in a hydrograph, a graph showing flood stage, river height, velocity, flow, or other properties of water with respect to time, height and water volume.

The closest **gage is located upstream on the Suncook River in Chichester.** The real-time hydrograph can be extremely useful to Allenstown's emergency managers during potential or actual flooding events. A summary of Suncook current river data is displayed in **Figure 4** and future predictions are graphed to ascertain whether Flood Stages might be reached.

Figure 4

Prediction Hydrograph of the Suncook River in Chichester, April 2015



Source: NOAA National Weather Service

The US Geological Survey operates this **river monitoring gage USGS 01089500** Suncook River at North Chichester to measure river gage height and discharge over time for the purposes of flood control and reports this information to the National Weather Service's Advanced Hydrological Predication Service. Historical data is available on the site as well as a wealth of other flow data. This critical, cooperative venture provides simplified, more easily accessible public information about flooding conditions at the gage location. Hydrographs for rivers across New Hampshire are listed on the US Geological Survey (USGS) National Water Information System website. River monitoring gage station options **measure the magnitude of river flooding.**

The US Geological Survey (USGS) hosts a Flood Inundation Map Online tool that permits the viewing of flood prediction forecasts to help with planning where various flood stages could be represented on a map of Allenstown. The supporting USGS Flood Inundation Mapping Science main site provides additional information and links to inundation studies. The above-noted USGS Online Inundation Mapping utility will **measure the location of the flooded Suncook Rivers.**

More information on Suncook River flooding and stream gages is found in **CHAPTER 6. FLOODPLAIN MANAGEMENT**.

Allenstown uses VUEWorks for geographic information system (GIS) mapping of municipal infrastructure such as storm drain systems, sewer lines, roadways, sidewalks, street signs, and more. This GIS should be compatible with the more common ARCGIS layers available in New Hampshire at NH GRANIT. The Town does not own a large scale map plotter for printing paper maps. Few staff are trained to use the software VUEWorks to its fullest capacity or are knowledgeable of GIS architecture and theory. More user training and collection of common GIS layers for Allenstown should occur.

The Town would have to investigate whether VUEWorks is compatible with the ARCGIS-oriented software program HAZUS-MH which can measure multiple hazard damages. If VUEWorks is found to be compatible, specific potential building losses from flooding could be determined, which would **measure the potential damages from future flooding**.

Potential Future Hazards

Allenstown has several areas particularly susceptible to flooding. Riverside Park (on Pine Acre Road) has flooded repeatedly in the past. Every time a major flood has occurred in the last perhaps 40 years, Brookside Trailer Park (on Route 28) has been flooded. Pease Brook and the Merrimack River, in addition to the Suncook River, are the major causes of flooding in Town.

Drainage of roads plays a key role in preventing damages. Culvert pipes need to be up-sized to address the increased water. The Town has been working with the State and FEMA to upgrade culvert pipes.

Many roads in Allenstown are vulnerable to washouts and floods. They include Mt Delight Road, Deerfield Road, and New Rye Road. A complete listing of past and future potential road washouts and a **Table** of Town-owned culverts is found in **CHAPTER 6. FLOODPLAIN MANAGEMENT**.

Suncook River - *Suncook River Plan*

ALLENSTOWN SUNCOOK RIVER EVENTS	
Probability -	HIGH
Magnitude -	HIGH
Overall Risk -	**8.0**

The Suncook River is a tributary of the Merrimack River. The Suncook flows from the Crystal Lake, Upper and Lower Suncook Lakes in Barnstead south through Gilmanton, Pittsfield, Chichester, Epsom, forms the boundary between Allenstown and Pembroke, into the Merrimack River.

The principal streams in Allenstown are the Merrimack River and the Suncook River. Allenstown lies almost entirely within the Suncook River watershed. It also falls within the larger Merrimack River watershed, which encompasses most of the State. The Suncook River forms the border between the towns of Allenstown and Pembroke. The river meanders in a southwesterly direction for about seven (**7.0**) miles as the Allenstown-Pembroke border starting near the intersection of Route 28 and North Pembroke Road and ending at the confluence of the Suncook and Merrimack Rivers.

According to the ***USGS Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire 2009***, the Suncook River is 30 miles long. No major flood control structures are found on the river. The Pittsfield Mill Dam in Pittsfield is standard, and the Webster, Pembroke, and China Mill Dams in Suncook Village are used for hydro-electric power generation.

The Suncook River is dammed at two locations on the Allenstown stretch: (1) the Webster Mill Dam behind the Post Office on Glass Street; and (2) the China Mill Dam at Main Street in downtown Suncook Village. The latter two dams were created to power the mills that dominated the economy of Allenstown and Pembroke during the industrial revolution. The two Buck Street Dams near the Route 28 and Deerfield Road intersection were removed in October 2011 to help lower the water levels upstream of the dam during floods.

Avulsion

From the ***VHB Geomorphology-based Restoration Alternatives for the Suncook River, Epsom, NH, 2008***, on May 15-16, 2006, an extreme rain event resulted in state-wide flooding. A larger than 100-year flood impacted the Suncook River, causing the river to change its course (called an avulsion) in Epsom near the Huckins Mill Dam, upstream of Bear Island. Prior to the avulsion, the Suncook River had split into two channels at the Dam, a main west channel and a smaller secondary east channel. The avulsion caused the river to flow through "Cutter's Pit", a gravel excavation site to the northeast of Bear Island, before rejoining a section of the secondary channel. According to the report, nearly two miles of former Suncook River channel was abandoned, including most of the primary channel that had formed Bear Island.

The ***USGS Flood Study 2009*** states the floodplains have shifted as a result of the avulsion and developed a new floodplain map layer which is used in the Hazard Mitigation Plan's Maps.

CHAPTER 6. FLOODPLAIN MANAGEMENT contains additional information on the avulsion.

River Gages

Two stream gages are located on Suncook River for local officials and many others to monitor the river heights and to predict floods. The older North Chichester gage in Chichester is tied into the National Weather Service and the US Geological Survey (USGS) and is used for peak flow and height prediction models and real-time data. Much historical river data is available from this gage. The new Allenstown Route 28 gage installed in July 2011 is monitored by the USGS and specifically by Allenstown emergency management to monitor the real-time river height of the Suncook River flowing into Allenstown. A static height gage is placed on the Allenstown/Pembroke Route 28 bridge for on-site monitoring. Both stream gages are available on the internet for anyone to view real-time data.

CHAPTER 3. ASSETS AND RISKS contains additional information on stream gages.

Inundation Maps

The USGS Flood Inundation Maps for the Suncook River in Epsom, Pembroke, and Allenstown, and Chichester, New Hampshire 2012 were developed to "provide emergency management personnel and residents with information that is critical for flood-response activities, such as evacuations, road closures, disaster declarations, and post-flood recovery" for these four communities. The report used data from the North Chichester stream gage only because of its historic data.

The inundation maps, which are available for viewing online, were created as a result of the severe flooding experienced along the Suncook River in 1936, 2006, 2007, and 2010.

CHAPTER 6. FLOODPLAIN MANAGEMENT contains additional information on inundation mapping.

Sediment Transport

The ***USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire after the May 2006 Flood*** models about 100 to 400 tons of sediment per day moving past the Short Falls Road Bridge from Cutter's Pit through Allenstown and into the Merrimack River. Changes in streambed and surface-water elevations are results of this sediment carried downriver from the 2006 avulsion.

CHAPTER 6. FLOODPLAIN MANAGEMENT contains additional information on sediment.

Fluvial Erosion Hazard (FEH) and Fluvial Geomorphic Features

As a result of the many flooding events and existing complications of the very dynamic Suncook River, the NH Geological Survey (NHGS) at the NH Department of Environmental Services (NHDES) coordinated a fluvial geomorphology assessment of the river. Conducted by Field Geology Services who collected fluvial geomorphology field data in designated river reaches of the Suncook River in Allenstown/Pembroke and Epsom in 2013, a suite of data features were collected from the Allenstown/Pembroke town line at the confluence of the Merrimack River to the northern Epsom town line. In Addition, the Town of Barnstead's portion of the River was assessed. The middle communities opted out of the assessment. NHGS wrote the ***Suncook River Fluvial Geomorphology Assessment Discussion Guide*** in Spring 2015 to help communities interpret the data that was collected on a reach by reach basis.

CHAPTER 6. FLOODPLAIN MANAGEMENT contains additional information on the fluvial geomorphic data collection and analysis.

Other Resource Documents

Many resource documents are available relating Suncook River characteristic, some of which were mentioned within this section.

CHAPTER 13. APPENDIX contains a listing of recent studies and resources available on the Suncook River including an image of the document cover and their website location.

Area Events

Numerous Suncook River flooding events in recent history have occurred in the communities through which the River flows. Most of these area events likely had an impact on Allenstown too.

- *Floods of 1936*
  In Epsom, low roads near the Suncook River were flooded. In addition, water came up over the railroad tracks and train service could not reach Town. It took 5-7 days for the floodwaters to completely recede. This is one of the worst natural disasters to ever strike Epsom. *Epsom Town Historian*

- *May 14-17, 2006*
  The Suncook River Avulsion occurred. There were nine bridges / culverts washed out as well as dams breached. Epsom sustained flooding damage to the following areas: Northwood Lake Dam overtopped, damage to the Old Mill Dam (until the river changed direction), River Road culvert, Kingstowne Mobile Home Park flooded, Webster Park Lane was underwater, Millhouse Road was flooded, North Road culvert, Black Hall Road flooded, the Epsom Elementary School athletic fields flooded and the equipment hut was lost due to flooding, Blakes Brook culvert, Mountain Road culvert, Center Hill Bridge washed out, Echo Valley Road culvert, Griffin Road culvert, Rte 107 culvert, Old Richie Road culvert, Baker Road flooded, Mt Delight culvert, Swamp Road was under water, as well as Leighton Brook culvert. *Epsom Hazard Mitigation Committee 2009*

- *April 16-18, 2007*
  Indirect peak discharge measurements on stream gages on the Suncook River at Short Falls Road were 14,100 ft3, which was determined to be greater than 100-year flood discharge levels. *USGS Flood of April 2007 in New Hampshire*

- *April 13 – 27, 2007*
  Epsom sustained flooding damage to the following areas: in the area of Towle Pasture and Black Hall Roads was flooded, Route 107 was closed, Echo Valley Farm Road, River Road, New Orchard and Locke Hill Road, Range Road, Short Falls Road, Mill House Road, Jug City Road, Drolet Road, Sleepy Hollow Lane, Kingstowne Mobile Home Park, Webster Park, Route 28 by the Police Department and Rte 107.

  The Town water pump house, Center Hill Road, Rte 107 and Echo Valley Hill Road sustained damage. *Epsom Hazard Mitigation Committee 2009*

- *March 14-31, 2010, Severe Storms and Flooding*
  FEMA-1913-DR. Severe storms and flooding occurred over a two-week period which caused damage to roads and bridges. In Merrimack County, the reimbursement to towns for repair was $0.28 per capita (146,455 people in 2010), and in Hillsborough County damages reimbursed were $1.80 per capita (400,721 people in 2010). *fema.gov*

Events in Allenstown

The following events were found to have impacted Allenstown.

- *March, 1936*
  In central New Hampshire, the flood of 1936 caused the Suncook River and Merrimack River to overflow. The Merrimack River flooded homes near the Sewer Plant on Ferry Street and also flooded homes on Main Street in Allenstown. *Allenstown Town Historian 2004*

- *February 12, 1970*
  During the February 12, 1970 ice jam event, there were three separate jam sites on the Suncook River in Allenstown. One site was an abandoned dam located in close proximity to the Route 28 bridge. This site caused the evacuation of 5 homes and 50 trailers. The second jam, near the Route 3 bridge, flooded roads and 40 families were forced to evacuate. The last ice jam was located at the Webster Dam and resulted in eight flooded basements. *US Army Corps of Engineer Ice Jams Database and Allenstown Town Historian 2004*

  Brookside Trailer Park was flooded. Residents of Riverside Park were evacuated and the Civil Defense was called out to sandbag a home at Pine Acres. The home was normally 100 feet from the stream's edge, but water reached the home's foundation during the flood. The gates on the Suncook River Dam in Allenstown were raised to alleviate backpressure. *Union Leader, February 12, 1970*

- *Spring, 1976*
  In the spring of 1976, the Suncook River flooded in Allenstown, causing flooding on Albin Avenue, Canal Street, and Ferry Street. People living on Albin Avenue were evacuated. Brookside Trailer Park was also flooded. *Allenstown Hazard Mitigation Committee and Town Historian 2004*

- *March, 1977*
  In March of 1977, ice break-up caused a major jam in the Suncook River, causing flooding both in Allenstown and Pembroke. Homes and roads were flooded. More than 100 buildings were evacuated in Allenstown and Pembroke combined. *US Army Corps of Engineers*

- *October 2005 - Columbus Day Flood*
  The Columbus Day Flood in October 2005 was not a significant event in Allenstown. The EOC was not activated. The Suncook River reached action state, but no damage was done. The USGS Suncook River Stream Gage in North Chichester does not retain data sooner than 2007. *Allenstown Hazard Mitigation Committee 2015*

- *May 14-17, 2006 - Mother's Day Flood*
  Emergency responders activated the EOC during the Mother's Day Flood in May, 2006. Mandatory evacuations were executed in vulnerable areas of Town. All Departments were on emergency footing. The Town and its residents received significant Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the event. The USGS Suncook River Stream Gage in North Chichester does not retain data sooner than 2007. *Allenstown Hazard Mitigation Committee 2015*

- *April 2007 - Spring Flooding*
  The results of this spring 2007 flood were more damaging than the 2006 flood. Emergency responders activated the EOC in April 2007. Mandatory evacuations along the Suncook River were executed in vulnerable areas of Town. The Town and its residents received significant Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the event.

  From the After Action Report (AAR), the Allenstown Board of Selectmen declared a state of emergency for the Town of Allenstown at 11:30 hrs on April 17. The Allenstown Emergency Operations Center (AEOC) was activated at the same time.

  This flood resulted in a higher water level causing significant damage throughout the town. A total of 101 residences were evacuated during the flood. Mandatory evacuations were ordered for 61 residences with another 40 voluntary evacuations. The number of condemned homes at the time this report was being written was 14. A total of 61 homes sustained damage. These residences were located on Riverside Drive, Jill-Erik Road, Albin Avenue, Clement Road, Bourque Road, and Jasper Drive. A residence on Hillside Drive sustained major structural damage from a tree that fell on the mobile home causing it to partially collapse. The AEOC was finally closed on April 21, 2007.

  The following roadways were closed as a result of flooding: Route 28, Mount Delight Road, Jill-Erik Road, Riverside Drive, part of Albin Avenue, and Jasper Drive. Roadway damaged occurred on River Road, Deerfield Road, Mount Delight Road, Jill-Erik Road, Riverside Drive, and Granite Street near the Highway Department. The Ferry Street Boat Landing sustained damage as well. The area around the boat landing sustained erosion damage. *Allenstown Hazard Mitigation Committee 2015, Flood After Action Report (AAR)*

- *March 14-31, 2010 Severe Storm/Flooding*
  In March 2010, in Allenstown, the Suncook River caused moderate flood damage to residences, but was not as extensive as the 2006 and 2007 floods. As a result of these 2 recent and high impact floods, the Town of Allenstown applied for and was granted a Flood Mitigation Assistance grant for Phase I to acquire 14 homes on Riverside Drive, Albin Drive and Jillerik Road and for Phase II to acquire 3 homes on Riverside Drive. Allenstown chose to break down the overall, long-term project into several phases, because there are so many homes affected by the flooding. The Town believes that the resources (both money and personnel) required to manage a project any larger would be too overwhelming to properly implement. Instead, the Town is focusing on conducting a well executed acquisition program for Phase III. *Town of Allenstown FY-2011 FMA Property Acquisition Funding Grant Application*

Magnitude of Flooding

The magnitude of flooding was described in the previous section, entitled **Flooding**, and includes compatible information on magnitude of flooding related to the Suncook River. Please refer to that previous section for additional information.

Potential Future Hazards

Allenstown has several areas particularly susceptible to flooding. Riverside Park (on Pine Acre Road) has flooded repeatedly in the past. Every time a major flood has occurred in the last perhaps 40 years, Brookside Trailer Park (on Route 28) has been flooded.

Homes near the Suncook River, especially in low-lying areas, are at risk. Mobile home parks are especially at risk, and many reside in the floodplain.

An aggressive effort has been undertaken to acquire the homes which are vulnerable to flooding. Houses at the highest risk remain on Riverside Park Drive, Albin Avenue, Fanny Drive, Clement Road, and Bourque Road. The Swiftwater Drive condominiums are also a priority to purchase and remove.

Several businesses fall within the floodplain and are vulnerable against the flooding by the Suncook River. They include the Doctor’s Professional Park, NH Exteriors Residential Office Park, Twin Oaks Campground, and Johnson’s Floral.

The Allenstown Wastewater Treatment Facility on Ferry Street is vulnerable to both the Suncook River and the Merrimack River.

Hurricanes and Severe Storms

ALLENSTOWN HURRICANE/STORM EVENTS	
Probability -	HIGH
Magnitude -	MODERATE
Overall Risk -	6.0

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. Flooding is often caused from the coastal storm surge of the ocean and torrential rains, both of which accompany the storm. The floods and high winds can result in loss of life and property.

Area Events

Hurricane season begins on June 1 and continues through the end of November. August and September are the most active hurricane months. It is not uncommon for New England to be impacted by a hurricane more than once in a season. River and flooding due to heavy rains is a risk to Allenstown during hurricanes. Numerous hurricane events in recent history have occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town.

- *August, 1635*
  A hurricane struck portions of New Hampshire in 1635. *NH Homeland Security and Emergency Management*

- *October 18-19, 1778*
  Portions of New Hampshire experienced 40-75 mph winds. *NH Homeland Security and Emergency Management*

- *October 9, 1804*
  A hurricane struck portions of New Hampshire in 1635. *NH Homeland Security and Emergency Management*

- *September 23, 1815*
  Portions of New Hampshire experienced the effects of a hurricane in 1815.

- *September 8, 1869*
  Portions of New Hampshire experienced winds over 50 mph. *NH Homeland Security and Emergency Management*

- *September 21, 1938*
  New Hampshire and Southern New England were affected by the Gale of 1938, including experiencing flooding events. Extensive flooding occurred throughout the region washing out roads and bridges, flooding homes and disrupting electrical, telephone and mail services. It is unknown how the events affected Allenstown. *The Only Henniker on Earth by the Henniker History Committee*

  Major hurricane caused millions of dollars worth of damage to northeast. Central New Hampshire was inundated with water. Downed trees caused extensive damage to homes, businesses and community infrastructure. Roosevelt ordered emergency aid be sent to New Hampshire, including Merrimack County. *Concord Monitor*

- *June 14-15, 1942*
  The upper Connecticut and Merrimack River basins flooded as a result of a small cyclonic disturbance accelerated by the convergence of warm, moist air from the Tropics and colder air from Canada. Nearly 5 inches of rain fell in a 3 hour period, damaging crops, telephone lines and power lines, highways, railroads, bridges, culverts and residences. *Timeline: Boscawen, NH*

- *1954 – 1991 Hurricanes Carol, Edna, Donna, Doria, Bell, Gloria, and Bob*
  Hurricanes on August 31, 1954 (Carol – tree and crop damage), September 11, 1954 (Edna), April 12, 1960 (Donna – heavy flooding), August 28, 1971 (Doria), August 10, 1976 (Bell), September 27, 1985 (Gloria), and 1991 (Bob) impacted New Hampshire and southern New England. *NH Homeland Security and Emergency Management*

- *July/August 1986*
  Severe summer storms with heavy rains, tornadoes, flash floods, and severe winds occurred in July/August 1986. These storms were a detriment to the road network Statewide. *NH Homeland Security and Emergency Management*

- *August 7-11, 1990* *(see also **Flooding**)*
  A series of storm events with moderate to heavy rains occurred on August 7-11, caused flooding in eight counties, including Merrimack County, and resulted in a disaster declaration. The damage totaled $2,297,777 for all counties.

- *October 1996* *(see also **Flooding**)*
  In October 1996, heavy rains caused flooding in six counties, including Merrimack County. A disaster was declared and damage totaled $2,341,273 for all counties.

- *July 1998* *(see also **Flooding**)*
  Severe storms in July 1998 caused heavy flooding in six counties, including Merrimack County. Damages of $3.4 million were incurred for all counties.

- *July 6, 1999*
  Severe storms in July 1999 bring strong damaging winds. The roof of the Pill building in Concord is blown off during a storm. *Concord Monitor 7/7/99*

- *Severe Winter Storm, February 23-March 3, 2010*
  FEMA-1892-DR. This severe weather event included high winds, rain, and snow over a week-long period. The primary impact was debris removal and repair reimbursement for fallen trees and powerlines. In Merrimack County, the reimbursement to communities was the equivalent of $10.39 per capita (146,455 people in 2010), with Hillsborough County at $3.68 per capita (400,721 people in 2010). In the Concord area, 21,000 Unitil customers were out of power at the peak outage period. *fema.gov, Unitil Energy Systems, 2010*

- *Tropical Storm Irene, August 26-September 6, 2011*
  FEMA-4026-DR. Tropical Storm Irene impacted New Hampshire and damaged four counties, including Merrimack County at the equivalent of $4.29 per capita (146,455 people in 2010). Damages to roads and bridges from flooding were the primary impact,

but power outages from downed trees and lines also occurred during high winds throughout this week-long event. *fema.gov*

- *Tropical Storm Sandy, October 26, 2012-October 31, 2012*
  FEMA-3360-DR. Tropical Storm Sandy impacted New Hampshire with rain and wind. Merrimack County received a disaster declaration for Emergency Protective Measures.

Events in Allenstown

The following events were found to have impacted Allenstown.

- *September 21, 1938*
  High winds and heavy flooding made this hurricane the worst natural disaster to impact the Town. Wind had a devastating impact in Allenstown. Many roofs and chimneys were torn off by high winds in Town. *Allenstown Town Historian 2004*

- *May 31, 2002*
  A line of severe thunderstorms moving through New Hampshire produced severe winds that downed trees and power lines throughout the central and southeastern part of the state. About 18,000 customers lost electrical service during the storms. Trees were reported down in Allenstown and many other neighboring towns. *Allenstown Hazard Mitigation Committee 2009*

- *August 25, 2007*
  A severe thunderstorm downed trees in Allenstown. Numerous severe thunderstorms began developing statewide during the late afternoon of August 17th and continued through the evening hours. Wind damage was widespread with these storms along with a few reports of large hail. *Allenstown Hazard Mitigation Committee 2009*

- *February 23-March 3, 2010 , (High Wind) Severe Winter Storm*
  Allenstown experienced power outages, with trees down on wires, roads, cars, and buildings. The flooding from this storm was worse than the snow and ice damage. Emergency responders activated the EOC. All Departments were on emergency footing. The Town received Public Assistance (PA) grant funds as a result of the event. *Allenstown Hazard Mitigation Committee 2015*

- *August 26-September 6, 2011, (High Wind) Tropical Storm Irene*
  Emergency responders and all Departments prepared for Tropical Storm Irene to hit Allenstown in August, 2011. The EOC was activated, and all Departments were on emergency footing. However, the storm did minimal damage. Road closures occurred for a maximum of 15-20 minutes. Trees fell on multiple homes, many of which were destroyed as a result, but the expected rain and flooding did not occur. The Town and its residents received Public Assistance (PA) grant funds and Individual Assistance (IA) grant funds as a result of the Tropical Storm Irene. *Allenstown Hazard Mitigation Committee 2015*

- *October 28-29, 2012, Hurricane Sandy*
  Minor damage to power lines occurred from Tropical Storm Sandy in October, 2012 because of trees down and high winds. No flooding was experienced. Infrastructure damage to traffic signals was experienced at the Main Street and Ferry Street intersections. The EOC was not activated. Overall, Allenstown was not greatly impacted. *Allenstown Hazard Mitigation Committee 2015*

Magnitude of Hurricanes and Severe Storms

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Hurricanes, high wind and rain events, and thunderstorms can damage Allenstown just like any other community in Central New Hampshire. Forested lands and trees along the transportation infrastructure can be blown down across roads; the above-ground powerlines along the sides of the road can be snapped either by trees or high winds and fall onto the roads or nearby objects; and runoff flooding and stream/brook and river flooding can occur as a result of hurricanes and severe storms.

The Saffir-Simpson Hurricane Wind Scale **measures the magnitude of wind events effects on property damage** on a 1 through 5 rating basis. The Saffir-Simpson scale describes the Category 1 through 5 strengths with their respective threats to people, different types of homes, shopping centers, trees, power lines, water, and more as displayed in **Table 4**.

Table 4
Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	**74-95 mph**	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	**96-110 mph**	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 ***major***	**111-129 mph**	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 ***major***	**130-156 mph**	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 ***major***	**157 mph or higher**	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Oceanic and Atmospheric Administration (NOAA)

The National Oceanic and Atmospheric Administration (NOAA) hosts an animated visual representation of a Hurricane Intensity Scale (Wind Damage) **measuring the increasing magnitude of Category wind speeds** on a home and nearby trees. Allenstown is fortunate the community is not located on the NH coast which often receives the worst damage from hurricanes, including storm surges described by the National Hurricane Center, damaging the State's coastal and western most regions.

Many of the severe wind storms Allenstown experiences are not hurricanes but are thunderstorms. Thunderstorms are common in New Hampshire, particularly during the hot weather months. The Thunderstorm Category Criteria scale in **Table 5** was developed by an Accuweather.com meteorologist to **measure the magnitude of thunderstorms with their various weather components, including rain, wind, hail, tornado, and lightning.**

Table 5
Thunderstorm Criteria Scale

THUNDERSTORM CATEGORIES	RAINFALL - inches per hour	WIND Gust - max mph	HAIL Size - in	TORNADO - Potential Highest Category	LIGHTNING Frequency - per 5 minutes	DARKNESS Aspect	Overall THUNDERSTORM impact
T-1 Weak Thunderstorms or **Thundershowers**	0.03" to 0.10"	< 25 mph	None	None	Few strikes during entire storm	**Slightly Dark** Sunlight may be seen after storm	1. No damage. 2. Gusty winds at times.
T-2 Moderate Thunderstorms	0.10" to 0.25"	25-40 mph	None	None	Occasional 1 to 10	**Moderately Dark** Heavy downpours might cause the need for car headlights	1. Heavy downpours. 2. Occasional lightning. 3. Gusty winds. 4. Very little damage. 5. Small tree branches might break. 6. Lawn furniture moved around. 7. Power outages are possible.
T-3 Heavy Thunderstorms 1. Singular or lines of storms	0.25" to 0.55"	40-57 mph	1/4" to 3/4"	EF0	Occasional to Frequent 10 to 20	**Dark** Car headlights used. Visibility low in heavy rains. Cars might pull off the road.	1. Minor damage. 2. Downpours produce some flooding on streets. 3. Frequent lightning could cause house fires. 4. Hail occurs with the downpours. 5. Small tree branches are broken. 6. Shingles are blown off roofs. 7. Power outages are likely.
T-4 Intense Thunderstorms 1.weaker supercells 2. Bow echoes or lines of storms	0.55" to 1.25"	58-70 mph	1" to 1.5"	EF0 to EF2	Frequent 20 to 30	**Very Dark** Car headlights used. Some streetlights come on.	1. Moderate damage. 2. Heavy rains can cause flooding to streams and roadway flooding occurs. 3. Hail can cause dents on cars and cause crop damage. 4. Tornado damage. 5. Power outages will occur.

Table 5, continued
Thunderstorm Criteria Scale

THUNDERSTORM CATEGORIES	RAINFALL - inches per hour	WIND Gust - max mph	HAIL Size - in	TORNADO - Potential Highest Category	LIGHTNING Frequency - per 5 minutes	DARKNESS Aspect	Overall THUNDERSTORM impact
T-5 **Extreme Thunderstorms** 1. Supercells with family of tornadoes 2. Derecho Windstorms	1.25" to 4"	> 70 mph	1.5" to 4"	EF3 to EF5	Frequent to Continuous > 30	**Pitch Black** Street lights come on. House lights might be used.	1. Severe damage to trees and property. Damage is widespread. 2. Flooding rains. 3. Damaging hail. 4. Damaging wind gusts to trees and buildings. 5. Tornadoes EF3 to EF5 or family of tornadoes can occur. Tornadoes cause total devastation. 6. Widespread power outages.

Source: Adapted from Accuweather.com, Henry Margusity, Senior Meteorologist

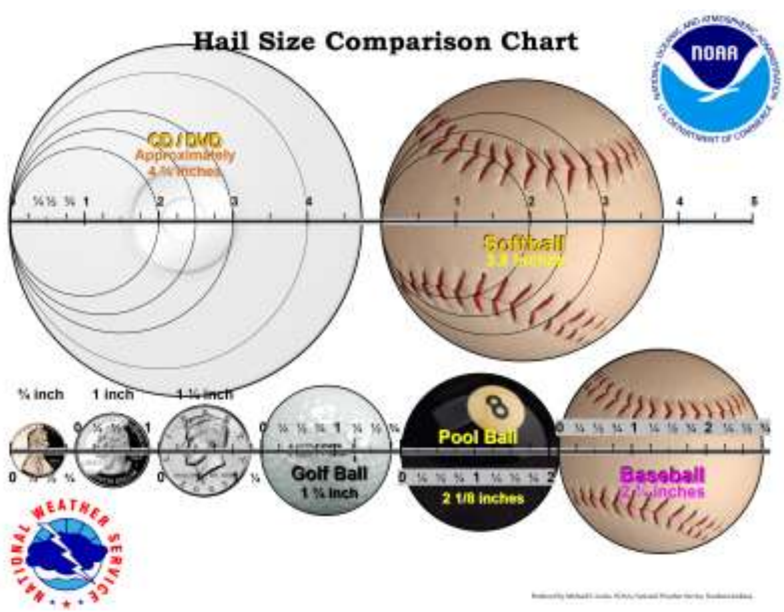
The Hail Size Description Chart developed by the National Oceanic and Atmospheric Administration (NOAA) and enhanced by other National Weather Service local sites depicts the potential size of hail during a hurricane or severe storm event, which could occur anywhere in Allenstown. The chart is shown below along with a Hail Size Comparison Chart which is a visual representation of some of the relative sizes of hail (note this chart image is not shown to scale). The Description Table and Size Comparison Figure in **Table 6** and **Figure 5** **measure the magnitude of hailstones** that could fall on Allenstown during severe storm events.

Table 6
Hail Size Description

Hailstone Diameter in Inches	Size Description
< 1/4	bb
1/4	**Pea Size**
1/2	Mothball Size
3/4	Penny Size
7/8	Nickel Size
Severe Criteria 1	Quarter Size
1 1/4	Half Dollar Size
1 1/2	Walnut or Ping Pong Ball Size
1 3/4	Golf Ball Size
2	**Hen Egg Size**
2 1/2	Tennis Ball Size
2 3/4	Baseball Size
3	**Teacup Size**
3 4/5	Softball Size
4	**Grapefruit Size**
4 3/4	CD/DVD

Note: Hail size refers to the diameter of the hailstone.

Figure 5
Hail Size Comparison



Sources: National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS)

Allenstown uses VUEWorks for geographic information system (GIS) mapping of municipal infrastructure such as storm drain systems, sewer lines, roadways, sidewalks, street signs, and more. This GIS should be compatible with the more common ARCGIS layers available in New Hampshire at NH GRANIT. The Town does not own a large scale map plotter for printing paper maps. Few staff are trained to use the software VUEWorks to its fullest capacity or are knowledgeable of GIS architecture and theory. More user training and collection of common GIS layers for Allenstown should occur.

The Town would have to investigate whether VUEWorks is compatible with the ARCGIS-oriented software program HAZUS-MH which can measure multiple hazard damages.
If VUEWorks is found to be compatible, specific potential building losses from flooding could be determined, which would **measure extent of potential flooding and wind damage from thunderstorms**.

Flooding from undersized or unmaintained culverts, road and driveway runoff, or swollen streams such as Catamount Brook, Bear Brook, Little Bear Brook, Boat Meadow Brook, Pease Brook or the Suncook River and Merrimack River can occur when hurricanes, severe storms, or heavy rain events such as thunderstorms strike the Town. For a review of the **measurement of flooding magnitude**, see the **Flooding** section.

Potential Future Hazards
It is likely that hurricanes will impact Allenstown in the future. The entire Town, covered by the electric utilities of Eversource (formerly Public Service of NH (SNH), NH Electric Coop and Unitil, is prone to power outages. The response time to these outages could be long. Areas vulnerable to wind/tree debris/power outage damage include the High Ridge Trail Water Tower and the Deerfield Road corridor.

Rapid Snow Pack Melt

Warm temperatures and heavy rains cause rapid snowmelt. The water cannot seep into the frozen ground in early spring and so it runs off into streets and waterways. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

ALLENSTOWN RAPID PACK SNOW MELT EVENTS	
Probability -	MODERATE
Magnitude -	LOW
Overall Risk -	2.0

Area Events

Numerous rapid snow pack melt events in recent history have likely occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town.

- *February 11-16, 1824*
  Heavy rains melted snow causing flooding on the Merrimack River; one of the piers on the Hooksett Bridge was destroyed. On the Concord Upper and Lower Bridges, 5 piers and parts of the structures were carried away by the waters. Bridges, mills and dams were either carried away or were destroyed in Canterbury, Henniker, Allenstown and Weare. *Timeline: Boscawen, NH*

- *March 11-21, 1936*
  The great flooding of 1936 resulted in part from heavy rains but also from rapid snow pack melt. Snow north of Concord contributed to the higher waters in the Winnipesaukee, Contoocook and Pemigewassett rivers. These flooded rivers were largely responsible for the destruction in Concord and the surrounding area. *Concord Monitor*

- *Spring, 1976*
  The entire region experienced spring flooding. *NH Homeland Security and Emergency Management*

- *March 14, 1977*
  With the peak record of the Soucook River, area communities experienced flooding. *NH Homeland Security and Emergency Management*

- *April 16, 1987* (*see also **Flooding***)
  Caused by rapid snowmelt and intense rain, statewide the damage totaled nearly $5 million.

Events in Allenstown

The following events were found to have impacted Allenstown.

- *Spring, 1976*
  In the spring of 1976, the Suncook River flooded in Allenstown, causing flooding on Albin Avenue, Canal Street, and Ferry Street. People living on Albin Avenue were evacuated. Brookside Trailer Park was also flooded. *Allenstown Hazard Mitigation Committee and Town Historian 2004*

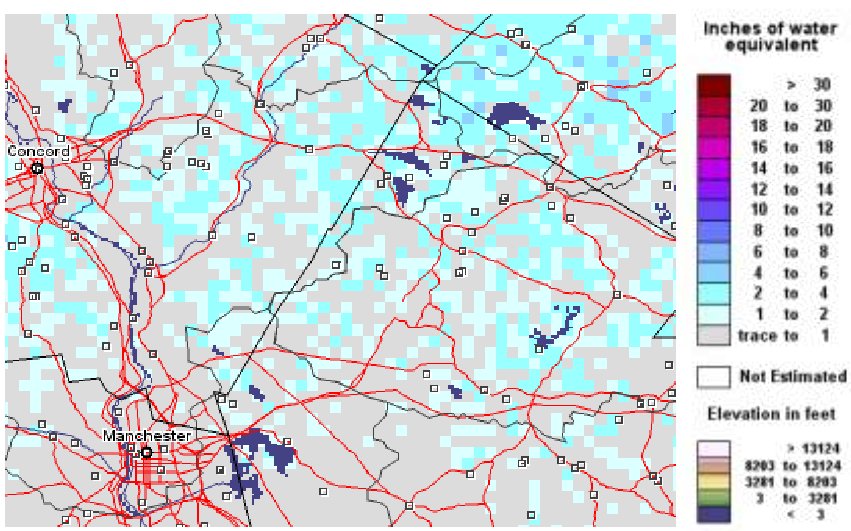
Magnitude of Rapid Snow Pack Melt

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Rapid snow pack melt is another category of flooding. The solid snow cover from a winter season can be melted prior to ground thaw in a few warm or rainy days, resulting in flash-flood like conditions.

The National Oceanic and Atmospheric Administration (NOAA)'s National Operational Hydrologic Remote Sensing Center (NOHRSC) hosts an Interactive Snow Information site that produces daily Modeled Snow Water Equivalent Maps from data collected by local climate station, identified by the tiny black square boxes on the Map (**Figure A-3**). Historic and current snow water equivalent (how much water there would be if the current snow melted) can be mapped and identified.

An online Modeled SWE Map was zoomed to the Central NH Region level as displayed in **Figure 6** for the date of April 9, 2015. The daily prediction of snow water equivalent legend is posted to **measure the magnitude of snow water equivalent (snow pack melt)**, an extremely useful tool for emergency managers.

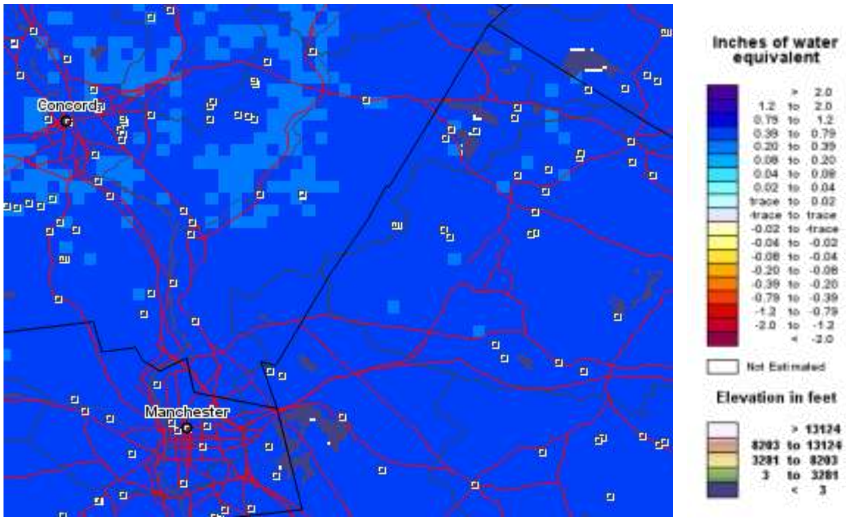
Figure 6
Modeled Snow Water Equivalent (SWE)
Map of the Central NH Region (Daily)



Source: National Operational Hydrologic Remote Sensing Center (NOHRSC), 04-09-2015

An accompanying tool on this NOHRSC website, the Change in Modeled Snow Water Equivalent (SWE) Over 24hrs Map, indicates how much the snow water equivalent changed (increased) over the previous 24 hour period. Displayed in **Figure 7,** Change in Modeled SWE Map **measures the magnitude of inches of rapid snow pack melt experienced over 24 hours**, between April 8 and April 9, 2015. The tiny black square boxes on the Map indicate the climate reporting stations which collect this data.

Figure 7
Change in Modeled Snow Water Equivalent (SWE) Over 24hrs
Map of the Central NH Region (Daily)



Source: National Operational Hydrologic Remote Sensing Center (NOHRSC), 04-09-2015

Emergency responders can use this Interactive Snow Information Map tool to identify increases or decreases in the number of inches of SWE, either through snowfall or snowmelt. Using both the Modeled Snow Water Equivalent and the Change in Modeled Snow Water Equivalent together as predictive tools, responders can monitor snow melt and identify problem areas in Town for resolution.

Rapid snow pack melt can cause flooding or ponding throughout the community. Specific damaged locations include undersized or unmaintained culverts, roads, driveways, slopes, yards or fields, or swollen streams such as the Suncook River, Merrimack River, Catamount Brook, Little Bear Brook, Boat Meadow Brook, Bear Brook Brook, and Pease Brook. For a review of the **measurement of flooding magnitude**, see the **Flooding** section.

Potential Future Hazards

There is the possibility of damages from the rapid snow pack melt because of the flooding from the Suncook River and the various streams.

Locations in Allenstown that may be vulnerable to rapid snow pack melt include areas along the Suncook River or any of the Town's fast moving brooks or ditches. Damage to roads is expected.

River Ice Jams - *Suncook River Plan*

ALLENSTOWN RIVER ICE JAM EVENTS	
Probability -	MODERATE
Magnitude -	LOW
Overall Risk -	2.0

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

Area Events

Numerous ice jam events in recent history have likely occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town.

- *April 12, 1812*
  Ice chunks carried 100 feet of a Concord bridge downstream on the Merrimack River. *History of Concord (Bouton)*

- *March 12, 1936*
  As a result of heavy snowfall totals, heavy rains, and warm weather, ice chunks jammed the Contoocook River. *US Army Corps of Engineers NH Ice Jams Database*

- *April 3, 1959*
  As reported by the US Army Corps of Engineers, "Maximum annual gage height of 12.03 feet, affected by backwater from ice, reported at USGS gage Soucook River near Concord, on April 3, 1959." *US Army Corps of Engineers NH Ice Jams Database*

- *March 19, 1968*
  As reported by the US Army Corps of Engineers, "Maximum annual gage height, 10.48 feet due to an ice jam recorded at USGS gage Soucook River near Concord, New Hampshire on March 19, 1968." *US Army Corps of Engineers NH Ice Jams Database*

- *March 14, 1977*
  In the State, an ice jam caused major disruption to the road networks as a result of road washouts. *NH Homeland Security and Emergency Management*

Events in Allenstown

The following events are found to have impacted Allenstown.

- *February 12, 1970*
  During the February 12, 1970 ice jam event, there were three separate jam sites on the Suncook River in Allenstown. One site was an abandoned dam located in close proximity to the Route 28 bridge. This site caused the evacuation of 5 homes and 50 trailers. The second jam, near the Route 3 bridge, flooded roads and 40 families were forced to evacuate. The last ice jam was located at the Webster Dam and resulted in eight flooded basements. *US Army Corps of Engineer Ice Jams Database and Allenstown Town Historian 2004*

  Brookside Trailer Park was flooded. Residents of Riverside Park were evacuated and the Civil Defense was called out to sandbag a home at Pine Acres. The home was normally 100 feet from the stream's edge, but water reached the home's foundation during the flood. The gates on the Suncook River Dam in Allenstown were raised to alleviate backpressure. *Union Leader, February 12, 1970*

- *March, 1977*
  In March of 1977, ice break-up caused a major jam in the Suncook River, causing flooding both in Allenstown and Pembroke. Homes and roads were flooded. More than 100 buildings were evacuated in Allenstown and Pembroke combined. *US Army Corps of Engineers*

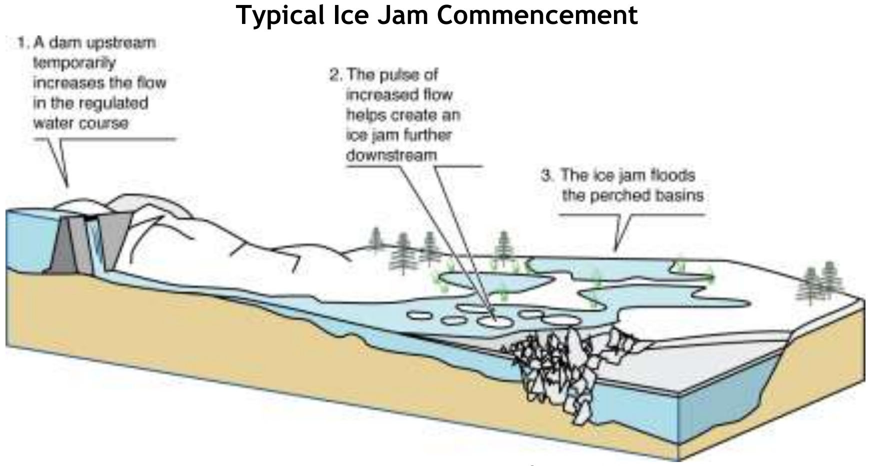
Magnitude of River Ice Jams

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. The dams along many small streams and brooks in Town are unlikely to be afflicted by ice jams. Six (**6**) dams are classified as Non-Menace (**NM**) dams. Five (**5**) Low Hazard (**L**), zero (**0**) Significant Hazard (**S**), and zero (**0**) High Hazard (**H**) are also classified in Allenstown.

As Allentown only contains non-menacing and low hazard classified dams, these dams pose less of a threat to property damage or loss of life if failure occurred. The low hazard dams, which would pose more of a threat than mon-menacing classified dams, are Bear Hill Pond Dam, Catamount Pond Dam, Hall Mountain Marsh Dam, Hayes Marsh Dam, and Buck Street East Dam. *However, NHDES has since removed the Buck Street East Dam after the 2011 database was generated, and the categorization has likely been downgraded to inactive (ruins).*

Figure 8 displays how river ice jams can begin. Ensuring that dams are regularly maintained and have a current Emergency Action Plan on file with the NH Department of Environmental Services (NHDES) will help with keeping the occurrence of ice jams at a minimum.

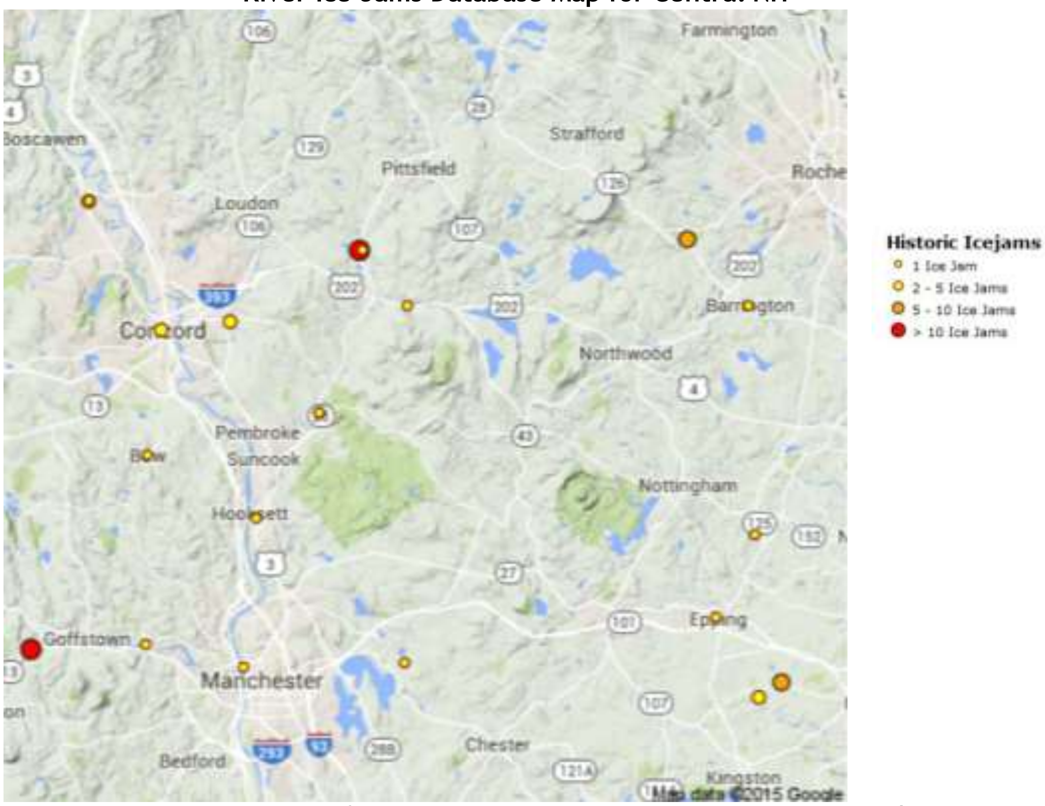
Figure 8
Typical Ice Jam Commencement



Source: Internet Accessed May 2014

The US Army Corps of Engineers (ACOE) maintains the Ice Jam Database, Bulletins & Surveys website which locates where ice jams are presently occurring and where they have occurred in the past. **Figure 9** displays those ice jams within the ACOE database. Reports can be generated in various formats so emergency responders can **identify the locations of prior ice jams and begin to mitigate the effects of future events.**

Figure 9
River Ice Jams Database Map for Central NH



Source: US Army Corps of Engineers (ACOE) River Ice Jam Mapping Tool, 2015

A specific scale which **measures the potential magnitude of river ice jams was not located.**

Potential Future Hazards

Ice jams have occurred in the past along the Suncook River, so it is likely that they will occur again. Areas of future concern include the Suncook River at Upper Turnpike Street at the double-decker bridge.

Dam Breach and Failure - *Suncook River Plan*

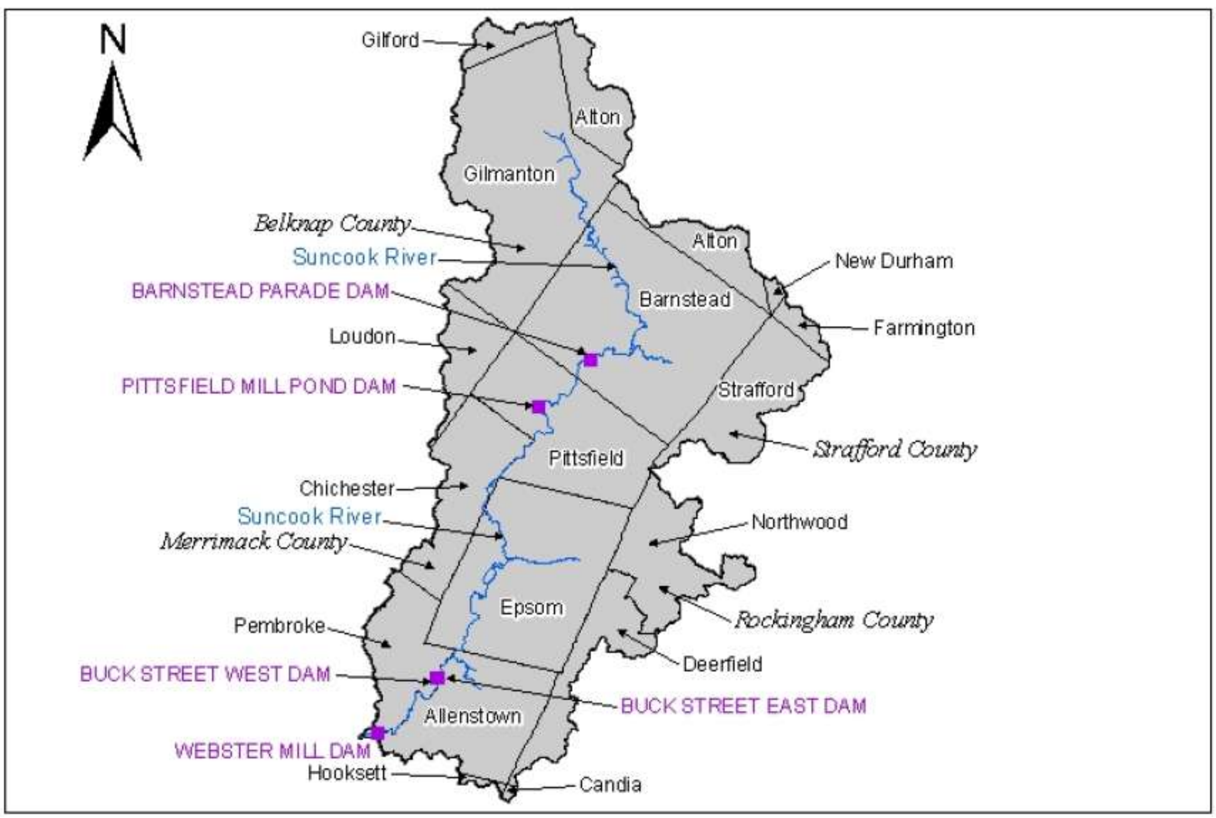
ALLENSTOWN DAM BREACH EVENTS	
Probability -	LOW
Magnitude -	LOW
Overall Risk -	1.0

Dam breach and its resulting failure causes rapid loss of water that is normally held by the dam. These kinds of floods are extremely dangerous and pose a significant threat to both life and property as they are quick, unexpected, and if they occur during a flooding event, dam failures can overload an already burdened water channel.

Area Events

Numerous dam breaches in recent history have likely occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town. Suncook River dams in four counties within its watershed are displayed in **Figure 10**. **Appendix B** of the **USGS April 2007 Flood Study** contains detailed Suncook River dam information on each of these displayed.

Figure 10
Dams in the Suncook River Watershed



Source: USGS April Flood Study Appendix A, 2007

- *May 15, 2006*
  The Pillsbury Lake Dam in Webster, holding back an artificial lake of about 70 acres, was breached by flooding due to heavy rains. The earth and concrete dam, which blocks the Dear Meadow Brook, was built in the 1960s, creating the Pillsbury Lake District with about 180 households. Floodwaters punched out a 20-foot breach in the dam. The Lake's level fell from 15 feet at its deepest point to about two feet at that same point following the event. *Concord Monitor, 5/18/06*

Events in Allenstown

There are currently **18** dams in Allenstown in the 2011 New Hampshire Dam database retained by the Department of Environmental Services Dam Bureau. According to RSA 482:2 II, a dam is any artificial barrier which impounds or diverts water, has a height of four feet or more or has a storage capacity of two acre-feet or more, or is located at the outlet of a great pond. Inactive dams are defined as dams that do not meet the legal definition of a dam. Of the **18**, there are **7** inactive/unclassified dams listed in Allenstown that do not meet the above definition and may be in ruins, exempt, breached, removed, or never built.

Each of the **11** active dams located in Allenstown is categorized into one of four classifications which are differentiated by the degree of potential damages that a failure of the dam is expected to cause. The classifications are designated as High Hazard **(HM)**, Significant Hazard **(S)**, Low Hazard **(LM)**, and Non-Menace **(NM)**. **Table 7** provides the definitions of the dam classifications, describing the magnitude of potential dam failure in New Hampshire.

Allenstown has six (**6**) **NM** dams. Five **(5)** **LM** dams are the Bear Hill Pond Dam on Boat Meadow Brook, Catamount Pond Dam and Hall Mountain Marsh Dam on Bear Brook, Archery Pond Dam on a tributary of Bear Brook, Hayes Marsh Dam on Catamount Brook, and the *Buck Street East Dam on the Suncook River. **However, NHDES has since removed the Buck Street East Dam after the 2011 database was generated, and the categorization has likely been downgraded to inactive (ruins).*

- **Low (LM) Hazard Dams**:
  - Bear Hill Pond Dam on Boat Meadow Brook,
  - Catamount Pond Dam and Hall Mountain Marsh Dam on Bear Brook,
  - Archery Pond Dam on a tributary of Bear Brook,
  - Hayes Marsh Dam on Catamount Brook, and
  - *Buck Street East Dam on the Suncook River.

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Table 7
New Hampshire Dams Classifications

<table>
<tr><th colspan="2">NON-MENACE Structure</th><th>Inspection</th></tr>
<tr><td rowspan="2">NM</td><td>Means a dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property, provided the dam is:</td><td rowspan="2">Every 6 years if criteria met</td></tr>
<tr><td>❍ Less than six feet in height if it has a storage capacity greater than 50 acre-feet;
❍ Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.</td></tr>
<tr><th colspan="2">LOW Hazard Structure</th><th>Inspection</th></tr>
<tr><td rowspan="2">LH</td><td>Means a dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:</td><td rowspan="2">Every 6 years</td></tr>
<tr><td>❍ No possible loss of life.
❍ Low economic loss to structures or property.
❍ Structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services.
❍ The release of liquid industrial, agricultural, or commercial wastes, septage, or contaminated sediment if the storage capacity is less than two-acre-feet and is located more than 250 feet from a water body or water course.
❍ Reversible environmental losses to environmentally-sensitive sites.</td></tr>
<tr><th colspan="2">SIGNIFICANT Hazard Structure</th><th>Inspection</th></tr>
<tr><td rowspan="2">SH</td><td>Means a dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:</td><td rowspan="2">Every 4 years</td></tr>
<tr><td>❍ No probable loss of lives.
❍ Major economic loss to structures or property.
❍ Structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services.
❍ Major environmental or public health losses, including one or more of the following:
♦ Damage to a public water system, as defined by RSA 485:1-a, XV, which will take longer than 48 hours to repair.
♦ The release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more.
♦ Damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.</td></tr>
<tr><th colspan="2">HIGH Hazard Structure</th><th>Inspection</th></tr>
<tr><td rowspan="2">HH</td><td>Means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as a result of:</td><td rowspan="2">Every 2 years</td></tr>
<tr><td>❍ Water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure, which is occupied under normal conditions.
❍ Water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to dam failure is greater than one foot.
❍ Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services.
❍ The release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 147-A:2 VII.
❍ Any other circumstance that would more likely than not cause one or more deaths.</td></tr>
</table>

Source: NH Department of Environmental Services (NHDES) Dams Bureau, 2012

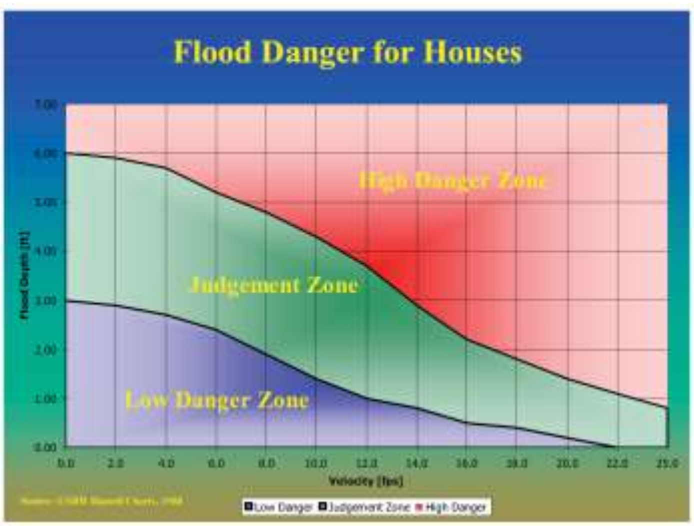
Magnitude of Dam Breach and Failure

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Dam breach is considered a Technological Hazard, a secondary hazard caused by flooding conditions. Six (**6**) dams are classified as Non-Menace (**NM**) dams in Town. Five (**5**) Low Hazard (**LM**) dams are classified and include the Bear Hill Pond Dam on Boat Meadow Brook, Catamount Pond Dam and Hall Mountain Marsh Dam on Bear Brook, Archery Pond Dam on a tributary of Bear Brook, Hayes Marsh Dam on Catamount Brook, and the Buck Street East Dam on the Suncook River. Dam breaches are a potential danger to people and property within the dam breach inundation area(s). Hydrographs should be monitored and the potential inundation area should be mapped - see the **Flooding** section for more information.

Dam Downstream Flood Depth Velocity Charts and Tables of Danger Zones were developed in the Downstream [Dam] Hazard Classification Guidelines **by the** US Department of Interior, Bureau of Reclamation (USBR) from 1988 **that measure the magnitude of flood damage by dam breaches on foundation homes, cars, and adults**. Hydrograph information at stream gages should be able to provide the depth and velocity information (see **Flooding** section).

Figure 11, **Figure 12**, and **Figure 13** respectively provide the danger levels (**High**, **Judgment**, **Low**) of dam breach flooding for foundation houses, passenger vehicles and adults. These **measure the magnitude of danger from dam breach flood on homes, vehicles, and people.**

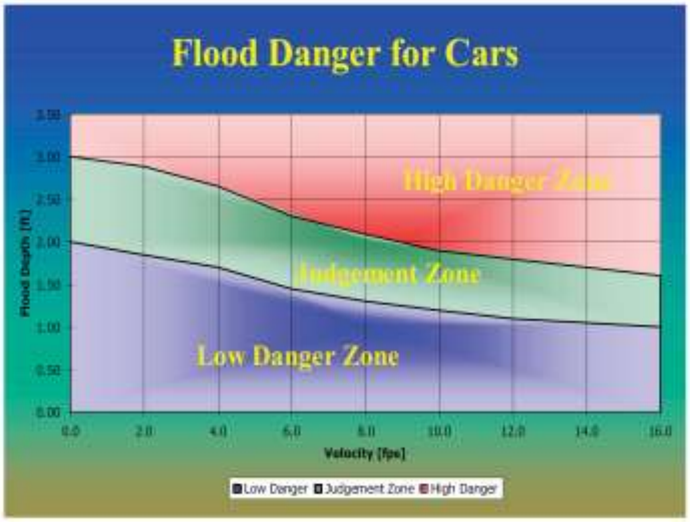
Figure 11
Dam Breach Flood Danger for Houses (and Workplaces) on Foundations



Dam Breach Flood Danger Zone	Effects on Foundation Houses and Worplaces
Low	Occupants of most houses are not seriously in danger from flood water
Judgment	Danger level is based upon (engineering) judgment
High	Occupants of most houses are in danger from flood water

Source: US Department of Interior, Bureau of Reclamation (USBR); Updated graphics by the State of Maryland Department of the Environment Dam Safety Program

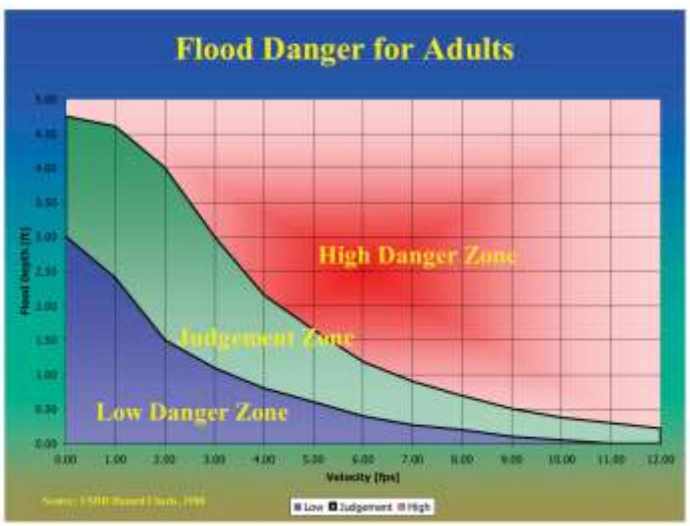
Figure 12
Dam Breach Flood Danger for Passenger Vehicles on Roadways



Dam Breach Flood Danger Zone	Effects on Passenger Vehicles
Low	Occupants of almost any size passenger vehicle are not seriously in danger from flood water
Judgment	Danger level is based upon (engineering) judgment
High	Occupants of almost any size passenger vehicle are in danger from flood water

Source: US Department of Interior, Bureau of Reclamation (USBR); Updated graphics by the State of Maryland Department of the Environment Dam Safety Program

Figure 13
Dam Breach Danger for Adults



Dam Breach Flood Danger Zone	Effects on Adults
Low	Almost any size adult is not seriously in danger from flood water
Judgment	Danger level is based upon (engineering) judgment
High	Almost any size adult is in danger from flood water

Source: US Department of Interior, Bureau of Reclamation (USBR); Updated graphics from the State of Maryland Department of the Environment Dam Safety Program

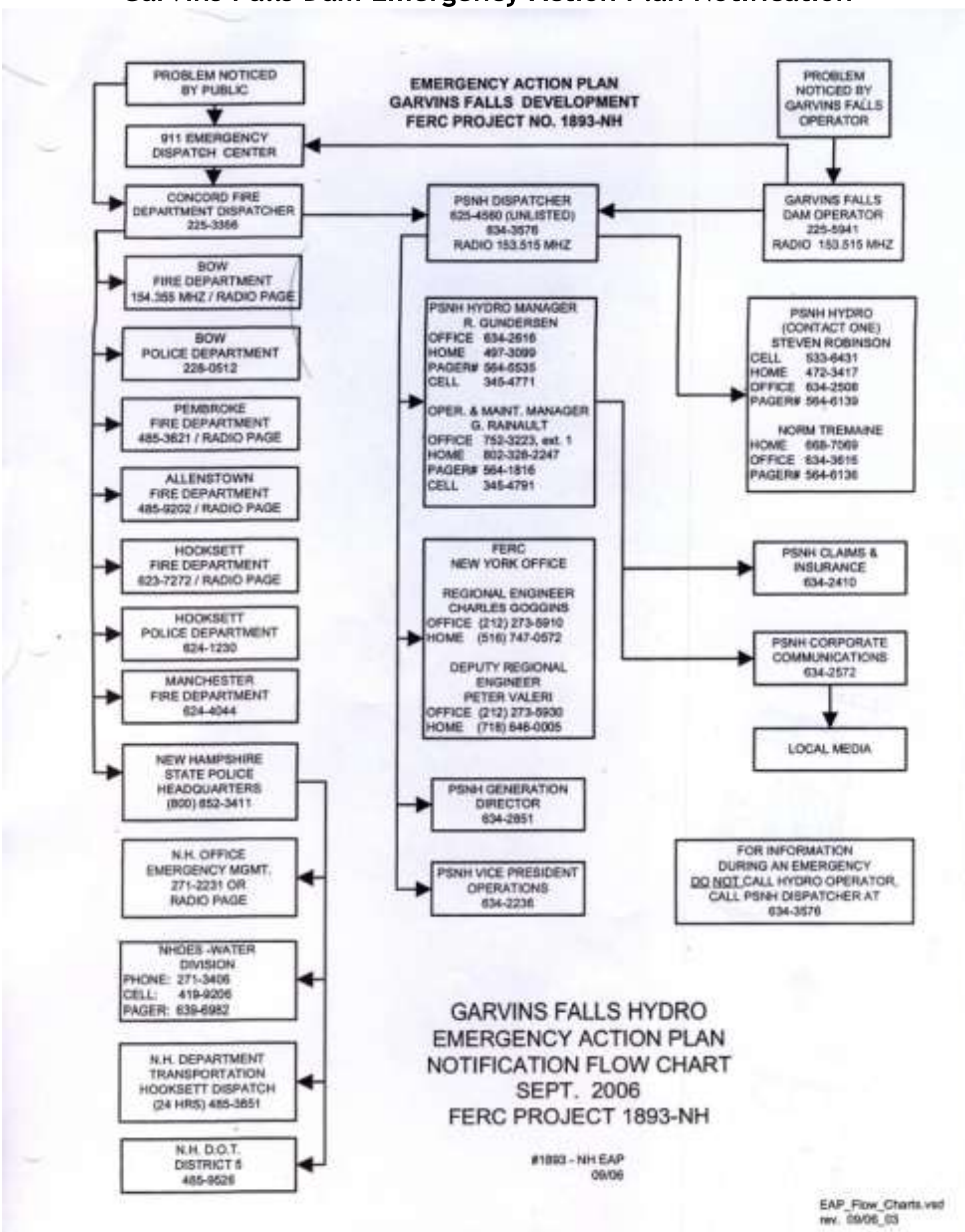
A newer interim guidance has been developed, [Guidelines for Estimating Life Loss for Dam Safety Risk Analysis 2014 by the US Department of the Interior, Bureau of Reclamation], which suggests a new technique for **measuring the magnitude of people at risk (PAR) and fatality rates through dam failure**. These guidelines should be consulted for future information as the interim guidance is revised and enacted.

Potential Future Hazards

With **11** active dams in the Town, the likelihood of a dam breach raises concern. Failure of the dams could result in blocked roads and flooding of low land areas. Private dam owners should be required to conduct required maintenance and repairs. All dams are listed in **Table 27**. Garvins Falls dam in Concord, owned by PSNH, is the most probable risk for damage to Allenstown. **Figure A-14** of the Emergency Action Plan Notification for the Dam is displayed as excerpted from the ***Public Service Company of New Hampshire Merrimack River Project FERC Project No. 1893 Shoreline Management Plan, May 2009***.

Figure 14

Garvins Falls Dam Emergency Action Plan Notification



Source: Public Service Company of New Hampshire Merrimack River Project FERC Project No. 1893 Shoreline Management Plan, May 2009

Fluvial Erosion and Bed Scouring - *Suncook River Plan*

ALLENSTOWN FLUVIAL EROSION AND BED SCOURING EVENTS	
Probability -	**HIGH**
Magnitude -	**HIGH**
Overall Risk -	**8.0**

Fluvial erosion is the wearing away of the river/stream bank and floodway. Bed scouring is the wearing away of the bed of the river or stream, typically shown as a pool type formation at downstream culvert outflows. Watercourses with high elevation change (stream gradient) are particularly prone to flash-flooding conditions and most vulnerable to erosion and scouring. During flooding or even high flow events, rivers can erode their banks and migrate into their floodplains. A migrating river has the potential to impact nearby structures (berms, dams, buildings, etc.) or infrastructure such as river/stream crossings (culverts and bridges) or transportation features (roads, drainage structures, rail, etc.) in its migration path.

Fluvial geomorphology is the study of how processes of flowing water in rivers work to shape river channels and the land around them. Fluvial assessments are a collection of field data undertaken within designated river reaches. A **river reach** is a length of stream that has characteristics similar enough that condition data collected within that length is representative of the reach as a whole.

To identify areas of river and stream erosion that could impact public health and safety in the Suncook River watershed, the New Hampshire Geological Survey (NHGS) at the NH Department of Environmental Services (NHDES) coordinated a **fluvial geomorphology assessment** (FGA) conducted by Field Geology Services who collected field data along the Suncook River in 2013. The lower river assessment covered river reaches in Allenstown/ Pembroke and Epsom. North of Chichester and Pittsfield on the river, Barnstead's section of the Suncook was also assessed. There were six (**6**) river reaches along the **Suncook River** in Allenstown, however four (**4**) of the reaches were assessed due to inability to assess ponding features. These **4** reaches totaling **6.5** river miles are the focus of the FGA discussion.

The Suncook River data features collected during the fluvial geomorphology assessment are displayed on series ***Maps 5A, 5B, and 5C Fluvial Geomorphic Features***, ***Maps 6A, 6B, and 6C Fluvial Erosion Hazard Meander Belts***, and ***Maps 7A, 7B, and 7C Large Woody Material Density***. With this information in the **HAZARD MITIGATION PLAN 2015**, the Town has an opportunity to consider areas of identified potential flooding and erosion risk in future planning efforts. River assessments data can also be utilized to develop fluvial erosion hazard maps. If a community elected to do so, they could use the maps to pursue development limitations through the zoning ordinance amendment process to protect infrastructure and people. The FGA findings and descriptions are discussed in detail in **CHAPTER 6. FLOODPLAIN MANAGEMENT**.

Area Events

Bank erosion events in recent history have likely occurred in the State, region, and the local area surrounding Allenstown.

- *May 14 –17, 2006*
  The Suncook River, through Epsom, changed its course during this recent heavy rain event and its resultant flooding. The River shifted hundreds of meters, flowing around two dams, creating about a mile of new river through a sand pit a half mile from its original course, and leaving a similar length of dry riverbed. The water carved through peat bogs and tore away a corner of a sand excavation pit. Pittsfield experienced bank erosion as their floodgates failed, and Epsom, Allenstown, and Pembroke later dealt with siltation issues from the new river course. *Concord Monitor, 5/18 – 5/23/06.*

Events in Allenstown

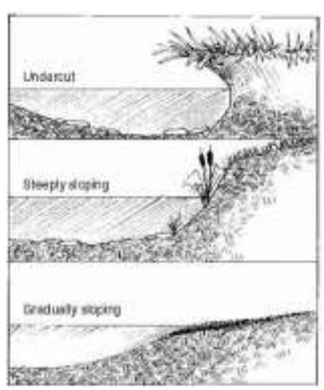
Fluvial erosion has been found to have impacted Allenstown on Deerfield Road and Mt. Delight Road.

Magnitude of Fluvial Stream Bank Erosion and Bed Scouring

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Bank erosion could occur along the banks of the brooks in Allenstown. Certain roadways with a very steep slopes, mentioned in the next section, are also particularly vulnerable.

Primary erosion influences include the river/stream gradient, the stream's location on the stream channel platform, whether the channel has been artificially straightened, and composition of the bank material. Additionally, diverse stream bank shapes have different types of resistance to erosion. **Figure 15** shows an <u>undercut bank</u>, a bank that rises vertically or overhangs the stream and is most vulnerable to collapse. The <u>steeply sloping bank</u> slopes at more than a 30 degree angle and is vulnerable to erosion. The <u>gradually sloping bank</u> has a slope of 30 degrees or less and can be less vulnerable to erosion. Erosion can occur on any stream bank shape under the right conditions, **visual stream bank shape characteristics are one measurement in determining the potential magnitude of erosion along a stream.**

Figure 15
Stream Bank Erosion Characteristics

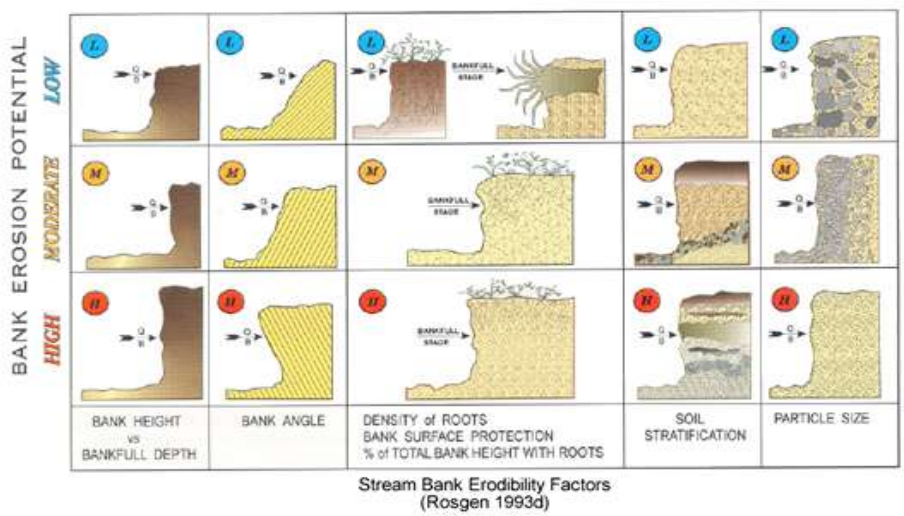


Source: US Geological Survey (USGS)

A method more successfully used by professionals than laypersons **to technically predict the potential magnitude of stream bank erodibility is the** [Environmental Protection Agency (EPA)]**'s Bank Assessment for Non-point Source Consequences of Sediment (BANCS) method.** This method utilizes two bank erodibility estimation tools: Bank Erosion Prediction Index (BEHI) and Near Bank Stress (NBS).This application of both criteria involves evaluating the bank characteristics and flow distribution along river reaches and mapping various risk ratings commensurate with bank and channel changes. An estimate of erosion rate is made, and then is multiplied by the bank height times the length of bank of a similar condition, providing an estimate of cubic yards and/or tons of sediment per year.

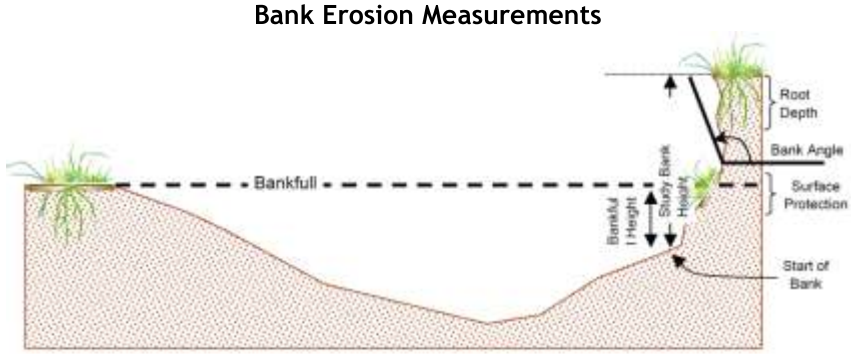
Taken into consideration for the BEHI are the bank height versus bankfull depth, bank angle, density of roots, soil stratification, and particle size at a river reach. **Figure 16** displays a visual representation of the BEHI while **Figure 17** graphically defines the measurements used within the calculations.

Figure 16
Bank Erosion Prediction Index (BEHI)



Source: US Environmental Protection Agency (US EPA)

Figure 17
Bank Erosion Measurements



Source: US Environmental Protection Agency (US EPA)

The Near Bank Stress (NBS) technique provides seven different methods for categorizing stress upon the riverbank which would cause erosion, listed in **Figure 18**.

Figure 18
Methods for Estimating Near-Bank Stress

Methods for Estimating Near-Bank Stress
(1) Transverse bar or split channel/central bar creating NBS/high velocity gradient: **Level I - Reconnaissance.**
(2) Channel pattern (R_c/W): **Level II - General Prediction.**
(3) Ratio of pool slope to average water surface slope (S_p/S): **Level II - General Prediction.**
(4) Ratio of pool slope to riffle slope (S_p/S_{rif}): **Level II - General Prediction.**
(5) Ratio of near-bank maximum depth to bankfull mean depth (d_{nb}/d_{bkf}): **Level III - Detailed Prediction.**
(6) Ratio of near-bank shear stress to bankfull shear stress (t_{nb}/t_{bkf}): **Level III - Detailed Prediction.**
(7) Velocity profiles/Isovels/Velocity gradient: **Level IV - Validation.**

Source: US Environmental Protection Agency (US EPA)

Using a series of Worksheets developed by the US Environmental Protection Agency (US EPA) for the NBS methods of categorizing riverbank stress, calculations for the studied river reach are compared to the US EPA indices to obtain the final Bank Erosion Risk Rating in **Table 8:**

Table 8
Bank Erosion Risk Rating Index

Bank Erosion Risk Rating	Velocity Gradient *Method 7* *feet/second*	Near-Bank Stress / Sheer Stress *Method 6* *pounds/feet^2*
Very Low	< 0.5	< 0.8
Low	0.5 to 1.0	0.8 to 1.05
Moderate	1.1 to 1.6	1.06 to 1.14
High	1.61 to 2.0	1.15 to 1.19
Very High	2.1 to 2.4	1.2 to 1.6
Extreme	> 2.4	> 1.6

Source: US Environmental Protection Agency (US EPA)

Together, the **BEHI** and the **NBS** comprise the BANCS erosion predication of river banks at identified river reaches. The complete set of required Worksheets is available on the US EPA Bank Erosion Prediction website and the basic Worksheets are located in **CHAPTER 12. APPENDIX**. The **BANCS** method of predicting stream bank erosion rates is a **technical measurement of the potential magnitude of stream bank erosion.**

Potential Future Hazards

The ***Suncook River Fluvial Geomorphic Assessment Discussion Guide Spring 2015*** from the NH Geological Survey's Suncook River assessment of 2013 provided ample data that was mapped for the Hazard Mitigation Plan. Associated tabulated data is provided in **CHAPTER 6. FLOODPLAIN MANAGEMENT**. From these sources erosion of the Suncook River is a significant concerns, with nearly 70% of its current banks already in a state of erosion. See the ***Map 5 series*** for detailed description. The Town has developed some Actions to help this condition, including placing riprap on Town-owned riverfront property.

Debris Impacted Infrastructure

Debris carried by floodwaters that compromises the effectiveness of bridges, dams, culverts, diverting structures, etc. This debris may compound a flooding hazard by obstructing normal floodwater flow.

ALLENSTOWN DEBRIS IMPACTION EVENTS	
Probability -	MODERATE
Magnitude -	HIGH
Overall Risk -	6.0

Debris impacted infrastructure could also be comprised of downed trees, limbs, or powerlines onto roadways. These roads are typically considered unsafe to pass under such conditions until the debris has been cleaned up or moved out of the travel way and the powerlines restored.

Area Events

Debris impaction events in recent history have likely occurred in the State, region, and the local area surrounding Allenstown and may have also had an impact on the Town.

- *2005-2011, Recurring Debris Impacted Infrastructure Events*
  In Concord, Allenstown Brook originates at Thayer Pond has the potential to overflow and could be impacted by debris. School Street, Warren Street, Pleasant, State Hospital, Clinton Street, South Street, Rockingham Street washed out during prior flooding events. The City received federal money to repair Pleasant and Warren.
  Concord Hazard Mitigation Task Force 2011

- *May 31, 2006*
  Debris carried by heavy rains damaged the West Joppa Road Covered Bridge in Warner.
  Warner Hazard Mitigation Committee 2008

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Magnitude of Debris Impacted Infrastructure

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Debris impacted infrastructure is considered more of a technological hazard than a natural hazard. Impaction of infrastructure can occur on a large scale when trees or old vehicles block a dam or bridge, or on a smaller scale can be simply leaves, sticks, and litter blocking a culvert.

Along certain brooks in Allenstown or sections along the Suncook and Merrimack Rivers, the probability for woody/leafy debris will differ from a low potential to a high potential. Most of these locations will run through forests and emerge when crossed by development such as roadways via bridges or culverts.

A publication from the US Federal Highway Administration (FwHA) entitled Debris Control Structures Evaluation and Countermeasures Hydraulic Engineering Circular No. 9 Third Edition provides many criteria for determining both the production and estimation of largest size delivered to a site, particularly a bridge. A river reach must be observed to ascertain the

Potential, and each Potential is then assigned to that particular reach. **Table 9 measures the High to Low scale potential magnitude for flowing debris delivery to a downstream site.**

Table 9
Potential for River/Brook Debris Delivery to the (Bridge/Culvert/Dam) Site

Potential for Debris Delivery	Direct Evidence	Indirect Evidence
High	**1.** Multiple cases of floating debris accumulation at bridges **2.** Chronic floating debris accumulation at one or more sites. **3.** Floating debris accumulation at sites where potential for accumulation would be low if floating debris were not abundant. **4.** Abundant floating debris stored in the channel. **5.** Past need for debris removal in the channel system or at bridges.	**1.** Widespread bank erosion in the upstream channel system. **2.** History of changes in the upstream channel system, including degradation, lateral migration, widening, channelization, in-stream gravel mining, widespread drainage, or dams. **3.** Prospects of changes in the channel system. **4.** Hydraulic and geomorphic factors indicating stream instability. **5.** Widespread timber harvesting in the basin. **6.** History or prospect of marked changes in basin land use. **7.** In-stream gravel mining.
Low	**1.** Negligible floating debris delivered in major events, especially at sites with a high potential for trapping floating debris or at typical debris-accumulation sites. **2.** All of the floating debris accumulates in forested channel upstream. **3.** Floating debris in the channel is stationary during floods because of low flow velocity.	**1.** The inability of woody vegetation to grow along the channel system and on steep slopes leading down to the stream channels. **2.** The channel system is stable and is unlikely to experience any significant change.

Source: US Federal Highway Administration

Table 10 measures the High to Low scale of the potential magnitude for debris accumulation at a downstream site.

Table 10
Potential for River/Brook Debris Accumulation Across a Span/Gap at the Site

Potential for Debris Accumulation	Span/Gap Wider than Maximum Expected Length of Debris?	Location* of Debris Accumulation	Potential for Debris Delivery
High, Chronic	No	In the Path	**High**
High	No	In the Channel	**High**
Medium	No	In the Path	**Low**
	No	Bank/Floodplain	**High**
Low	Yes	*n/a*	*n/a*
	No	Bank/Floodplain	**Low**
	No	In the Channel	**Low**
	n/a	Sheltered	*n/a*

Source: US Federal Highway Administration, adapted by CNHRPC

The potential for debris delivery to and debris accumulation on bridges, culverts, or dams **measures the magnitude of debris impacted infrastructure** in **Table 9** and **Table 10.**

Potential Future Hazards

As Allenstown continues to have flooding, traveling debris could impact the Route 3/28. The following culverts are undersized and should be replaced or should be maintained to ensure their carrying capacity (see also **CHAPTER 6. FLOODPLAIN MANAGEMENT**):

- 168 River Road
- 265 River Road
- Mount Delight Bridge Culvert

The above culvert replacements have been developed into Actions, but the development of a culvert replacement plan would be beneficial. The most serious debris impacted infrastructure could occur at the Route 3 double-decker bridge.

Definitions of *Location for Table 9, adapted by CNHRPC

Sheltered Location. A sheltered location is defined for the section of the bridge that includes a forest area directly upstream of the bridge/culvert/dam that traps the transported debris and prevents it from being delivered to the structure. This category should only be applied when the width of forest along the direction of flow is more than a double line of trees.

Bank/Floodplain Location. This category includes the slope of the bank, top of the bank, and the floodplain since piers located on the slope of banks or at the top of the bank are just as likely to accumulate debris as piers located in the floodplain. The floodplain includes any area outside of the channel that is inundated in the design flood to a depth sufficient to transport drift, and it may be either clear of trees or a forested area that is subject to future clearing. If there is evidence that debris is transported within the slope of the channel banks, then the banks should not be assigned to this category.

In the Channel Location. Debris can be transported anywhere in the channel. As expected, debris accumulations are more common for "in the channel" locations than for "bank/floodplain" locations, so the potential for debris accumulations for this category is higher than for the previous category. If there is evidence that debris is transported within the slope of the channel banks, then they should be assigned to this category.

In the Path Location. This category is defined for the portion of the cross section in which the majority of the debris is transported. Floating debris is generally transported in most streams along a relatively narrow path within the channel. In a straight reach, this is where the flow is the deepest and fastest, in what is known as the thalweg. In a curved reach, this category generally exists between the thalweg and the outside bank of the bend. The best way to identify the debris path is to observe it during bank-full or high flow conditions. If high-flow observations are not available, observations during base flow can confirm the estimates based on channel characteristics.

Tornadoes

Significantly high winds that occur especially during hurricanes, winter storms, and thunderstorms, but can also exist independent of other storms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during high wind occurrences.

ALLENSTOWN TORNADO EVENTS	
Probability -	LOW
Magnitude -	HIGH
Overall Risk -	3.0

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

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

The Enhanced Fujita Scale replaced the Fujita Scale in 2007 as the standard scale for rating the Magnitude of a tornado as measured by the damage it causes. Enhanced Fujita (EF) Scale had a more consistent assessment of damage with 28 damage indicators, but kept the original Fujita (F) Scale database intact. Wind speeds for the EF Scale were modified to be more accurate estimates. The comparison of both are shown later in this section.

Area Events

Numerous tornadoes in recent history have occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town.

Between 1791 and 1821, six tornadoes rated F2 or higher on the Fujita Tornado Damage Scale (winds between 113-157 mph causing considerable damage) have occurred in Merrimack County *NH Homeland Security and Emergency Management*. The worst tornado to in the area was rated an F3 (winds between 158-206 mph causing severe damage, which includes roofs and some walls torn off well-constructed homes, and heavy cars lifted and thrown) and occurred on August 20, 1968. The worst tornado ever to strike New England was the Worcester Tornado of July 9, 1953. Within one minute 90 people were killed and over 1,300 injured. Damage was estimated to exceed $52 million.

Tornadoes can occur at anytime of the year, although they are rare outside of the warm season. The peak months of tornado occurrence in the Northeast are June through August, with August being the most frequent month. Thunderstorms have been responsible for spawning tornadoes in many parts of New England. On average, six tornadoes per year touch down somewhere in New England. Damage from tornadoes is caused as a result of high wind velocity and windblown debris. It is a likely possibility for a tornado to touch down in Merrimack County again and even in Allenstown.

- *Early Tornadoes, 1791-1821*
  Four tornadoes rated F2 or higher on the Fujita Tornado Damage Scale (winds between 113-157 mph causing considerable damage) occurred in Merrimack County on July 14, 1791, September 5, 1792, July 1793, and on September 9, 1821. *NH Homeland Security and Emergency Management*

- *Spring, 1927*
  In the Spring of 1927 a cyclone (tornado) and a flood hit New Hampshire and downed many trees in Bow and Concord. Water height peaked at 12 feet, 2 inches over Sewall's Fall Dam in Concord.

- *July 23, 1946*
  A tornado struck and damaged the National Guard Armory on Airport Road. *Concord Daily Monitor*

- *July 9, 1953*
  The worst tornado ever to strike New England was the Worcester Tornado of July 9, 1953. Within one minute, 90 people were killed and over 1,300 injured. Damage was estimated to exceed $52 million.

- *Tornadoes, 1962 – 1976*
  Three separate tornadoes, all of an F1 intensity, touched down in Merrimack County. The March 31, 1962 tornado had caused no injuries, but in the July 12, 1967 and August 15, 1976 tornadoes, five people were injured during each event. *The Tornado Project*

- *July 27, 1979*
  The Concord Monitor reported that during a severe thunder and lightning storm, a small twister was sighted at Beaver Meadow, where 13 trees were toppled, including a 100-foot tall pine. The duration was about 15-20 seconds. *Concord Daily Monitor*

- *Severe Storms, Tornado, and Flooding, July 24, 2008*
  FEMA-1782-DR. An F2-F1 tornado touched down in Rockingham County then proceeded into another county. In Merrimack County, the tornado was rated up to an F-3. The tornado killed a woman in Deerfield trapped in a collapsed house. In the county, there was substantial damage from the tornado and the storm which totaled the equivalent of $1.12 per capita (146,455 people in 2010) for the towns' debris removal reimbursement costs. A total of 123 residences statewide were affected, with 17 destroyed and another 37 suffering major damage. Damage was estimated to exceed $10 million. *fema.gov*

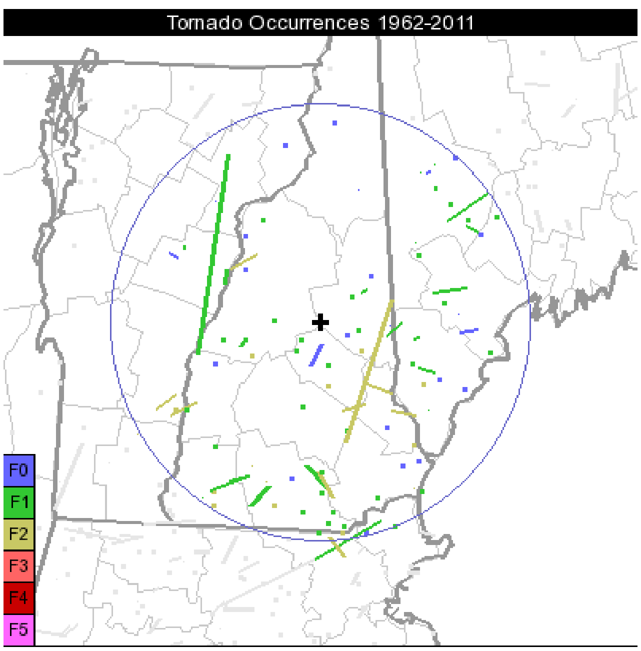
  The effects of the F-3 tornado in Epsom were that it destroyed 84,000 acres and there was significant damage to personal property destroying or damaging nine homes. There were numerous sources of assistance from varying disciplines. *Epsom Hazard Mitigation Committee 2009*

Events in Allenstown
The following events were found to have impacted Allenstown.

- *Severe Storms, Tornado, and Flooding, July 24, 2008*
  Fortunately, the July 2008 tornado that ravaged Epsom, Northwood, and other communities spared Allenstown. Emergency responders responded to Epsom's call for assistance during the response phase. The Highway Department assisted the Town for clean-up duties during the recovery phase. *Allenstown Hazard Mitigation Committee 2015*

Magnitude of Tornadoes
The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. While a tornado of any magnitude in Allenstown would be extremely unusual, it would not be entirely unexpected after a recent devastating tornado strike in 2008 in Epsom, Northwood, and other surrounding communities.

Figure 19
NH Tornado Locations, 1962-2011

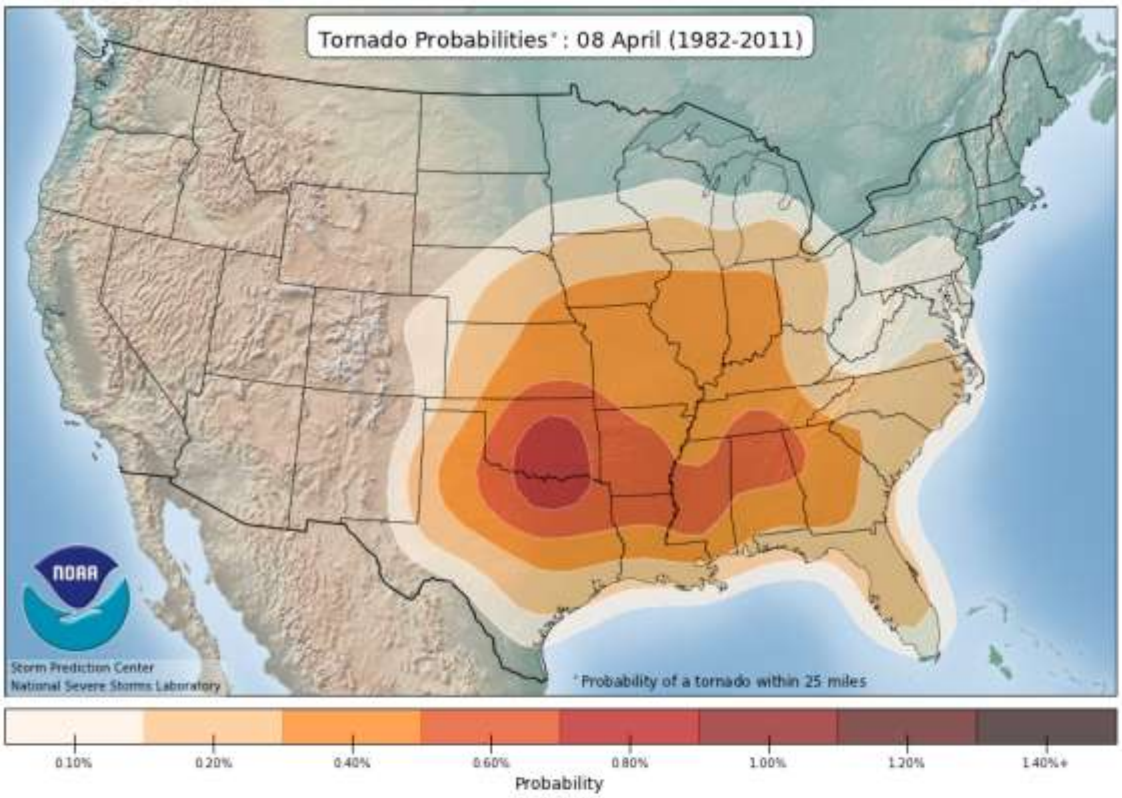


The NOAA Storm Prediction Center hosts an interactive US Tornado Environment Browser (2003-2011) which provides information about historic tornadoes that occurred across the country in both map and chart formats. **Figure 19** with the map of New Hampshire indicates where several tornadoes occurred between 1962 and 2011. The **magnitude of each tornado event is listed using the older Fujita Scale**.

Source: National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center, 01-18-2015

At the National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center (SPC) website, maps of current probable hazardous weather conditions within the United States can be viewed, including Tornado Probability as shown in **Figure 20**. The probability values are based upon the prior 30 years' worth severe weather reports from 1982-2011. The Map indicates the Central NH Region has a **0.01%** chance of a tornado occurring within 25 miles of the area indicated for the date displayed. The Tornado Probability Map **measures the probability of a tornado striking an area on the current day**.

Figure 20
Tornado Probability Map (Daily)



Source: National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center, 04-09-15

The Enhanced Fujita (EF) Scale is used today to rate the magnitude of tornadoes, a 2007 update from the original F-scale (Fujita Scale). The comparisons are provided in **Table 11. The EF** scale **measures the magnitude of a tornado.**

Table 11
Enhanced Fujita (EF) Scale

Enhanced Fujita (EF) Scale 2007 - Present	Fujita (F) Scale *replaced*
F Number with 3-Second Gust mph	**F Number with 3-Second Gust mph**
EF0 65-85 mph	**F0** 45-78 mph
EF1 86-110 mph	**F1** 79-117 mph
EF2 111-135 mph	**F2** 118-161 mph
EF3 136-165 mph	**F3** 162-209 mph
EF4 166-200 mph	**F4** 210-261 mph
EF5 over 200 mph	**F5** 262-317 mph

Source: National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center

Associated with the EF scale are **28** Enhanced F (EF) Scale Damage Indicators which **measure the Degree of Damage (DOD) to structures when experiencing tornadic winds**. The DOD, a scale of 1 to 10, differs by building construction structure type and wind speed. Descriptions of the potential damage are provided.

Two (**2**) of the **28** Degree of Damage (DOD) Indicators are provided here. In **Figure 21**, the DOD of **One/Two Family Residences (FR12)** is displayed and in **Figure 22**, the DOD of **1-Story Elementary Schools (ES) is shown**. Many other DOD Indicators are available for different types of structures in Allenstown.

Figure 21
Damage Indicator of One and Two Family Residences

2. ONE-AND TWO-FAMILY RESIDENCES (FR12)
(1000 – 5000 sq. ft.)

Typical Construction
- Asphalt shingles, tile, slate or metal roof covering
- Flat, gable, hip, mansard or mono-sloped roof or combinations thereof
- Plywood/OSB or wood plank roof deck
- Prefabricated wood trusses or wood joist and rafter construction
- Brick veneer, wood panels, stucco, EIFS, vinyl or metal siding
- Wood or metal stud walls, concrete blocks or insulating-concrete panels
- Attached single or double garage

DOD*	Damage description	EXP	LB	UB
1	Threshold of visible damage	65	53	80
2	Loss of roof covering material (<20%), gutters and/or awning; loss of vinyl or metal siding	79	63	97
3	Broken glass in doors and windows	96	79	114
4	Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward; failure of porch or carport	97	81	116
5	Entire house shifts off foundation	121	103	141
6	Large sections of roof structure removed; most walls remain standing	122	104	142
7	Exterior walls collapsed	132	113	153
8	Most walls collapsed, except small interior rooms	152	127	178
9	All walls	170	142	198
10	Destruction of engineered and/or well constructed residence; slab swept clean	200	165	220

* DOD is degree of damage

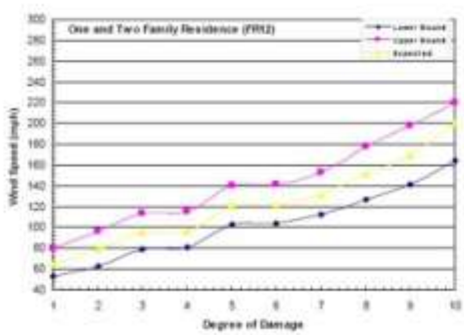


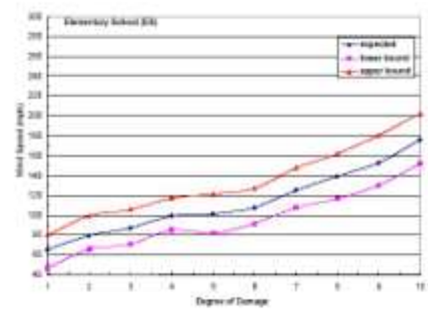
Figure 22
Damage Indicator of Elementary School (1-Story)

15. ELEMENTARY SCHOOL (ES)

General Description
- These buildings are typically single story with flat roofs
- Building may contain a small gym or cafeteria with moderately long spans between supports
- Buildings have long interior hallways with bearing or non-bearing walls
- BUR, single-ply membrane, or metal standing seam roof panels
- Metal or plywood roof decking supporting a light-weight poured gypsum deck
- Roof structure consists of open web steel joists bearing on exterior walls and steel interior girders
- Exterior non-bearing walls constructed with CMUs, glass curtain walls or metal studs with brick veneer, stucco, or EIFS cladding
- CMU bearing walls with brick veneer, stucco, or EIFS cladding
- Walls can have a large percentage of window glass

DOD*	Damage description	EXP	LB	UB
1	Threshold of visible damage	65	47	80
2	Loss of roof covering (<20%)	79	66	90
3	Broken windows	87	71	106
4	Exterior door failures	99	85	118
5	Uplift of some roof decking; significant loss of roofing material (>20%); loss of rooftop HVAC	101	82	121
6	Damage to or loss of wall cladding	108	92	127
7	Uplift or collapse of roof structure	125	108	148
8	Collapse of non-bearing walls	139	117	162
9	Collapse of load-bearing walls	153	130	180
10	Total destruction of a large section of building or entire building	176	152	203

* Degree of Damage



Source: National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center

These tornado damage tools **measure the magnitude of potential tornado damage which could be experienced in Allenstown or in nearby communities** with the Elementary School example Damage Indicator shown.

Potential Future Hazards

Significantly high winds occur especially during hurricanes, tornadoes, winter storms, and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during high wind occurrences. All utilities, including power lines, are at risk and their damage or destruction would create a hazard to the Town.

The whole Town could be impacted by a tornado. Populated areas include the Suncook Village area, and manufactured housing communities. A tornado occurring in Allenstown would cause considerable damage. Roofs could be torn off frame houses; mobile homes demolished; large trees snapped or uprooted; and light object missiles would be generated as a result of an EF-2 Tornado.

The Town's communications equipment on High Ridge Trail Tower could be vulnerable.

The Sprint cell tower behind 24 Allenstown Road in Allenstown could possibly be damaged in the event of a tornado. A communications interruption or failure resulting from damage to the tower could affect the capabilities of emergency personnel.

Downbursts

A downburst is a severe localized wind blasting down from a thunderstorm. These "straight line" winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts are capable of producing winds of up to 175 mph and are life threatening. Downbursts fall into two categories:

ALLENSTOWN DOWNBURST EVENTS	
Probability -	HIGH
Magnitude -	MODERATE
Overall Risk -	6.0

- microburst, which covers an area less than 2.5 miles in diameter and
- macroburst, which covers an area equal to or greater than 2.5 miles in diameter.

Area Events

Numerous downbursts in recent history have occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town.

- *August 18, 1991*
  Five people were killed and 11 were injured in Stratham resulting from an isolated downburst that also caused $2.5 M in damage. *NH Hazard Mitigation Plan*

- *December 1998*
  Bradford/Newbury Town line off Route 103/Lake Todd area. Trees were snapped in an area about 100 yards wide and about a mile long. *Bradford Hazard Mitigation Committee 2007*

- *July 6, 1999*
  A downburst impacted three counties in New Hampshire, including Merrimack County. It resulted in 2 deaths. Also, two roofs were blown off and widespread power outages occurred. The downburst was designated a macroburst (at least 2.5 miles in diameter). *NH Homeland Security and Emergency Management*

- *May or June of 2005*
  A microburst hit the Concord Country Club, which caused downed trees and loss of power. No injuries were reported. *Concord Hazard Mitigation Task Force 2011*

- *September 9, 2009*
  Northwood Lake was impacted by a possible downburst. Trees fell on homes and on roads. Storm debris forced 16 road closures and damaged six structures. During a thunderstorm, rain and 15 minutes of hail reported to be the size of golfballs impacted the Town. *wmur.com*

- *September 5, 2011*
  In Bow, a 60mph microburst damaged or destroyed a dozen campers in the area of Route 3A between Grandview and Down Road. No injuries were reported. Telephone service at the Town's Police dispatch center was also disrupted. *Unionleader.com 09/06/11*

Events in Allenstown

The following events are found to have impacted Allenstown.

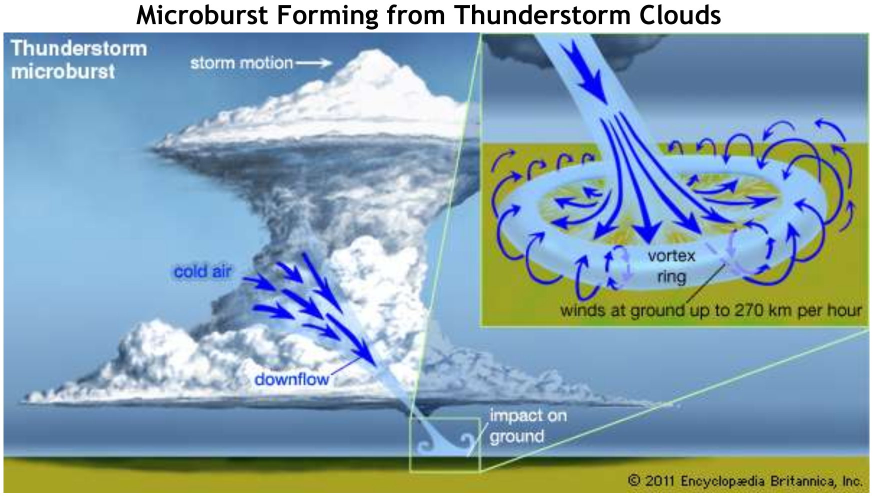
- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Magnitude of Downbursts

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Downbursts often accompany thunderstorms, which are quite common during Central NH's hot weather months. Microbursts and macrobursts (wet) have been known to occur here in the region.

Downbursts of both sizes are capable of producing strong wind shear - or large changes in wind speed and direction over a short distance. Trees are regularly snapped off in a singular direction as a result of a macroburst or microburst. Downbursts typically originate from thunderstorm clouds, with air moving in a downward motion until it hits the ground level and then spreads outward in all directions. In fact, the wind pattern of a downburst is the opposite of a tornado's wind pattern. The National Oceanic and Atmospheric Administration (NOAA) National Weather Service and the National Weather Service Jetstream Online School for Weather have provided descriptions of downbursts. **Figure 23** illustrates the process of microburst formation.

Figure 23
Microburst Forming from Thunderstorm Clouds



Source: Internet (Encyclopedia Brittanica)

Downbursts can follow the Enhanced Fujita Scale for the tornado-like high winds (see **Tornado** section) they spawn. Downbursts are categorized into macrobursts and microbursts, which have different characteristics. Although there are wet and dry microbursts, New Hampshire only experiences wet microbursts. The Enhanced Fujita Scale (**Table 11**) **measures the magnitude of wind speed for downbursts in Table 12.**

Table 12
Characteristics of Downbursts: Macrobursts and Microbursts

Characteristics	Microburst *(wet)*	Macroburst *(wet)*
Wind Span	< 2.5 miles	> 2.5 miles
Time	2 to 5 minutes	5 to 20 minutes
Wind Speed	Up to EF 4 (166 mph)	Up to EF 3 (136 mph)
Example of Damages	Trees flattened; hazardous conditions for planes; building damage.	Not as strong as a microburst, but winds last longer.

Source: National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS)

Potential Future Hazards

Downbursts are considered a greater threat than tornadoes in Allenstown. The vulnerabilities are similar, with historic resources and exposed, taller buildings, communications towers, and utilities most likely to be affected.

As in the case of a tornado, if there were a downburst in town with severe localized winds, all utilities would be at risk of damage. Utilities and communication are critical to the Town and the inhabitants' safety in the event of a hazard. Tornados and downbursts are very isolated events and it is hard to predict where they will strike.

Populated areas include the Suncook Village area and the Deerfield Road corridor.

The Sprint cell tower behind 24 Allenstown Road in Allenstown could be vulnerable in the event of a downburst. A communications interruption or failure resulting from damage to the tower could affect the capabilities of emergency personnel.

Lightning

ALLENSTOWN LIGHTNING EVENTS	
Probability -	HIGH
Magnitude -	MODERATE
Overall Risk -	6.0

All thunderstorms contain lightning. During a lightning discharge, the sudden heating of the air causes it to expand rapidly. After the discharge, the air contracts quickly as it cools back to ambient temperatures. This rapid expansion and contraction of the air causes a shock wave that we hear as thunder, a shock wave that can damage building walls and break glass. Lightning strikes can cause death, injury, and property damage. Lightning is often referred to as the "Underrated Killer". New Hampshire ranks 16th in the US for casualties from lightning strikes.

Area Events
Localized lightning strikes in recent history have likely occurred in the State, region, and the local area surrounding Allenstown.

- *July 1995*
  Lightning and resulting fire destroyed a 200 year-old farmhouse causing $200,000 damage. *National Climatic Data Center*

- *July 1997*
  Lightning ignited a massive 21 alarm fire. More than 200 firefighters and 50 trucks battled the blaze that eventually gutted a lumber yard. *National Climatic Data Center*

- *June 12, 2005*
  During a thunderstorm, lightning struck and severely damaged the historic Loudon Town Hall on Clough Hill Road. *Loudon Hazard Mitigation Committee, 2005*

Events in Allenstown
The following events are found to have impacted Allenstown.

- *August 1998*
  Lightning struck the antenna on the roof of the Allenstown Town Hall, started a fire, and blew out several computers inside. In addition, the fire station at the time (since then a new station has been built) was hit by lightning. This lightning strike knocked out computers and the municipal fire system. *Allenstown Hazard Mitigation Committee 2004*

Magnitude of Lightning
The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Severe storms such as thunderstorms are usually responsible for the lightning the Central NH region receives. Lightning fires are unpredictable and they are most dangerous when strikes occur in rural areas with limited fire suppression access.

Lightning can be measured to determine how likely it may be for starting fires. Using a Level system of **1** to **6** corresponding with storm development and the number of lightning strikes, the Lightning Activity Level (LAL) **measures the magnitude of lightning strikes** as displayed in **Table 13**.

Table 13
Lightning Activity Level (LAL)

Level	LAL Cloud and Storm Development	Cloud to Ground Strikes per 5 Minutes	Cloud to Ground Strikes per 15 Minutes
LAL 1	No thunderstorms	n/a	n/a
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five minute period.	1 to 5	1 to 8
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5 minute period.	6 to 10	9 to 15
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced Lightning is frequent, 11 to 15 cloud to ground strikes in a 5 minute period.	11 to 15	16 to 25
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.	> 15	> 25
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.	6 to 10	9 to 15

Source: National Weather Service

Related to the lightning strike scale is the Thunderstorm Category Criteria (see the Hurricanes and Severe Storms section) which **measures the magnitude of winds, hail, rain, lightning, and other thunderstorm hazards**.

Potential Future Hazards

Lightning can strike at any given location. Specific sites in Allenstown which would cause the greatest impact if struck by lightning are the utilities, the generators and transformers. Additionally, if the Sprint cell tower behind 24 Allenstown Road was damaged, essential communications would be interrupted. Other vulnerable sites are remote areas that cannot be easily accessed by emergency vehicles.

Wildfire

ALLENSTOWN WILDFIRE EVENTS	
Probability -	LOW
Magnitude -	HIGH
Overall Risk -	3.0

Wildfire is defined as any unwanted and unplanned fire burning in forest, shrub or grass. Wildfires are frequently referred to as forest fires, shrub fires or grass fires, depending on their location. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. The threat of wildfires is greatest where vegetation patterns have been altered by past land-use practices, fire suppression and fire exclusion. Because fire is a natural process, fire suppression can lead to more severe wildfires due to vegetation buildup.

Increased severity over recent years has decreased capability to extinguish wildfires. Wildfires are unpredictable and usually destructive, causing both personal property damage and damage to community infrastructure and cultural and economic resources. Negative short term effects of wildfires include destruction of timber, forage, wildlife habitats, scenic vistas and watersheds. Effects in the long term include those mentioned above, as well as reduced access to recreational areas and poorer water quality caused by sediment, burned debris and chemicals.

Area Events

Wildfire events in recent history have likely occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town.

- *August 2002*
  One of the hottest Augusts on record in Concord along with drought conditions since March made for a high fire danger in New Hampshire. Numerous forest fires were reported, including a 30-acre blaze in New Durham. *Concord Monitor 8/20/02*

- *April 2006*
  A wildfire in Webster burned over five acres throughout the night. Fire crews had to dig embers out of the soil that were 4 to 5 inches deep. The Forest Ranger commented that embers embedded that deep in the soil at that time of year was very unusual. *WMUR 4/20/06*

- *April 29, 2006*
  A freight train sparked brush fires along tracks in Bow, Hooksett and Manchester. In Bow, a 50' by 350' fire was spreading toward the woods when officials arrived on the scene. Concord Fire Chief said that fires sparked by trains are not unusual and they are typically caused by exhaust coming out of the stack. *WMUR News*

Events in Allenstown

The following events are found to have impacted Allenstown. More wildfires are known to have occurred in Town but dates of the events their details were not available for the development of the **HAZARD MITIGATION PLAN UPDATE**. Refer to the NH Department of Safety Fire Reporting System for fire statistics; currently available are fires from 2010-2013.

- *Summer, Early 90s*
  During a dry summer in the early 1990s, 30 acres were burned by wildfire in Bear Brook State Park. *Allenstown Hazard Mitigation Committee 2004*

- *Summer, 2000*
  During the summer of 2000, an illegal campfire caused a wildfire to burn 25 acres near Gilbert Road. *Allenstown Hazard Mitigation Committee 2004*

- *May 2001*
  In May 2001, a fire on Wing Road, Allenstown burned a barn, house, and 5 buildings. The fire spread and eventually burnt 10 acres of land. *Allenstown Hazard Mitigation Committee 2004*

- *Miscellaneous Fires, 2011*
  For 2011, Allenstown reported a total of 1 fire to the NH Fire Marshal's office, which was a vehicle fire. *NH Department of Safety Fire Reporting System*

- *Miscellaneous Fires, 2012*
  For 2012, Allenstown reported a total of 10 fires to the NH Fire Marshal's office. Of those, 6 were structure fires, 1 was a vehicle fire, and 3 were wildfires. *NH Department of Safety Fire Reporting System*

- *Miscellaneous Fires, 2013*
  For 2013, Allenstown reported a total of 16 fires to the NH Fire Marshal's office. Of those, 14 were structure fires, 1 was a vehicle fire, and 1 was a wildfire. *NH Department of Safety Fire Reporting System*

Magnitude of Wildfire

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Wildfire is a tremendous danger to our State and region, both to the small urbanized and primarily forested and rural areas. Fires, including wildfires, have an extensive history in Allenstown.

The Wildland Urban Interface (WUI) Hazard Scale by the US Department of Commerce National Institute of Standards and Technology (NIST) is a new rating system that evaluates several characteristics of wildfires around two factors, Ember Exposure (E-) and Fire Exposure (F-) threats. The **1** to **4** scale of exposure helps emergency responders recognize the potential scale of danger they face before suppressing a wildfire that has begun to spread into occupied lands. The WUI E- and F- Scales are not currently recognized by the National Fire Protection Association (NFPA). The entire E-Scale is displayed in **Table 14** and the entire F-Scale is displayed in **Table 15**. The WUI Hazard Scale can **measure the potential magnitude of how a wildfire can devastate buildings and threaten people**.

Table 14
Ember (E-) Scale of the Wildland Urban Interface (WUI)

E-Scale/ Zone	Ember Exposure	Ember Flux *grams/ m^2-sec*	Building Construction Class	Building Construction Attributes for Protection against Embers	Threat to Home-owners	Threat to Fire Fighters
E-1	**None**	None	WUI1	Normal Construction <u>Requirements:</u> - Maintained landscaping - Local AHJ-Approved Access for firefighting equipment	**No**	**No**
E-2	**Minor**	**	WUI2	Low Hardening Construction <u>Requirements:</u> - Treated combustibles allowed on structure - Attached treated combustibles allowed - Treated combustibles allowed around structure - Low flammability plants - Irrigated and well maintained Landscaping - Local AHJ-Approved Access for firefighting equipment	**Moderate**	**No**
E-3	**Signif-icant**	**	WUI3	Intermediate Hardening <u>Construction Requirements:</u> - No exposed combustibles on structure - Low flammability plants - Irrigated and well maintained landscaping - Local AHJ-Approved Access for firefighting equipment	**Severe**	**No**
E-4	**Extreme**	**	WUI4	High Hardening Construction <u>Requirements:</u> - No exposed combustibles - All vents, opening must be closed - Windows and doors must be covered with insulated non-combustible coverings. - Irrigated and well maintained low flammability landscaping - Local AHJ-Approved Access for firefighting equipment	**Severe**	**No**

***Further work needed*

Table 15
Fire (F-) Scale of the Wildland Urban Interface (WUI)

F-Scale/ Zone	Heat Exposure	Heat Flux *w/cm2*	Building Construction Class	Building Construction Attributes for Protection against Embers	Threat to Home-owners	Threat to Fire Fighters
F-1	**None**	**0**	WUI1	Normal Construction <u>Requirements:</u> - Maintained landscaping - Local AHJ-Approved Access for firefighting equipment	**No**	**No**
F-2	**Low heat flux****	**< 0.8**	WUI2	Low Hardening Construction <u>Requirements:</u> - Treated combustibles allowed on structure - Attached treated combustibles allowed - Treated combustibles allowed around structure - Low flammability plants - Irrigated and well maintained Landscaping - Local AHJ-Approved Access for firefighting equipment	**Severe**	**No**
F-3	**Moderate heat flux****	**0.8 - 2**	WUI3	Intermediate Hardening <u>Construction Requirements:</u> - No exposed combustibles on Structure - Combustibles placed well away from Structure - Low flammability plants - Irrigated and well maintained landscaping - Local AHJ-Approved Access for firefighting equipment	**Severe**	**Moderate**
F-4	**Severe heat flux**** *(Prolonged direct flame contact)*	**> 2**	WUI4	High Hardening Construction <u>Requirements:</u> - No exposed combustibles - All vents, opening must be closed - Windows and doors must be covered with insulated non-combustible coverings - Irrigated and well maintained low flammability landscaping - Local AHJ-Approved Access for firefighting equipment	**Severe**	**Severe**

***Experiments needed to quantify the flux levels*

*Source: US Department of Commerce, National Institute of Standards and Technology (NIST) for both **Table 14** and **Table 15**.*

The Haines Lower Atmosphere Stability Index maintained by the US Wildland Fire Assessment System (WFAS) is a regularly used wildfire rating system. The index measures the stability and dryness of the air over a fire to determine the potential for large fire growth. The Haines Index values can range between **2** to **6**. The drier and more unstable the lower atmosphere is, the higher the index (highest potential for large fires). **Table 16** displays the Haines Index, which **measures the potential for existing wildfires to grow into larger wildfires**.

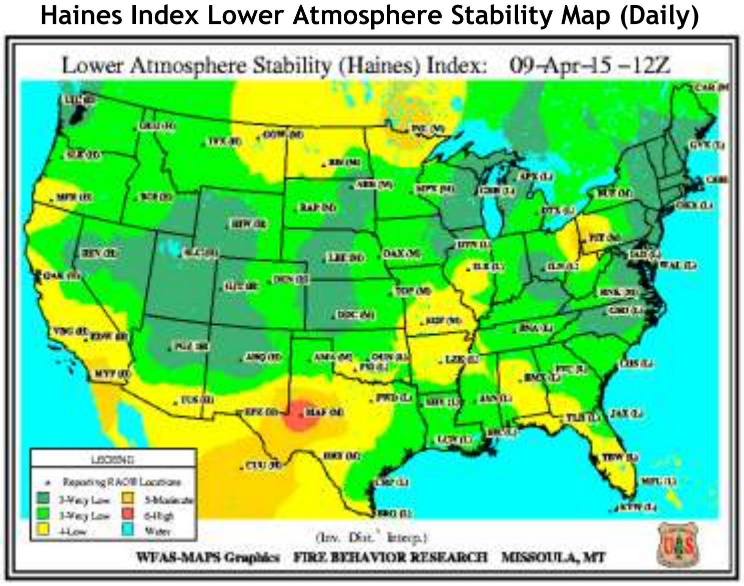
Table 16
Haines Index

Haines Rating for Lower Atmosphere	Large Fire Growth Potential	Description	WFAS Daily Map Color
2	Very Low Potential	Moist Stable Lower Atmosphere	Teal
3	Very Low Potential	---	Green
4	Low Potential	---	Orange
5	Moderate Potential	---	Dark Orange
6	High Potential	Dry Unstable Lower Atmosphere	Red

Source: US Wildland Fire Assessment System (US WFAS)

The WFAS generates daily Lower Atmosphere Stability (Haines Index) Maps for the lower atmosphere for emergency responders to ascertain the level of potential wildfire escalation leading to extreme wildfires. **Figure 24** displays an example daily **Haines Index Map** of the Unites States. In the Central New Hampshire region which includes Allenstown, the wildfire escalation conditions are considered **Very Low Potential** to **Low Potential** for that day. The Haines Index Map is a graphical depiction of the **measurement of the potential for existing wildfires to grow into larger wildfires.**

Figure 24
Haines Index Lower Atmosphere Stability Map (Daily)



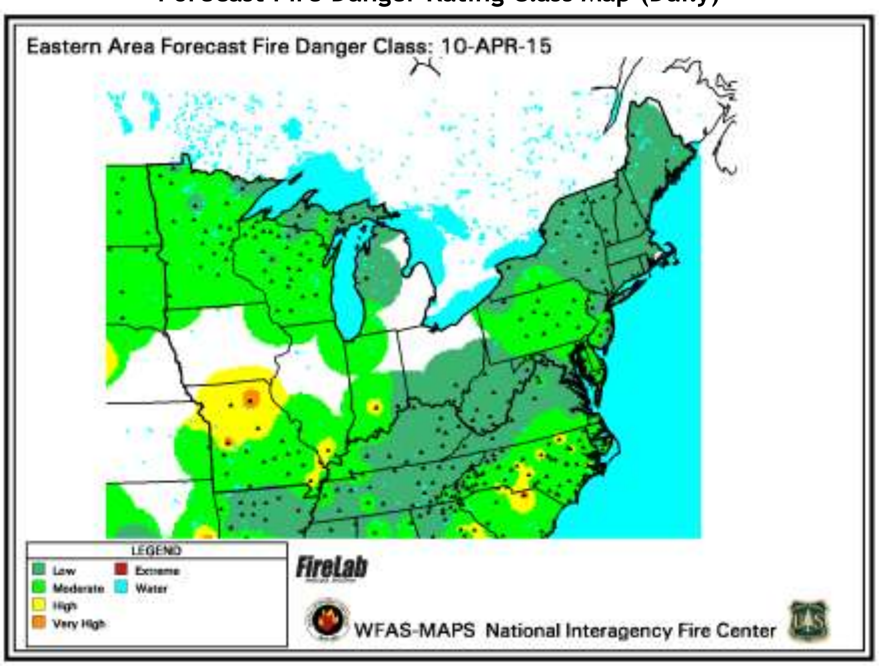
Source: US Wildland Fire Assessment System (US WFAS), 04-09-2015

Several other maps generated on WFAS provide information for weather, drought, and fire monitoring which help enable local responder preparedness.

Other measurements of how severe a fire could become in Allenstown are available. Drought conditions are reflected in numerous agricultural, hydrological, and other meteorological indicators, both observed and modeled. For instance, the Palmer Drought Severity Index (PDSI), **measures the balance between moisture demand (temperature driven evapotranspiration) and moisture supply (precipitation) in the form of cumulative monthly moisture conditions**. The Keetch-Byram Drought Index was designed specifically for fire potential assessment, a measurement of cumulative moisture deficiency relating to flammability of organic material in the ground. The US Drought Monitor **measures the weekly drought intensity of NH counties,** and the rest of the country, on an intensity scale of **D0** (Abnormally Dry) to **D4** (Exceptional Drought). When conditions are dry such as when a drought is occurring, fires are more likely to start and continue burning. The **Drought** section contains further information about these assessment tools. These are **measurements of the potential magnitude of a fire enhanced by dry conditions.**

The National Fire Danger Rating System (NFDRS) on WFAS is another fire rating system that considers current and future predicted weather, fuel types, and fuel moisture reported by reporting stations. Values in between the stations are estimated and a map is generated for the Forecast Fire Danger Rating Class and Observed Fire Danger Rating Class in a particular area. **Figure 25** displays a Fire Danger Classification Map of the Eastern Unites States for an example day. Southern New Hampshire, where Allenstown is located, is shown to have a **Low** fire danger susceptibility for that day. Reporting stations are indicated with a marker. The National Fire Rating System **measures the level of susceptibility an area has to fire**.

Figure 25
Forecast Fire Danger Rating Class Map (Daily)



Source: National Fire Danger Rating System (NFDRS), 04-10-2015

The National Weather Service (NWS) has an online National Fire Weather mapping tool that displays selections of different criteria such as Fire Weather Watches, Large Fires, and NWS Fire Weather Zones. Although this mapping service is currently under renovation, in the future the online map will identify the location of Fire Weather Watches, Red Flag Warnings, or Hazardous Weather outlooks across the Central NH region, state, and Northeast. This map will **measure the magnitude of weather conditions contributing to the development of wildfires which might damage Allenstown.**

Potential Future Hazards

Bear Brook State Park is the most significant fire threat in Allenstown since over 51% of the Town's acreage is the forested State Park. The homes in Allenstown most vulnerable to fire are situated in the Suncook Village area, along isolated Deerfield Road in Bear Brook, and along the side roads within this State Park area.

The Allenstown Fire Department has a Twitter page at https://twitter.com/allenstownfire that indicates current conditions and fires.

Severe Winter Weather

ALLENSTOWN SEVERE WINTER WEATHER EVENTS	
Probability	HIGH
Magnitude -	MODERATE
Overall Risk -	6.0

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

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

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

A Nor'easter is a large weather system traveling from South to North, passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a Northeasterly direction. In the winter months, oftentimes blizzard conditions accompany these events. The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods.

Extreme cold temperatures are associated with continental Arctic air masses. The actual temperatures reached depend specifically on the nature of the cold air mass and where it originated. In general, those from the Arctic regions are the coldest. Though cold temperatures are dangerous in their own right, they become more so in conjunction with strong winds. The combination produces a wind-chill factor – heat loss measured in Watts per meter squared (Wm-2). A wind-chill factor of 1400 Wm-2 is equivalent to a temperature of -40 degrees F. At 2700 Wm-2, exposed flesh freezes within a half minute.

All winter storms make walking and driving extremely dangerous. The elderly and very young are at high risk during winter storms and may be affected by hypothermia and isolation. During winter storms, there is an increased risk of fire because people may lose electricity and use candles, portable gas stoves, and other flammable sources of heat and light *(Northeast States Emergency Consortium).*

Winter snow events are as common in Allenstown as they are in the entire western half of New Hampshire. Allenstown's steep slopes and hills, numerous Class VI and gravel roads, Route 103, Interstate 89, and its magnitude of water features suggest a high potential for icing, damage, power outages, and impassibility when ice and storm events hit. The probability of future ice and snow events in Allenstown is **HIGH**.

Area Events
Numerous severe winter events in recent history have occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town. Unlike the relatively infrequent hurricane, New Hampshire generally experiences at least one or two Nor'easters each year with varying degrees of severity. These storms have the potential to inflict more damage than many hurricanes because the high storm surge and high winds can last from 12 hours to 3 days, while the duration of hurricanes ranges from 6 to 12 hours.

Severe winter storms, including Nor'easters, typically occur during January and February. However, winter storms can occur from late September through late May.

Typically, infrastructure and critical facilities are impacted by heavy snow. The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods. Power outages are also a common impact during snowstorms. The following descriptions are of heavy snowstorms that have additional detail.

- *May 17, 1794*
  On a negative note, a "great frost" destroyed the grain crop for the year and on a positive note it also destroyed the canter worms which had been destructive to vegetation. *Timeline: Boscawen, NH*

- *January 11, 1810*
  Portions of New Hampshire were affected by a severe cold snap and high winds which blew the roofs off of houses. *Pembroke Town History; Timeline: Boscawen, NH*

- *Year of 1816*
  Portions of New Hampshire experienced a very cold year. Little corn was raised during the year because of the cold weather. In some places there was a frost throughout the year. *Pembroke Town History*

- *March 11-14, 1888*
  All of New England experienced a major snowstorm with snow accumulations of 30-50 inches, one of the most severe winter storms to ever hit New England. *States Emergency Consortium*

- *December 17-20, 1929*
  On December 17-20, 1929, an ice storm caused unprecedented disruption and damage to telephone, telegraph and power systems throughout the State. *US Army Corps of Engineers NH Storms database*

- *December 29-30, 1942*
  On December 29-30, 1942, a severe glaze ice storm impacted the entire State. *US Army Corps of Engineers NH Storms database*

- *Snowstorms, 1940-1978*
  Ten severe snowstorms are documented in south-central New Hampshire during this time span, February 14-15, 1940 (depths over 30" and high winds), February 14-17, 1958 (20-33"), March 18-21, 1958 (22-24"), March 2-5, 1960 (up to 25"), January 18-20, 1961 (up to 25", blizzard conditions), January 11-14, 1964 (up to 12"), January 29-31, 1966 (up to 10"), February 22-28, 1969 (24-98", slow-moving storm), December 25-28, 1969 (12-18"), January 19-21, 1978 (up to 16"). Accumulations ranged from 10-33 inches in the area and even to 98 inches in the western portion of the State. *American Meteorological Society*

- *December 22, 1969-January 17, 1970*
  Many communities experienced power disruption during long ice storm period. *US Army Corps of Engineers NH Storms database*

- *February 5-7, 1978*
  This snowstorm is described as "a natural disaster of major proportions" and stunned all of New England. The storm was caused by an intense coastal Nor'easter that produced winds in excess of hurricane force and very high snow totals. Most of southern New England received more than three feet of snow, 25-33" in NH and higher throughout New England. Abandoned cars along roadways immobilized infrastructure and blocked major interstates. For over a week, New England remained paralyzed by the storm. All of New Hampshire was impacted. Governor Meldrim Thomson Jr. declared a state of emergency. *American Meteorological Society, Northeast States Emergency Consortium*

- *January 8-25, 1979*
  Impacts from this ice storm were felt throughout the State of New Hampshire. There were major disruptions to power and transportation in many communities. *US Army Corps of Engineers NH Storms database*

- *Snowstorms, 1982-2001*
  Four major snowstorms impacted New England, on April 5-7, 1982 (18-22"), in March 1993, in February 1996 (snow, ice and bitter temperatures), and in March 2001. *American Meteorological Society, Northeast States Emergency Consortium, Suncook-Hooksett Banner March 7, 1996*

- *March 3-6, 1991*
  This ice storm impacted the entire State of New Hampshire. Numerous outages from ice-laden power lines in southern New Hampshire occurred. *US Army Corps of Engineers NH Storms database, NH Homeland Security and Emergency Management*

- *December 1996*
  Heavy snowfall hit the State of New Hampshire December, 1996.

- *January 7, 1998*
  This ice storm had severe impacts throughout most of the State, with 52 communities impacted. FEMA Disaster Declaration #1199, Six injuries and one death resulted. Damage totaled $12,446,202. In addition, there were 20 major road closures, 67,586 people left without electricity, and 2,310 people without phone service. *US Army Corps of Engineers NH Storms database, NH Homeland Security and Emergency Management*

- *March 23, 1999*
  This storm hit New Hampshire with snow and wind. Two feet of snow fell overnight on Mt. Washington and approximately 18,000 New Hampshire residents lost electricity.

- *January 16, 2004*
  Bitter cold and blustery winds made temperatures feel as cold as -40 degrees. Outdoor exposure in the State proved deadly, causing six deaths. *Associated Press*

- *Severe Winter Storm, December 11, 2008*
  FEMA-1812-DR. Accumulating ice, snow, rain, and strong winds caused downed trees and power lines, with power outages and traffic accidents resulting. In Merrimack County, debris removal and repair cost reimbursement FEMA the equivalent of $10.07 per capita (146,455 people in 2010). In Hillsborough County, debris removal costs

were $6.35 per capita (400,721 people in 2010). The major disaster was declared in all 10 counties. *fema.gov*

- *February 23-March 3, 2010, Severe Winter Storm*
  FEMA-1892-DR. This severe weather event included high winds, rain, and snow over a week-long period. The primary impact was debris removal and repair reimbursement for fallen trees and powerlines. In Merrimack County, the reimbursement to communities was the equivalent of $10.39 per capita (146,455 people in 2010), with Hillsborough County at $3.68 per capita (400,721 people in 2010). In the Concord area, 21,000 Unitil customers were out of power at the peak outage period. *fema.gov, Unitil Energy Systems, 2010*

- *April 1, 2011, April Fool's Day Snowstorm*
  A Nor'easter snowstorm impacted the State, causing over 30,000 power outages, most by PSNH. Snow fell in depths of up to 8", but stopped by noon. Although dozens of accidents were reported, no serious injuries were reported. *wmur.com*

- *October 29-30, 2011, Severe Storm and Snowstorm*
  FEMA-4049-DR. Towns in Central NH were impacted by this shocking, early severe snowstorm, although a major disaster declaration was not declared in Merrimack County. Halloween festivities were cancelled in most communities, to the heartbreak of young children. In Hillsborough County, damages were at the equivalent of $5.11 per capita (400,721 people in 2010). The storm was also declared in Rockingham County. *fema.gov*

- *February 8-10, 2013, Severe Snowstorm*
  FEMA-3360-DR. Blizzard conditions with winds gust of 50-60 MPH and over 20 inches snow hit New Hampshire and the New England area. Disaster declaration received for emergency protective measures in eight counties of the State.

- *November 2014 Thanksgiving Day Snowstorm*
  Large amount of snowfall fell in a very short period of time ahead of typical seasonal expectations. Power outages were prolific, with a peak of about 200,000 outages, from the Public Service of New Hampshire, Unitil (Concord area), and NH Electric Co-op. Nearby Concord and the towns on the eastern side of the Central NH region accumulated only 6-12" of snow according to PSNH, far less snow than southern and western NH. This was not a presidentially declared disaster in NH. *National Weather Service, Associated Press, Concord Monitor*

- *January 2015 Blizzard*
  Predicted at near blizzard conditions, the end of January, 2015 snowstorm's major declaration ended up having a Hillsborough County wide per capita impact of $3.88, making the storm a fairly expensive one at $3.3 million dollars in Public Assistance over three southern NH counties. Snow approached 30" in some areas with heavy snow and 50 mph whiteout wind conditions. There was no declaration for Merrimack County *fema.gov, Boston Globe*

Events in Allenstown

The following events were found to have impacted Allenstown.

- *Late 1950s*
  During mid-April in the late 1950s, an ice storm impacted Allenstown by disrupting the road network. Bulldozers were required to open the road to get to the Town Hall. *Allenstown Town Historian 2004*

- *March 3-6, 1991*
  Numerous outages from ice-laden power lines in southern New Hampshire occurred. Allenstown was hit hard by this storm. *Allenstown Town Historian 2004*

- *March, 1993*
  Allenstown experienced power outages throughout town during this storm. *Allenstown Town Historian 2004*

- *January 7, 1998*
  In Allenstown, tree damage, especially in Bear Brook State Park, was particularly severe. *Allenstown Hazard Mitigation Committee 2004*

- *December 11, 2008 Ice Storm*
  The Ice Storm of December, 2008 caused significant power outages in Allenstown. Residents were temporarily sheltering in Concord hotels. The EOC was prepared to activate, but power came back on for essential services and the Village area. It took about 7 days before power was completely restored to the Town. *Allenstown Hazard Mitigation Committee 2015*

- *February 23-March 3, 2010, Severe Winter Storm*
  Allenstown experienced power outages, with trees down on wires, roads, cars, and buildings. The flooding from this storm was worse than the snow and ice damage. Emergency responders activated the EOC. All Departments were on emergency footing. The Town received Public Assistance (PA) grant funds as a result of the event. *Allenstown Hazard Mitigation Committee 2015*

- *October 29-30, 2011 Halloween Snowstorm*
  Allenstown was covered in nearly two feet of snow, which was removed from the roads and Town parking areas by the Highway Department. The EOC was not activated. The emergency shelter was opened, but no one used it. The Town received Public Assistance (PA) grant funds as a result of the unexpected snow event. *Allenstown Hazard Mitigation Committee 2015*

- *February 8-10, 2013 Severe Winter Storm*
  Allenstown experienced only minor damages from this snow storm. Sporadic power outages were experienced. The EOC was not activated. Only the Police and Fire Departments were on emergency footing. The Highway Department operated normally to remove the snow accumulation. The Town received $10,000 in Public Assistance (PA) grant funds as a result of the event. *Allenstown Hazard Mitigation Committee 2015*

- *November 2014 Thanksgiving Day Snowstorm*
  Large amount of snowfall fell in a very short period of time ahead of typical seasonal expectations. Power outages were prolific, with a peak of about 200,000 outages, from the Public Service of New Hampshire, Unitil (Concord area), and NH Electric Co-op. Nearby Concord and the towns on the eastern side of the Central NH region accumulated only 6-12" of snow according to PSNH, far less snow than southern and western NH. Allenstown enacted its snow procedure, which includes a staging area off of Deerfield Road for debris removal and plowing since these outlying areas in Bear Brook State Park quickly become cut off from the main Town. This was not a presidentially declared disaster in NH. *National Weather Service, Associated Press, Concord Monitor*

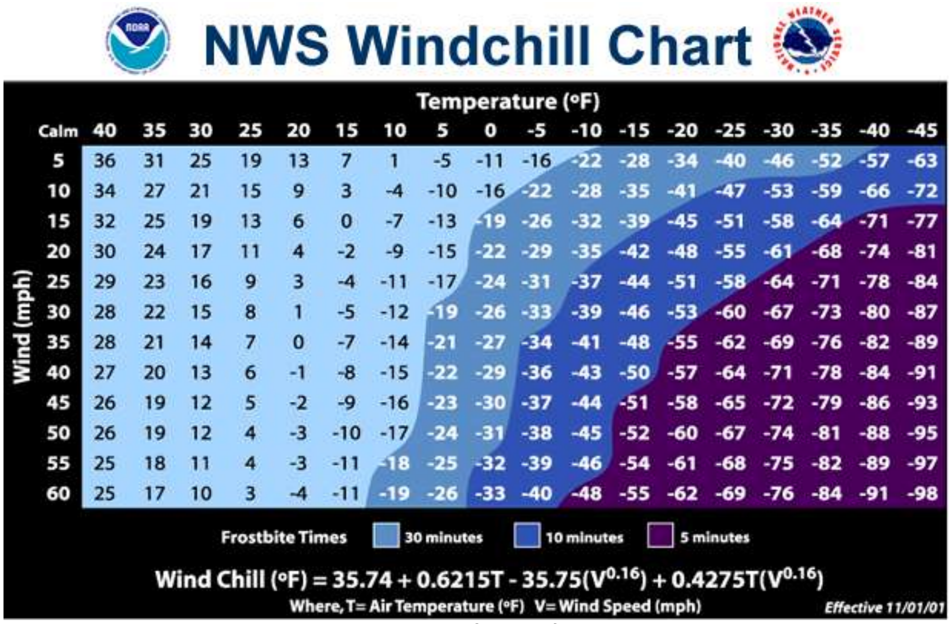
- *January 2015 Blizzard*
  Predicted at near blizzard conditions, the end of January, 2015 snowstorm's major declaration ended up having a Hillsborough County wide per capita impact of $3.88, making the storm a fairly expensive one at $3.3 million dollars in Public Assistance over three southern NH counties. Snow approached 30" in some areas with heavy snow and 50 mph whiteout wind conditions. To the west of Allenstown, the closest reporting weather station, Concord (CON), Concord had accumulated 29" at the airport. Allenstown enacted its snow procedure, which includes a staging area off of Deerfield Road for debris removal and plowing since these outlying areas in Bear Brook State Park quickly become cut off from the main Town. This was not a presidentially declared disaster in Merrimack County. *fema.gov, Boston Globe, NOAA National Operational Hydrologic Remote Sensing Center for Station CON (Concord Municipal Airport)*

Magnitude of Severe Winter Weather

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. New Hampshire, the Central NH Region, and Allenstown are extremely familiar with all types of severe winter weather, including frigid temperatures, ice storms, heavy snow fall, rapid snow pack melting, blocked roadways, fallen trees or limbs, and power outages. Higher levels of elevation are particularly susceptible to severe winter weather and wind chill.

The National Weather Service (NWS) Windchill Temperature (WCT) Index in **Figure 26** calculates wind chill based on wind speed and temperature. The WCT Wind Index measures wind speed at a height of five feet above the ground, incorporates heat transfer theory, lowers the wind calm threshold, and assumes no warming impact from the sun. These factors are all used on human modeling. Frostbite times of 30 minutes, 10 minutes, and 5 minutes are identified at specific temperatures and wind speeds. For example, a person experiencing windchill in 5 degree weather with 35 mph winds will experience frostbite conditions within 30 minutes. The Windchill Temperature Index **measures the magnitude of windchill leading to frostbite conditions**.

Figure 26
Windchill Temperature Index


NWS Windchill Chart

Temperature (°F)

Wind (mph)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T = Air Temperature (°F) V = Wind Speed (mph)

Effective 11/01/01

Source: National Weather Service

The Sperry-Piltz Ice Accumulation Index (SPIA) shown in **Table 17** is used to **measure the magnitude of ice damage from severe winter weather.** The index is compared to the tornado and hurricane scales note above. Storm total rainfall converted to ice accumulation, wind, and temperatures during the storm period are used to develop SPIA.

Table 17
Sperry-Piltz Ice Accumulation Index (SPIA)

Ice Damage Index	Average NWS Ice Amount *in Inches*	Wind Speed *mph*	Ice Damage and Impact Descriptions
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems. No alerts or advisories needed for crews, few outages.
1	0.10 to 0.25	15 to 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges might become slick and hazardous.
	0.25 to 0.50	> 15	
2	0.10 to 0.25	25-35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions might be extremely hazardous due to ice accumulation.
	0.25 to 0.50	15-25	
	0.50 to 0.75	< 15	
3	0.10 to 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days. Warming sites needed.
	0.25 to 0.50	25 - 35	
	0.50 to 0.75	15 - 25	
	0.75 to 1.00	< 15	
4	0.25 to 0.50	> = 35	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures. Outages lasting 5-10 days. Shelters or warming sites needed.
	0.50 to 0.75	25 - 35	
	0.75 to 1.00	15 - 25	
	1.00 to 1.50	< 15	
5	0.50 to 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 to 1.00	> = 25	
	1.00 to 1.50	> = 15	
	> 1.50	Any	

Source: www.spia-index.com (adapted by CNHRPC)

Cumulative ice damage identified by the SPIA is combined with daily National Weather Service forecasts to develop a Forecast Sperry-Piltz Ice Accumulation Index Map for the Northeast's current 24-hour period. This online tool permits the **monitoring of ice conditions for worsening or lightening over time**.

The National Climactic Data Center (NCDC) produces the Regional Snowfall Index (RSI) for the Northeast to categorize significant snowstorms. The RSI ranks snowstorm effects on a scale from **1** to **5**, similar to the Enhanced Fujita Scale for tornadoes or the Saffir-Simpson Hurricane Wind Scale for hurricanes. The RSI differs from these other indices because it includes population, a social component. The RSI is based on the spatial extent of the storm, the amount of snowfall, and the juxtaposition of these elements with population. Including population information ties the index to societal impacts. Currently, the index uses population based on the 2000 Census. The Regional Snowfall Index (RSI) displayed in **Table 18** is a **measurement of the magnitude of a snowstorm in the Northeast, which includes New Hampshire and Allenstown.**

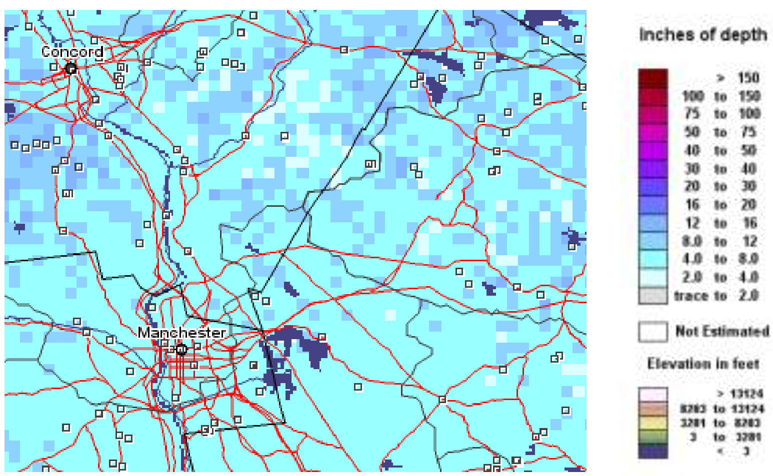
Table 18
Regional Snowfall Index (RSI) for the Northeast

Storm Category	RSI Value	Snow Description
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18.0+	Extreme

Source: National Climactic Data Center (NCDC), 2014

The National Oceanic and Atmospheric Administration (NOAA)'s National Operational Hydrologic Remote Sensing Center (NOHRSC) hosts an Interactive Snow Information site that produces daily Modeled Snow Depth Maps displaying inches of snow depth. These Maps **measure the magnitude of snow depth during a chosen certain day for New Hampshire counties, although individual communities like Allenstown will recognize their municipal location**. **Figure 27** displays an example daily Modeled Snow Depth Map. The tiny black square boxes on the Map indicate the climate reporting stations which collect this data.

Figure 27
Modeled Snow Depth Map of the Central NH Region (Daily)



Source: National Operational Hydrologic Remote Sensing Center (NOHRSC), 04-10-15

As noted, many indices and tools are available to **measure the magnitude of a severe winter storm in Allenstown**. Municipal highway budgets allocate funding annually to handle snow removal, sanding and salting, tree limb cutting and removal, and storm overtime for staff. However, snow depths that regularly exceed what is considered the normal for snowfall in Central NH will result in higher taxes for communities in order to simply maintain the "new normal" of severe winter storms of up to 24" in depth such as was experienced during the February 2013 winter storm.

Potential Future Hazards

It is extremely likely that Allenstown will be impacted by severe winter weather in the future. Damage and serious conditions can result in all areas of the community. Areas above 500 feet and the western portion of Town are more vulnerable. Power outages may occur as a result of downed trees due to heavy snow loads on branches.

The Town's communications equipment on High Ridge Trail Tower is vulnerable to several hazards and could experience power loss.

There is one cellular tower in Allenstown, located on behind 24 Allenstown Road. A tall communications tower could possibly be damaged by natural, human, or technological hazard events. A communications interruption or failure resulting from damage to the tower could affect the capabilities of emergency personnel.

Populated areas include the Suncook Village area, and the Deerfield Road corridor.

Earthquake

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

ALLENSTOWN EARTHQUAKE EVENTS	
Probability -	LOW
Magnitude -	HIGH
Overall Risk -	3.0

Area Events

Numerous earthquake events in recent history have occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town. No earthquakes have been documented in Allenstown. Between 1728 and 1989, there have been 270 earthquakes in New Hampshire *(Northeast Emergency Consortium)*. Four of these earthquakes were of a Richter Magnitude scale of 4.2 or more *(Northeast Emergency Consortium)*. Two of these occurred in Ossipee, one west of Laconia, and one near the Quebec border.

Historically, New England has experienced some earthquakes. New England experiences an average of 30-40 earthquakes per year, registering between 2.0 and 2.5 magnitude, but most are not felt.

- *1638*
  An earthquake of magnitude 6.5 to 7.0 on the Richter scale was reportedly felt from Plymouth, Massachusetts to Canada.

- *Early Earthquakes, 1727 and 1755*
  Both earthquakes, October 29, 1727 and November 18, 1755, caused damage to the New England coastline and throughout New England. *Northeast States Emergency Consortium*

- *March 28, 1890*
  In New Hampshire, an earthquake produced 30 seconds of rumbling. *History of Concord, NH (J Lyford)*

- *November 18, 1929*
  An earthquake originating at the Grand Banks in Newfoundland at a scale of 7.2 was felt by all of New Hampshire. *National Earthquake Information Center*

- *December 20 and 24, 1940*
  In late December, New Hampshire felt the shock of two earthquakes, both at 5.5 on the Richter scale. The earthquakes originated near Tamworth in Ossipee. *National Earthquake Information Center, Northeast States Emergency Consortium*

- *June 15, 1973*
  An earthquake originating near the Quebec border at a scale of 4.8 was felt in various locations throughout the State. *Northeast States Emergency Consortium*

- *January 19, 1982*
  An earthquake with magnitude 4.5 originated west of Laconia on January 19, 1982. Event caused much alarm but little physical damage. *Northeast States Emergency Consortium*

- *April 20, 2002*
  An earthquake originating 15 miles southwest of Plattsburgh, NY with a magnitude of 5.1 shook many New England residents awake at 6:50 am. Many felt a slight ground shaking for 15-30 seconds and there were no deaths or injuries reported. *cnn.com and USGS*

- *January 20, 2004*
  An earthquake measuring 2.2 on the Richter Scale was centered in the Hillsborough-Hopkinton area. Shaking and noise were reported, but no damage occurred. *Concord Monitor, January 2004*

- *September 25, 2010*
  "A magnitude 3.2 earthquake rattled buildings and nerves across much of New Hampshire Saturday night. The quake occurred at 11:28 p.m. and was centered about 10 miles north of Concord, according to the U.S. Geological Survey. State police said they received reports from residents across the state who reported what they thought was an explosion. The quake was felt in places like Fremont, Derry, Durham, Henniker, Penacook and Raymond. There were no reports of damage." *Union Leader*

- *October 16, 2012*
  With the epicenter near Hollis Center, Maine, a 4.0 earthquake was measured and felt not only in Central NH, but throughout New England. Reportedly sounding like a jumbo jet and lasting for 10 seconds, calls came in to local Fire Departments inquiring about the event. By two hours later, no calls reporting damages or injuries had been received. *Concord Monitor*

Events in Allenstown

The following events were found to have impacted Allenstown.

- *September 25, 2010*
  There was no noticeable impact to Allenstown. *Allenstown Hazard Mitigation Committee 2015*

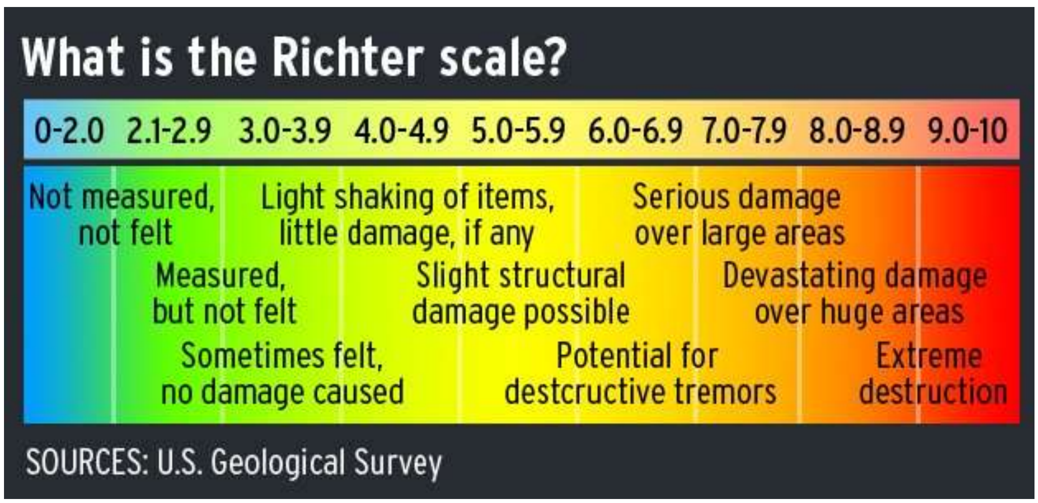
- *October 16, 2012*
  There was no noticeable impact to Allenstown. *Allenstown Hazard Mitigation Committee 2015*

Magnitude of Earthquakes

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Small earthquakes either occur within or affect the Central NH region, including Allenstown, every few years.

The Richter Scale of **0** to **9** **measures the *magnitude* of an earthquake** while the Modified Mercalli Intensity Scale of **I** to **XII** **measures the *intensity* of an earthquake**. Often in media reports, earthquake readings are expressed as a Richter Scale magnitude number to provide comparison to earthquakes around the world. However, the Modified Mercalli Scale is equally helpful, providing descriptions of what could be felt and what could occur to surroundings during an earthquake. The Richter Scale in **Figure 28** **measures the magnitude of an earthquake**.

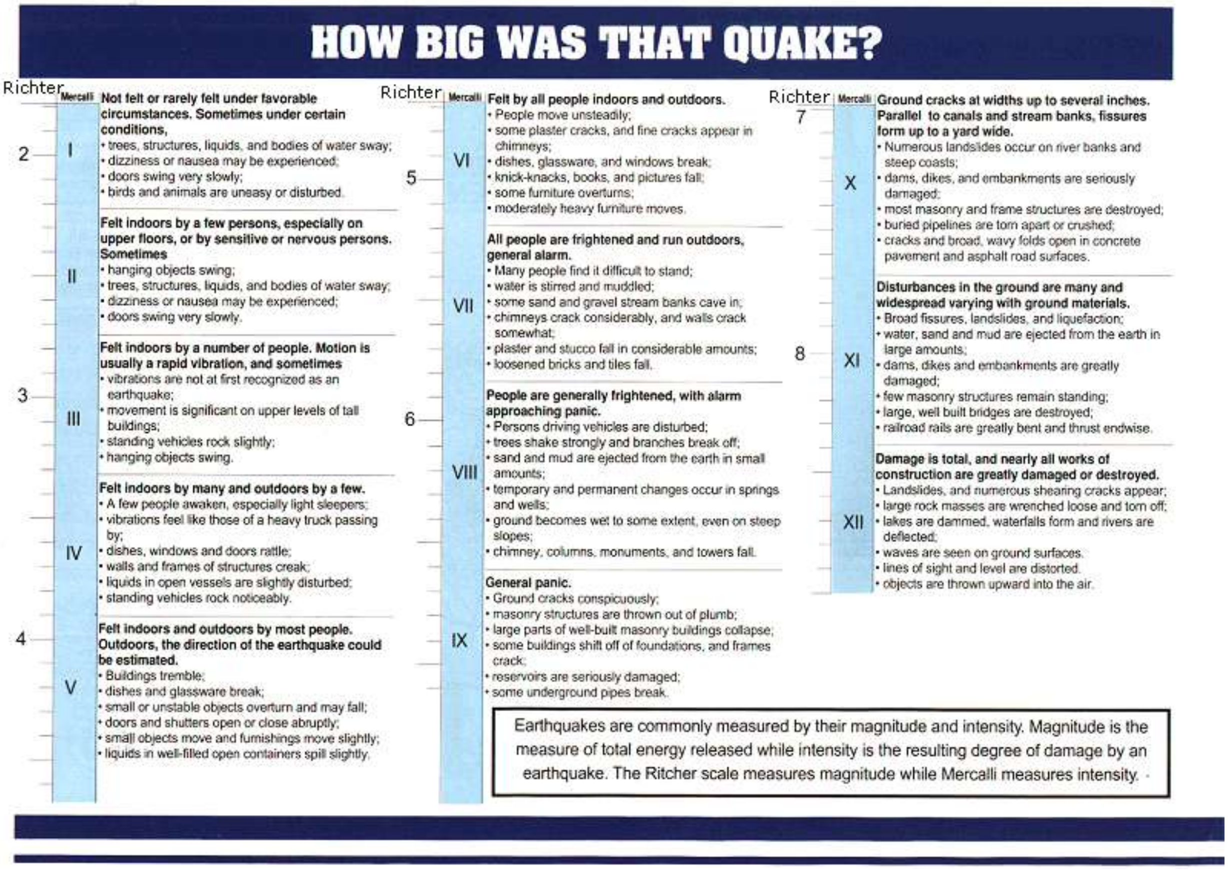
Figure 28
Descriptive Richter Scale



Source: US Geological Survey (USGS)

The National Oceanic and Atmospheric Administration (NOAA) provided a helpful tool by combining the Richter and Modified Mercalli scales into a descriptive resource shown in **Figure 29.** The Richter and Modified Mercalli Scales respectively **measure the magnitude and intensity of an earthquake.**

Figure 29
Earthquake Impacts on the Richter and Modified Mercalli Scales



Source: National Oceanic and Atmospheric Administration (NOAA)

The New England Seismic Network (NESN) operated by the Weston Observatory of Boston College is a network of broadband seismometers distributed through New England which monitor earthquake activity. Seismogram stations close to the Central NH Region are located at Dartmouth College in Hanover, in Lebanon, at the Franklin Falls Dam (US Army Corps of Engineers), and at the University of New Hampshire in Durham. The NESN New England Real-Time Earthquake Monitor online map **measures and displays the magnitude and locations of real-time and recent earthquakes in New England.**

The US Geological Survey Earthquake Hazards Program hosts an online 1 Day, Magnitude 2.5+ Earthquake Map that displays the location and magnitude of earthquakes that rate over 2.5 on the Richter scale over the past day. This map **measures and displays the magnitude and locations of real-time 1 day earthquakes over 2.5 R** in the world.

Potential Future Hazards

Although it is likely Allenstown residents may feel earthquakes it the future, it is unlikely that any significant damage will result.

In Allenstown, old buildings would be particularly susceptible to earthquake damage, including Suncook Village where most residents live. Underground lines would be highly susceptible.

Landslide

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

ALLENSTOWN LANDSLIDE EVENTS	
Probability -	Low
Magnitude -	Low
Overall Risk -	1.0

Area Events

Localized landslides in recent history have likely occurred in the State, region, and the local area surrounding Allenstown.

- *May 14, 2006*
  Backyard material slid toward a Bow home on Mother's Day catching a family, with one young child and expecting another, by surprise. No one was injured by the mudslide but thousands of dollars of property damage were caused. The debris and mud that slid and caused the damage came from land that didn't belong to the family. They had to move out for 10 days until a contractor deemed the property safe. *WMUR News*

- *Circa 2008 or 2009*
  On Granite Street in Hooksett, a house slid towards the river. Research is not conclusive. *Epsom Hazard Mitigation Committee 2012*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

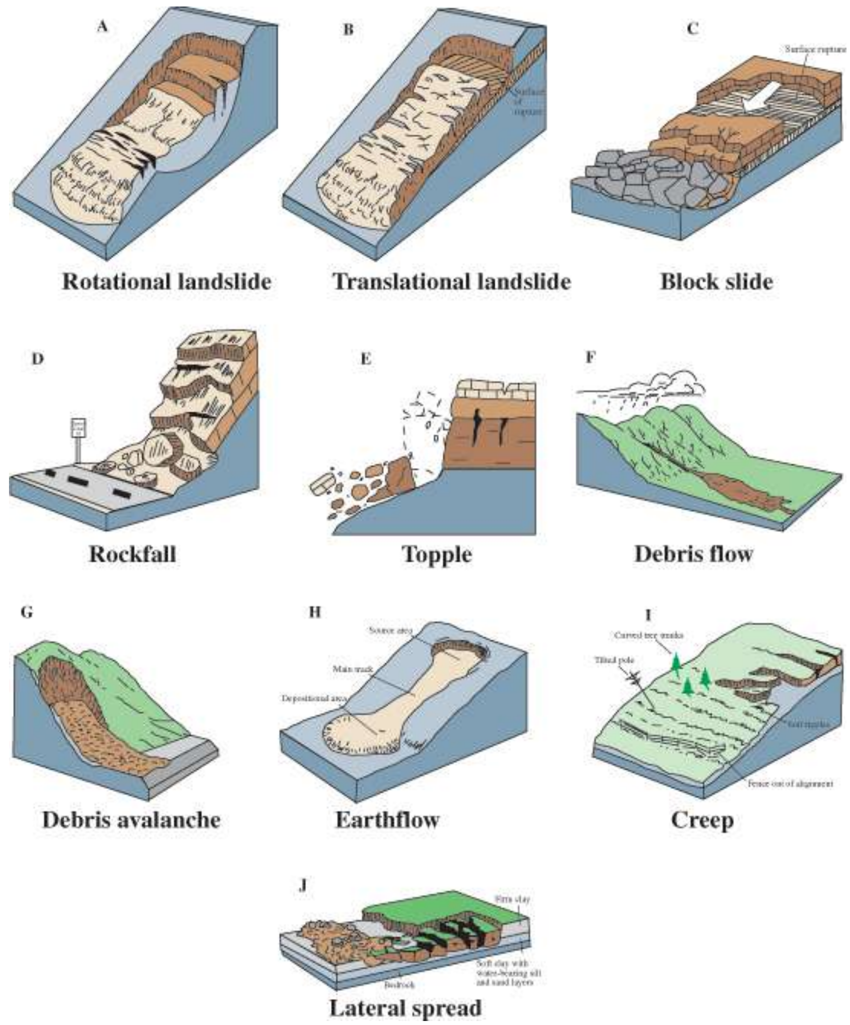
Magnitude of Landslide Hazards

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. A landslide occurs on areas of slope, and depending upon where one occurs within a community and the risk factors involved, a landslide might cause no damage or material could sweep down to roadways or homes causing severe damage.

There is presently **no known widely-used scale measuring the magnitude of landslides.** However, several resources which might be of use to Allenstown are available to **characterize landslides and help identify the risks** involved.

The US Geological Survey (USGS)' Landslide Hazards Program identifies different types of landslides within its publication The Landslide Handbook – A Guide to Understanding Landslides 2008 as displayed in **Figure 30**.

Figure 30
Basic Types of Landslides

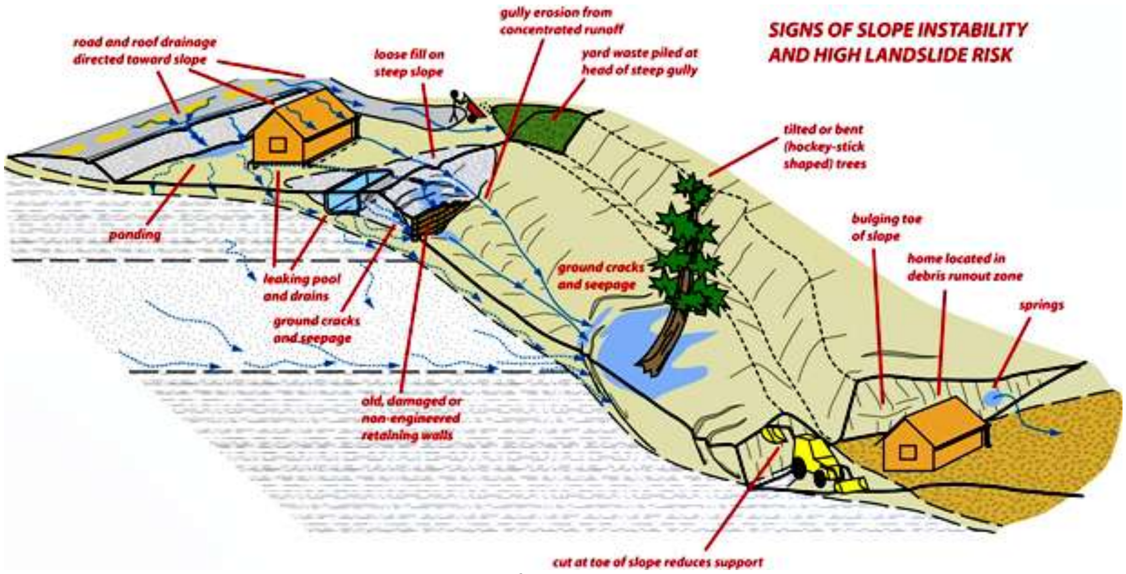


Source: US Geological Survey (USGS)

For further consideration, **risk factors of landslides** in **Figure 30** can be identified by signs of slope instability, which result in a higher landslide risk. Locations of structures, water features, and geologic features on steeper slopes and natural underground water systems can have a higher incidence of landslide risk.

The District of North Vancouver developed an online Guide to Living Near Steep Slopes with an illustration of risks (**Figure 31**) that has simple tips for property owners to help reduce landslide risk on their property.

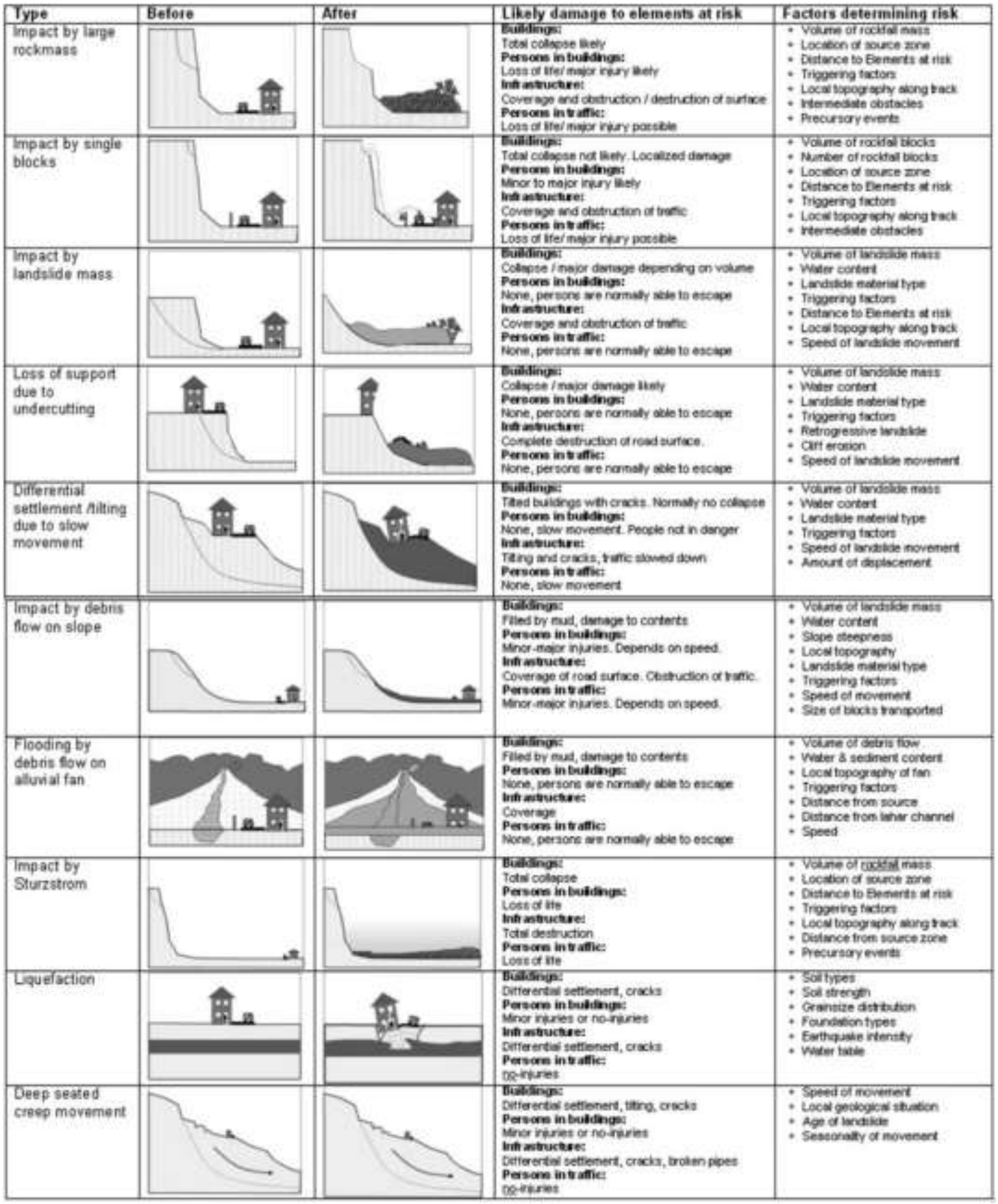
Figure 31
Landslide Risk Factors



Source: North Vancouver District

Landslide expert Cees Van Westen, now with the University of Twente in the Netherlands, is widely sourced around the globe as a landslide risk assessment specialist. In 2006, Van Westen attempted to encourage the development of a unified landslide intensity qualitative risk assessment approach with several colleagues. The Landslide Hazard and Risk Zonation schematic that Van Westen et. al. developed in **Figure 32** on the following page **can help measure the intensity of landslides in certain areas.**

Figure 32
Landslide Hazard Risks and Damages



Type	Before	After	Likely damage to elements at risk	Factors determining risk
Impact by large rockmass			**Buildings:** Total collapse likely **Persons in buildings:** Loss of life/ major injury likely **Infrastructure:** Coverage and obstruction / destruction of surface **Persons in traffic:** Loss of life/ major injury possible	• Volume of rockfall mass • Location of source zone • Distance to Elements at risk • Triggering factors • Local topography along track • Intermediate obstacles • Precursory events
Impact by single blocks			**Buildings:** Total collapse not likely. Localized damage **Persons in buildings:** Minor to major injury likely **Infrastructure:** Coverage and obstruction of traffic **Persons in traffic:** Loss of life/ major injury possible	• Volume of rockfall blocks • Number of rockfall blocks • Location of source zone • Distance to Elements at risk • Triggering factors • Local topography along track • Intermediate obstacles
Impact by landslide mass			**Buildings:** Collapse / major damage depending on volume **Persons in buildings:** None, persons are normally able to escape **Infrastructure:** Coverage and obstruction of traffic **Persons in traffic:** None, persons are normally able to escape	• Volume of landslide mass • Water content • Landslide material type • Triggering factors • Distance to Elements at risk • Local topography along track • Speed of landslide movement
Loss of support due to undercutting			**Buildings:** Collapse / major damage likely **Persons in buildings:** None, persons are normally able to escape **Infrastructure:** Complete destruction of road surface. **Persons in traffic:** None, persons are normally able to escape	• Volume of landslide mass • Water content • Landslide material type • Triggering factors • Retrogressive landslide • Cliff erosion • Speed of landslide movement
Differential settlement /tilting due to slow movement			**Buildings:** Tilted buildings with cracks. Normally no collapse **Persons in buildings:** None, slow movement. People not in danger **Infrastructure:** Tilting and cracks, traffic slowed down **Persons in traffic:** None, slow movement	• Volume of landslide mass • Water content • Landslide material type • Triggering factors • Speed of landslide movement • Amount of displacement
Impact by debris flow on slope			**Buildings:** Filled by mud, damage to contents **Persons in buildings:** Minor-major injuries. Depends on speed. **Infrastructure:** Coverage of road surface. Obstruction of traffic. **Persons in traffic:** Minor-major injuries. Depends on speed.	• Volume of landslide mass • Water content • Slope steepness • Local topography • Landslide material type • Triggering factors • Speed of movement • Size of blocks transported
Flooding by debris flow on alluvial fan			**Buildings:** Filled by mud, damage to contents **Persons in buildings:** None, persons are normally able to escape **Infrastructure:** Coverage **Persons in traffic:** None, persons are normally able to escape	• Volume of debris flow • Water & sediment content • Local topography of fan • Triggering factors • Distance from source • Distance from lahar channel • Speed
Impact by Sturzstrom			**Buildings:** Total collapse **Persons in buildings:** Loss of life **Infrastructure:** Total destruction **Persons in traffic:** Loss of life	• Volume of rockfall mass • Location of source zone • Distance to Elements at risk • Triggering factors • Local topography along track • Distance from source zone • Precursory events
Liquefaction			**Buildings:** Differential settlement, cracks **Persons in buildings:** Minor injuries or no-injuries **Infrastructure:** Differential settlement, cracks **Persons in traffic:** no-injuries	• Soil types • Soil strength • Grainsize distribution • Foundation types • Earthquake intensity • Water table
Deep seated creep movement			**Buildings:** Differential settlement, tilting, cracks **Persons in buildings:** Minor injuries or no-injuries **Infrastructure:** Differential settlement, cracks, broken pipes **Persons in traffic:** no-injuries	• Speed of movement • Local geological situation • Age of landslide • Seasonality of movement

Source: Landslide Hazard and Risk Zonation - Why is it still so difficult? by Cees Van Westen et.al., 2006

Potential Future Hazards

Landslide is a possibility in select areas of Allenstown where certain topological conditions are met. Development in close proximity to areas of steep slopes (greater than 15%) could present a risk to residents. Most potential landslides will be in conjunction with another hazard event, such as flooding or severe rain, or from the construction of buildings or infrastructure in a topologically vulnerable area.

The extent of landslides in Allenstown is going to impact a very limited area. Roads are likely to experience erosion during heavy rain events and a large scale landslide could damage only a limited number of structures. Landslides that damage buildings could occur during flooding events of the Suncook River.

Drought

ALLENSTOWN DROUGHT EVENTS	
Probability -	**LOW**
Magnitude -	**MODERATE**
Overall Risk -	**2.0**

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

Area Events

Numerous drought events in recent history have occurred in the State, region, and the local area surrounding Allenstown that may have also had an impact on the Town. Periods of drought have occurred historically in New Hampshire. The longest recorded continuous spell of less than normal precipitation occurred between 1960-69. In 1999, a drought warning was issued by the Governor's Office. In March 2002, all counties, with the exception of Coos, were declared in Drought Emergency. This was the first time that low-water conditions had progressed beyond the Level Two Drought Warning stage.

- *Various Droughts in the State of New Hampshire*
  In the years 1929-1936 (regional), 1939-1944 (severe in southwest, moderate elsewhere), and 1947-1950 (moderate), the State was hit by numerous and long-lasting droughts. Between 1960-1969 was the longest recorded continuous spell of less than normal precipitation with crops affected. For two consecutive years in the mid 1960s, wells went dry. *NH Homeland Security and Emergency Management*

- *April, 1999*
  In April 1999, due to lack of precipitation in the State, a drought warning was issued by the Governor's Office. *NH Homeland Security and Emergency Management*

- *March, 2002*
  A Drought Emergency was declared by the State, marking the first time low-water conditions have progressed beyond the Level Two stage. *NH Department of Environmental Services*

Events in Allenstown

The following events are found to have impacted Allenstown.

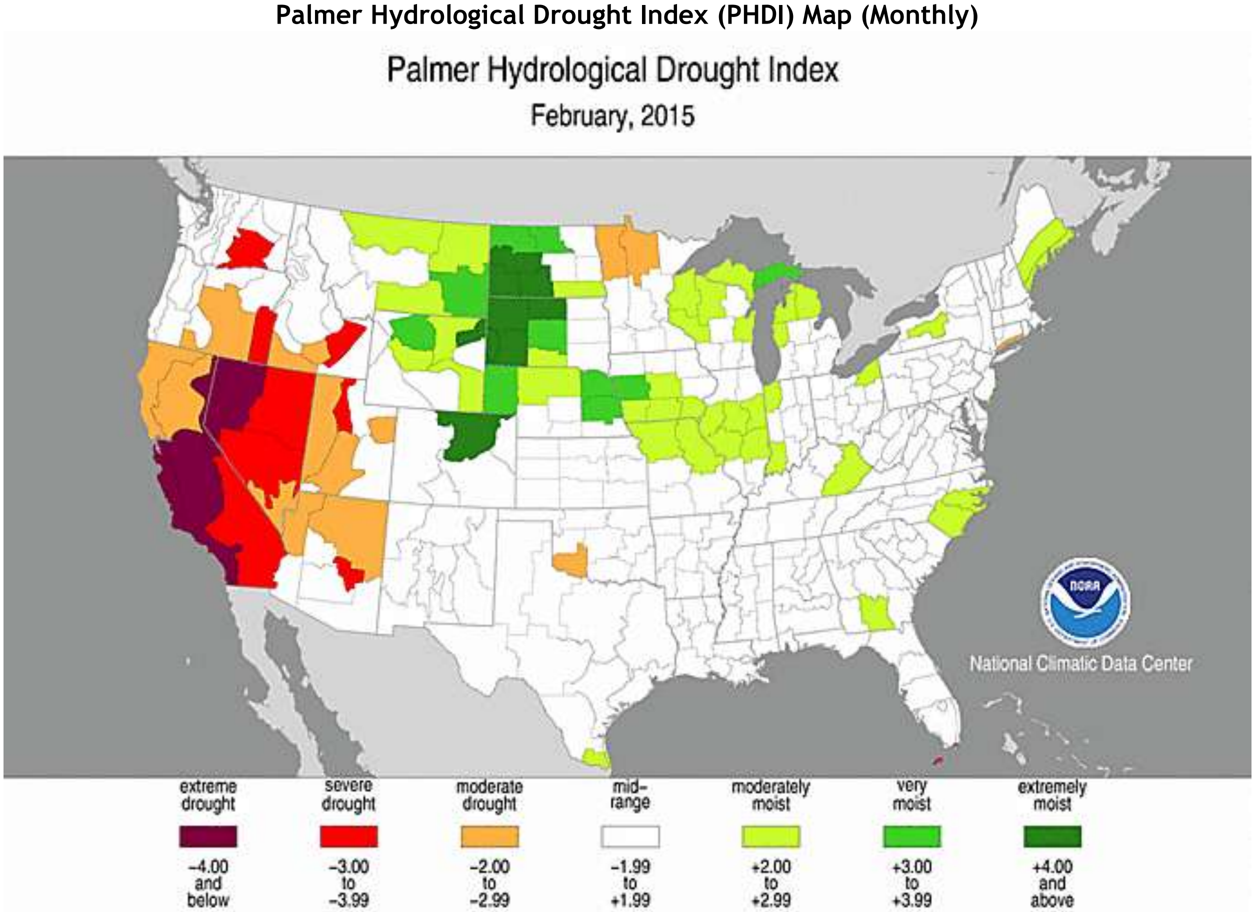
- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Magnitude of Drought

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Drought conditions are reflected in numerous agricultural, hydrological, and meteorological indicators, both observed and modeled. Drought conditions influence how severe a fire could become in Allenstown and whether tree farms and crops would be able to survive. Droughts can reduce water levels in ponds and rivers, in turn affecting aquatic habitats and local seasonal tourism. Water wells have been known to "go dry" during drought conditions.

The National Oceanic and Atmospheric Administration (NOAA) National Climactic Data Center (NCDC) hosts **Palmer Drought** indices measuring the balance between moisture demand (evapotranspiration driven by temperature) and moisture supply (precipitation). The Palmer Hydrological Drought Index (PHDI) **measures the magnitude of hydrological drought in the form of long-term, cumulative monthly moisture conditions**. February 2015 in New Hampshire appeared stable at **moderately moist** in the PHDI as seen in **Figure 33**.

Figure 33
Palmer Hydrological Drought Index (PHDI) Map (Monthly)

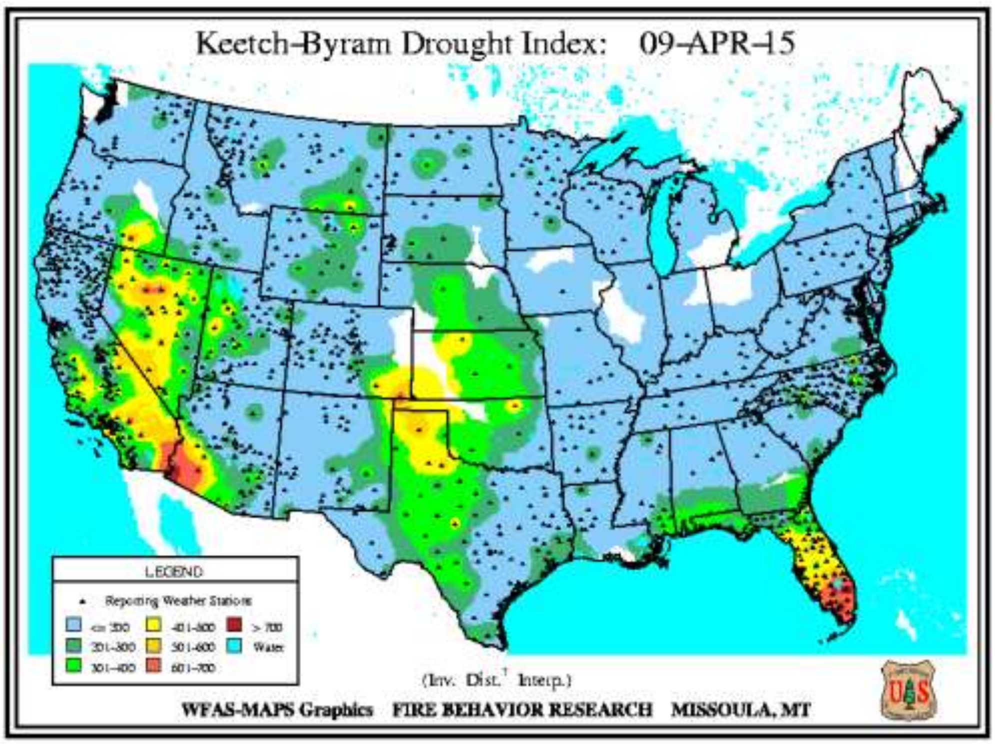


Source: National Climactic Data Center (NCDC), February 2015

The Keetch-Byram Drought Index (KBDI) of the US Fire Service Wildland Fire Assessment System (WFAS) was designed specifically for fire potential assessment, to **measure the magnitude of cumulative moisture deficiency relating to flammability of organic material in the ground**. Simply stated, the KBDI attempts to measure the amount of precipitation necessary to return the soil to full field capacity. From a scale of **0** to **800**, New Hampshire in **Figure 34** measured **<=300** on the day displayed.

- KBDI = 0 - 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation.
- KBDI = 200 - 400: Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- KBDI = 400 - 600: Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.
- KBDI = 600 - 800: Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

Figure 34
Keetch-Byram Drought Index (KBDI) Map (Daily)

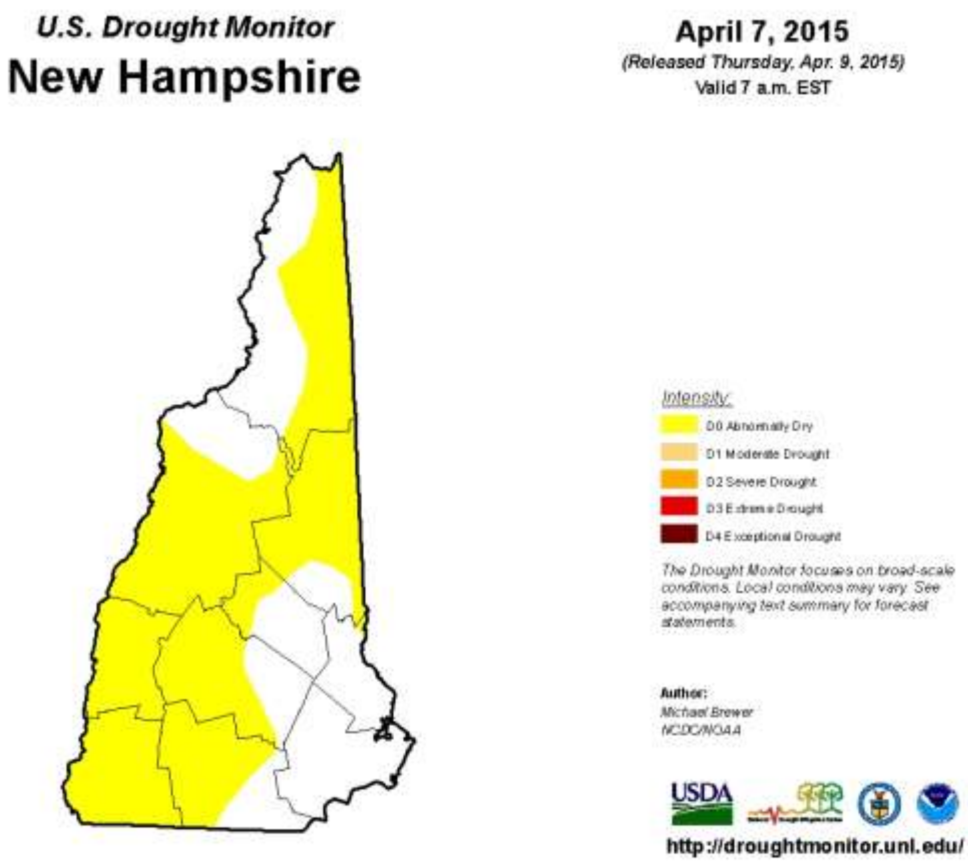


Source: US Fire Service Wildland Fire Assessment System (WFAS), 04-09-2015

The US Drought Monitor **measures the intensity of weekly drought in the** US **and in** NH counties on an intensity scale of **D0** (Abnormally Dry) to **D4** (Exceptional Drought). When conditions are dry such as when a drought is occurring, fires are more likely to start and continue burning, plants become dry and can die off, wetlands and intermittent streams reduce in size or dry up, and waterbodies and watercourses recede from their banks.

Much of New Hampshire, including areas of the Central NH Region was rated **D0** Abnormally Dry in **Figure 35** for the time period displayed. For this particular date, Allenstown was not included in the **D0** area.

Figure 35
Drought Intensity in New Hampshire Counties Map (Daily)



Source: US Drought Monitor, 04-09-2015

Potential Future Hazards

In the case of drought, residential and town water supplies would be threatened. Most homes in Town rely on well water which is not easily replenished during periods of drought. All the farms in town, including the tree farms, would be affected by drought. Additionally, wildfires would have the potential of being more severe and commonplace during periods of drought.

All the farms in town, including the tree farms, would be affected by drought. Lavallee farm, Verville's tree farm, Bear Brook Stables, McNamara Farm, Wing Road Farm could be especially vulnerable to drought conditions. Wildfires would have the potential of being more severe and commonplace during periods of drought, particularly along Deerfield Road and in Bear Brook State Park.

Radon

Radon is a naturally occurring radioactive gas with carcinogenic properties. The gas is a common problem in many states, including New Hampshire. Data collected by the NH Office of Community and Public Health's Bureau of Radiological Health indicates that one third of the houses in New Hampshire have indoor radon levels that exceed the US Environmental Protection Agency's "action level" of four picocuries per liter for at least some portion of the year.

ALLENSTOWN RADON EVENTS	
Probability -	HIGH
Magnitude -	HIGH
Overall Risk -	**9.0**

Radon may also enter homes dissolved in drinking water from drilled wells. High levels of radon in water from individual drilled wells is a common occurrence in New Hampshire.

Area Events

In New Hampshire, radon gas is a common problem, most often affecting the north, east and southeast portions of the State. The gas is colorless, tasteless, and has no odor. Radon is a radioactive gas that comes from the natural decay of uranium that is found in nearly all soils. It typically moves up through the ground to the air above and into homes through cracks and other holes in the foundation. Homes trap radon inside, regardless of age or how they are built. Radon from soil gas is the main cause of radon problems, although sometimes radon enters the home through well water. The gas is the second highest cause of lung cancer, behind smoking *(Environmental Protection Agency)*.

- *1986-1987*
  In Dunbarton, a citizen initiative of well water testing, primarily around the Town Center, found that the radon levels in the community exceeded all levels in the country. The Elementary School well tested fine, but the church had a very high concentration, as well as the rest of the area at the top of the hill around the Town Offices. Residents and Town officials placed filtration systems in their homes and public buildings.

  The information garnered interviews with WMUR Channel 9 and a series of public meetings to raise the awareness of Town residents. Although there is no specific Town program in place, residents can test their wells using kits available at the NH Department of Environmental Services. *Dunbarton Hazard Mitigation Committee, 2005*

Events in Allenstown

The following radon events were found to have affected Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Magnitude of Radon

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. Radon is a life-threatening gas to people in their homes and indoor workplaces, either through air (inhalation of soil vapor or water vapor) or water (inhalation and ingestion) exposure.

The Environmental Protection Agency (EPA) has set **indoor air quality standard** risk levels for radon based on whether a person has smoked or has not smoked within their lifetime. The measured radon levels and lung cancer death risk numbers in **Table 19** are based off the recommended maximum exposure of **4 picocuries per liter (pCi/L)** as described in the EPA's *A Citizen's Guide to Radon*. Indoor air quality risks of radon exposure **measure the magnitude of radon in homes by picocuries per liter (pCi/L) and lung cancer death**.

Table 19
Indoor Air Quality Risks of Radon Exposure

Radon Risk If a Person Has Never Smoked - *Former smoker might have higher risks*
Radon Risk If a Person Smokes

Radon Level	If 1,000 people who never smoked were exposed to this level over a lifetime*...	The risk of cancer from radon exposure compares to**...	WHAT TO DO:
20 pCi/L	About **36** people could get lung cancer Smokers = **260**	35 times the risk of drowning	Fix home
10 pCi/L	About **18** people could get lung cancer Smokers = **150**	20 times the risk of dying in a home fire	Fix home
8 pCi/L	About **15** people could get lung cancer Smokers = **120**	4 times the risk of dying in a fall	Fix home
4 pCi/L	About **7** people could get lung cancer Smokers = **62**	The risk of dying in a car crash	Fix home
2 pCi/L	About **4** person could get lung cancer Smokers = **32**	The risk of dying from poison	Consider fixing home between 2 and 4 pCi/L
1.3 pCi/L	About **2** people could get lung cancer Smokers = **20**	*Average indoor radon level*	*Reducing radon levels below 2 pCi/L is difficult*
0.4 pCi/L	Smokers = **3**	*Average outdoor radon level*	*Reducing radon levels below 2 pCi/L is difficult*

* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).
** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.

Source: US Environmental Protection Agency (US EPA)

There is currently no federally-enforced **drinking water standard** for radon. The EPA has proposed to regulate radon in drinking water through community water suppliers (water systems that serve 25 or more year-round residents), but the EPA does not regulate private wells.

The proposal was to require community water suppliers to provide water with radon levels no higher than 4,000 pCi/L, which contributes about 0.4 pCi/L of radon to the air in homes. This proposal commenced in 1999 and has not yet been legislated.

Potential Future Hazards

The potential for the presence of radon in the Town is at high to moderate levels according to bedrock geology data depicted on ***Map 1: Potential Hazards***. As radon is addressed on an individual basis, long-term conditions and consequences are unknown. Some residents have taken individual measures against radon in well water and in basements. Arsenic is also a problem in New Hampshire wells.

Biological

ALLENSTOWN BIOLOGICAL EVENTS	
Probability -	MODERATE
Magnitude -	HIGH
Overall Risk -	6.0

Biological hazards are natural hazards that can be potentially catastrophic to ecosystem functioning and human and wildlife well-being. They can include medical wastes, microorganisms, viruses or toxins. Examples of biological hazards include invasive species and/or wildlife diseases such as West Nile Virus, Chronic Wasting Disease, Lyme Disease, Avian Influenza (Bird Flu), Dengue Fever, viral meningitis, red tides and algal blooms. Biological hazards are spread through animals, reptiles, fowl, bacteria, insects and spiders, plants, molds and fungus. In recent years, Avian Influenza has become a highly-discussed biological hazard because of its potential to annihilate large numbers of fowl, and particularly, domesticated birds such as chickens, ducks and turkeys. Humans are susceptible to Avian Flu through contact with infected birds. Human-induced biological hazards are possible but not consensually considered natural; they are often referred to as biological terror, where a biological hazard is manipulated in such a way to cause harm to others.

Area Events

In New Hampshire, the biological events most likely to affect a large population include health outbreaks such as flu, meningitis and conjunctivitis. Diseases such as West Nile Virus and EEE have found its way to the State, and although deaths have resulted from EEE, no humans have tested positive for West Nile.

- *1736-1737*
  From July 1736 to September 1737 in New Hampshire's coastal towns and inland to Kingston and Chester, about 1000 deaths were caused by "throat distemper." In 1754, 55 people in Hampton alone died of the same disease. [Merrills' *Gazetteer of the State of New Hampshire*, 1817.] *Allenstown Town Historian*

- *1812-1816*
  A regional epidemic that was occurring in NH & VT known as "Spotted Fever," claimed many residents. The disease, uncertain to the cause even now, would cause victims to go from healthy to their deathbed in as little as six hours. The town of Warren has record of a mass burial of about two dozen victims. *Local CNHRPC Town Hazard Mitigation Committee*

- *Year of 1918*
  Two thousand people in New Hampshire died of flu (Spanish flu) in nineteen eighteen compared to just one hundred forty five people the year before. *Department of Commerce*

- *1996*
  Milfoil was discovered on the north end of Lake Massasecum in Bradford. A 10 to 11 acre portion of the lake was closed. Several chemical treatments were tried but failed to eradicate the milfoil. Eventually, the weed was harvested. *Blaisdell Lake Property Owners Association, Inc. August 3, 2002*

- *February 1 - 14, 2002*
  In a two week period at a New Hampshire College, nearly 500 of the schools 5,060 students were affected by an outbreak of bacterial conjunctivitis. *Morbidity and Mortality Weekly Report; 3/15/2002*

- *December 27, 2003*
  Three teenagers from southwestern New Hampshire were hospitalized for bacterial meningitis and a fourth from Concord was suspected of having the potentially fatal illness. An 18 year old girl from Bennington died from the illness. Two of the victims were from Monadnock Regional High School. *NY Times, December 27, 2003*

- *September 30, 2004*
  Andover horse dies of EEE; a mosquito-borne virus that is a threat to humans as well. It was the second horse death in NH in September but only the second in NH since 1984. *Concord Monitor*

- *2005*
  Seven people were tested in New Hampshire for EEE, Eastern Equine Encephalitis and two died. Forty-six (46) birds and a mosquito pool were tested for West Nile Virus. *NH Center for Disease Control*

- *2005-2006*
  The State was preparing for the Avian flu pandemic, which did not end up impacting the country. Using over $800,000 in federal funds, Town emergency officials trained for the possible pandemic. Ten portable trailers were dispersed across the State, containing medical supplies. Articles and public service announcements served to educate the public. *www.dhhs.state.nh.us/dphs/cdcs/avian, www.nhphn.org/news, www.wildlife.state.nh.us/Wildlife*

- *October 20, 2007*
  A preschool student at the Boscawen Elementary School died at Boston Children's Hospital from pneumonia caused by Methicilin-resistant Staphylococcus areus, often called MRSA, a bacterium that can be passed from child to child by skin contact. The school was criticized for not cancelling school, and for not notifying parents until after media attention about the issue. School officials said they had acted on the advice of state officials who told them that the MSRA case should not be big news. *Concord Monitor*

- *2009-2011*
  The swine flu (H1N1) pandemic was experienced across the globe and was closely monitored by NH doctors. H1N1 was included in the seasonal vaccine strains for 2009-10, 2010-11 and 2011-12 vaccines. Public service announcements about proper hygiene, staying isolated when sick, and fact sheets were prominent. There 722 state-reported confirmed cases to date, as well as 10 confirmed NH deaths related to flu complications. *www.nh.gov/safety/divisions/hsem, www.dhhs.state.nh.us/dphs/cdcs/influenza, www.cdc.gov, www.en.wikipedia.org*

Events in Allenstown

The following biological events are found to have affected Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Magnitude of Biological Hazards

The potential magnitude of a hazard event, also referred to as the extent, scale or strength of a disaster, provides a measurement of how large and significant a hazard can become. If populations of the world, United States, Northeast, New England, New Hampshire, and/or Allenstown experienced a sudden, specific medical illness at the same time, a pandemic would occur.

The Center for Disease Control and Prevention (CDC) released the *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States* (aka "Community Strategy") on February 1st, 2007. Although this publication develops a **Pandemic Severity Index (PSI)** only for pandemic influenza, many of its principles of voluntary home isolation and quarantine and social distancing could possibly be applied to other infectious diseases such as infectious mononucleosis, bacterial or viral meningitis, and other infections.

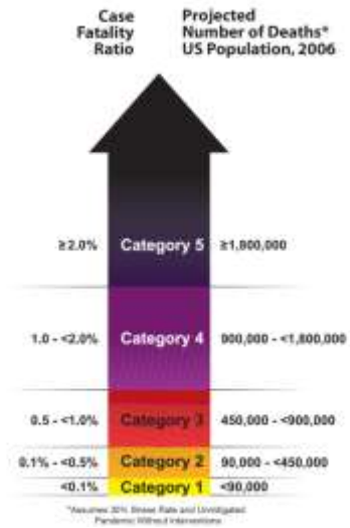
In **Figure 36** below, using a rating system of Category **1** through **5**, the Pandemic Severity Index **measures the magnitude of unmitigated pandemic flu without intervention in the United States.** For instance, a Category **5** outbreak would have an estimated **>2%** fatality rate, in comparison to the 1918 Spanish Flu outbreak. A Category **1** outbreak would assume a **20-40%** illness rate and would compare to seasonal influenza outbreaks.

Steps which individuals and communities can take to **reduce the risk of transmitting and obtaining the flu or other contagion in relation to the PSI** are provided in **Figure 37.**

The *State of New Hampshire Influenza Pandemic Public Health Preparedness and Response Plan 2007* included its classification system from the CDC Interim document "Community Strategy" noted above.

Figure 36
Pandemic Severity Index (PSI) for Influenza

Characteristics	Pandemic Severity Index				
	Category 1	Category 2	Category 3	Category 4	Category 5
Case Fatality Ratio (percentage)	<0.1	0.1-<0.5	0.5-<1.0	1.0-<2.0	≥2.0
Excess Death Rate (per 100,000)	<30	30-<150	150-<300	300-<600	≥600
Illness Rate (percentage of the population)	20-40	20-40	20-40	20-40	20-40
Potential Number of Deaths (based on 2006 U.S. population)	<90,000	90,000-<450,000	450,000-<900,000	900,000-<1.8 million	≥1.8 million
20th Century U.S.Experience	Seasonal Influenza (illness rate 5-20%)	1957,1968 Pandemic	None	None	1918 Pandemic



Source: Center for Disease Control (CDC)

Figure 37
Community Mitigation Strategy Interventions for PSI

Interventions by Setting	Pandemic Severity Index		
	1	2 and 3	4 and 5
Home			
Voluntary isolation of ill at home (adults and children); combine with use of antiviral treatment as available and indicated	Recommend	Recommend	Recommend
Voluntary quarantine of household members in homes with ill persons (adults and children); consider combining with antiviral prophylaxis if effective, feasible, and quantities sufficient	Generally not recommended	Consider	Recommend
School			
Child social distancing –dismissal of students from schools and school-based activities, and closure of child care programs	Generally not recommended	Consider: ≤ 4 weeks	Recommend: ≤ 12 weeks
–reduce out-of-school contacts and community mixing	Generally not recommended	Consider: ≤ 4 weeks	Recommend: ≤ 12 weeks

Source: Center for Disease Control (CDC)

Interventions by Setting	Pandemic Severity Index		
	1	2 and 3	4 and 5
Workplace/Community **Adult social distancing**			
–decrease number of social contacts (e.g., encourage teleconferences, alternatives to face-to-face meetings)	Generally not recommended	Consider	Recommend
–increase distance between persons (e.g., reduce density in public transit, workplace)	Generally not recommended	Consider	Recommend
–modify, postpone, or cancel selected public gatherings to promote social distance (e.g., stadium events, theater performances)	Generally not recommended	Consider	Recommend
–modify workplace schedules and practices (e.g., telework, staggered shifts)	Generally not recommended	Consider	Recommend

New Hampshire developed guidelines for phased response to the arboviruses (mosquito-borne) Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV) within the *State of New Hampshire Arboviral Illness Surveillance, Prevention, and Response Plan 2014* and its associated Community Risk Category Map. Risk Categories **1** through **5** determine human illness probability and the recommended response to outbreaks. This Plan is similar to other New England State Plans and should be consulted to ascertain proper emergency management response to this biological hazard. The Risk Categories in **Table 20** and the Central NH region community arboviral risk map displayed in **Figure 38 measure the potential risk of human arbovirus EEE or WNV illness outbreak.**

Table 20
Arbovirus (Mosquito-Borne) Illness Risk Index

Risk Category	Probability of Human Illness
1	Remote
2	Low
3	Moderate
4	High
5	Very High

Figure 38
Central NH Excerpt of Arboviral Community Risk Map (2014)

Source: State of New Hampshire

No magnitude index for invasive species has been located, although the pathways required for transmission of invasive species are lately studied within threat assessments. Information on pathway risk assessments are found at the US Department of Agriculture (USDA) National Invasive Species Information Center (NISIC) and the USDA Forest Service Northeastern Area websites.

A Map of Priority Areas for Invasive Plant Management in Allenstown was developed by a NH Fish and Game (NH FG) partnership. This Map is provided in **CHAPTER 12. APPENDIX**.

Biological hazards can also be caused by bioterrorism, the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals or plants. The Center for Disease Control (CDC) has categorized the bioterrorism agents into three (3) priority Categories **A**, **B** or **C**, indicating how easily they can be spread and the severity of illness or death they cause. The bioterrorism Categories **measure the risk of transmission of infectious organisms, germs, or pathogens** as indicated in **Table 21**. This bioterrorism agent category index does not include chemicals.

Table 21
Bioterrorism Agent Category Index

Category A	Category B	Category C
HIGHEST priority agents include organisms or toxins that pose the highest risk to the public and national security because:	**SECOND HIGHEST priority agents because:**	**THIRD HIGHEST priority agents include emerging pathogens that could be engineered for mass spread in the future because:**
They can be easily spread or transmitted from person to person	They are moderately easy to spread	They are easily available
They result in high death rates and have the potential for major public health impact	They result in moderate illness rates and low death rates	They are easily produced and spread
They might cause public panic and social disruption	They require specific enhancements of CDC's laboratory capacity and enhanced disease monitoring.	They have potential for high morbidity and mortality rates and major health impact.
They require special action for public health preparedness.		
Examples of Category A Agents	**Examples of Category B Agents**	**Examples of Category C Agents**
Anthrax (Bacillus anthracis)	Brucellosis (Brucella species)	Emerging infectious diseases such as:
Botulism (Clostridium botulinum toxin)	Food safety threats (e.g., Salmonella species, Botulism, Typi (thypoid fever), Escherichia coli O157:H7, Shigella dysenteriae)	Nipah virus
Plague (Yersinia pestis)	Glanders (Burkholderia mallei)	Hantaviruses
Smallpox (variola major)	Ricin toxin from Ricinus communis (castor beans)	Tickborne hemorragic fever or encephalitis viruses
Tularemia (Francisella tularensis)	Staphylococcal enterotoxin B	Yellow fever virus
Viral hemorrhagic fevers (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g., Lassa, Machupo])	Viral encephalitis (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis])	Multidrug-resistant Mycobacterium tuberculosis
	Water safety threats (e.g., Vibrio cholerae, Cryptosporidium parvum)	

Source: Center for Disease Control (CDC)

Potential Future Hazards

Students are vulnerable to health outbreaks as they tend to congregate in large numbers and in shared environments where physical contact is common.

It is difficult to predict where a biological hazard would occur due to human and wildlife mobility. Any of these biological hazards could affect Allenstown. The Town has swampy areas which are prime breeding ground for mosquitoes. Large deer herds that can be present do carry deer ticks. The Town's land cover is primarily forested.

TECHNOLOGICAL HAZARD EVENTS IN ALLENSTOWN

A compilation of technological hazards that have affected Allenstown in the past or have the potential to affect the Town appears in the following section. Within Allenstown, the risk of each hazard has been identified as a **HIGH**, **MODERATE**, or **LOW** **Probability** of occurrence based on past and potential events as indicated in the following Chapters. Potential **Magnitude** of each hazard based upon the same assumptions through the research and indicated by the **HIGH**, **MODERATE**, or **LOW** scale is also provided.

Hazard events were researched using a wide variety of sources for the original **ALLENSTOWN HAZARD MITIGATION PLAN 2004** which were the basis for the past events and updated to the present. Sources and techniques included interviewing local townspeople, researching Town Histories and related documents, and collecting information from governmental or non-profit websites. Other significant hazard events were described within this Chapter for the surrounding area or Merrimack County for the **HAZARD MITIGATION PLAN UPDATE 2015** and some of them may have affected the community. These disasters were also considered by the Committee when determining the risk assessment.

Committee member experiences, knowledge, and recollections generally comprise the local ***Events in Allenstown*** sections. While additional hazards might have occurred in Town, those events in the Plan are what the Committee chose to list, or were familiar with to list, to comprise the hazard events within the local ***Events in Allenstown*** sections over the various versions of the Hazard Mitigation Plan. The same is true for the ***Potential Future Hazards*** sections.

Events of this “technological” nature include hazardous material release, explosion/fire, transportation accident, building/structure collapse, power/utility failure, extreme air pollution, radiological event, fuel/resource shortage, strike, business interruption, financial collapse, and communication collapse. Dam failure is being treated as a natural hazard due to its flooding consequence and is located in the **NATURAL HAZARDS** section.

Hazardous Materials

ALLENSTOWN HAZARDOUS MATERIALS EVENTS	
Probability -	LOW
Magnitude -	HIGH
Overall Risk -	3.0

Hazardous materials and hazardous wastes contain properties that make them potentially dangerous or harmful to humans. They can be liquids, solids, contained gases or sludge. Hazardous wastes can be the by-product of manufacturing, as well as discarded commercial products. Most households contain cleaning agents that become hazardous waste when disposed of improperly. Chemicals have numerous benefits but can also cause hazards during their production, storage, transportation, use or disposal. Hazardous materials can have adverse health related effects and may even cause death in certain cases. In addition, hazardous materials may damage homes, businesses and other property, as well as natural ecosystems. Chemical accidents in plants or chemical spills during transportation may often release hazardous chemicals.

Area Events

The risk from hazardous materials spills or releases into groundwater is always present as long as consumers and homeowners make irresponsible decisions regarding the disposal of household chemicals. American families improperly dispose of, on average, 15 pounds of hazardous household chemicals in a year. These household chemicals can contaminate drinking water in wells and cause damage to various ecosystems. Most people contaminate without being aware that they are doing so. Further education is needed in order to reduce hazardous waste contamination.

- *Circa 1960-1970*
  A junkyard was in operation by a former public employee near the Village of Epsom Mills some decades ago at the old farm later owned by Henry Carnevale. Battery acid, gas, and oil from junk cars were dumped onto the ground, and the pollution problems were left for future generations to deal with. *Epsom Town Historian*

- *1995*
  The Suncook Valley Leather Tannery at 5 Main Street experienced a fire that took two weeks to extinguish. The environment was exposed to multiple chemicals due to fire suppression activities and the chemicals used in the facility. The original part of the building was built in the 1800s and was used in a chemically-dependent industry. Chemicals were also present in the building materials. *Pittsfield Hazard Mitigation Committee 2011*

- *May 27, 2004*
  Fifty-three businesses were forced to close at the Concord Center on Ferry Street in Concord when state officials discovered more than 70 buckets of formaldehyde, motor oil, roofing tar and cleaning solvents in the flooded basement. There were no reported injuries but some workers complained of headaches and dizziness. *Concord Monitor*

- *Summer 2008*
  Mixing of pool chemicals occurred, creating chlorine vapors at Ridgewood circle and at Black Hall Road in two separate incidents. *Epsom Hazard Mitigation Committee 2009*

Events in Allenstown

The following hazardous materials events have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Transportation of hazardous materials on State Route 3 and Route 28 is likely an everyday occurrence. These trucks could rollover and spill their contents onto these significant roadways.

In addition, there are several facilities in Town that handle, store, or use hazardous materials. Any of these facilities could have a spill or an incident on the highway could result in a spill. A listing of facilities which store or use hazardous materials is found in **Table 34**.

Explosion/Fire

ALLENSTOWN EXPLOSION/FIRE EVENTS	
Probability -	LOW
Magnitude -	MODERATE
Overall Risk -	2.0

Explosions are violent releases of energy due to a sudden increase in volume within a given space. Explosions produce extremely high temperatures and release gases. Urban fires in large, unoccupied buildings have occurred around the world. They are sometimes deliberate and sometimes accidental. They have the potential to cause widespread property damage and place both occupants and neighbors in danger.

Area Events

There is a risk of explosion in households that use gas or oil burners or who store such gases or chemicals in an unsafe manner. Business and industrial sites would also be at potential risk of explosion if there existed flammable materials and especially gases and/or other chemicals.

- *April 13, 2004*
  French's Toy Shoppe, an established downtown Concord business, was damaged by fire. A neighboring business and 3 abutting apartments were also damaged. The building was 230 years old. No injuries were reported, however, business was forecasted to be shut for one month for repairs. *Concord Monitor*

- *January 23, 2005*
  A near-fatal explosion occurred at the Gold Star sod farm in Canterbury. Gasoline fumes ignited a propane heater, triggering a fiery explosion and fire that consumed a large workshop and part of the main storage building. Fire crews from several departments battled the fire and laid sand down as a buffer between a nearby river in order to prevent contamination as pesticides and other chemicals burned. *Concord Monitor*

- *April 13, 2006*
  A Concord Dunkin Donuts on South Main Street was destroyed by fire. The two employees and two customers inside when the fire began were able to escape unharmed. *Concord Monitor*

- *July 2008*
  Cumberland Farms propane explosion of July 2008 resulted in the closure of Rte 4. *Epsom Hazard Mitigation Committee 2009*

- *January 21, 2010*
  Pleasant View Gardens suffered a fire which destroyed about 30,000 square feet of greenhouses, plus a building. The cause is undetermined. *Loudon Hazard Mitigation Committee 2010*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

A listing of facilities which store or use hazardous materials is found in **Table 34**; these locations may be most susceptible to explosions and the resulting fires.

Transportation Accident

ALLENSTOWN TRANSPORTATION EVENTS	
Probability -	LOW
Magnitude -	LOW
Overall Risk -	1.0

Given the number of passengers, frequency of travel, distances traveled and complexity of modern transport, relatively few major accidents involving large numbers of people have occurred. Nevertheless, transportation infrastructure has the potential to fail and cause major hazards; airplanes crash, trains derail, buses and other vehicles collide and boats sink.

Area Events

Automobile accidents could occur on any roadway in the region. A major accident would have the greatest impact for travelers on I-89, I-93 and I-393, as these roads experience high traffic volume and vehicles travel at high speeds. In addition, several rail lines create the potential for a transportation accident. Many motor vehicle accidents occur at train crossings. Trains could potentially derail, causing injuries or fatalities and hazardous materials spills. The Concord-Lincoln Line runs 73 miles between Concord and Lincoln. It is owned by the State of New Hampshire and operated by Plymouth & Lincoln Railroad/ New England Southern. The New Hampshire Main Line runs between Concord, Nashua and Lowell, MA. This line is owned by the Boston & Maine Corporation and the New Hampshire section is operated by the Springfield Terminal Railway. The commodities most frequently transported on New Hampshire's rail lines are pulp, paper & allied products, stone, sand, gravel and metals and clay and glass products. In 1999, 876,882 expanded tons of coal and petroleum products, 791,200 tons of chemicals and 171,700 tons of waste and scrap metals were transported on NH rail lines.

- *June 24, 1973*
  A railroad car of grains spontaneously combusted at the Concord railroad yard. It was determined the grain was improperly processed and stored while it was too hot.
  Concord Daily Monitor

- *1990*
  A plane crash in 1990 on Martin Hill Road in Epsom killed two people. *Epsom Hazard Mitigation Committee 2009*

- *January 7, 2001*
  A minor landing accident occurred on an icy runway at the Concord Municipal Airport. The accident was blamed on the inexperience of the student pilot and the poor landing conditions. No injuries were reported. *National Transportation Safety Board*

- *July 3, 2005*
  A Cessna 152 airplane was damaged during takeoff from Concord Municipal Airport. A certified flight instructor and non-certified student were not injured in the accident.
  National Transportation Safety Board

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Traffic accidents may be the most likely type of transportation hazard in Allenstown, but they have not yet been significant enough to warrant listing in the Plan. State Route 3 runs past Suncook Village and intersects Route 28 which travels in a north-south direction. Much of the Town's business lies along these two roads. As traffic increases, there is the likelihood that accidents will occur in this area in the future.

Building/Structure Collapse

ALLENSTOWN BUILDING/STRUCTURE COLLAPSE EVENTS	
Probability -	LOW
Magnitude -	MODERATE
Overall Risk -	2.0

Building or structure collapse may occur as a result of fire due to the age of a building or structure as well as from a significant natural disaster such as an earthquake or deterioration of a foundation due to water damage. Any natural disaster that could weaken a building's or structure's integrity, coupled with inadequate building conditions, could result in collapse.

Area Events

Building and structure collapse, although not common, can result from flooding, heavy snow buildup on rooftops, and weakened structural integrity due to fire. Building and structure collapse are more likely to occur in older, less stable structures which are located in sensitive locations.

- *September 3, 2004*
  In Webster, a fire destroyed a colonial-era barn and killed two horses. The extensive fire resulted in building collapse which made it very hard for authorities to determine the cause of the fire. *Concord Monitor*

- *January – February 2008*
  In Concord, heavy snowloads caused multiple building collapses, including Oak Bridge Condominium Pool Building, Beede Electric, Hall Street Capitol Distributors loading dock. *Concord Hazard Mitigation Task Force 2011*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

The Schools have flat roofs, so snow loading can be a problem. Historic structures generally have peaked roofs and are not as susceptible to snow loading or building collapse; their roofs are built more securely and will not collapse during minor fires. Buildings and large barns with heavy snow loads or other events could cause the roofs to collapse.

Several building in Allenstown that contain a number of people which would be vulnerable to such a hazard including Hodgson 25 Canal Street, Allenstown Elementary School, Armand Dupont School , Riverside Terrace, and 98 Main Street.

ALLENSTOWN POWER/UTILITY FAILURE EVENTS	
Probability -	HIGH
Magnitude -	MODERATE
Overall Risk -	6.0

Power/Utility Failure

Utilities systems exist everywhere and are subject to damage from construction work, accidents and extreme weather. Many utilities are protected by back-up generators to prevent failure, whatever the cause may be. Nuclear power plants produce roughly 20% of the nation's power, they exist in nearly all states and 3 million Americans live within 10 miles of a nuclear power plant. The greatest risk to life resulting from a nuclear power plant failure is radiation contamination resulting from radiation release into the environment. People in the immediate vicinity are at greatest risk of radiation contamination. Another common source of energy, coal, can be potentially hazardous because coal power plants emit chemicals such as mercury and sulfur dioxide.

Area Events

New Hampshire contains nuclear and coal power plants. There are two coal power plants in New Hampshire: Merrimack Plant in Bow and Schiller in Rockingham County. The Merrimack Station Power Plant is the largest coal-fired electrical generating station owned by PSNH. It supplies power to 189,000 residents. The greatest health concern over the Merrimack Plant in Bow is the release of mercury into air and area water bodies, such as the Merrimack River.

Customers in Allenstown receive electricity from Public Service Company of New Hampshire.

In the harsh environment that New Hampshire residents are subjected to, power and utility failures on an isolated level are not uncommon. During nearly every heavy snow storm, ice storm, or other severe weather event, someone, somewhere, loses power and/or other utilities.

- *November 9, 1965*
  Northeast Blackout of 1965. The New York- New England grid was not prepared to handle an overload caused by a blown relay and the entire region, from Pennsylvania to New Hampshire and Vermont, was in the dark for a short period of time. The huge effort of re-establishing energy began immediately following the event. The blackout affected the western portion of the state, while the eastern portion and Maine experienced no power failure. *Central Maine Power*

- *February 18, 2006*
  55 mph wind gusts, resulting from a cold front in the region, felled trees which blocked roads and downed power lines. 80,00 homes and businesses in the state reportedly lost power. Unitil had outages in every town it serves. A reported 25,000 customers in the Concord area lost power. *Concord Monitor*

- *December 12, 2008*
  Hundreds of thousands of home and business owners in the State were without heat or electricity after an ice storm moved through the State causing the largest power outage in New Hampshire's history. Unitil had 5,000 customers out in Concord. A large amount of FEMA funds were received for snow and ice removal from streets and sidewalks as well as removing trees and limbs off streets when they came down with ice on them. *Concord Monitor, Concord Hazard Mitigation Task Force 2011*

- *February 25-March 1, 2010, High Wind Event*
  In Concord, 2,000 Unitil customers were out of power at the peak outage period. Unitil opened their emergency operations center, and the City opened their EOC for a few hours. Problems included Interference with electrical lines, trees down, and road blockages. Crews were out clearing the entire period. Wind Storm caused power/utility failures, road closures from downed power lines and trees, home and property damage. Some resident's homes were without power for several days. *Unitil Energy Systems and Concord Hazard Mitigation Task Force 2011*

Events in Allenstown

The following events are found to have impacted Allenstown.

- *January 15,1998 Ice Storm*
  Significant power outages were experienced during this first major storm to wreak havoc with power lines. *Allenstown Hazard Mitigation Committee 2015*

- *December 11, 2008, Ice Storm*
  The Ice Storm of December 11-12, 2008 caused significant power outages in Allenstown. Residents were temporarily sheltering in Concord hotels. The EOC was prepared to activate, but power came back on for essential services and the Village area. It took about 7 days before power was completely restored to the Town. Fallen branches along multiple streets or onto powerlines or homes are reported in addition to reports of utility poles on fire and requests for welfare checks.

  From the After Action Report (AAR), on Wednesday, December 10, Allenstown Emergency officials started to receive the first indications of a potential snow/ice event that would eventual have a significant impact on the Town of Allenstown. The snow/ice event that followed resulted in the loss of electricity to 20% of the population or approximately 1,000 residents. Electric power was out of service for a lengthy period of time and was not restored completely until the following Tuesday, December 16. There were several road closures due to power lines and trees in the roadway.

  Several residents utilized the regional shelter established by the Red Cross on Green Street in Concord. However the majority of residents either spent their time in hotels, with relatives or had generators to power their residents. A fair number of residents needed water which they were able to obtain at either the Police or Fire Stations. The Police Station was established as a warming center that several residents used.

  During this event the Board of Selectmen declared a State of Emergency. Although the EOC was not activated several ESFs were operational while others were at a heightened state of readiness. The Fire Department responded to 25 calls for service consisting of arcing wires, wires down, alarm activations and CO2 issues. The Police Department responded to 100 calls for service during the event. *Allenstown Hazard Mitigation Committee 2015*

- *February 23-March 3, 2010, Severe Winter Storm*
  Allenstown experienced power outages, with trees down on wires, roads, cars, and buildings. The flooding from this storm was worse than the snow and ice damage. Emergency responders activated the EOC. All Departments were on emergency footing. *Allenstown Hazard Mitigation Committee 2015*

- *August 26-September 6, 2011, (High Wind) Tropical Storm Irene*
  The EOC was activated, and all Departments were on emergency footing. However, the storm did minimal damage. Road closures occurred for a maximum of 15-20 minutes. Trees fell on multiple homes, many of which were destroyed as a result, but the expected rain and flooding did not occur. *Allenstown Hazard Mitigation Committee 2015*

- *October 28-29, 2012, Hurricane Sandy*
  Minor damage to power lines occurred from Tropical Storm Sandy in October, 2012 because of trees down and high winds. Infrastructure damage to traffic signals was experienced at the Main Street and Ferry Street intersections. The EOC was not activated. Overall, Allenstown was not greatly impacted. *Allenstown Hazard Mitigation Committee 2015*

- *February 8-20, 2013, Severe Winter Storm NEMO*
  Allenstown experienced only minor damages from this snow storm. Sporadic power outages were experienced. The EOC was not activated. Only the Police and Fire Departments were on emergency footing. *Allenstown Hazard Mitigation Committee 2015*

Potential Future Hazards
Power losses are commonly sustained during widespread hazard events. Populated areas include the Suncook Village area, and Deerfield Road Corridor.

The Town's communications equipment on High Ridge Trail Tower is vulnerable to several hazards and could experience power loss.

There is one cellular tower in Allenstown, located on behind 24 Allenstown Road. A tall communications tower could possibly be damaged by natural, human, or technological hazard events. A communications interruption or failure resulting from damage to the tower could affect the capabilities of emergency personnel.

The Allenstown Waste Water Treatment Facility Plant could be severely impacted by a power outage.

The Schools are set up to provide shelters if the residents are able to leave their homes. Residents should be able to shelter in place, gathering needed supplies and water ahead of time.

A few individuals in Town who require oxygen and power would comprise the most vulnerable populations. The power could not be offline for more than two or three days without causing losses. Over the last few years, standby generators have been installed at the Fire Station and the Town Hall.

Extreme Air Pollution

ALLENSTOWN EXTREME AIR POLLUTION EVENTS	
Probability -	LOW
Magnitude -	MODERATE
Overall Risk -	**2.0**

Air pollution is the release of gases, finely divided solids or finely dispersed liquid aerosols into the Earth's atmosphere that exceed the capacity of the atmosphere to dissipate them or dispose of them into the biosphere. Volcanic activity is the greatest source of air pollution, however, dust storms, wildfires and vehicle exhaust also greatly contribute to air pollution. Humans are at risk of respiratory illnesses due to increased air pollution.

Area Events

The New Hampshire Department of Environmental Services conducts daily air quality forecasts for the entire state. Forecasts are based on Ozone and Particle Pollution. Levels of air quality range from "Good"- no health impacts expected- to "Hazardous"- everyone should avoid all outdoor exertion. Email alerts from the NHDES are available on days when the air quality is predicted to reach unhealthy levels.

Extreme air pollution affects New Hampshire citizens 10 days during an average year. Although New Hampshire does not cause most of the pollution that affects its citizens, large urban areas to the south and large power plants in the Midwest produce the emissions that are brought to the state by atmospheric winds. New Hampshire has little control over the extreme air pollution in the state. It can be assumed that in the future air pollution in the state will worsen.

- *September 14, 2005*
  The Department of Environmental Services declared air-quality action days in the state for 9/14 and 9/15 because of an increase in air particles due to slow moving, stagnant air masses from the Ohio Valley. High temperatures can contribute to decreased air quality. The DES advised people to limit all outdoor activities. *Concord Monitor*

- *May 31, 2010*
  On Memorial Day weekend, brush fires from Canada impacted the air quality of New Hampshire Residents from more than 50 wildfires that are burning out of control in Quebec. Over 150,000 acres in central Quebec, north of Montreal and Quebec City, about 500 miles north of Manchester, reduced visibility to 1.75 miles in Concord. No air quality alert was issued, although people with respiratory issues were urged to remain indoors. *Union Leader 2010*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Allenstown residents can do little to reduce extreme air pollution, but educating them to monitor the air quality action days and staying indoors on days with a high level of pollution is the best way to protect residents.

PSNH in nearby Bow across the Merrimack River has made many improvements to their particulate containment systems as mandated by the EPA. Previously, Allenstown, ash and particulates would noticeably coat vehicles overnight in some areas of Town.

Wildfires and other types of fires can reduce air quality in isolated areas. Vehicular traffic from Routes 3 and 28 are other sources of local air pollution.

Radiological Accident

Radiological accidents occur primarily at nuclear power plants when radioactive gases are released. They can cause widespread contamination to people and ecosystems as were the cases in Chernobyl and 3-Mile Island. Their cleanup may take centuries because of the extreme saturation of contaminants in the soil, in buildings and in water supplies.

ALLENSTOWN RADIOLOGICAL ACCIDENT EVENTS	
Probability -	LOW
Magnitude -	HIGH
Overall Risk -	3.0

Area Events

The Central New Hampshire region is geographically located between Vermont Yankee Nuclear Power Plant in Vernon, VT and the Seabrook Nuclear Station in Seabrook, NH. These facilities present the greatest risk of radiation contamination to the region in the case of a meltdown or other catastrophic event. As more nuclear facilities are decommissioned, the mobilization of nuclear wastes will increase, augmenting the risk of exposure. Small underground shelters or concrete basements may provide a level of protection. Personal household supplies of iodide, purchased in advance, can help limit the uptake of radiation in the thyroid.

- *January 7, 2010 - Present*
  The Vermont Yankee Nuclear Power Plant notified the Vermont Department of Health that groundwater monitoring samples taken in November 2009 contained tritium. An investigation was launched, and a major source of leakage was found in steam pipes inside the Advanced Off-Gas (AOG) drain line to be clogged and corroded. The samples taken show the movement of the tritium contamination in the groundwater into the Connecticut River. Health risks are being investigated. *Vermont Department of Health 2012*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Allenstown is positioned between Vermont Yankee and Seabrook nuclear power plants. No one portion of the Town is more vulnerable than the next. Allenstown is not considered vulnerable to any radiological threat from failure of the nuclear power plants due to any terrorist attack or any other malfunction causing public concerns.

Occasionally, trucks using Route 3 or Route 28 would likely transport radiological waste and/or material through the Town borders. The spillage of these materials and/or wastes has the potential to cause a serious but isolated contamination event.

Fuel/Resource Shortage

ALLENSTOWN FUEL/RESOURCE SHORTAGE EVENTS	
Probability -	LOW
Magnitude -	MODERATE
Overall Risk -	2.0

Current popularly-used sources of energy, such as petroleum, are limited and their production levels are variable, therefore they are prone to shortages and will continue to be so in the future. Fuel and resource shortages are also due to rises in demand. As different regions of the world develop they will need more fuel. Fuel and resource shortages are evident in the rising costs of energy.

Area Events

Fuel and resource supplies are often dictated by international geopolitical events, as was the case in 1973, and weather events such as hurricanes in the Gulf of Mexico, therefore it is difficult to predict future hazards that may affect the central New Hampshire region. Nevertheless, any major weather event occurring in the south during hurricane season or a particularly cold winter in the northeast, can and will impact the fuel and resource supply in Webster and the entire region. In addition, as made evident in recent months, political instability in oil producing countries and foreign policy do affect fuel supply in the United States.

- *1973*
  The OPEC nations halted exports of oil to the Western nations that supported Israel during a conflict known as the Yom Kippur War, which uncovered the actual power OPEC had on the world's energy business. In the United States, a massive shortage led to high fuel prices and near chaos. The incident caused the U.S. to seriously consider its energy situation and energy independence. *Canadian Economy Online*

- *August 31, 2005*
  Gasoline prices rose between 40 and 50 cents in Hurricane Katrina's wake and there was concern that in many regions gasoline wouldn't even be available to consumers. President Bush stated that the natural disaster "disrupted the capacity to make gasoline and distribute gasoline". *The White House Office of the Press Secretary, August 31, 2005*

- *April, 2006*
  MSNBC released the article: "Gasoline Supply Problems Hit U.S. East Coast". The article began by stating: "Scattered gas stations from New Hampshire to Virginia are facing temporary shortages as the industry grapples with a transition to more ethanol-blended fuel." The cause of the fuel shortage was due in large part to logistical and transitional difficulties as terminal owners were required to switch to the higher ethanol-content gas. *MSNBC website, April 21, 2006*

- *April 2007*
  Rumford Energy oil went out of business, filing bankruptcy, with pre-paying customers losing their money. The company owed at least $1million dollars to more than 1,000 customers in the Concord area. *Concord Monitor 05/18/07*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Allenstown residents and officials are not at any particular risk for fuel/resource shortage. Rather, they as consumers are under the same economic conditions and burdens as the rest of the country. Personal fuel consumption choices will result in individuals and the municipality weathering any existing and future fuel shortage.

There are three (3) service stations operating in Allenstown for public use, although many use nearby Hooksett or Concord stations. Both stations receive their supply of gasoline from outside of the local area. With rising prices, people may have to make choices as to how to best economize their vehicle trips. Allenstown will most likely continue to feel the effect of the national energy crisis. The NH DOT and NH DRED pumps may also be available for emergency use.

Strike

A strike is the collective refusal to work under unfavorable conditions set by employers. Employees who wish to express their disdain for low wages, long hours or poor working conditions will often strike as a group in order to make a greater impression on an employer, the public or the media.

ALLENSTOWN STRIKE EVENTS	
Probability -	Low
Magnitude -	Low
Overall Risk -	**1.0**

Area Events

Strikes are most common of employees of public institutions and private businesses. Strikes have the potential to disrupt business, schools and/or government.

- *1922*
  A nine month strike occurred in Manchester, NH at the Amoskeag Manufacturing Company over wages and hours.

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

It is illegal for public employees and unions to strike, but "sick-outs" can occur. The only employer in Town to have a union is the School District. If a strike/ sick-out occurred, this could have an effect on the Town and the residents. Any strikes, or public outcry at the act of striking, could stretch the Police Department resources as well as the Fire Department resources.

Business Interruption

Business interruption may occur following a natural disaster or catastrophe, such as a hurricane, fire or flood. Occasionally, businesses are forced to temporarily close their operations in order to make necessary repairs caused by damage or to relocate. During a period when a business is interrupted, it may lose money to competitors, causing further economic hardship.

ALLENSTOWN BUSINESS INTERRUPTION EVENTS	
Probability -	Low
Magnitude -	Low
Overall Risk -	1.0

Area Events

Significant employers in the region, many of which provide crucial services or goods, have the potential to be incapable of opening for business if a disaster were to occur. Most recently, during the May 2006 floods in the central New Hampshire region, numerous area businesses experienced interruptions. Several businesses are highlighted below.

- *May 10, 2005*
  A February fire at Bowie's Market in Bradford caused a two and a half month business interruption as Bruce Bowie and family relocated their market to the town of Andover. The Bowie family was out of work during the interruption. They eventually relocated to an East Andover location where they had previously done business. *Concord Monitor*

- *May 30, 2006*
  An article in the Concord Monitor, published May 30, 2006, described the business interruption experienced by some local area businesses. Pitco Frialator, Blue Seal Feeds and Grappone Auto Dealerships were affected by the high water levels. At Pitco Frialator, within a week everything was back to normal and a large contract with a restaurant chain was nearly complete. At the Concord Business Center, 45 businesses that rent space were not able to work for 2 days. Over 140 businesses reported damage to the state. Farms, orchards and greenhouses were hardest hit. *Concord Monitor*

  Route 3A in Concord and Bow, an area of multiple car dealerships, industrial enterprises, and major employers, was closed for three days as a result of the "Mother's Day" floods, which affected businesses, restaurants, and truck stops in Bow. *Bow Hazard Mitigation Committee 2007*

- *December 2008 Ice Storm*
  Businesses throughout New Hampshire were affected by the ice storm.

Events in Allenstown

While no specific business interruption has been reported to have impacted Allenstown, many businesses are believed to have been disrupted during the December 11, 2008 Ice Storm, February 23-March 3, 2010 Severe Winter Storm, August 26-September 6, 2011Tropical Storm Irene, and the October 28-29, 2012 Hurricane Sandy.

Potential Future Hazards

The potential for interruptions exists for all Allenstown businesses because of other hazards that have the potential to cause such interruptions. Any of the other risks mentioned has the potential to cause business interruptions. These interruptions could be harmful to Allenstown business owners. An interruption at the Bi-Wise market or at the three service stations, in that they provide local critical services or goods for residents who cannot travel far, may be harmful to the Town as a whole.

Financial Issues, Economic Depression, Inflation, Financial System Collapse

Financial concerns such as depression, recession, inflation and financial system collapse have previously affected the United States and most industrialized nations of the world. Both developing and industrialized nations have experienced economic depression and financial system collapse due to unpredictable changes in the stock market, inflation, geopolitics, energy prices, etc. The most memorable economic depression that has occurred in the United States was the Great Depression that began in 1929 and may not have ended until the U.S. entered WW II in 1941. Economic depression can also occur on a local level with the closing of a major company or manufacturer resulting in widespread layoffs.

ALLENSTOWN FINANCIAL COLLAPSE EVENTS	
Probability -	LOW
Magnitude -	HIGH
Overall Risk -	**3.0**

Area Events

Financial concerns mentioned above are somewhat difficult to predict, especially when considered on a localized level. Economic concerns such as layoffs are fickle and can occur on a whim. Some major employers in the region with great influence are: Shop & Save Grocers-Concord, Graphic Packaging-Concord, Precision Technology Inc.-Pembroke, CAIMS Protective Clothing-Pittsfield, Concord Hospital, Grappone Auto Dealerships-Concord and Pitco Frialator in Concord.

- *April 27, 2006*
  In Franklin, 172 workers were laid off from Polyclad Laminates. *Concord Monitor*

- *April 30, 2006*
  It was reported that China Mill in Suncook plans to lay off 58 of its 150 workers in June of 2006. *Concord Monitor*

- *Summer 2009*
  Precision Technology in Pembroke closed suddenly without the required 60 days notice under the federal Worker Adjustment and Retraining Notification Act and owed their 131 employees money. The business printed and bundled fliers and inserts for mass mailings. The State assisted the workers in obtaining what was owed. *Concord Monitor 10/5/10*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Multiple simultaneous business closings within the town would have an adverse affect on residents and businesses. A number of residents work in Town, so the local economy could be affected. Other working outside the community would also be subject to the effects of local economic issues.

Communications Systems Interruptions

ALLENSTOWN COMMUNICATIONS SYSTEM INTERRUPTION EVENTS	
Probability -	LOW
Magnitude -	MODERATE
Overall Risk -	2.0

Communications systems, like utilities, are found everywhere and are subject to damage by construction work, severe weather and traffic accidents. Because communications systems depend on electricity, any power outage may cause an interruption in a communications system. In addition, many communications systems have buried cables which are particularly vulnerable to being cut. Communications systems interruptions can negatively impact a region, town, neighborhood or household in the case of a natural disaster, catastrophe or other emergency.

Area Events

Communications systems are as prone to failure as power. Power lines often share cables and poles with communications systems. When power fails, cable and telephone services frequently fail as well.

- *Mid-1990s*
  It was thought that in 1994 or 1995, Concord Hospital phone lines were down. *Boscawen Hazard Mitigation Committee 2007*

- *Circa 2003*
  A Verizon failure in Manchester affected the State's 911 dispatch. *Concord Fire Department*

- *September 30, 2005*
  High winds and heavy rains left thousands without power. In Bow, the radio station WTPL 107.7 FM lost power for 2 hours. *Concord Monitor*

Events in Allenstown

The following events are found to have impacted Allenstown, although it is highly likely resident communications and possibly some Town communications were interrupted by the various power-outage causing disasters since 2008 – the December 11, 2008 Ice Storm, February 23-March 3, 2010 Severe Winter Storm, August 26-September 6, 2011Tropical Storm Irene, and the October 28-29, 2012 Hurricane Sandy.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Telephone lines provide main service to Allenstown. Communication failure is often a secondary hazard event from a natural disaster such as a high wind event or severe winter weather. Such an outage will likely affect the majority of Town residents and the traveling public passing through Allenstown.

The Town's communications equipment on High Ridge Trail Tower is vulnerable to several hazards and could experience power loss.

There is one cellular tower in Allenstown, located on behind 24 Allenstown Road. A tall communications tower could possibly be damaged by natural, human, or technological hazard events. A communications interruption or failure resulting from damage to the tower could affect the capabilities of emergency personnel.

Systems failures could affect Town businesses and local government on a large scale. Cell phones are good alternatives to telephones, but some residents do not have computers.

If land lines and cell towers were interrupted, then cable and email would likely be interrupted as well. The state has portable communication trailers that can be moved into Allenstown if needed.

HUMAN HAZARD EVENTS IN ALLENSTOWN

A compilation of human hazards that have affected Allenstown in the past or have the potential to affect the Town appears in the following section. Within Allenstown, the risk of each hazard has been identified as a **HIGH**, **MODERATE**, or **LOW** **Probability** of occurrence based on past and potential events as indicated in the following Chapters. Potential **Magnitude** of each hazard based upon the same assumptions through the research and indicated by the **HIGH**, **MODERATE**, or **LOW** scale is also provided.

Hazard events were researched using a wide variety of sources for the original **ALLENSTOWN HAZARD MITIGATION PLAN 2004** which were the basis for the past events and updated to the present. Sources and techniques included interviewing local townspeople, researching Town Histories and related documents, and collecting information from governmental or non-profit websites. Other significant hazard events were described within this Chapter for the surrounding area or Merrimack County for the **HAZARD MITIGATION PLAN UPDATE 2015** and some of them may have affected the community. These disasters were also considered by the Committee when determining the risk assessment.

Committee member experiences, knowledge, and recollections generally comprise the local ***Events in Allenstown*** sections. While additional hazards might have occurred in Town, those events in the Plan are what the Committee chose to list, or were familiar with to list, to comprise the hazard events within the local ***Events in Allenstown*** sections over the various versions of the Hazard Mitigation Plan. The same is true for the ***Potential Future Hazards*** sections.

Events of this “technological” nature include hazardous material release, explosion/fire, transportation accident, building/structure collapse, power/utility failure, extreme air pollution, radiological event, fuel/resource shortage, strike, business interruption, financial collapse, and communication collapse. Dam failure is being treated as a natural hazard due to its flooding consequence and is located in the **NATURAL HAZARDS** section.

Events of human nature include economic threats, general strike, terrorism (ecological, cyber and chemical), sabotage, hostage situations, civil unrest, enemy attack, arson, mass hysteria, and special events where any human-caused hazard could occur. While relatively uncommon, these events are all caused by direct human action.

Economic Threats

Identity theft and crimes against financial institutions pose an economic threat to all citizens.
These threats include bank fraud, debit and credit card fraud, telecommunications and computer crimes, fraudulent identification, fraudulent government securities, counterfeiting, and electronic fund transfer fraud. These crimes can have drastic economic impacts upon an individual, family, business or organization.

ALLENSTOWN ECONOMIC THREAT EVENTS	
Probability -	HIGH
Magnitude -	MODERATE
Overall Risk -	**5.0**

Area Events

Economic threats such as those mentioned above can indeed threaten an individual, family, business or organization. Recently, identity theft and fraud have become matters of great concern for people wishing to protect their identity and investments.

- *November 2009*
  The Meredith Financial Resources Mortgage Service, which suddenly declared bankruptcy, was declared a front for a massive Ponzi scheme that may have cost investors as much as $100 million. The money was supposedly placed in trusts and used to finance construction projects. Investors' money may have instead been used to pay interest to earlier investors, rather than financing the construction projects they claimed to back. Officials with the New Hampshire Department of Justice, the U.S. attorney's office, the FBI, and state banking and securities regulators continue to investigate the case. *Concord Monitor, December 2009*

Events in Allenstown

The following events are found to have impacted Allenstown.

- *Recurring to Present*
  Reports on internet fraud happens regularly THE FTC reports back to the Town of Allenstown the electronically data any identify fraud, credit card fraud, counterfeiting (3-4 per year which have been prosecuted) bank fraud, telecommunicataions fraud (calls from Russia, Nigeria) wire fraud, back to the Town for investigation. *Allenstown Hazard Mitigation Committee 2015*

Potential Future Hazards

The citizens of Allenstown are potential victims of economic threats, but no more so than citizens of other towns and cities in New Hampshire and beyond. Personal education about options and protection measures is key to individual financial protection. Incident history indicates that the elderly are most frequently targeted by scams and fraud. **Table 32** displays the **Economic Assets** in Allenstown. Economic challenges puts strain on residents of Allenstown, and these impacts to citizens could be far reaching. Most of it will be computer based.

General Strike

A general strike is the stoppage of work by a significant proportion of workers over a broad range of industries in an organized effort to achieve economic or political objectives. A general strike is a form of social revolution.

ALLENSTOWN GENERAL STRIKE EVENTS	
Probability -	LOW
Magnitude -	LOW
Overall Risk -	1.0

Area Events

Strikes which would affect the area could occur at public and private institutions and at those businesses which supply goods and services to consumers.

- *May 1, 2006*
  The most recent general strike that occurred in the United States and New Hampshire was the 'Day Without Immigrants' strike during which both legal and illegal immigrants, in a show of solidarity, boycotted businesses and did not work or go to school in order to demonstrate the economic impact immigrants have on the United States. Events in New Hampshire were held at Dartmouth College and City Hall Plaza, Manchester.

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

It is illegal for public employees and unions to strike, but "sick-outs" can occur. The only employer in Town to have a union is the School District, the contract expires in 2018. If a strike/ sick-out occurred, this could have an effect on the Town and the residents. Any strikes, or public outcry at the act of striking, would stretch the Police Department resources as well as the Fire Department. Regionally, GE in Hooksett is a large employer of Allenstown residents.

Terrorism

ALLENSTOWN TERRORISM EVENTS	
Probability -	**MODERATE**
Magnitude -	**HIGH**
Overall Risk -	**5.33**

The use of force or violence against people in order to create fear, cause physical harm and/or intimidation or for reasons of ransom. Terrorists often make threats in order to create fear and change public opinion. Cyber terrorism consists of hackers who threaten the economy by attacking the intricate computer infrastructure, affecting business and communication. Biological and chemical terrorism refers to those infectious microbes or toxins used to produce illness or death in people or animals. Terrorists may contaminate food or water, thus threatening an unprotected civilian population. Eco-terrorism refers to the destruction of property by persons who are generally opposed to the destruction of the environment or to make a visible argument against forms of technology that may be destructive to the environment.

Area Events

The following acts of terrorism are considered so because of their intent to create fear and also for their political motivation.

- *November 1, 1993*
  A shooting at the Newbury Town Hall was ignited by tax and land disputes. Two town workers were killed, another was wounded, and the gunman shot and killed himself. *Concord Monitor*

- *August 1997*
  Five people were left dead after a series of shootings which began in Bow by a man who was angered over long simmering land disputes. The individual was eventually apprehended in Colebrook, NH. *NH Homeland Security and Emergency Management*

- *October 27, 1998*
  The lit fuse of a bomb left in the Concord Library stacks set off smoke alarms that may have saved the lives of many people. The individual allegedly responsible for the bomb scare left notes complaining about state government. *NH Homeland Security and Emergency Management*

- *October 1998*
  About a dozen buildings were evacuated after the New Hampshire Technical Institute in Concord received an anonymous call warning that three bombs had been placed on campus. This event followed the bomb scares at the Concord Library. *AP Online, 11/01/98*

- *September 2001*
  The 2001 anthrax attacks in the United States, also known as Amerithrax from its Federal Bureau of Investigation (FBI) case name, occurred over the course of several weeks beginning on Tuesday, September 18, 2001, one week after the September 11 attacks. Letters containing anthrax spores were mailed to several news media offices and two Democratic U.S. Senators, killing five people and infecting 17 others. According to the FBI, the ensuing investigation became "one of the largest and most complex in the history of law enforcement". *Wikipedia 2014*

- *October 2001 to February 2002*
  The community responded to many suspicious packages and substances as a result of the introduction of anthrax spores into US Postal facilities elsewhere in the country. *Concord Fire Department*

- *October 2010*
  A bomb threat was called in to Concord Hospital as a result of a child custody issue and the group known as the "Oathkeepers." The FBI was contacted, but nothing was found in the Hospital during a bomb sweep. Phone lines were flooded with calls by the Oathkeepers to inhibit using the landlines. The incident was determined to be harassment instead of an actual event. *Concord Hazard Mitigation Task Force 2011*

Events in Allenstown
The following events are found to have impacted Allenstown.

- *1987*
  The Toll House at Bear Brook State Park was exploded by a bomb. No injuries were sustained as the bombing occurred at night. No one was discovered, but later a pipe bomb resident was prosecuted in the 1990s. *Allenstown Hazard Mitigation Committee 2015*

- *Circa Late 1990s*
  On Main Street, a pipe bomb with gunpowder in a canister exploded. Local Fire and Police Departments were called. Another bomb was sent to a MA mall and the perpetrator convicted of terrorism. *Allenstown Hazard Mitigation Committee 2015*

- *Circa 2000*
  White powders were sent to the doctor's office in the Professional Park. The powders were later found to be a hoax. *Allenstown Hazard Mitigation Committee 2015*

- *February 2012*
  Six chemical bombs (made with common household chemicals) were found at a NH DOT shed, and others at houses. No damage of consequence occurred. *Allenstown Hazard Mitigation Committee 2015*

Potential Future Hazards
It is unlikely that the Town will be the target of any act of international terrorism. Domestic terrorism has occurred within the last 15 years in Allenstown and regionally. Possible targets could be the Town Office, the Allenstown Elementary and Armand Dupont Schools, the Post Office, or the Fire or Police Stations, all governmental facilities, State facilities (Bear Brook State Park, NHDOT shed), veterinary hospital, or churches.

Sabotage

Sabotage is a deliberate action aimed at someone or some institution in order to weaken that person's or institution's integrity and reputation through subversion, destruction, obstruction or disruption. Sabotage may occur in war, a workplace, in the natural environment, as a crime, in politics or as a direct attack against an individual.

ALLENSTOWN SABOTAGE EVENTS	
Probability -	**LOW**
Magnitude -	**HIGH**
Overall Risk -	**2.67**

Area Events

Sabotage is an isolated event and is nearly impossible to predict. Sabotage can infiltrate a business, organization or individual from any part of the world because of modern technology.

- *October 2000*
  A former help desk worker at a Portsmouth, NH company was found guilty by federal prosecutors of network sabotage for hacking into the company's system after being fired and deleting important documents. *U.S. Department of Justice Press Release. June 18, 2001*

- *November 5, 2002*
  A group of Republicans plotted to commit political sabotage by jamming a series of Democratic phone banks on Election Day. Two former Republican officials have been sentenced to federal prison for the crime. *Concord Monitor, June 16, 2006*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Any incident of sabotage in Allenstown could come from within Allenstown or any nearby Town, or outside of the State or country, but some sabotage efforts would require perpetrators to be on site. Computer systems could be vulnerable, such as at the Town Office. Technological systems such as water treatment or wastewater treatment, or public water supplies could also be vulnerable.

Many significant facilities in Allenstown could be subject to sabotage. These include the major powerlines going through Deerfield, high pressure Tennessee gasline running parallel to the Merrimack River, three public well fields, a water tank over the Hooksett town line, and the State Park explosives facility. The direct physical attack rate of politicians in Allenstown is higher than that of all NH municipalities.

Cyberterrorism

ALLENSTOWN CYBERTERRORISM EVENTS	
Probability -	HIGH
Magnitude -	HIGH
Overall Risk -	**8.0**

Unlawful attacks and threats of attacks against computers, networks, and the information stored on these systems when done to intimidate, coerce, or cause harm and is politically or socially motivated is defined as cyberterrorism. Distinct from computer crimes, they can cause serious consequences to those against which this threat is used. The cyberterrorism results in violence against people or property or causes harm to generate fear. Examples include attacks that lead to death, injury, explosions, severe economic loss or attacks that cripple critical infrastructure.

Area Events

Much of the infrastructure upon which the State of NH relies is automated and could be subject to cyberterrorism. These could include the government, military, communications systems, utilities, fuel, electrical systems, nuclear power plants, transportation systems, financial systems, emergency medical services and more.

- No details on specific events were found during research on NH and the Central NH Region or were identified during Committee discussion.

Events in Allenstown

The following events are found to have impacted Allenstown.

- *June 2013*
  Five attacks in 2013 to date to the Town servers have been recorded, one of which did significant damage. The Town Hall computer system servers were affected, and some computers required hard drives reformatting in mid-May 2013. No leads were found. *Allenstown Hazard Mitigation Committee 2015*

- *2013*
  A number of recent cyber attacks have tried to infiltrate the Police Department system, but none have been getting through. *Allenstown Hazard Mitigation Committee 2015*

Potential Future Hazards

The municipal, Elementary School, Armand Dupont School, Police Department, and Allenstown Waste Water Treatment Facility computer systems could be vulnerable to cyberterrorism. As the Town becomes more integrated, the opportunity for damage is more possible. The WTTF servers run the entire plant, so hackers could do significant damage, mixing chemicals, etc. Both the Police Department and Town Hall have personal information on their systems, which could be very damaging if accessed. The Fire Department TEMSIS contains sensitive information on people, following the national form so cyberterrorists could cross over and get national data too.

Hostage Situation

A hostage situation is an incident where an innocent civilian is held by someone or some group of persons demanding something from another person or group of persons not related to the person or persons being held hostage. The person or persons held are done so pending the fulfillment of certain terms.

ALLENSTOWN HOSTAGE SITUATION EVENTS	
Probability -	LOW
Magnitude -	LOW
Overall Risk -	**1.33**

Area Events

Hostage situations can occur anywhere, including banks, schools, governmental facilities, institutions, prisons, and in other locations.

- *October 15, 1971*
  In Nashua, a man held another man hostage at gunpoint and demanded to see the Chief of Police. The acting Chief arrived at the scene and was immediately shot by the man holding the other man hostage. The acting Chief died 12 days later. *City of Nashua, NH website*

- *1980*
  In Portsmouth, a woman took two students hostage for 2-3 days. She demanded to speak to Jimmy Carter about the hostage situation in Iran. She was talked out of the situation, released the students, and was prosecuted. *Bow Hazard Mitigation Committee*

- *1987*
  A Concord High School student took a group of students hostage. The Police Department shot and killed him. *Allenstown Hazard Mitigation Committee 2015*

- *October 2007*
  In Rochester, a man held three people working for Hillary Clinton's presidential campaign hostage with a bomb and demanded to speak with Senator Clinton. Local police, State Police, and the FBI address the situation and took the man into custody without incident. *News Reports*

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Hostage situations are isolated events and are nearly impossible to predict. The sites where this potential mainly exists are the Town Hall, the Allenstown Elementary and Armand Dupont Schools, and everyday domestic situations. People have barricaded themselves within residences, but not hostage situations have occurred in Allenstown.

Civil Disturbance / Public Unrest

ALLENSTOWN CIVIL DISTURBANCE/ PUBLIC UNREST EVENTS	
Probability -	LOW
Magnitude -	LOW
Overall Risk -	**1.0**

This hazard refers to types of disturbances that are caused by a group of people, often in protest against major socio-political problems including sit-ins or protests against wars and any general and public expression of outrage against a political establishment or policy. Examples of civil disturbance include protests of the WTO and G8 meetings and large-scale sit-ins to protest against the Iraq War. Many instances of civil disturbance and public unrest are quelled by a use of force from police. Participants may be victims of personal injury in severe cases.

Area Events

The most probable locations of larger civil disturbance and/or protest in the State are at the State House in Concord and at the universities and colleges. They have also occurred at controversial locations, such as feminist health centers. The Concord Feminist Health Center was the victim of arson in 2000.

- *January 1998*
  Between 500 to 600 University of New Hampshire students took over an intersection in Durham. The use of force by police and fire crews was required in order to dissipate the potential risk of further unrest and potential injury due to violence. Several students were treated after being sprayed with pepper spray. *"Civil Unrest in Durham: Lessons Learned", Fire Service News, NH Fire Academy, Volume XVII, Number 1*

- *October 2003*
  Anti-abortion group protests school's sex education program in Goffstown. The anti-abortion protestors were affiliated with Hillsborough County Right to Life. The intent of the group was to express their view that the sexual education curriculum in the district was inappropriate. *Siecus Public Policy Profile, State Profile of New Hampshire*

- *November 9, 2005*
  In Concord, the teachers' union protested for weeks over contract negotiations. One of their qualms was the rising cost of health benefits. As of the 9th, teachers had not supervised after-school clubs, participated at staff meetings or been involved with other volunteer roles for two weeks. Each morning before classes they picketed. The union's lead negotiator said: "people are happier when they feel fairly compensated." *Concord Monitor*

- *March 8, 2006*
  About 25 Trade union members protested outside Concord Hospital on Pleasant Street, arguing that the hospital should refuse to hire contractors for the new addition who do not provide health insurance to their workers. Protestors stated that non-union contractors who didn't provide health insurance had an unfair advantage over those who did. *Concord Monitor*

- *March 18, 2006*
  A reported 400 citizens marched in Concord to recognize the 3 year anniversary of the beginning of the war in Iraq. The protestors marched around downtown Concord and finished in front of the statehouse. *NH Independent Media Center*

- *Late April, 2006*
  A protest took place at the statehouse in Concord. Protestors demonstrated their opposition to the federal government's new national ID card proposal, the Real ID Act.
  Washington Post

Events in Allenstown
The following events are found to have impacted Allenstown.

- *2001*
  At Holiday Acres sit in when Chester Turnpike new road opening Marilynn Drive. They did not want the entry because it was a dead e3nd street, more traffic
  Allenstown Hazard Mitigation Committee 2015

Potential Future Hazards
Large scale incidents of civil disturbance and public unrest are unlikely in Allenstown. Potential public unrest may take place at the Town Office, or at the Allenstown Elementary and Armand Dupont Schools. The tax rate of 2013 will be increasing nearly $8.00 per $1,000 of valuation and the Town Hall may experience civil unrest although it was the school rate which increased. Town Meetings (annually in March) have had civil unrest in the distant past but it might be more likely to see at future meetings.

Enemy Attack

ALLENSTOWN ENEMY ATTACK EVENTS	
Probability -	LOW
Magnitude -	LOW
Overall Risk -	1.0

Enemy attack, although unlikely, has previously occurred on American soil and may occur in the future. The most memorable enemy attack of recent years was the 9/11/2001 attack against the World Trade Center in New York and against the Pentagon. Much effort is being made by the Government to prevent an enemy attack before it occurs by collecting intelligence on potential enemies of the United States.

Area Events

The area does have a number of potential targets which may be attractive to enemy attack, including Vermont Yankee and Seabrook Nuclear Power Plants, the Franklin Falls, Hopkinton-Everett, and Blackwater Dams, and the State Office complexes in Concord.

- No details on specific events were found during research on the region.

Events in Allenstown

The following events are found to have impacted Allenstown.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

The likelihood of an enemy attack in Allenstown is low. However, with State Routes 3 and 28 running through the Town, regional targets could bring terrorist through the community.

Arson

The unlawful and intentional damage, or attempt to damage, any real or personal property by fire or incendiary device. Arson is a crime that can have grave economic repercussions, cause great property damage and cause personal injury or death.

ALLENSTOWN ARSON EVENTS	
Probability -	**MODERATE**
Magnitude -	**HIGH**
Overall Risk -	**6.0**

Area Events

Many fires are difficult to prove as cases of arson because building/structure collapse permanently conceals evidence and arson can be as simple as throwing a cigarette butt in brush from a moving car. Fire Investigators regularly determine the cause of fires, some of which are determined as arson events.

- *May 29, 2000*
  The Feminist Health Center in Concord was the site of a fire determined to be arson. An accelerant was used. The center did not experience an interruption of business.
  An open letter from the Concord Feminist Health Center

- *August 8, 2005*
  Three Claremont teens were indicted on charges that they threw a bomb at an unoccupied house which caused major damage. *Concord Monitor*

- *December 18, 2005*
  An elderly Concord man's death was ruled a homicide after the man was pulled from a house fire. The cause of the fire was arson. *Concord Monitor*

- *January 15, 2007*
  According to investigators, a fire that destroyed a senior center under construction in Hopkinton appeared to be caused by arson. The two-story building was being framed and was set to open in the spring. *Concord Monitor*

Events in Allenstown

The following events are found to have impacted Allenstown.

- *1987*
  The Toll House at Bear Brook State Park was exploded by a bomb. No injuries were sustained as the bombing occurred at night. No one was discovered, but later a pipe bomb resident was prosecuted in the 1990s. *Allenstown Hazard Mitigation Committee 2015*

- *July 2001*
  At the White Rabbit Inn, a fatal arson killed one person and injured several others. Suspects were identified but no prosecutions; however, the suspects were indicted on other charges. *Allenstown Hazard Mitigation Committee 2015*

- *1990s to early 2000s*
  Five arson fires at China Mill (Hodgson Mill) fabric factory occurred. No arrests were made but, suspects were identified in some of them. *Allenstown Hazard Mitigation Committee 2015*

- *Summer 2007*
  Riverside Apartments at 98 Main St (once an old Mill building, now residential) housed arson activities. Carpet burns were found in the hallway, and minor building damage was experienced. *Allenstown Hazard Mitigation Committee 2015*

Potential Future Hazards
Arson is a real and potential in Allenstown and could occur anywhere in Town which is heavily forested. Buildings that contain numerous people, such as the Town Hall, the Allenstown Elementary and Armand Dupont Schools could be at a higher level of risk. Wildfires in remote areas, such as deep within Bear Brook State Park, are also of particular concern because of accessibility and the potential to damage large areas and the difficulty of getting timely fire suppression to the scene.

Bear Brook State Park is a significant location of arson as many fires are set. Hodgson Mills has a transitional workforce which may be more subject to crime.

Mass Hysteria

The collective hysteria (shared hysterical or sociopsychological symptoms) experienced by more than one person. Mass hysteria may occur when a group witness a particular traumatic event and experience the same nauseating symptoms or react similarly. Examples of mass hysteria include such cases as rioting and frenzy, particularly following large-scale accidents or terrorist attacks.

ALLENSTOWN MASS HYSTERIA EVENTS	
Probability -	LOW
Magnitude -	LOW
Overall Risk -	**1.0**

Area Events

Mass hysteria events are more likely to occur in large population centers, which in the area includes sections of Concord, the New Hampshire International Speedway in Loudon during race events, and in gatherings of people in other locations. Significant annual events are listed in **Table 22**.

- *Mid 2000s*
  At a local hockey game at New England College, parents and teams reacted to an incident during the event. Multiple people were removed by the Police Department.
  Henniker Hazard Mitigation Committee 2007

Events in Allenstown

The following events are found to have impacted Allenstown. Significant local annual events are listed in **Table 23**.

- No details on specific events were found during research on Allenstown or were identified during Committee discussion.

Potential Future Hazards

Schools are potential locations of mass hysteria, but the risk is low.

Special Events

Events draw large numbers of people to area hotels, stores, restaurants and streets, generating increased revenue for local businesses. Large gatherings of people can influence behaviors of groups which may result in mass hysteria, or may become a target for a form of terrorism.

ALLENSTOWN SPECIAL EVENTS	
Probability -	Low
Magnitude -	Low
Overall Risk -	1.0

Area Events

Many special events in and around Concord have a significant impact on the number of people in any given location on any particular day. **Table 22** summarizes the major annual events that directly or indirectly impact the entire region.

Table 22
Significant Area Annual Events

Event	Date	Number of People	Location
Annual Law Enforcement Event	Second Week in May	2,000	Concord - State House / LOB
Balloon Festival	Mid-late July	Unknown	Hillsborough
Balloon Rally	First weekend in August	10,000	Pittsfield - Drake's Field
Bradford Fire Works/Fair	July 4 weekend	500-1500	Bradford Center
Breast Cancer Walk	October	5,000	Throughout Concord
Concord High School Graduation	Middle of June	4,000	Concord - Memorial Field
Day after Thanksgiving Shopping	Day after Thanksgiving	Unknown	Concord - Mall Area, Loudon Road, Downtown
Deerfield Fair			
Downtown Market Days / Summer Music Festival	Third week in July (Wed, Thurs, Fri)	5,000 daily	Concord – Downtown
First Fridays Events	First Fridays in May, June, and July	Unknown	Concord - Main Street
UNH Law School Graduation	Middle of May	Unknown	Concord - Washington Street
Halloween Howl	Friday before Halloween	1,000-2,000	Concord - Main Street
Holiday Magic Parade	November	1,000	Concord - Heights
Hopkinton State Fair	September (Labor Day wknd)	40,000 - 50,000 total	Hopkinton - State Fairgrounds
July 4 Fireworks	July 4	5,000	Concord - Memorial Field
Kiwanis Parade & Fair	Second Weekend in May (Thurs, Fri, Sat & Sun)	1,000	Concord - Main Street, Everett Arena
Laconia Motorcycle Rally Week	June (week before Father's Day)	100,000 - 400,000	Laconia, Weir's Beach, Lakes Region area
Leaf Peeping Tourism	September/October	500-800	Concord
Memorial Day Parade	Memorial Day (observed)	Unknown	Concord - Main Street
Midnight Merriment	First Friday in December	Unknown	Concord - Main Street
Mt Sunapee Craft Fair	Early August	Unknown	Newbury, Mt. Sunapee State Park
NH Motor Speedway: Motorcycle Weekend	June (Father's Day week)	15,000 - 20,000	Loudon

Table 22, continued
Significant Area Annual Events

Event	Date	Number of People	Location
NH Motor Speedway: NASCAR Cup Race	July and September weekends	110,000	Loudon
NH Technical Institute Graduation	Mother's Day Weekend	1,500	Concord - NHTI
Payson Center Rock'n Road Race 5K	May	10,000+	Throughout Concord
Presidential Primary Election (media attention)	Sept - Nov quadrennially	Unknown	Concord - State House, Polling Places
St. Paul's School Alumni Weekend	Weekend after Memorial Day (Fri, Sat, & Sun)	2,000	Concord - St. Paul's School

Source: CNHRPC Region Hazard Mitigation Committees

Events in Allenstown
Local special events have an immediate impact on the community as the infrastructure bends to accommodate a significant number of additional people traveling to one location, and being situated in one location, on event days. Events which take place in Allenstown are displayed in **Table 23**.

Table 23
Significant Local Annual Events

Event	Date	Number of People	Location
Old Home Day	Last Sat of August	200	Parade from School Street into Pembroke
Reach the Beach	Middle of September	5,000	Franconia Notch - Hampton (BBSP transition, rest spots, FD provides food)
Toys for Tots Run (motorcycles travel through Allenstown)	Late September	2,000	Concord DMV - Amherst Street
Toys for Tots Bear Brook Snowmobile and 4 Wheelers	December	1,300	Bear Brook State Park

Source: Allenstown Hazard Mitigation Committee 2004, 2015

Potential Future Hazards
Effect of these events could include traffic congestion, vehicle accidents, and lack of good and services. Police, Fire, and Emergency Management forces should be aware and on alert when any of the regional or local annual events occur.

EVACUATION ROUTES

Evacuation routes out of a community generally follow along main travel ways in a north-south and/or east-west pattern to lead to other communities and state or interstate routes. In Allenstown, the primary evacuation routes were identified as Route 3 north-south into Pembroke and Hooksett, Route 28 north into Pembroke, and Main Street north-south into Pembroke and Hooksett. These routes service the majority of the population, which is concentrated in the downtown area and those living within the Bear Brook State Park borders. Secondary evacuation routes are Deerfield Road east into Deerfield.

Primary Evacuation Routes

- Route 3, North-South (Pembroke-Hooksett)
- Route 28, North (Pembroke)
- Main Street, North-South (Pembroke-Hooksett)

Secondary Evacuation Routes

- Deerfield Road, East (Deerfield)

These evacuation routes out of Allenstown are depicted on ***Map 1: Potential Hazards***. In the event of an emergency, there should be a plan to coordinate evacuation traffic in the appropriate directions.

MAP 1: POTENTIAL HAZARDS

The first map in this four-part series, ***Map 1: Potential Hazards,*** depicts where hazards are likely to occur in Allenstown. The intent of this map is to portray a picture of which areas of Town may be more vulnerable to certain types of hazards and how best to exit Allenstown in the event of an emergency.

Areas where flooding regularly occurs along roadways are shown with wetlands and the Town's water features. Areas identified as particularly susceptible to road flooding damage are noted in addition to Allenstown's steep slopes (>15%). The power lines and evacuation routes are also shown. Bridges and dams are displayed as potential hazards. The intent of this map is to portray a picture of which areas of Town may be more vulnerable to certain types of hazards.

MAP 2: PAST HAZARDS

Map 2: Past Hazards identifies the locations where known natural disasters have occurred in town. In Allenstown, areas of flood damage, ice and snow damage, fire damage, and frequent accident locations were noted on the map. The past hazard locations were identified by the Hazard Mitigation Committee or through research into the hazards listed within this Chapter.

CHAPTER 3.
ASSET AND VULNERABILITY IDENTIFICATION

2015 PLAN UPDATE

The Hazard Mitigation Committee reviewed and updated as needed each of the assets and risks tables within this Chapter. Sites were added or removed, and contact information was revised. Modifications were made to the ***Primary Hazard Vulnerability*** column to reflect changes over the last five years. addition of technological and human hazards into the document. Revisions were made to the future development section, which now includes a clear table. The ***Map 3: Assets and Risks*** and ***Map 4: Potential Hazards and Losses*** maps were also updated as needed.

INTRODUCTION

The identification of assets within a community is integral to determining what may be at risk from a natural disaster. This Chapter examines the assets in five categories: CRITICAL FACILITIES, VULNERABLE POPULATIONS, ECONOMIC ASSETS, SPECIAL CONSIDERATIONS, and HISTORIC/OTHER CONSIDERATIONS.

Not only are the address and phone number supplied, where available, for each identified asset, the hazards to which the asset is most susceptible are listed. Hazards are primarily natural disasters, but can also include secondary disasters (such as sewer or water line rupture) or human-made disasters or emergencies (such as a vehicular accident).

In Allenstown, each asset can be damaged by any or all of the dozens of hazards listed in CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT. The majority of the assets appear on ***Map 3: Assets and Risks*** at the end of this section. Because of the numerous hazards each site may be susceptible to, the main hazard categories of Natural, Human, and Technological were often used in the following tables to signify the primary type of hazard susceptibility. When these general designations are not sufficient, specific hazards are alternatively listed if they are appropriate for a given site.

CRITICAL FACILITIES

Critical facilities are categorized as those town or state buildings or services that are first-responders in a disaster. Fire Departments, Police Departments, and Highway Departments as well as the Town Office are crucial in providing and coordinating the emergency services. Other critical facilities would include hospitals and shelters. Utilities or utility features, such as cisterns or culverts, are included because of communication and power/water services provided.

Table 24
Essential Facilities

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Town Hall	16 School Street	485-4276	Lightning, Gas Leak, Utility/Power Failure, Terrorism, Cyberterrorism, Earthquake
Police Department	40 Allenstown Road	485-9500	Lightning, Gas Leak, Utility/Power Failure, Terrorism, Explore/Fire, Sabotage
Fire Department	1 Ferry Street	485-9202	Lightning, Gas Leak, Utility/Power Failure, Cyberterrorism
Highway Department/Transfer Station	161 Granite Street	485-5460	Utility/Power Failure, Explosion/Fire, Biological, Radiological
Casella Transfer Station (private)	104 River Road	888-485-1469	Gas Leak, Utility/Power Failure, Biological, Explosion/Fire, Radiological
DOT Equipment Shed	Route 28 at North end of River Road)	485-9526	Hurricanes/Severe Storms, Tornados, Lightning,

Source: Allenstown Hazard Mitigation Committee 2015

Table 25
Utilities

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Wet Cistern 1	Clearview Road	485-9202	Ice/Snow, Earthquake
Wet Cistern 2	Birchwood Road	485-9202	Ice/Snow, Earthquake
Wet Cistern 3	Dowst Road	485-9202	Ice/Snow, Earthquake
Wet Cistern 4	Mount Delight Road	485-9202	Ice/Snow, Earthquake
Wet Cistern 5	New Rye Road	485-9202	Ice/Snow, Earthquake
Wet Cistern 6	Chestnut Drive (near #30)	485-9202	Ice/Snow, Earthquake
Wet Cistern 7	Chestnut Drive (opposite #75)	485-9202	Ice/Snow, Earthquake
Wet Cistern 8	Podunk Road	485-9202	Ice/Snow, Earthquake
Dry Cistern	157 Deerfield Road (by swimming pond)	N/A	Ice/Snow, Earthquake, Drought
Allenstown Wastewater Water Treatment Facility	35 Canal Street	485-5600	Earthquake, Flooding, Lightning, Utility/Power Failure, Gas Leak, Biological , Chemical, Sabotage, Fire/Explosion, Dam Breach
Hodgdon Mill Canal (Essex Power)	Canal Street (next to mill)	N/A	Flooding, Earthquake, Ice Jams, Debris Impacted Infrastructure
Sewage Pump Station 1	River Road at Pinewood Road intersection	485-5600	Earthquake, Flooding, Lightning, Utility/Power Failure, Biological , Chemical, Sabotage, Fire/Explosion, Dam Breach
Sewage Pump Station 2	Glass Street (Pembroke)	485-5600	Earthquake, Flooding, Lightning, Utility/Power Failure, Biological , Chemical, Sabotage, Fire/Explosion, Dam Breach
Bear Brook SP Water Pump Station (2)	157 Deerfield Road	485-7257	Flooding, Ice, Fire, Utility/Power Failure, Sabotage, Earthquake, Drought

Source: Allenstown Hazard Mitigation Committee 2015

Table 26
Town-Owned Culverts*
Suncook River Plan

GIS*	Location	Size	Material	Condition	Notes
1	Park & Howe				
2	4 Howe Ave				
3	Bailey Ave				Not in Road C/B out Pipe
4	Ridge Road East				C/B Not in Road out on Lincoln
5	8 Oak Street		SDR35		
6	Sunset Ave				C/B Not in Road out to Ravine
7	36 Library Street				C/B Not in Road out to Iris Pond
8	Canal & Reynolds				C/B in Road out to River
9	Canal				C/B Not in Road out to River
10	9 Houle				Not in Road C/B out Pipe
11	Bartlett at the end				Not in Road C/B out Pipe
12	Dodge Rd	8"	Steel		
13	Dodge & River Rd	12"	Galvanized		At Intersection
14	168 River Rd		Granite	Bad	Blocked and Does not work
15	160 River Rd	8"	SDR35		C/B in Road into the Brook
16	133 River Rd				C/B in Road into the Woods
17	11 River Rd		Granite		Roadway
18	River Rd & Turnpike Intersection				Pipe in Road into C/B
19	Chester Turnpike				C/B in Road into Swamp
20	Chester Turnpike & Granite St	12"	Galvanized		Roadway
21	Granite St (Keith side of the road)				Side of the Road Ditch line to the Brook
22	134 Granite St	8"	Hand core		C/B in Road into the Swamp
23	138 Granite St	6"	Hand core		Drywell under drain in Stone to Swamp
24	144/146 Granite St	6"	Hand core		Drywell under drain in Stone to Swamp
25	198 Granite St				Roadway Brook to C/B to Brook
26	30 Townhouse	2 30"	Cement		Roadway
27	258 River Rd	10"	SDR35		Roadway to Brook
28	264 River Rd	20"	Hand core		Roadway to Brook
29	265 River Rd	20"	Galvanized	Bad	Roadway to Brook
30	5 Gilbert Rd	14"	Hand core		Roadway New in 2012
31	33 Gilbert Rd	6"	SDR35		Roadway Drywell to Woods
32	New Rye	5'	Galvanized		Roadway to Brook
33	45 New Rye	10"	Galvanized		Roadway

Table 26, continued
Town-Owned Culverts
Suncook River Plan

GIS*	Location	Size	Material	Condition	Notes
34	70 New Rye	12"	Galvanized		Roadway
35	105 Wing Rd		Galvanized		Roadway to Woods
36	105 Wing Rd		SDR35/Cement		Roadway to Woods
37	324 Deerfield Rd	2'	Cement		Roadway
38	Podunk Bridge				Box Culvert Roadway
39	341 Deerfield Rd	12"	Cement		Roadway
40	367 Deerfield Rd	10"	Cement		Roadway
41	420 Deerfield Rd	18"	Cement		Roadway
42	Deerfield Rd Wason's Bridge	8'	Galvanized		Roadway
43	16 Mt Delight	30"	Galvanized		Roadway
44	26 Mt Delight				C/B in Road to Swamp
45	37 Mt Delight Bridge	40"	Cement	Bad	Roadway
46	37 Mt Delight Bridge	20"	Galvanized	Bad	Roadway
47	Mt Delight Top of the Hill Town line	12"	SDR35		Roadway
48	32 Dowst Rd	10"	SDR35		C/B in Road to Swamp

*Source: Highway Department; *Culvert Location GIS Project 2015*
**blank cells indicate information is Not Available (N/A)*

A listing of the culverts in the community, as displayed in **Table 26**, is the beginning of a culvert maintenance Plan. In 2013, the Town began locating their culverts via GPS so the digital mapping layer can be placed on the Town's VUEWorks system. A database of attributes is allocated to each culvert in the field while taking the GPS point reading. Knowing where culverts are located and replacing, maintaining, and monitoring then regularly will help alleviate some of the flooding conditions in Allenstown, particularly those related to washouts.

Many of the brooks flowing through the culverts are tributaries of the Suncook River and contribute to overall flooding conditions along the Towns floodplains. The brooks include Bear Brook, Little Bear Brook, Catamount Brook, Boat Meadow Brook, Pease Brook, and other small, unnamed urban brooks. They all drain into the Suncook River.

Table 27
Dams
Suncook River Plan

Facility Type	Status	Class	Location	Hazards the Site is Most Susceptible to
004.01 Bear Hill Pond Dam	Active	L	Boat Meadow Brook	None
004.02 Pembroke Water Works Dam	Active	NM	Boat Meadow Brook	None
004.03 Old Reservoir Dam	Active	NM	Boat Meadow Brook	None
004.04 Cold Spring Pond Dam	Active	NM	Cold Spring Brook	None
004.05 Pumping Plant Dam	Ruins	---	Boat Meadow Brook	None
004.06 Fire Hole Dam	Ruins	---	Tributary of Boat Meadow Brook	None
004.07 Cold Spring Brook Club Pond Dam	Ruins	---	Cold Spring Brook	None
004.08 Fluerry Farm Pond Dam	Ruins	---	Tributary of Boat Meadow Brook	None
004.09 Pease Brook Dam	Not Built	---	Pease Brook	None
004.10 Catamount Pond Dam	Active	L	Bear Brook	None
004.11 Catamount Brook Dam	Ruins	---	Catamount Brook	None
004.12 Hall Mountain Marsh Dam	Active	L	Bear Brook	None
004.13 Archery Pond Dam	Active	NM	Tributary of Bear Brook	None
004.14 Pease Brook Dam	Ruins	---	Pease Brook	None
004.15 Hayes Marsh Dam	Active	L	Catamount Brook	None
004.16 Buck Street Dam East	Ruins 2012	---	Suncook River	None
004.17 Wasson Farm Pond Dam	Active	NM	Unnamed Stream	None
004.18 Philie Recreation Pond Dam	Active	NM	Unnamed Stream	None
027.12 Gavins Falls Dam (Bow)	Active	H	Merrimack River	None
190.01 China Mill Dam (Pembroke)	Active	L	Suncook River	None
190.02 Pembroke Dam (Pembroke)	Active	L	Suncook River	None
190.03 Webster Mill Dam (Pembroke)	Active	S	Suncook River	None

Source: NH Department of Environmental Services GIS dams database; Allenstown Hazard Mitigation Committee 2015

The dams in Table 27 above have four classifications by the NH Department of Environmental Services which are differentiated by the degree of potential damages that a failure of the dam is expected to cause. The classifications are designated as **High Hazard (H)**, **Significant Hazard (S)**, **Low Hazard (L)**, and **Non-Menace (NM)**. Other dams are unclassified, which means that they are inactive. Further description is available in CHAPTER 2. HAZARD IDENTIFICATION.

The highlighted dams in **Table 27** indicate a higher-risk dam to the community, the **L**, **S**, and **H** dams. The Garvins Falls Dam in Concord is included as it is considered a potential danger to Allenstown should the dam fail. The Emergency Action Plan Notification for the dam is displayed as excerpted from the ***Public Service Company of New Hampshire Merrimack River Project FERC Project No. 1893 Shoreline Management Plan, May 2009*** in **CHAPTER 2. HAZARD IDENTIFICATION.**

Three (**3**) dams in Pembroke along the Suncook River in Suncook Village, at the town line of Allenstown, would have a catastrophic affect on Allenstown's downtown should flooding occur at these dams. The two Towns should work together on this issue. The Plan has developed an Action proposing this idea.

Table 28
Bridges

Facility Type	Location	Phone	Primary Hazard Vulnerabilities
068/055 US Route 3 Bridge	Over Suncook River/Buck St at Pembroke TL	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials
088/067 NH 28 Bridge (culvert)	Over Boat Meadow Brook	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials
092/066 River Road Bridge (box culvert)	Over Boat Meadow Brook	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials e
107/098 NH 28 Bridge	Over Suncook River at Pembroke TL	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials
129/103 Deerfield Road Bridge	Over Bear Brook	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials
150/063 Podunk Road Bridge	Over Catamount Brook	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials
161/079 Podunk Road Bridge	Over Bear Brook	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials
181/078 Deerfield Road Bridge	Over Pease Brook	271-2667	Flooding, Debris Impacted Infrastructure, Traffic Accident, Haz Materials
Main Street Bridge (Town)	Over Suncook River	485-5460	Traffic Accident, Haz Materials

Source: NH Department of Transportation State Bridge List;
Allenstown Hazard Mitigation Committee 2015

Table 29
Shelters, Schools, and Medical Facilities

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Pinehaven Boys Center	River Road	485-7141	Terrorism, Sabotage Cyberterrorism, Tornado, Hurricane, Downburst
Allenstown Elementary School (SHELTER)	30 South Main Street	485-9574	Lightning, Gas Leak, Utility/Power Failure, Terrorism, Sabotage Cyberterrorism, Tornado, Hurricane, Downburst
Armand R. Dupont School	10 School Street	485-4474	Lightning, Gas Leak, Utility/Power Failure, Terrorism, Sabotage Cyberterrorism, Tornado, Hurricane, Downburst
Allenstown Animal Hospital	9 River Road	485-7133	Terrorism, Sabotage, Cyberterrorism, Ecoterrorism, Tornado, Hurricane, Downburst
PACE Academy	50 Pinewood Road	N/A	Flooding (500 year)
Suncook Health Center	50 Pinewood Road	N/A	Flooding (500 year)
Tritown Family Dental	50 Pinewood Road	N/A	Flooding (500 year)

Source: Allenstown Hazard Mitigation Committee 2015

STREAM GAGES - *Suncook River Plan*

Tools are available for the Town to monitor Suncook River levels at two river gaging stations. The USGS gage in North Chichester was installed in 1918, and has been operated/monitored on and off since then, but current observations are only available from November 2007 to present. The USGS Allenstown gage off of the Route 28 bridge was installed most recently in fall 2012 after the Town of Allenstown secured a grant for its purchase, installation, and maintenance to help prepare its residents for Suncook River flooding. Because of the newness of the Allenstown gage, the data available is limited. The direct websites to these gage monitoring sites are provided in **Table 30**.

Table 30
Stream Gages

Facility Type	Location	Website to Monitor	Primary Hazard Vulnerabilities
USGS 01089500 River Gage - Chichester	North Chichester on Suncook River	http://nwis.waterdata.usgs.gov/nwis/inventory/?site_no=01089500	Flooding, Ice Jams, Debris Impacted Infrastructure
USGS 01089925 River Gage – Allenstown	Route 28 on Suncook River (bridge at Pembroke Town Line)	http://nwis.waterdata.usgs.gov/nh/nwis/uv?site_no=01089925	Flooding, Ice Jams, Debris Impacted Infrastructure

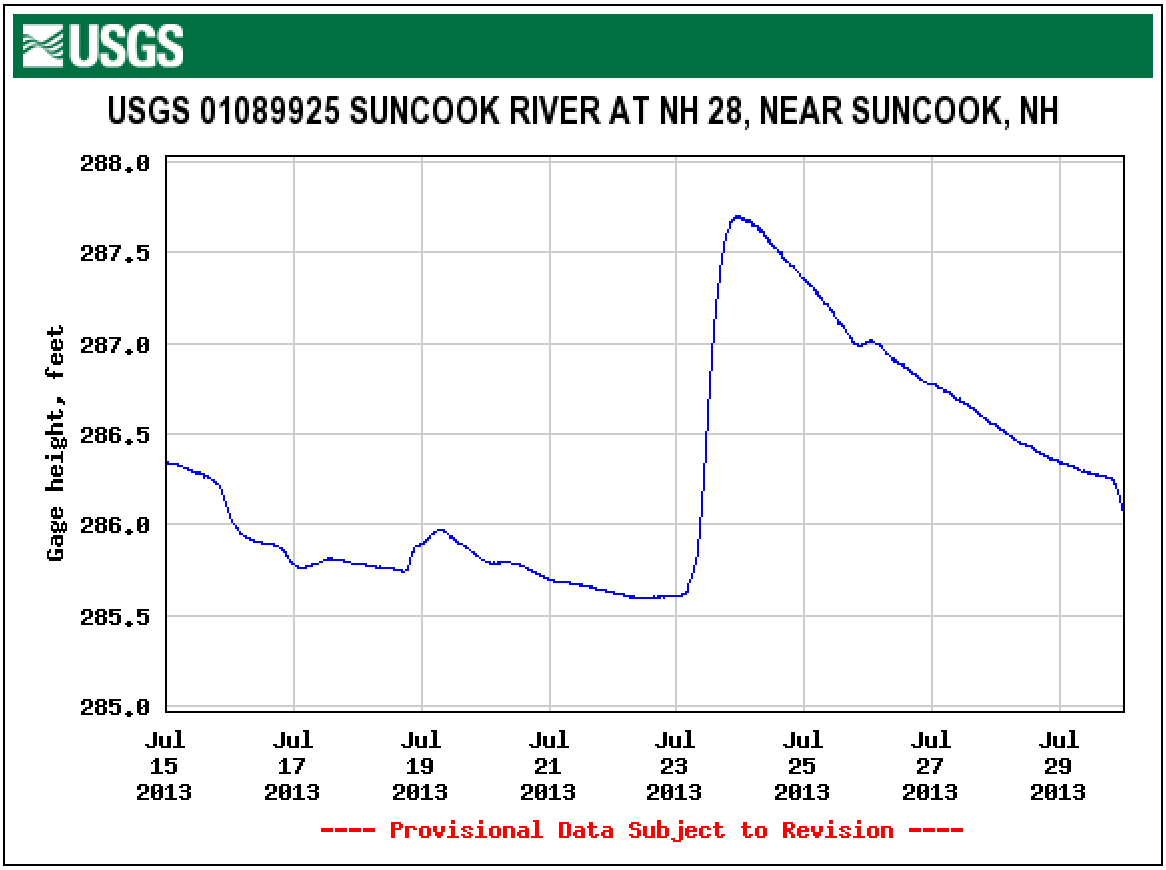
Source: Allenstown Hazard Mitigation Committee 2015

An automated USGS river gage (01089925) was installed in July 2011 at the Route 28 bridge at the Allenstown/Pembroke town line to read river elevation height using FEMA 2010 Emergency Management Performance Grant (EMPG) funding provided to Allenstown. Three years of gage maintenance was included, which ended July 2014. Allenstown will have to pay to continue service of the gage at this time. In addition, a static river height gage was installed at the same time on the Route 3 bridge which permits visual monitoring in the field.

Streamgages are very useful tools to determine how quickly the water levels of the Suncook River have increased during heavy rainfall or snow melt conditions, and whether flooding is about to occur. Being able to chart this information provides emergency responders and local official the opportunity to plan for protecting people and property. The USGS has a website which provides this information in a snapshot for both gage locations.

Figure 39 and **Figure 40** below display the height of the Suncook River during a heavy rain fall period at the Allenstown Route 28 and the North Chichester gages at the end of July 2013 and are examples of the typical USGS stream gage height chart.

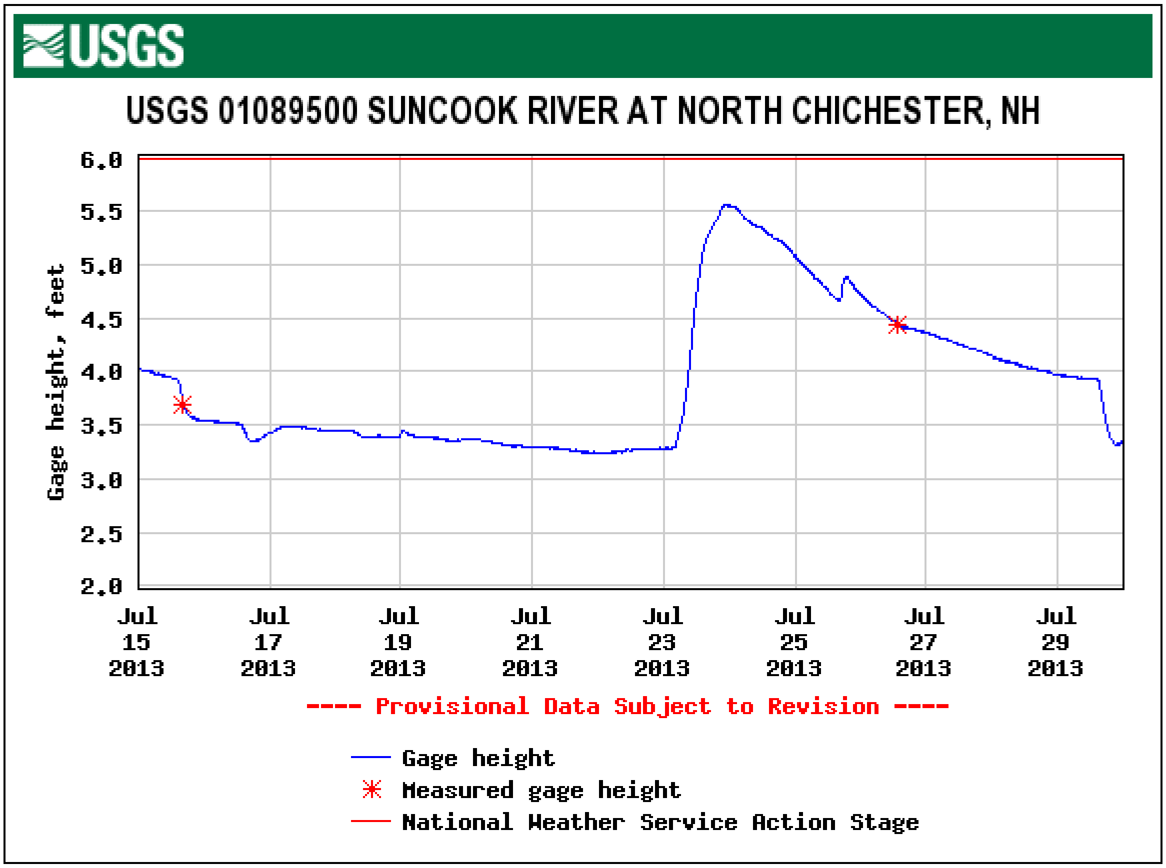
Figure 39
USGS Suncook River Gage Height at Route 28
July 15-29, 2013



Source: USGS Stream Gage 07-15-13 to 07-29-13;
http://nwis.waterdata.usgs.gov/nh/nwis/uv?cb_00065=on&format=gif_default&period=&begin_date=2013-07-15&end_date=2013-07-29&site_no=01089925

The elevation of the Suncook River is shown on the Route 28 gage in **Figure 39**. On July 15, when the graph begins, the height was at **286.5** feet, declining one (**1**) foot to **285.5** feet on July 23. A deluge of rainfall accounted for the surge in water, increasing over two (**2**) feet to **287.5** feet by July 25, then declining again to **286.0** feet on July 29. Within this time period, the Suncook River at Route 28 displayed over a two (**2**) foot difference in height.

Figure 40
USGS Suncook River Gage Height at North Chichester
July 15-29, 2013

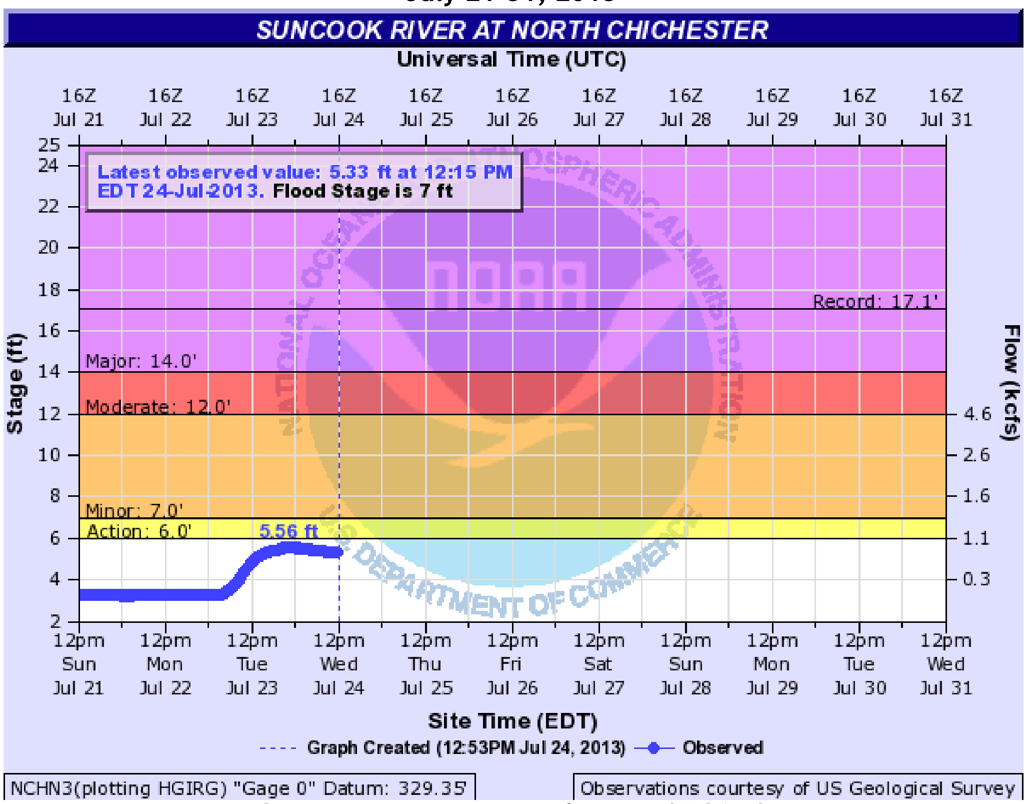


Source: USGS Stream Gage 07-15-13 to 07-29-13;
http://nwis.waterdata.usgs.gov/nwis/uv?cb_00065=on&format=gif_default&period=&begin_date=2013-07-15&end_date=2013-07-29&site_no=01089500

At the same time, **Figure 40** in Chichester a few miles north of Route 28, the gage portrays an overall Suncook River height of **4.0** feet on July 13, less than **3.5** feet on July 23, and displays the effect of heavy rainfall that day and July 24, peaking at just over **5.5** feet. The Action Stage of **6.0** feet has not yet been met. The North Chichester gage displays an overall difference in height of about two (**2**) feet during this time period, correlating with the height difference in the Route 28 gage.

Figure 41 also displays a snapshot of slightly different gage information available to officials and the public, courtesy of the National Oceanic Atmospheric Administration (NOAA), which are flood stages. These National Weather Service (NWS) flood observation stages in a hydrograph format allow for a quick determination of flood scale as seen from the Suncook River at North Chichester (NCHN3). NOAA information is not available for the Route 28 gage.

Figure 41
NOAA/NWS North Chichester Gage Hydrograph
July 21-31, 2013



Source: www.water.weather.gov 07-26-13

During the same approximate time period of July 21-31, 2013, the NWS graph in **Figure 41** displays the height of the Suncook River as compared to flood stages. Between July 23 and 24, the water level reached a height of **5.56** feet, just short of the **6.0**' Action Stage. This stage is when local officials would get ready to take action for a flooding event. The **5.5** feet maximum height again compares favorably with the information from the USGS graphs in **Figure 39** and **Figure 40**.

These two stream gages, as well as other New Hampshire gages, appear on different real-time interactive mapping and/or graphing websites. Gages can be monitored online for different types of information, graphics, and reports. As of 2013, the USGS will discontinue operation of a number of streamgages nationwide as a result of budget cuts. At this time, neither the Route 28 gage nor the North Chichester gage will be affected by the funding reduction.

- http://streamstatsags.cr.usgs.gov/gages/viewer15.htm?stabbr=GAGES
  The **USGS StreamStats National Data Collection Information** is an interactive map that allows selection of backgrounds features. The Suncook River North Chichester gage appears on this website, but the Allenstown Route 28 gage does not.

- http://wim.usgs.gov/FIMI/#
  The **USGS Flood Inundation Mapper** displays the Suncook River at different levels, Flood Stage (7-12'), Moderate Flooding (12-14'), and Major Flooding (14-18'). The approximate area to be inundated, or flooded, can be displayed using this tool to identify the locations in potential danger of flooding at different levels. Again, only the North Chichester gage is available on this page for the Suncook River.

- http://nwis.waterdata.usgs.gov/nh/nwis/rt
  This **US Geological Survey** site is where the stream gage information is available for both the Route 28 and the North Chichester gage. Not only is data available in the form as is displayed in **Figures 39** and **40**, additional reports and historical data are available for each. As the North Chichester gage has been in place much longer, it contains much more information such as daily, monthly, and annual statistics, peak streamflows, and annual water data reports.

- http://water.weather.gov/ahps/region.php?state=nh
  The New Hampshire webpage of **NOAA's National Weather Service (NWS)** offers a variety of river observations from gages as well as other weather-related maps and tools. The North Chichester gage icon is clickable and pulls up a hydrograph similar to that represented in **Figure 41**.

VULNERABLE POPULATIONS

Areas or neighborhoods that are densely populated, buildings that house people who may not be self-sufficient in a disaster or areas that include homes which are not very resistant to natural disasters are considered vulnerable. Vulnerable populations include schools, manufactured home parks (MHP), elderly housing developments or care facilities, and day care centers. Homes along the Suncook River are also considered vulnerable.

Table 31
Vulnerable Populations

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
We Care Retirement Home	12 Cross Street	485-4149	Lightning, Gas Leak, Utility/Power Failure, Tornado, Hurricane, Downburst
Tender Years Child Care Center	3 Chester Turnpike	485-8932	Utility/Power Failure, Gas Leak, Tornado, Hurricane, Downburst
Garden Drive *formerly Bear Brook Gardens Two*	238 Deerfield Road	Not available	Fire, Utility/Power Failure, Ice, Tornado, Hurricane, Downburst
River Pines Cooperative *formerly Bear Brook Terrace*	Route 28	Not available River Pines Cooperative	Flooding, Utility/Power Failure , Tornado, Hurricane, Downburst
Holiday Acres	1A Parkwood Drive	485-5447	Utility/Power Failure, Tornado, Hurricane, Downburst
Catamount Hill Cooperative *formerly Bear Brook Villa*	Route 28, Catamount Hill Drive	(603) 210-5148 Catamount Hill Cooperative, Inc.	Fire, Utility/Power Failure, Severe Winter Weather, Tornado, Hurricane, Downburst
Old Home Cooperative *formerly Bear Brook Gardens One*	213 Deerfield Road	485-5550	Fire, Utility/Power Failure, Ice, Tornado, Hurricane, Downburst
Chroniak's Manufactured Housing Park	48 Main Street	485-8851	Lightning, Gas Leak, Utility/Power Failure, Tornado, Hurricane, Downburst
Saint Germain's Manufactured Housing Park	50 Main Street	485-4096	Lightning, Gas Leak, Utility/Power Failure, Tornado, Hurricane, Downburst
Boys & Girls Club	8 Whitten Street	485-0599	Lightning, Gas Leak, Utility/Power Failure, Tornado, Hurricane, Downburst

Table 31, continued
Vulnerable Populations

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Suncook Pond Senior Housing	1 Suncook Pond Drive	(603) 836-5680 EastPoint Properties, Bedford	Lightning, Gas Leak, Utility/Power Failure, Tornado, Hurricane, Downburst, Economic Threats, Flooding
Sunrise Hill Housing	Sunrise Lane and Young Drive	485-5098 Allgeyer Management Services, Allenstown	Lightning, Gas Leak, Utility/Power Failure, Tornado, Hurricane, Downburst, Economic Threats, Flooding

Source: Allenstown Hazard Mitigation Committee 2015

ECONOMIC ASSETS

Although a town normally contains dozens of small businesses, typically several businesses stand out prominently in Town. These businesses employ the most people in a town (both from Allenstown and from outside) and are places where large numbers of people are located and may need to evacuate from in the event of a disaster. In other cases, some large businesses can provide critical services or products to residents in need or may be able to sustain their employees for a duration of time. In Allenstown, there are few businesses and only one which is large enough to be considered an economic asset.

Table 32
Economic Assets

Facility Type	Address	Phone	Number of Employees	Primary Hazard Vulnerabilities
Allenstown Professional Park	50 Pinewood Road	485-7861	15	Flooding, Utility/Power Failure, Gas Leak, Route 28 Accidents
Suncook Business Park	65 Pinewood Road	268-0538	25	Flooding, Utility/Power Failure, Gas Leak, Route 28 Accidents
NH Optical Laboratory	32 Library Street	218-1470	6	Flooding, Lightning, Utility/Power Failure, Gas Leak

Source: Allenstown Hazard Mitigation Committee 2015

SPECIAL CONSIDERATIONS

Churches and cemeteries are special considerations for their unique contributions to society. Churches are often natural gathering places for people in disasters and can temporarily provide shelter and accommodation. Cemeteries, both public and small privately owned lots, are recognized for their historical and logistical importance. In addition, businesses that potentially store or use hazardous materials are listed as special considerations due to the potential for leaking or combustion in the event of a disaster.

Table 33
Cemeteries and Churches

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Burgin Family Cemetery	Deerfield Road	N/A	Earthquake
Cate-Batchelder Cemetery	Deerfield Road	N/A	Earthquake
Batchelder-Hayes Cemetery	Deerfield Road	N/A	Earthquake
Batchelder-Blaisdell Cemetery	Mount Delight Road	N/A	Earthquake
Clark Burial Ground Cemetery	Bear Brook State Park	N/A	Earthquake
Dowst-Allen Cemetery	Wing Road	N/A	Earthquake
Evans-Batchelder Cemetery	Deerfield Road	N/A	Earthquake
Philbrick Cemetery	Philbrick Road	N/A	Earthquake
St. Jean Baptiste (new) Cemetery	River Road	N/A	Earthquake
St. Jean Baptiste (old) Cemetery	Granite Street Ext	N/A	Earthquake
Kenison Corner – west Cemetery	Deerfield Road	N/A	Earthquake
Kenison Corner – east Cemetery	Deerfield Road	N/A	Earthquake
Leavitt Cemetery	Podunk Road	N/A	Earthquake
Lane-Lear Cemetery	New Rye Road	N/A	Earthquake
St. Jean The Baptist Parish	10 School Street	485-3113	Lightning, Utility/Power Failure, Gas Leak
Sunrise Baptist Church	Route 28	485-8133	Lightning, Utility/Power Failure, Gas Leak

Source: Allenstown Hazard Mitigation Committee 2015

Table 34
Hazardous Materials Facilities

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Thomas Hodgson Mill/Perfect Fit Industry	25 Canal Street	485-7161	Utility/Power Failure, Gas Leak, Lightning
Suncook River Convenience Store	270 Pinewood (Route 28)	485-2242	Route 28 Accidents, Utility/Power Failure, Gas Leak
Irving Station	24 Allenstown Rd	485-8060	Utility/Power Failure, Gas Leak, Lightning
Mega X	3 Allenstown Rd	485-2020	Utility/Power Failure, Gas Leak, Lightning
PSNH Substation	Canal Street	N/A	Utility/Power Failure, Gas Leak, Lightning
Eversource (formerly Public Service of New Hampshire)	Bow Station	N/A	Ammonium hydroxide

Source: Allenstown Hazard Mitigation Committee 2015

HISTORIC/OTHER CONSIDERATIONS

Historic resources and structures provide that link to the cultural history of a town. They may also be more vulnerable to certain hazards since they often have fewer safety devices installed or have limited access. Recreational facilities are places where large groups of people can and do gather. Campgrounds in particular may be more vulnerable to natural disasters because the shelters are light and temporary.

Table 35
Historic Sites and Buildings

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Bear Brook State Park Civilian Conservation Corps	Deerfield Road	N/A	Fire, Utility/Power Failure
Old Meeting House	Deerfield Road	N/A	Fire, Utility/Power Failure
China Mills	Downtown	N/A	Lightning, Flooding, Gas Leaks, Power Outages

Source: Allenstown Hazard Mitigation Committee 2015

Table 36
Recreational and Gathering Sites

Facility Type	Address	Phone	Primary Hazard Vulnerabilities
Library	59 Main Street	485-7651	Lightning, Gas Leaks, Utility/Power Failure
Suncook Senior Center	10 School Street	485-4254	Lightning, Gas Leaks, Utility/Power Failure
Allenstown Elem Sports Field	Downtown	N/A	Lightning, Gas Leaks, Utility/Power Failure
Volunteers Park	River Road/Wall Street	N/A	Lightning
Upper Elem Sports Field	Downtown	N/A	Lightning, Gas Leaks, Utility/Power Failure
Whitten St Park	8 Whitten Street	485-0599	Lightning, Gas Leaks, Utility/Power Failure
Pine Haven Boys Center Sports Field	Off River Road	N/A	Fire, Utility/Power Failure
Bear Brook State Park	Deerfield Road	N/A	Fire, Utility/Power Failure

Source: Allenstown Hazard Mitigation Committee 2015

FUTURE DEVELOPMENT

Not only do existing sites have susceptibility to different types of hazards, consideration must be granted to new development projects in a community. Allenstown has future development prospects on the horizon, shown in **Table 37**, which have been presented to, or will soon be presented to, the Planning Board. In addition, large areas of land which are for sale and/or may be developed in the future are prime areas to identify for future development.

Table 37
Future Development

Facility Name	Location	Type of Facility	Primary Hazard Vulnerabilities
Map 109 Lot 95	Route 3	Open Land	Tornado, Hurricane, Earthquake
Map 108 Lot 3	Route 3	Rock Quarry	Tornado, Hurricane
Lots behind Holiday Acres, Allenstown Aggregate	Granite Street/Chester Turnpike	Open Land	Tornado, Hurricane

Source: Allenstown Hazard Mitigation Committee 2015; Town Administrator

This information does not appear on the maps because the developments or potential developments are not guaranteed to be built at this time.

HOMES WITHIN THE SPECIAL FLOOD HAZARD AREAS

As noted in the **CHAPTER 4. POTENTIAL LOSSES**, there are a total of **94** buildings in the floodplain, including **72** single family homes, **3** multi-family homes, **8** manufactured homes, and **11** non-residential buildings located within the Special Flood Hazard Areas (floodplains) in Allenstown.

The majority of homes within the floodplain are located in the eastern and northeastern portions of Town directly adjacent to the Merrimack River.

With an up-to-date Floodplain Ordinance in place today, site inspections would be conducted by the Zoning Compliance Officer for all-new construction or substantial improvements. No new homes would be constructed in the Special Flood Hazard Areas without the necessary safeguards or permits.

MAP 3: ASSETS AND RISKS

The ***Map 3: Assets and Risks*** illustrates the sites inventoried within this section. They are categorized into Emergency Response and Town Facilities, Schools, Water Supplies, Bridges, Dams, Cemeteries, Churches, Communications Towers, Daycare Facilities, Elderly Housing, Entertainment and Recreation, Hazardous Material Facilities, Large Employers, Manufactured Housing Parks, and Unique/Historic Resources. Each facility is referenced by a keyed and numbered legend. A concentration of facilities exists along NH Route 3 in the Village.

CHAPTER 4.
POTENTIAL LOSSES

2015 PLAN UPDATE

As five years have elapsed since the second (2010) writing of this Plan, assessing data has changed and therefore building values have changed. The 2004 Plan contained building values which have been updated and elaborated upon. Not only are the average and total home and non-residential building values in the Special Flood Hazard Areas modified within this Chapter, damages ranges for other natural hazards have been revised. Potential dollar damages resulting from natural hazards as identified in **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT** were calculated. Losses from technological and human hazards have been discussed based upon the **41** hazards previously identified.

INTRODUCTION

The Town of Allenstown has been impacted by natural disasters, including floods, wind events, severe winter storms and ice storms, secondary disasters as a result of the natural disasters (such as power loss) and to a lesser degree, human and technological hazards as documented in **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT**. This Chapter estimates town-wide building damage in Town from natural hazard events. It is difficult to ascertain the amount of damage caused by a hazard because the damage will depend on the hazard's location and magnitude, making each hazard event somewhat unique. Human and technological hazards are typically even more incalculable. Human loss of life was not included in the potential loss estimates for natural hazards, but could be expected to occur, depending on the severity of the hazard.

LOSS ESTIMATION

Estimating losses from a natural disaster is difficult and often inaccurate. Estimating losses from technological and human-induced hazards is even more difficult because technological hazards are less predictable than natural hazards and human behavior is almost completely unpredictable. What type of hazard will impact what portions of Allenstown, the nature of the damage and how hard the hazard will impact people, infrastructure, critical facilities and other assets is beyond most scientific measures.

While this Plan focuses on being pro-active in those geographic areas of Allenstown most prone to recurring hazards (like flooding), some initial estimates of measurable property damage and building damage have been discussed by utilizing simple techniques such as the numbers of structures and assessed valuation. This two-dimensional approach of calculating dollar losses from tangible structures offers a basic yet insightful tool to begin further loss estimation analyses.

Tools for Communities with GIS

For gauging more three-dimensional estimation of damages, FEMA has developed a software program entitled HAZUS-MH (for multi-hazard), which is a powerful risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest Geographic Information Systems (GIS) technology to produce estimates of hazard related damage before, or after, a disaster occurs. Developed for ARCGIS which produced the ***Maps*** for this Plan, HAZUS-MH takes into account various effects of a hazard event such as:

- Physical damage: damage to residential and commercial buildings, schools, critical facilities, and infrastructure;
- Economic loss: lost jobs, business interruptions, repair and reconstruction costs; and
- Social impacts: impacts to people, including requirements for shelters and medical aid.

Federal, State and local government agencies and the private sector can order HAZUS-MH free-of-charge from the FEMA Distribution Center. Allenstown should first ascertain whether their municipal VUEWorks GIS software is compatible and if so, consider training staff to perform models. With many Town existing and under-development infrastructure GIS data layers available, HAZUS-MH could prove very helpful for estimating losses for the community on a disaster-specific basis. However, much staff time is necessary to train staff and maintain a GIS system and the Town does not own a large-size map plotter. Official map generation is typically subcontracted out to other agencies.

Allenstown's Method of Dollar Loss for Overall Natural Hazards

A more manageable technique was used for loss estimation for the purposes of this **HAZARD MITIGATION PLAN UPDATE**. Natural hazard losses are calculated based on dollar damage ranges over the entire community, or in the case of flooding, buildings in the floodplain are counted and their value is collected. Using **09/01/12** assessment data, the total assessed value of all residential and non-residential structures in Allenstown (**$189,343,800**) is the basis for loss estimation calculations. The number of total parcels in the community as of **April 2013** is **1,948**. Points for consideration for technological and human hazard losses are raised, as each non-natural hazard would need to be uniquely measured by site, scope, and magnitude.

LOSSES BY FLOODING

Flooding is often associated with hurricanes, ice-jams, rapid snow melting in the spring, and heavy rains. These are all types of flooding hazards evaluated in **CHAPTER 2. HAZARD IDENTIFICATION**.

Parcels within the floodplain were identified using Allenstown's 2013 tax maps concurrently with the 2010 FEMA Digital Flood Insurance Rate Maps (DFIRMs). Next, parcels containing buildings were identified using the Town tax assessor's database for the Town. Building type was characterized into one of four categories. The categories are single-family homes, multi-family homes, manufactured homes, and non-residential buildings. Building value was taken from the assessing database. ***Land value and building content value were not considered in these calculations***.

Table 38

Building Value in the Special Flood Hazard Areas

Building Type	Number of Buildings	Total Value of Buildings	Average Replacement Value
Single Family Homes	72	$6,332,400	$87,950
Multi-family Homes	3	$397,800	$132,600
Manufactured Homes	8	$293,400	$36,675
Non-Residential Buildings	11	$3,571,300	$324,664
Totals	**94**	**$10,594,900**	-----

Sources: Town of Allenstown 04/01/13 Assessing Database; GIS 2010 Floodplain Overlay w/Tax Maps

In **Table 38**, **72** single family residential homes, **3** multi-family homes, **8** manufactured homes, and **11** non-residential buildings were considered to be situated the floodplain. The average replacement value is **$187,950** for a single-family home, and **$324,644** for a non-residential building. The multi-family home average is **$132,600** and manufactured homes average **$36,675**. The assessed value of all residential and non-residential structures in Allenstown is **$189,343,800.** The total value of all buildings in the Special Flood Hazard Areas is about **$10.6 million** for the **94** structures.

Potential Building Losses Calculations for Flooding

In the following calculations, the average replacement value was calculated by adding up the assessed values of all structures in the special flood hazard areas and then dividing by the number of structures. The Federal Emergency Management Agency (FEMA) has developed a process to calculate potential loss for structures during flooding. The potential loss was calculated by multiplying the average replacement value by the percent of damage expected from the hazard event, and then by multiplying that figure by the number of structures.

The costs for repairing or replacing infrastructure such as bridges, railroads, power lines, roads, drainage systems, telephone lines, or natural gas pipelines, and land value and the contents of structures have not been included in these estimates in the following figures.

Table 39

Dollar Damage Ranges for Total Buildings in Special Flood Hazard Areas

Building Type	Total Value of Buildings	Total Buildings Damaged in Potential Floodplain by Respective Building Type		
		Eight-Foot Flood 49% Damage	Four-Foot Flood 28% Damage	Two-Foot Flood 20% Damage
Single Family Homes	$6,332,400	$3,102,876	$1,773,072	$1,266,480
Multi-Family Homes	$397,800	$194,922	$111,384	$79,560
Manufactured Homes	$293,400	$143,766	$82,152	$58,680
Non-Residential Buildings	$3,571,300	$1,749,937	$999,964	$714,260

Source: Town of Allenstown (see ***Table 38****)*

Table 39 represents the worst case scenario of *all* single-family homes, multi-family homes, manufactured homes, and non-residential buildings within the Special Flood Hazard Area that are damaged by a flood hazard event.

If all of the **72** single family homes were damaged by a ***Two-Foot Flood (20% Damage)***, the dollar damage to the buildings *only* could be **$1.2 million** while an ***Eight-Foot Flood (49% Damage)*** could yield over **$3 million** in damage. Although there are only **11** non-residential buildings in the SFHA, all non-residential buildings damaged in the same ***Two-Foot Flood (20% Damage)*** could total **$700,000** versus an ***Eight-Foot Flood (49% Damage)*** of **$1.7 million** in damage.

Multi-family homes could sustain **$80,000** damage from two-foot flooding and from **$190,000** from eight foot flooding; for manufactured homes, the damage could be **$59,000** and **$145,000**, respectively. Dollar damage estimations vary according to the standard percentages of damage levels associated with flooding levels set by FEMA.

Table 39A

Dollar Damage Ranges for Individual Buildings in Special Flood Hazard Areas

Building Type	Average Value of Individual Buildings	Individual Buildings Damaged in Potential Floodplain by Respective Building Type		
		Eight-Foot Flood 49% Damage	Four-Foot Flood 28% Damage	Two-Foot Flood 20% Damage
Single Family Homes	$87,950	$43,096	$24,626	$17,590
Multi-Family Homes	$132,600	$64,974	$37,128	$26,520
Manufactured Homes	$36,675	$17,971	$10,269	$7,335
Non-Residential Buildings	$324,664	$159,085	$90,906	$64,933

Source: Town of Allenstown (see ***Table 38****)*

Table 39A also represents the worst case scenario, but of *individual* single-family homes, multi-family homes, manufactured houses, and non-residential buildings within the Special Flood Hazard Area that are damaged by a flood hazard event. If one single family home was damaged by a ***Two-Foot Flood (20% Damage)***, the projected dollar damage to the building *only* could be about **$17,000** while an ***Eight-Foot Flood (49% Damage)*** could yield over **$43,000** in damage. If damage was sustained to one non-residential building, the projected dollar damage could be **$65,000** from a ***Two-Foot Flood (20% Damage)*** but **$160,000** for an ***Eight-Foot Flood (49% Damage)***. Multi-family homes could sustain **$26,000** damage from two-foot flooding and from **$65,000** from eight foot flooding; for manufactured homes, the damage could be **$7,500** and **$18,000**, respectively.

LOSSES BY OTHER NATURAL HAZARDS

Building damage by natural disasters in New Hampshire is not limited to flooding alone, which is easier to quantify and predict. Simple calculations can be made based upon generalizations of a disaster impacting a certain percentage of the number of buildings in the Town. The assessed value of all residential, commercial, and industrial structures in Allenstown is **$189,343,800** (no land). Disaster damages are often illustrated in the following section utilizing a percentage range of town-wide building damage. At **1,881** housing units in Allenstown from the US Census 2010, disaster impact to **10%** of them would yield **188** damaged units.

Hurricane and Severe Storms

Damage caused by hurricanes can be both severe and expensive. In the past, Allenstown has been impacted by wind and flooding damage as a result of hurricanes. The assessed value of all residential and non-residential structures in Allenstown is **$189,343,800**.

With a scenario range of**1%** (average of **18** buildings) to **5%** of buildings (average of **94**) struck throughout the Town, a hurricane or severe storm could potentially cause up to **$1,893,438** to **$9,467,190** in building-only damage costs alone (not including contents, infrastructure, or land).

Rapid Snow Pack Melt

Flooding caused by rapid snow pack melt is often found along roadways and from watercourses such as rivers like the Merrimack River, Suncook River, Pease Brook, Boat Meadow Brook, Bear Brook, Little Bear Brook, and Catamount Brook. Those locations which are particularly susceptible would be the floodplain and along roadways, but anywhere the water cannot yet percolate into the frozen ground could be vulnerable.

With a scenario range of**1%** to **5%** of buildings flooded throughout the Town, rapid snow pack melt flooding could potentially cause up to **$1,893,438** to **$9,467,190** in building-only damage costs.

River Ice Jams

Pease Brook, the Merrimack River, and the Suncook River are the major causes of flooding in Allenstown, and Boat Meadow Brook, Bear Brook, Little Bear Brook, and Catamount Brook are other significant watercourses that have flooding potential. Multiple bridges on Route 3, Route 28, and other state and local roads that rest on top of these watercourses were identified previously in **Table 28**. Multiple additional small streams culverts and drainage systems abound. The ***2011-2014 Statewide Transportation Improvement Program (STIP)*** provides many examples of basic cost estimates bridge replacement and rehabilitation. Ranges can run from about **$170,000** (Durham – Bunker Creek) for a small local bridge replacement and approaches to over **$6,520,000** (Enfield – Mascoma Lake) or more for a bridge replacement with drainage, shoulders, and pavement rehabilitation. The average of six different bridge replacements within this cost range is **$3,163,000**.

Using this average figure of **$3,163,000** for one (**1**) bridge replacement in Allenstown, if two (**2**) bridges needed to be replaced in Town as a result of the physical damage caused by river ice jams, the costs could range up to **$6.3 million**.

In addition, if all the **72** single family homes in the floodplain were damaged as a result of two-foot flooding resulting from river ice jams, there could be up to **$1.2 million** in building damage costs.

Dam Breach and Failure

There are currently **18** dams in Allenstown in the 2011 New Hampshire Dam database retained by the Department of Environmental Services Dam Bureau. According to RSA 482:2 II, a dam is any artificial barrier which impounds or diverts water, has a height of four feet or more or has a storage capacity of two acre-feet or more, or is located at the outlet of a great pond. Inactive dams are defined as dams that do not meet the legal definition of a dam. Of the **18**, there are **7** inactive/unclassified dams listed in Allenstown that do not meet the above definition and may be in ruins, exempt, breached, removed, or never built.

Each of the **11** active dams located in Allenstown is categorized into one of four classifications which are differentiated by the degree of potential damages that a failure of the dam is expected to cause. The classifications are designated as High Hazard **(H)**, Significant Hazard **(S)**, Low Hazard **(L)**, and Non-Menace **(NM)**.

Allenstown has six (**6**) **NM** dams. Five **(5)** **L** dams are the Bear Hill Pond Dam on Boat Meadow Brook, Catamount Pond Dam and Hall Mountain Marsh Dam on Bear Brook, Archery Pond Dam on a tributary of Bear Brook, Hayes Marsh Dam on Catamount Brook, and the *Buck Street East Dam on the Suncook River.***However, NHDES has since removed the Buck Street East Dam after the 2011 database was generated, and the categorization has likely been downgraded to inactive (ruins).*

- **Low (L) Hazard Dams**:
  - Bear Hill Pond Dam on Boat Meadow Brook,
  - Catamount Pond Dam and Hall Mountain Marsh Dam on Bear Brook,
  - Archery Pond Dam on a tributary of Bear Brook,
  - Hayes Marsh Dam on Catamount Brook, and
  - *Buck Street East Dam on the Suncook River.

The amount of dollar damage in the event of a dam breach will vary according to the extent and severity of the breach as well as the classification of the dam. The Town's assessing records should be consulted to ascertain the range of possible damage to buildings in the vicinity.

Fluvial Stream Bank Erosion and Scouring

Pease Brook, the Merrimack River, and the Suncook River are the major causes of flooding in Allenstown. Boat Meadow Brook, Bear Brook, Little Bear Brook, and Catamount Brook are other significant watercourses that have flooding potential, plus multiple other brooks abound. These rivers and brooks would likely be prone to erosion at some identified locations.

With a scenario of **half (50%)** of the **72** single family homes in the floodplain (**36**) damaged by flooding or fluvial erosion, there could be up to **$3.1 million** in building-only damage costs.

Debris Impacted Infrastructure

Pease Brook, the Merrimack River, and the Suncook River are the major causes of flooding in Allenstown, and Boat Meadow Brook, Bear Brook, Little Bear Brook, and Catamount Brook are other significant watercourses that have flooding potential. Multiple bridges on Route 3, Route 28, and other state and local roads that rest on top of these watercourses are identified in **Table 28**. Multiple additional small streams culverts and drainage systems abound. The ***2011-2014 Statewide Transportation Improvement Program (STIP)*** provides many examples of basic cost estimates bridge replacement and rehabilitation. Ranges can run from about **$170,000** (Durham – Bunker Creek) for a small local bridge replacement and approaches to over **$6,520,000** (Enfield – Mascoma Lake) or more for a bridge replacement with drainage, shoulders, and pavement rehabilitation. The average of six different bridge replacements within this cost range is **$3,163,000**.

Along with the Town's and State's maintenance responsibilities of keeping drainage systems and culverts (including box culvert bridges) cleaned and maintained, private property owners are also required to maintain their own culverts to help eliminate the possibility of flooding as a result of debris impacted infrastructure. Private culverts typically are found under driveways.

Using this average figure of **$3,163,000** for one (**1**) bridge replacement in Allenstown, if two (**2**) bridges needed to be replaced in Town as a result of the physical damage caused by river ice jams, the costs could range up to **$6.3 million**.

Tornadoes

Tornadoes are relatively uncommon natural hazards in the State, although a tornado struck the Town of Epsom and Northwood in the region in July 2008. On average, about six touch down each year. However, damage largely depends on where a tornado strikes. If it strikes an inhabited area, the impacts could be severe. In the State of New Hampshire, the total cost of tornadoes between 1950 and 1995 was $9,071,389 *(The Disaster Center)*. A tornado touching down in Allenstown would not be town-wide because tornadoes strike in smaller areas. Dollar damage amounts would depend on whether the tornado impacted an area with a high density of buildings.

With a scenario of **1%** of buildings damaged throughout the Town, a tornado could potentially cause up to **$1,893,438** in building-only damage costs.

Downbursts and High Winds

Damage caused by downbursts and high winds (microbursts and macrobursts) would not be Town-wide because they typically strike in smaller areas. Few places in Allenstown are at specific risk (see **CHAPTER 2.** and **CHAPTER 3.**), but high winds can strike anywhere. Dollar damage amounts would depend on whether the hazard impacted an area with a high density of buildings. A strong microburst in 2011 in Bow resulted in significant damage to large recreational vehicles on Route 3A.

With a scenario of **1%** of buildings damaged throughout the Town, a downbursts and high winds could potentially cause up to **$1,893,438** in building-only damage costs.

Lightning

Damage caused by lightning would not be Town-wide because it typically strikes in smaller areas. Few places in Allenstown are at specific risk (see **CHAPTER 2.** and **CHAPTER 3.**), but lightning strikes can cause fires, especially in rural, forested areas. Dollar damage amounts would depend on whether the lightning and subsequent fire impacted an area with a high density of buildings.

With a scenario of **1%** of buildings damaged throughout the Town, a lightning storm could potentially cause up to **$1,893,438** in building-only damage costs.

Wildfire

The risk of fire is difficult to predict based on location. Forest fires are more likely to occur during years of drought. In addition, areas and structures that are surrounded by dry vegetation that has not been suitably cleared are at high risk. However, fire danger is generally universal and can occur in any location at any time. Dollar damage would depend on the extent of the fire, the number and type of buildings burned. Bear Brook State Park consumes more just more than half of the Town's land area. Hundreds of homes are situated within the overall area of the Park.

With a scenario of **1%** of buildings damaged throughout the Town, a wildfire could potentially cause up to **$1,893,438** in building-only damage costs.

Severe Winter Weather

Heavy snowstorms typically occur during January and February. New England usually experiences at least one or two Nor'easters with varying degrees of severity each year. Power outages, extreme cold, and impacts to infrastructure are all effects of winter storms that have been felt in Allenstown in the past. All of these impacts are a risk to the community, including isolation, especially of the elderly, and increased traffic accidents. Damage caused as a result of this type of hazard varies according to wind velocity, snow accumulation, and duration.

With a scenario range of**1%** to **5%** of buildings damaged throughout the Town, severe winter storms could potentially cause up to **$1,893,438** to **$9,467,190** in building-only damage costs.

Earthquake

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric, and phone lines and are often associated with landslides and flash floods. Four earthquakes in New Hampshire occurring between 1924 to 1989 had a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of Laconia, and one near the Quebec border. Small earthquakes of less than 2.5 magnitude occur in Boscawen a few times per year. Seismic lines are indicated on ***Map 1: Potential Hazards***. Buildings that are not built to a high seismic design level could be susceptible to structural damage. Suncook Village could be more vulnerable as buildings are older, closer together, and the area is heavily populated.

With a scenario range of**1%** to **5%** of buildings damaged throughout the Town, an earthquake could potentially cause up to **$1,893,438** to **$9,467,190** in building-only damage costs.

Landslide
Damage caused by landslides would be concentrated in those areas along embankments, either along the highways, hillsides, or rivers and streams (erosion). Few places in Allenstown are at specific risk (see **CHAPTER 2.** and **CHAPTER 3.**). Dollar damage amounts would depend on whether the landslide impacted an area with a high density of buildings.

With a scenario of **1%** of buildings damaged throughout the Town, landslides could potentially cause up to **$1,893,438** in building-only damage costs.

Drought
Drought is often declared on state-wide or region-wide basis, and sometimes by individual town. Although everyone would be charged to conserve water, orchards, farms, and nurseries would be most affected. Agricultural land may be among the most affected by drought. People who rely on well water might find their wells running dry. Damage costs caused by drought would be difficult to quantify, but dollar-wise, would most likely impact the agricultural economic base of a community.

As physical damage from a drought is usually isolated to specific locations, the effects of potential drought effects at certain facilities could be researched utilizing the Town's assessor's database for valuation or researching gross annual revenue on identified land.

Radon
As radon might not be noticed by the general public without education and testing, it is difficult to estimate any potential damages. Airborne radon seeping out of basements and through water vapor can be mitigated by individual property owners at an average of $1,200 for a radon reduction system (per the US Environmental Protection Agency) to treat the air inside a home.

If **10%** of Allenstown's homes (**188**) installed radon reduction systems, **$225,720** would be spent.

Biological
Biological hazards affect the ecosystem, humans, and wildlife. As such, a dollar value cannot be placed upon such living resources. However, the population of the Town, at **4,322** in 2010, is either spread out over the geography of the community or concentrated in manufactured housing and group living quarters. The Capital Area Public Health Network's Public Health Improvement Plan should be consulted for further information on the vulnerability of the Town. The Center for Disease Control, CDC, is a very good source of information on biological hazards and their detrimental effects.

LOSSES BY TECHNOLOGICAL HAZARDS

Allenstown increasingly relies on technology to perform everyday tasks more efficiently. A breakdown of this system has immeasurable damaging effects. Loss of business, productivity, routine and an impact to public health has negative consequences to individuals, families, and businesses alike. Human hazards are similar to technological hazards because they are both somewhat human-induced. Technology is designed by humans and humans are frequently partly responsible for technological disasters (transportation accidents, air pollution, strikes, financial collapse, etc.). Much of what follows in the sections on technological and human hazards is applicable to both categories. **CHAPTER 3. ASSET AND VULNERABILITY IDENTIFICATION** identifies sites that are vulnerable to the technological disasters highlighted below, and **Table 23** lists the annual events that occur within the Town.

Physical minor technological disasters such as traffic accidents are common in Allenstown and will continue to occur. The potential physical and human loss depends on the severity of the accident, the value of the vehicles involved and other factors such as the safety of the vehicles involved and the number of occupants in the vehicle. Because of the complex factors that determine the severity of traffic accidents, it is difficult to estimate the losses associated with them. Losses associated with larger events such as explosions and building collapses also cannot be easily measured because the loss depends on numerous unpredictable factors, such as: emergency response time, structural integrity, weather, geographic location, chemicals present at the accident site, occupants in the building or area, etc.

FEMA uses a methodology for integrating technological hazards into disaster mitigation planning. This methodology reinforces the importance of analyzing the vulnerability of assets and the hazards that threaten them. The methodology promotes the following steps prior to estimating losses: Identify Hazards, Profile Hazard Events, Inventory the Assets. These steps will heretofore be frequently referred to as steps 1, 2 and 3. This plan does not attempt to carry out the loss estimation for every asset in Allenstown based on the vulnerability of all assets and the severity of the hazards. What ensues, however, is an explanation of the steps used to arrive at an estimation of losses so that those responsible for mitigating hazards at specific locations within the Town may best do so. Numerous hazards have been identified below and where possible, resources containing further practical information for completing the three steps mentioned above have been included. The hazards have already been identified in **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT** and are listed below. The criteria for consideration for the second step, Hazard Profile, are as follows:

- *Application mode*: Describes the action (s) necessary to cause the hazard to occur.
- *Duration*: Length of time the hazard is present on the target. For example, length of time a hazardous material spill may affect an area.
- *Dynamic / static characteristic of a hazard*: Describes the tendency of the hazard to expand, contract, or remain confined in time, magnitude and space.
- *Mitigating conditions*: Characteristics of the target or its physical environment that can reduce the effects of the hazard. For instance, preventive measures are mitigating conditions when dealing with hazardous material spills.
- *Exacerbating conditions*: Characteristics that can enhance or magnify the effects of a hazard. For example, the wood in a structure may be an exacerbating condition in the case of a fire rather than a mitigating condition.

The third step used in estimating potential losses is the Inventory of Assets or the assessment of the vulnerability of the assets. By assessing the vulnerability it becomes easier to estimate the losses. Vulnerabilities can either be inherent or tactical. Inherent vulnerabilities exist independent of any protective or preventive measures applied to the asset. Inherent vulnerabilities to consider include:

- *Visibility*: Is the public aware of the target, facility, site, system or location?
- *Utility*: What is the value of the target, facility, site, system or location?
- *Accessibility*: Is the target, facility, site, system or location accessible to the public?
- *Asset mobility*: Is the target or asset mobile or is it fixed?
- *Presence of hazardous materials*: Are hazardous materials present at the target or asset?
- *Potential for collateral damage*: What are potential consequences for neighbors and surrounding area?
- *Occupancy*: What is the potential for loss of human life based on number of people present at the target or affected area?

Tactical vulnerability refers to the security, design and other mitigation tools used to protect a place. These measures can include site planning and landscape design, parking security, structural, electrical and fire protection engineering, architectural and interior space planning and electronic and organized security. These factors are included because when estimating potential asset losses it is necessary to first assess the vulnerability of the asset to particular threats. For example, the potential loss a structure could sustain as a result of a technological hazard will be higher if there are no preventive measures implemented in the building's design and construction.

Because there is no formula or system for estimating potential losses by technological and human-induced hazards, a thorough inventory of assets, profile of hazards and inventory vulnerability assessment are imperative. With that established, it should be noted that the damage of technological hazards can be great to physical structures, ecosystems, computer systems, utilities and communications. Humans rely on the proper functioning of technology for their well-being and any loss or interruption to this technology could be economically debilitating. However, the most valuable asset that could be at risk of a technological hazard is human life. Hazardous materials spills, explosions, fires, transportation accidents, building and structure collapse, radiological accidents and extreme air pollution all threaten the fragile human life.

Allenstown's permanent population base of nearly **4,322** in 2010, in addition to temporary and transient populations, is vulnerable to technological hazards, including those in the following sections.

Hazardous Materials

Damage to structures is often isolated at one or two locations, so the effects of potential disasters at certain facilities could be researched utilizing the Town Assessor's database for valuation on specific buildings. In order to best estimate the potential losses in the case of a hazardous materials spill or contamination, one must research the hazardous waste events that could potentially occur in the Town. This step has been referred to above as 'profiling' the hazard. A good source of information on different types of hazardous wastes and the consequences of their spillage is the U.S. Government's Environmental Protection Agency website. The National Response Center maintains an updated list of hazardous materials incidents that were responded to on their website http://www.nrc.uscg.mil/Default.aspx.

In 2014, there were a total of **26,195** hazardous materials incidents (calls) responded to within the U.S. and its territories, **30** of which occurred in New Hampshire and **3** of which occurred within the Central NH Region. The second factor in estimating the potential losses in the case of a hazardous waste incident is assessing the vulnerability of the asset or target in question. The Town must assess all those locations, including buildings, roads, rail corridors, rivers, lakes, streams, etc., that could be potential targets of a hazardous waste spill or contamination. When assessing the vulnerability of any site it is necessary to consider all the criteria explained above.

Explosion/Fire

Damage to structures is often isolated at one or two locations, so the effects of potential disasters at certain facilities could be researched utilizing the Town Assessor's database for valuation on specific buildings. FEMA reports that fire annually costs the U.S. over $10 billion in damage, causes 5,000 deaths and 30,000 injuries. They also report that in a typical year, home appliance and wiring problems account for 93,500 fires, 550 deaths and $760 million in property damage. Fire is a costly hazard that causes both property damage and physical harm or death.

A good source of information on fires and fire damage is the National Fire Protection Agency. The NFPA updates a website regularly: www.nfpa.org. The website contains extensive information on different types of fires and explosions. It should be referred to when doing research on the Hazard Profile. When doing the Inventory of Assets, all of the above criteria should be considered because fires and explosions have the potential to affect many structures differently depending on the structure's engineering and fire preventive measures. Explosions and fires also have the potential to cause physical harm and death and because of this they should be treated as very threatening hazards.

Transportation Accident

As discussed in the Introduction to Technological Hazards, the most common transportation accidents are vehicular. The same criteria for estimating potential losses resulting from the other technological hazards can be applied to transportation accidents. The Town can estimate the potential losses of different transportation accidents that may occur at different locations throughout the Town by profiling past accidents and by assessing the vulnerability of property and human life involved. Within the region, accidents of other nature have occurred, such as airplane crashes in Concord and Deering. One good source of information on all things pertaining to motor vehicle accidents is the National Highway Traffic Safety Administration. On their website, www.nhtsa.dot.gov, information on things such as crash tests and rollover ratings to an analysis of speeding-related fatal traffic crashes is included. This source will be useful when profiling the hazard. When assessing the vulnerability of assets, everything from high accident locations, frequency of accidents, time of accidents, weather, road conditions, vehicle type, the number of occupants and the driver should be considered in addition to the Step 3 criteria mentioned above.

Building/Structure Collapse

Damage to structures is often isolated at one or two locations, so the effects of potential disasters at certain facilities could be researched utilizing the Town Assessor's database for valuation on specific buildings. In profiling the building/structure collapse hazard, one should consider that buildings and structures frequently collapse because of some other hazard, such as fire, wind, flood, etc. An assessment of the vulnerability must include all the criteria mentioned above. Because firefighters and construction workers are a vulnerable population in the case of building and structure collapse, researching occupational safety is advisable in order to complete Steps 2 and 3. The Center for Disease Control website, www.cdc.gov, has a link to the Electronic Library of Construction Occupational Safety and Health. This Electronic Library has relevant articles on the effects of building/structure collapse and the vulnerability of workers who often are required to work in unsafe conditions.

Power/Utility Failure

The incapacity or destruction of the energy and utility systems in Allenstown and the region would have a debilitating effect on the physical and economic security of the Town, the public health and the general well-being of the Town's residents. Power failure is a common occurrence when many natural hazards cause damage to critical infrastructure. The potential vulnerability of power/utility infrastructure should be assessed, in the case that damage is inflicted by another hazard on this infrastructure. Because PSNH and Unitil are the major electric power providers to the Town of Allenstown, they are the best source of information on this particular hazard. Power and utility failure is similar to communications system failure because any interruption of service can cause lost revenues for businesses, interrupted service from organizations or agencies and even failure of emergency services by those who provide them. These consequences must be considered when estimating the losses incurred from power or utility failure.

Extreme Air Pollution

Extreme air pollution is a hazard that can adversely affect public health and productivity. On days when the air quality is very poor, an extra effort is required of emergency personnel. The best source of information on air pollution is the New Hampshire Department of Environmental Services. When estimating the losses resulting from extreme air pollution, it is necessary to first profile the hazard and assess the vulnerability of those assets most threatened. The general public is most at risk during poor air quality days, and within the general public, certain groups of people are more at risk than others. Worker productivity is decreased on poor air quality days and more work is required of emergency personnel. Energy output is higher on these days as well, for many people require air conditioners and fans to remain cool.

Radiological Accident

A radiological accident has the potential of causing widespread human loss of life, asset damage and environmental destruction. Cleanup of radiological accidents is painstaking. When assessing the potential losses in the case of a radiological accident, it is important to consider the potential loss of human life and the subsequent long-term loss of the utility of land and buildings in the area contaminated by the accident. The two nuclear power plants that were highlighted above have 10-mile Emergency Planning Zones around them. Neither Allenstown nor any town in the region is located within the EPZ of Seabrook Station. Nevertheless, contamination is possible at least 50 miles from the site of a radiological accident. Contamination is also possible resulting from a spill from a vehicle transporting radiological material. A recommended source of information on all things related to radiological accidents and nuclear power is the United States Environmental Protection Agency.

Fuel/Resource Shortage

Fuel or resource shortage is a hazard that has the potential to cause an economic crisis. Most recently, New Hampshire residents witnessed the effects of the fuel shortage resulting from the aftermath of Hurricane Katrina. The price of gasoline increased for several weeks until finally stabilizing. Because fuel supply is fickle, it is nearly impossible to predict the occurrence of a shortage. Nearly everyone is vulnerable to the effects of fuel shortage, from consumers to businesses. A few of the many sources on energy and the potential for fuel or resource shortages can be found on the websites of the U.S. Department of Energy, Environmental Protection Agency and the Federal Energy Regulatory Commission.

Strike

Strikes are a hazard capable of interrupting services provided by businesses, government, schools, hospitals and organizations. Strikes tend to cause economic loss rather than asset loss or loss of human life. When estimating the potential loss caused by a strike, it is important to do a profile of typical area strikes and to assess the services that could be disrupted. Estimation of losses should be directed at those potential targets of strikes and the assets related to those targets.

Business Interruption

Of the technological hazards, estimating potential losses resulting from business interruption may be the easiest. Typically, the only asset threatened by business interruption is economic. Business owners have a good idea of their daily, weekly, monthly and yearly revenue. By estimating lost revenue over any period of time, a business owner can calculate his or her losses. Without complicating the estimation too much, business owners should undergo Steps 1, 2 and 3 when estimating potential business interruption losses. The reason for this is that businesses may be interrupted for any number of reasons and it is important to attempt to predict how each hazard could affect business. For example, a flooded basement, causing a short-term interruption resulting from a severe hurricane, although debilitating, will not cause as long a business interruption as a fire that causes complete building collapse.

Financial Issues, Economic Depression, Inflation, Financial System Collapse

These hazards can threaten individuals, families, states and even the entire nation. It is difficult, at best, to foresee the occurrence of a hazard of this type. Nevertheless, it is recommended that a profile of the hazard and an assessment of the vulnerability of the assets inventoried be carried out. Not all assets are equally vulnerable to these hazards. As history has shown, such things as demographics and geography can make one population more vulnerable than another. It is also important to remember that these hazards frequently affect certain industries more than others. Financial collapse in the manufacturing sector may affect one geographic area or the entire nation, but the high tech sector may experience growth during the same period. Because of the complexity of this hazard, when estimating losses it is critical to follow Steps 1, 2 and 3 for all potential assets.

Communications Systems Interruptions

Communications systems interruptions can be detrimental to a business or other organization that relies on communications systems in order to conduct business. Often, communications systems interruptions or failures result in a business interruption. Therefore, the same criteria explained in the above section on Business Interruption may be applied to communication systems interruptions as well. In the case of an emergency, or during another hazard event, individuals and government agencies rely on communications for safety. If these systems were interrupted during another event, people would be at risk.

Refer to CHAPTER 3. ASSET AND VULNERABILITY IDENTIFICATION for identification of specific sites to vulnerable to these technological hazards.

LOSSES BY HUMAN HAZARDS

Allenstown is a community of about **4,322** people per the Census 2010 count. A high rate of casualty could result in the event of a human disaster event at a public gathering place, the Elementary School, the Town Offices, or during special events. **CHAPTER 3. ASSET AND VULNERABILITY IDENTIFICATION** identifies sites that are vulnerable to human disasters, and **Table 23** lists the annual events that occur within the Town.

Damage to structures is usually isolated to one or two locations, so the effects of potential disasters at certain facilities could be researched utilizing the Town Assessor's database for valuation on specific buildings.

The same methodology that was explained in the previous section should be applied to human hazards when estimating losses. Human and technological hazards are more similar to each other than either is to natural hazards because they both result from human behavior or failure of human-created systems. The profile of human hazards and the vulnerability of assets from human-induced hazards are distinct from those of technological hazards because they are even harder to measure. It should be assumed, in all cases, that any hazard event will cause a worst-case scenario. As in the previous section on technological hazards, when possible, sources of further information have been referenced in order to strengthen the research for steps 2 and 3. An additional tool that FEMA recommends is the creation of a Facility Inherent Vulnerability Matrix. This tool can be used to compare the relative vulnerability of each asset based on the criteria that is used for Step 2. The x-axis should contain vulnerability point values, ranging from low to high (0 for absolutely no vulnerability to 5 for high vulnerability), and the y-axis should contain the criteria: asset visibility, target utility, asset accessibility, asset mobility, presence of hazardous materials, collateral damage potential and site population/ capacity (incrementally increasing from 0 to >5000). Because each quadrant of the matrix contains a point value, the vulnerability of each asset can be calculated by selecting the appropriate point value.

The guidelines for estimating potential losses given above and in the previous section on Technological Hazards are only suggestions. However, because there is no straightforward methodology for calculating potential losses due to technological and human-induced hazards, the most thorough evaluation of assets, hazards and asset vulnerability provides the best means for estimating losses and mitigating disasters.

General Strike

Structural damage as well as disruption of services and revenue can occur. Most likely to occur as a result of general strike is disruption of services, as strikes are most frequently aimed at providers of services such as government, schools, hospitals and corporations.

Terrorism
Acts of terrorism vary greatly from act to act but recent terrorist events have been targeted at humans. Terrorist acts that cause human casualties have drawn more attention to terrorists and their agendas. There are different acts of terrorism and each has the potential to cause damage, however, the nature of the damage depends on the act of terrorism. Eco-terrorism typically targets businesses and government facilities, political terrorism may target a landmark or government office and biological terrorism may target large groups of people. In order to estimate potential losses from acts of terrorism, each type should be considered different. In other words, the vulnerability of the potential targets should be assessed depending on the different types of acts of terrorism. The U.S. Department of Homeland Security should be the primary source of information on terrorism.

Sabotage
Sabotage, like terrorism, has the potential to damage more than simply infrastructure or property. It is unknown how sabotage has the potential to cause human casualties; however, it can cause business interruption, humiliation and defamation of character, financial collapse and economic catastrophe. Businesses, organizations, government agencies, schools, individuals and anyone who could be at risk of sabotage should address their security and assess their vulnerability to the hazard. Especially vulnerable to sabotage are organizations in the industries of information and telecommunications, physical distribution, energy, banking & finance and vital human services.

Hostage Situation
Hostage situations vary in time and damage. Because hostage situations involve humans, the potential for casualties is greater in hostage situations than in other human hazards such as sabotage, general strike and civil unrest. The procedure for profiling the hazard should be done as for the other human hazards, but when assessing the vulnerability of the asset it must be remembered that it is human life.

Civil Disturbance / Public Unrest
Structural damage as well as disruption of services and revenue can occur.

Enemy Attack
Damage to structures is often isolated at one or two locations, so the effects of potential disasters at certain facilities could be researched utilizing the Town's assessor's database for valuation on specific buildings. Vulnerable targets are typically those that are the most visible and utile to the general public because enemies, like terrorists, seek those locations that offer the greatest potential for exhibition.

Arson
Damage to structures is often isolated at one or two locations, so the effects of potential disasters at certain facilities could be researched utilizing the Town's assessor's database for valuation on specific buildings. According to a 1998 FEMA/USFA report, arson is the leading cause of fire and direct financial loss resulting from fire. It accounts for 30% of both. For further details refer to the above reference to **Explosion/Fire** in the **LOSSES BY TECHNOLOGICAL HAZARDS** section.

Mass Hysteria

This condition can result at locations where large groups of people congregate in likely response to a primary hazard event. It is unknown how to calculate the potential losses resulting from an event of mass hysteria. Structural damage as well as disruption of services and revenue can occur in addition to bodily harm.

Special Events

The special events in Allenstown are listed in **Table 23** and the area special events have been listed in **Table 22**. Special events are unique because they are not inherently a hazard, like the natural, technological and other human hazards. In very rare cases, special events locations are the site of some property loss, injury and death in extreme cases. While researching special events in the region, no cases of death were discovered. Nevertheless, the potential exists. Because each special event is different, varying in place, time, number of people, etc., the vulnerability of the assets and potential for losses will vary. Different events draw different crowds to different venues.

MAP 4: POTENTIAL HAZARDS AND LOSSES

The ***Map 4: Potential Hazards and Losses*** illustrates where the community facilities and vulnerable populations are located as well as the locations of potential and future hazards. The map shows those areas where the population is most susceptible to flooding, wildfire, landslides, and wind damage as well as the locations of bridges, dams, wetlands, icy roads, and the recommended evacuation routes.

CHAPTER 5.
DEVELOPMENT TRENDS

2015 PLAN UPDATE

It has been five years since the last Plan was written, with the new decennial Census 2010 having been taken. The best available new data has been used in this Chapter to portray the population, housing, and overall demographic picture of present day Allenstown. A revised section on ***Relation to Natural Hazards*** helps to tie the fabric of the community into the most likely natural, human, and technological hazard events which could occur in those areas.

INTRODUCTION

A simplified description of how the Town's population and housing have grown within the last four decades follows. Relationships of the locations of people and buildings to natural hazard events are generally explored. Examination of this information will allow the Town to better understand the land use and demographic trends within its borders and how emergency and preventative services can best serve the growing and changing population and landscape.

POPULATION AND HOUSING GROWTH

Allenstown completed a Master Plan in 2003 and began to update Chapters in 2012. The update continues as of **SUMMER 2015**. The 2003 Chapters include detailed information and maps (where feasible) on Goals and Objectives, History and Culture, Population and Economics, Housing, Natural Features, Community and Recreational Facilities and Utilities, Transportation, Existing and Future Land Use, Regional Concerns, and Implementation. The drafted 2012 Chapters include Population, Land Use, Energy, and Economics. The chapters contain the basis for which the Town's ordinances and regulations are written and updated. The land use data collected for **Table 43** was taken from the 2012 Land Use Master Plan.

The following tables in **CHAPTER 5. DEVELOPMENT TRENDS** contain the newest available data from different sources on housing and population growth which depict development trends over time. Allenstown's population and housing have declined significantly over the last decade, but the Town had previously enjoyed a large growth boom in the 1970s.

The current Census 2010 population counted **4,322** people and **1,881** housing units in Allenstown.

Table 40
Overall Population and Housing Growth Trends in Allenstown, 1970-2010

Growth	Population	Net Change #	Net Change %	Housing Units	Net Change #	Net Change %
1970 Census	2,731	N/A	0	831	N/A	0
1980 Census	4,398	1,667	61.0%	1,591	760	91.5%
1990 Census	4,649	251	5.7%	1,868	277	17.4%
2000 Census	4,843	194	4.2%	2,093	225	12.0%
2010 Census	4,322	-521	-10.8%	1,881	-212	-10.1%
Total Change from 1970 - 2010	---	1,591	58.3%	---	1,050	126.4%

*Sources: 1970-1990 US Census CPH-2-31 Table 9 Population and Housing Unit Counts; US Census 2000 & 2010 Data *includes all housing units, including vacant and seasonal*

In **Table 40**, Allenstown's current population of **4,322** shows an overall increase of about **60%** in population over the previous four decades. Between 2000 and 2010, the Town's population *declined* by **11%** (**521** people) and housing by **10%** (**212** units). In the Central NH region, only one other community declined, but the rates were extremely low. The number of housing units increased by a significant rate since 1970, growing from **831** units in 1970 to over double that number to total **1,881** in 2010, an overall growth rate of **126%**. This housing rate is comparable to other mid-sized communities in the Central NH region.

In 2000, there was an average of **2.3** people in each housing unit, while in 2010 there were again **2.3** people per housing unit although population shrank more during that time. These figures are both decreases from 1970's average of **3.3** people living in each housing unit, also a regionally comparable figure from 40 years ago. Allenstown's overall growth since 1970 has increased by almost **1,600** people and over **1,000** homes.

Table 41
Population Density in Allenstown, 1970-2010

Area in Square Miles (excluding water)	Persons per square mile 1970	1980	1990	2000	2010
20.5	133.2	214.5	226.8	236.2	210.8

*Sources: **Table 40**, Office of Energy and Planning's GIS acreage calculations*

As displayed in **Table 41**, the overall population density has increased about **60%**, from **133** people per square mile in 1970 to **227** in 1990 and then down to **211** in 2010. The increase of **78** people per square mile over 40 years is a fairly low comparison to the other communities in the Central NH region. However, Allenstown is only **20.5** square miles in size and development opportunities are limited because of the Bear Brook State Park and the existing built environment.

Table 42
New Construction Permits Issued by Building Type, 2006 - 2014

Building Type	2006	2007	2008	2009	2010	2011	2012	2013	2014	9-Year Total
Single Family Homes	4	9	5	2	3	1	3	1	0	**28**
Multi-family Homes	0	0	0	0	0	0	0	0	0	**0**
Manufactured Homes	1	20	11	4	4	2	1	0	0	**43**
Non-Residential Buildings	4	7	7	1	3	3	0	0	0	**25**
Total Permits Issued	**9**	**36**	**23**	**7**	**10**	**6**	**4**	**1**	**0**	**96**

Source: Town of Allenstown building permits file (Town Administrator), Town Reports 2012-2014

In **Table 42**, Allenstown has had few new residential building permits issued since 2008. Within the 2010-2014 time span, **8** new single family homes and **7** new manufactured home permits were issued. Most manufactured home activity was replacement of the building to a newer model. The greatest number of new construction permits were issued in 2007 (**36**) and 2008 (**23**) during a short period of growth. In 2014, Allenstown issued **0** permits, the lowest in nine years, although only **1** permit was issued in 2013. Although not tracked here, the Town issued dozens of demolition permits during this time, partially due to the voluntary property acquisition along the Suncook River.

New manufactured housing permits were the predominant type of new residential permits issued in Town, totaling **43** over nine years. Over the entire 2006-2014 period, **0** multi-family permits and **25** new non-residential permits were issued. No multi-family permits were issued during this period. Comparatively, **28** new single family permits were issued, fewer than the manufactured home permits.

LAND USE

According to NH Office of Energy and Planning geographic information system (GIS) calculations, Allenstown has a total land area of **13,097** acres, or **20.5** square land miles. An additional **69** acres is water. The acreage figure is similar to the Town Tax Assessment Cards, which yielded a total acreage of **12,997.2** of land and water. However, the actual taxable land calculations may differ in the assessing records from the basic GIS calculations, which is not unusual.

For New Hampshire, Allenstown is considered a medium-sized community in terms of population, but is a very small-sized community in terms of available land area. Forested Bear Brook State Park covers over half of the Town's acreage. This resource has proven to be both an asset and a hindrance in terms of development and opportunity. Little available land development, whether residential or commercial, exists in Town as much of the land is the State Park.

From **Table 43**, the forested Bear Brook State Park is the predominant land use type, comprising over **51%** of the Town's land area. Undeveloped land (**29%**) and residential land (**14%**) follow as the next highest acreages of land use. Institutional acreage falls to **3%** and the remaining land uses even smaller, less than **2%**: commercial, industrial, mixed, and institutional land.

Table 43
Land Use in Allenstown, 2001

Land Use	Acres	% of Town
Residential	1,797.1	13.8%
Commercial	179.4	1.4%
Mixed	14.9	0.1%
Industrial	151.2	1.2%
Institutional	352.2	2.7%
Bear Brook State Park	6,683.3	51.4%
Undeveloped	3,819.1	29.4%
Total	**12,997.2**	**100.00%**

Source: Town of Allenstown 2003 Master Plan

There were few notable land use changes of note between 2001 and 2015 because of the restrictive development limitations. The draft 2015 Master Plan examines the land use in a different way, from the perspective of the Town's Zoning Districts.

Table 43A
Zoning Districts and Land Use, 2015

Zoning District	Acres	% of Town
Residential 1	378	2.9%
Residential 2	205	1.6%
Business	173	1.3%
Commercial and Light Industrial	294	2.3%
Industrial	252	2.0%
Open Space and Farming	11,592	89.9%
Total	**12,997.2**	**100.00%**

Source: Town of Allenstown Draft 2015 Master Plan

Table 43A illustrates only about 5% of the Town is zoned for residential use, about 6% is zoned for commercial purposes, and the rest is zoned for open space and farming activities. Many of the existing uses of land were in place prior to the zoning district placements or could not be spot zoned. As a result, many residences are located within the business districts or the open space and farming district. This difficult land use arrangement portrays how difficult it is for the Town to generate tax dollars as the Bear Brook State Park does not bring in tax revenue.

RELATION TO NATURAL HAZARDS

The locations of where people are concentrated or where new lands may be developed should be compared to the locations of potential natural hazards in order to best mitigate potential property damage, personal injury or loss of life. Because of large number of people and uses within limited acreage, high densities bring definitive hazard event probabilities.

Areas of Highest Densities

The population of Allenstown is concentrated in the downtown "Suncook Village" area and in manufactured housing parks off of Granite Street, Route 28, and Deerfield Road. The downtown population is primarily susceptible to lightning, fire, gas leak, and power outage hazards. The Granite Street manufactured housing park is mostly vulnerable to gas leaks and power outages. The Route 28 manufactured parks are susceptible to flooding, power outages, and vehicular accidents. The Deerfield Road manufactured housing parks are most susceptible to fire, power outages, and ice storms. The regulations state that permits for 15 replacement manufactured homes may be granted in any year; new placement of manufactured homes is currently not allowed. However, the low number building permits issued from **Table 42** does not illustrate that type of increase.

Changes Since the 2010 Plan

Population in Allenstown declined 11% between 2000 and the 2010 Census, now totaling 4,322. No density increases have occurred in Allenstown since the last Plan.

Vulnerable Populations

As the remaining buildable land in Allenstown is primarily located along Deerfield Road within Bear Brook State Park, the majority of new homes will be susceptible to power outage and wildfire. Flooding of Catamount Pond or Boat Meadow Brook at the intersection of River Road will affect the ability of residents to utilize the evacuation routes along Route 3 and Route 28. Trees fall on Deerfield Road which results in 20% of the residents unable to leave their homes in Bear Brook State Park. The Swiftwater Drive condominiums are also a concern with their high population density and proximity to the Suncook River.

Changes Since the 2010 Plan

One vulnerable population area identified in **Table 31** changed from the **HAZARD MITIGATION PLAN 2010**. Along Deerfield Road, the population's vulnerability to isolation if the road is blocked by flooding, or downed trees or powerlines has become even more recognized. Steps are underway to cut some damaged trees on Deerfield Road, including those infested with beetles. Other trees that are potential concern will be removed to minimize the possibility of road closures.

Future Development in Allenstown

The potential for hazards and the vulnerability of the population should be considered before undergoing any future development in Allenstown. Although growth at this time is very slow as depicted in **Tables 40** and **42** above, the number of residential housing units could increase by using the Town's plentiful undeveloped forestland areas when the economy improves.

From **Table 37**, some potential exists for additional on land not yet developed near the downtown area. One large lot is currently open land while the other is a rock quarry. These lots might become saleable by their owners in the future. These lots are presently most susceptible to tornadoes, hurricanes, and earthquakes. Other lots behind existing housing and quarrying facilities could be saleable in the future and are currently most susceptible to the same hazards.

The Town will eventually continue to grow and develop, and attention should be focused on the hazards any new development could face during the consideration process. Techniques to mitigate identified hazards could be undertaken by the developer when the facilities are sited and constructed. As illustrated in **Table 37**, potential residential and commercial development could occur in the future in different areas of Town.

Changes Since the 2010 Plan

Some changes in the Town's development potential have occurred in Allenstown since the **HAZARD MITIGATION PLAN 2010**, but these are more in-fill development types of community changes, which will increase development density. The prime example is Holiday Acres off of Granite Street. The manufactured housing park is proposing to increase its size by 250 manufactured homes, up from its existing 299 manufactured homes. This is a significant development with potential evacuation difficulties exacerbated.

CHAPTER 6.
FLOODPLAIN MANAGEMENT
Suncook River Plan

2015 PLAN UPDATE

Allenstown has been exposed to several major flooding events since 2006. A specific Chapter on floodplain management was not present in the 2010 Plan, although the required elements were available in different locations. Previous data has been updated and additional data on Suncook River-area characteristics has been added. Special Flood Hazard Area information has been added, roads impacted by flooding and potential future flooding threats were added, any repetitive losses were identified, and updated statistics were available.

New additions to **CHAPTER 6** are fluvial geomorphology data collected for the Suncook River in Allenstown and Pembroke at the confluence with the Merrimack River to the Epsom town border. Three new map series, ***Map 5. Fluvial Geomorphology Features, Map 6. Fluvial Erosion Hazard Meander Belt***, and ***Map 7. Large Woody Material Density*** were developed to provide a detailed view of where these potential flooding features are located. As the seven (**7.0**) mile Suncook River is too long to place all of the features on one map, each series produced three (**3**) location Maps, entitled ***West A***, ***Center B***, and ***East C*** for ***Maps 5, 6, and 7*** for a total of nine (**9**) new maps for the **HAZARD MITIGATION PLAN UPDATE 2015**.

INTRODUCTION

Flooding is the most common natural disaster to impact New Hampshire. Floods are most likely to occur in the spring due to the increase in rainfall and melting of snow. However, they can occur any time of year as a result of heavy rains, tropical weather systems which produce severe wind storms or hurricanes, or severe winter storms. Hurricanes, generated by the tropical weather systems, are a primary source of significant river channel migration in the state. Past flood events have been recounted within **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT** and the types of flooding hazard risk assessments are provided in **HIGH**, **MODERATE**, and **LOW** and the **OVERALL RISK**.

As introduced in **CHAPTER 2**, the New Hampshire Geological Survey (NHGS) at the NH Department of Environmental Services (NHDES) coordinated a fluvial geomorphology assessment conducted by Field Geology Services who collected fluvial geomorphology field data in designated river reaches along sections the Suncook River in Allenstown/Pembroke, Epsom, and Barnstead in 2013.

For Allenstown, the three (**3**) map series ***Map 5, Map 6, and Map 7*** display fluvial geomorphology features identified along the Suncook River in **Allenstown**, beginning at its Merrimack River confluence and ending at the Epsom town line. Additional data was collected by the NHGS for the locations of and density of large woody material in 200' sections within each reach.

FLOODING IN ALLENSTOWN

The **Overall Risk** of flooding in Allenstown is **6.0** out of a possible **9.0**, according to **CHAPTER 2. HAZARD IDENTIFICATION**. As the Census 2010 Census counted **1,881** housing units in Town, about **4.4%** of homes in Town are located within in a Special Flood Hazard Area according to **Table 38**. Hurricanes/severe storms is a **6.0 Overall Risk**, fluvial erosion hazards is a **4.0**, rapid snow pack melt and river ice jam hazards are a **2.0**, while dam breach and failure scores a **1.0 Overall Risk**. Most of the lower **Overall Risk** scores are due to the Town's purchase of vulnerable residential property along the floodplain, reducing the threat to life and property from river-based hazards. Flooding on local roads from undersized culverts have become more commonplace in the last few years and have temporarily disrupted travel.

Special Flood Hazard Areas

Despite lower **Overall Risk** scores, the **Probability** of these hazard events occurring in Allenstown within the next 25 years is typically **HIGH** or **MODERATE**. The Town is susceptible to flooding because of the close proximity of the Merrimack River and Suncook River to downtown (and Route 28) development. The Suncook River forms the western border of Allenstown with Pembroke. Route 28 and residential neighborhoods off Route 28 are especially vulnerable to flooding.

The 2010 FEMA Digital Flood Insurance Rate Maps (DFIRMs) for Allenstown identify the locations of Special Flood Hazard Areas (SHFA), also generally known as floodplains. There are nine (**9**) individual DFIRMs covering the Town, all nine (**9**) of which have SFHAs. The SFHA **Zones** located in Allenstown are displayed in **Table 2** in **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT.**

Five (**5**) DFIRMs locate Base Flood Elevations (BFEs) along the Suncook River and Merrimack River along their entire span through Town and display SHFA **Zone AE** (1% annual risk of flooding) with floodways areas.

Four (**4**) other DFIRMs provide other SHFA **Zone A** (1% annual risk of flooding) and **Zone X** (0.2% annual risk of flooding) locations. **Table 3** in **CHAPTER 2** provides this information. These locations include Catamount Brook, Boat Meadow Brook, Bear Brook, Little Bear Brook, Pease brook, Smiths Brook, Bill Hill Pond, and a swamp area. Emergency managers should be aware of these SFHA locations and where they coincide with homes and buildings so planned evacuation is possible in the event of flooding.

According to the ***FEMA Merrimack County Flood Insurance Study 2010***, which includes the Town of Allenstown, the Merrimack River originates at the confluence of the Pemigewassett and Winnipesaukee Rivers in Franklin, about 31 miles north of Allenstown. Only a short section of the Merrimack River is in Allenstown, forming the southwestern boundary with Bow and Hooksett. The river empties into the Atlantic Ocean at Newburyport, Massachusetts. Its floodplains range in width from between 800 feet to 1,900 feet within the county.

Brook floodplains also cause flooding in Allenstown, although on a smaller basis. Little Bear Brook and Bear Brook floodplains stretch from the Suncook River to about parallel with Deerfield Road (Bear Brook). Catamount Brook is a tributary of Bear Brook heading into Bear Brook State Park, Pease Brook empties in Bear Brook after crossing Mount Delight Road, and Boat Meadow Brook begins as an "urban brook," stretching from the Suncook into the State

Park north of Pine Haven Drive. A few smaller unnamed brooks are within the developed areas. These are the majority of floodplain areas in Allenstown.

The ***USGS Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown New Hampshire 2009***, in some ways, is an updated version of the 2010 FIS for the Suncook River in Allenstown. New 100- and 500- year flood elevations were conducted and an updated floodplain mapping layer to be used as the Digital Flood Insurance Rate Maps (DFIRMs) was developed as a result of this report. Changes in the 100-year recurrence interval flood elevation from the 1979 flood study were typically less than 2 feet. More information is available in **CHAPTER 2 HAZARD IDENTIFICATION AND RISK ASSESSMENT.**

Altogether, a total of **94** primary structures, which include **72** single family homes, **3** multi-family homes, **8** manufactured homes, and **11** non-residential buildings, were located within the new 2010 Special Flood Hazard Area (floodplain). This information is taken from **Table 38** in **CHAPTER 4 POTENTIAL LOSSES**.

SUNCOOK RIVER FLUVIAL GEOMORPHIC ASSESSMENT

As a result of the many flooding events and existing complications of the very dynamic Suncook River, the NH Geological Survey (NHGS) at the NH Department of Environmental Services (NHDES) coordinated a fluvial geomorphology assessment of the river. Conducted by Field Geology Services who collected fluvial geomorphology field data in designated river reaches of the Suncook River in Allenstown/Pembroke and Epsom in 2013, a suite of data features were collected from the Allenstown/Pembroke town line at the confluence of the Merrimack River to the northern Epsom town line. In Addition, the Town of Barnstead's portion of the River was assessed. The middle communities opted out of the assessment. NHGS wrote the Suncook River ***Fluvial Geomorphology Assessment Discussion Guide*** in Spring 2015 to help communities interpret the data that was collected on a reach by reach basis.

Including the Suncook River's fluvial geomorphology data information in the **HAZARD MITIGATION PLAN** can permit some of the issues identified within the Tables and narrative in **CHAPTER 6** to be undertaken as Actions in **CHAPTER 11**. Completing these Actions could help minimize property loss and damage, increase public safety, and enhance grant funding opportunity for future projects.

Fluvial Geomorphology Data to Ascertain Erosion and Flooding Characteristics

"Fluvial" is a term used by earth scientists to indicate action by flowing water and by rivers in particular. Geomorphology is the study of the form of the landscape around us, and how those forms came to be. Thus, fluvial geomorphology is an examination of how rivers work to shape their landscapes around them. Additional information on fluvial geomorphology in New Hampshire may be found by reading the NH Geological Survey (NHGS) fact sheet, located at http://des.nh.gov/organization/commissioner/pip/factsheets/geo/documents/geo-10.pdf.

During flooding or even high flow events, rivers can erode their banks and migrate across their floodplains. A migrating river has the potential to impact nearby structures (berms, dams, buildings, etc.) or infrastructure such as river/stream crossings (culverts and bridges) or transportation features (roads, drainage structures, rail, etc.) in its migration path.

Extensive collection of fluvial geomorphology data in an individual river reach, that specific length of a river and its adjacent floodplain that shares characteristics differing from its upstream and downstream neighbors, can provide clues to how the river might change, at which locations the river might change, and the likelihood of change in each reach during high flow and flooding events.

River Reach Location Mapping

Four (**4**) river reaches of geomorphically similar material were assessed in Allenstown, totaling **6.5** river miles as displayed in **Table 44**. Two reaches totaling another **0.5** miles were seemingly not assessed because of inaccessibility, ponding features, or no data to collect. The total length of the Suncook River traversing Allenstown and Pembroke is **7.0** miles.

Table 44
Suncook River Reaches in Allenstown-Pembroke

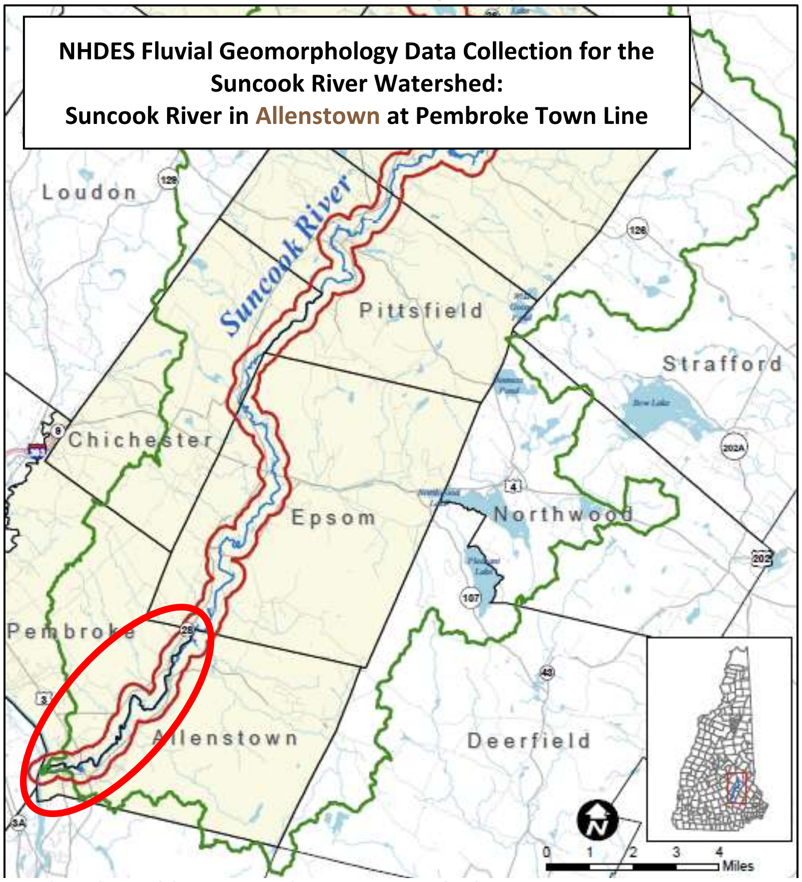
Geomorphically Related Assessed Reaches	Length of Reach (Feet)	Length of Reach (Miles)
Reach 1	2,452.3	0.5
Reach 3	1,408.2	0.3
Reach 5	22,995.5	4.4
Reach 6 *All-Pem Length*	7,696.0	1.5
Reaches Length	**34,552.1**	**6.5**
Unassessed River Length Reaches 2&4	2,546.0	0.5
Total Suncook River Length in Allenstown-Pembroke	37,098.1	7.0

Sources: Data collected by Field Geology Services and by the NH Geological Survey, 2013; Geomorphology assessments protocol determined by NH Geological Survey, 2014; Data distilled and formatted for display by Central NH Regional Planning Commission, 2015.

A mapped representation of the four (**4**) river reaches that were assessed in **Allenstown** along the Suncook River is displayed in **Figure 42**.

Reach 1 begins at the Merrimack River confluence, and extends **0.5** miles north. Reach 3 begins at the point perpendicular to Main Street and stretches **0.3** miles. Reach 5 and Reach 6 are much longer than the previous two, covering **5.9** miles of the river from the intersection of Route 3 to the Town's border with Epsom.

Figure 42
Suncook River Fluvial Geomorphology River in Allenstown



Source: Map developed by Central NH Regional Planning Commission (CNHRPC), 2014, from data provided by the NH Geological Survey (NHGS)

Fluvial Geomorphology Data Collection in Allenstown

The objective of fluvial geomorphology data collection and hazard mapping is to equip communities with information that can assist them in locating potential opportunities for stream crossing upgrades, stream restoration or hazard mitigation projects. With this information in the Hazard Mitigation Plan, the Town has an opportunity to consider areas of identified potential flooding and erosion risk in future planning efforts.

The Suncook River assessment included an inventory of river characteristics that can be used to determine potential flooding or debris impaction problems. Several communities were included in the collection watershed, Allenstown/Pembroke, Epsom, and Barnstead. Examples of possible features collected in the field included:

- River encroachments (such as berms)
- Grade controls (waterfalls, ledges, dams, weirs)
- Cross-section locations
- Debris jams
- Flow regulations and withdrawals
- Stormwater inputs
- Beaver dams
- Stream fords
- Channel straightening
- Bank erosion and mass failures
- Flood chutes/neck cutoffs/channel avulsions
- Headcuts
- Bank revetment (riprap)
- Culvert assessments

In Allenstown's Suncook River reaches, an interesting variety of geomorphology (condition) data was collected for the reaches in Allenstown.

Fluvial Geomorphology Feature Maps for the Hazard Mitigation Plan

Fluvial geomorphic data characteristics identified in Allenstown's field and research data collection are displayed on the map series ***Map 5. Fluvial Geomorphic Features West (5A), Center (5B), and East (5C)***.

Mapped Line Features

Many identified line geomorphic features co-occur in the same location and on both banks of the river. **Table 45A** displays how the total assessed river channel length of **34,552** linear feet (the **6.5** miles assessed) compares to the length of bank and channel features. Over seventy percent (**70%**) of the assessed river channel, or **24,323** feet, has been **straightened.**

Table 45A

Bank or Channel Features along the Assessed River Reaches

Bank or Channel Feature Identified in Reach	Linear Length of Feature, Both Banks (Feet)	Linear River Reach Length (Feet)	Length of L and R Banks Combined (Feet)	Percentage % of Total River Reach Bank (L and R) Impacted
Straightened Channel	24,323.1	34,552	----	70.4%
Bank Erosion	22,716.0	34,552	69,104	32.9%
Vegetated Buffers Less Than 25 Feet	21,617.5	34,552	69,104	31.3%
Road Encroachments	21,505.8	34,552	69,104	31.1%
Riverside Development	18,868.3	34,552	69,104	27.3%
Bank Armoring	9,895.5	34,552	69,104	14.3%
Mass Failure	202.8	34,552	69,104	0.3%

Sources: Data collected by Field Geology Services and by the NH Geological Survey, 2013; Geomorphology assessments protocol determined by NH Geological Survey, 2014; Data distilled and formatted for display by Central NH Regional Planning Commission, 2015.

From **Table 45A**, considering both banks (**L** left and **R** right), **33%** (**22,716'** total of **L** and **R** banks) of the banks assessed along the Suncook River channel is experiencing **erosion**. **Vegetated buffers less than 25 feet** and **road encroachments** are found along **31%** (**21,618'** and **21,506'**) of total river bank.

Over **27%**, or **18,868'** of both **L** and **R** banks, has nearby **riverside development**, **14%** (**9,896'**) of the reach is **armored** and less than one percent (**0.3%**), or **203'** total of **L** and **R** banks of the reach are considered in a **mass failure** state. Refer to ***Map 5 series*** for the specific locations of these fluvial geomorphic features.

The Hazard Mitigation Committee opted to include the detail tables for each geomorphic line feature that was surveyed by Field Geology Services or the NH Geological Survey and mapped by the Central NH Regional Planning Commission. The ***Map Identifier*** columns correlate to the label on the ***Map 5 series***. The data *Sources:* for each of the following **Tables 45B** through **Table 45H** remains the same as for **Table 45A.**

Table 45B

Bank Erosion along the Suncook River

Map Identifier	Location	Erosion HEIGHT in Feet	Erosion LENGTH in Feet	Total AREA in Sq. Ft.
1ER	Right Bank	4	269	**1,076**
2ER	Right Bank	8	324	**2,595**
3ER	Right Bank	10	308	**3,082**
4ER	Right Bank	10	173	**1,728**
5ER	Left Bank	3	1,079	**3,238**
6ER	Right Bank	3	1,444	**4,331**
7ER	Right Bank	6	231	**1,388**
8ER	Right Bank	6	1,488	**8,927**
9ER	Left Bank	8	501	**4,010**
10ER	Left Bank	6	427	**2,565**
11ER	Right Bank	7	230	**1,611**
12ER	Right Bank	6	185	**1,110**
13ER	Left Bank	6	480	**2,880**
14ER	Left Bank	8	317	**2,537**
15ER	Right Bank	7	181	**1,270**
16ER	Right Bank	7	2,508	**17,558**
17ER	Left Bank	8	1,117	**8,939**
18ER	Left Bank	8	3,817	**30,535**
19ER	Right Bank	12	703	**8,435**
20ER	Right Bank	8	1,365	**10,918**

Table 45B, continued

Bank Erosion along the Suncook River

Map Identifier	Location	Erosion HEIGHT in Feet	Erosion LENGTH in Feet	Total AREA in Sq. Ft.
21ER	Right Bank	8	397	**3,174**
22ER	Left Bank	6	289	**1,736**
23ER	Left Bank	4	675	**2,702**
24ER	Right Bank	4	580	**2,321**
25ER	Right Bank	6	946	**5,673**
26ER	Left Bank	5	444	**2,222**
27ER	Right Bank	5	1,169	**5,843**
28ER	Left Bank	8	566	**4,526**
29ER	Left Bank	4	501	**2,004**

Sources: Data collected by Field Geology Services and by the NH Geological Survey, 2013; Geomorphology assessments protocol determined by NH Geological Survey, 2014; Data distilled and formatted for display by Central NH Regional Planning Commission, 2015.

Table 45C

Bank Armoring along the Suncook River

Map Identifier	Type of Impact	Subimpact	Impact Location	Impact LENGTH in Feet
1BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**149**
2BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**73**
3BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**269**
4BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**118**
5BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**427**
6BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**471**
7BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**674**
8BA	Bank Armoring or Revetment	Rip-Rap	Left Bank	**88**
9BA	Bank Armoring or Revetment		Right Bank	**216**
10BA	Bank Armoring or Revetment	Other	Left Bank	**193**
11BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**180**
12BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**596**
13BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**193**
14BA	Bank Armoring or Revetment	Hard Bank	Right Bank	**117**
15BA	Bank Armoring or Revetment	Hard Bank	Left Bank	**107**

Table 45C, continued

Bank Armoring along the Suncook River

Map Identifier	Type of Impact	Subimpact	Impact Location	Impact LENGTH in Feet
16BA	Bank Armoring or Revetment	RIp-Rap	Left Bank	**200**
17BA	Bank Armoring or Revetment	Rip-Rap	Left Bank	**111**
18BA	Bank Armoring or Revetment	Hard Bank	Left Bank	**473**
19BA	Bank Armoring or Revetment	Hard Bank	Left Bank	**91**
20BA	Bank Armoring or Revetment	Hard Bank	Left Bank	**105**
21BA	Bank Armoring or Revetment	Hard Bank	Left Bank	**64**
22BA	Bank Armoring or Revetment	Rip-Rap	Left Bank	**564**
23BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**106**
24BA	Bank Armoring or Revetment	Hard Bank	Right Bank	**424**
25BA	Bank Armoring or Revetment	Hard Bank	Left Bank	**136**
26BA	Bank Armoring or Revetment	Hard Bank	Right Bank	**637**
27BA	Bank Armoring or Revetment	Rip-Rap	Left Bank	**1,105**
28BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**413**
29BA	Bank Armoring or Revetment	Hard Bank	Right Bank	**305**
30BA	Bank Armoring or Revetment	Rip-Rap	Left Bank	**456**
31BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**522**
32BA	Bank Armoring or Revetment	Rip-Rap	Right Bank	**136**
33BA	Bank Armoring or Revetment	Rip-Rap	Left Bank	**177**

Table 45D

Vegetated Buffers Less Than 25' along the Suncook River

Map Identifier	Impact Location	Impact LENGTH in Feet
1BL	Right Bank	**566**
2BL	Right Bank	**199**
3BL	Right Bank	**1,035**
4BL	Left Bank	**1,008**
5BL	Right Bank	**2,648**

Table 45D, continued
Vegetated Buffers Less Than 25' along the Suncook River

Map Identifier	Impact Location	Impact LENGTH in Feet
6BL	Right Bank	**1,786**
7BL	Left Bank	**300**
8BL	Left Bank	**366**
9BL	Right Bank	**2,151**
10BL	Left Bank	**276**
11BL	Left Bank	**1,263**
12BL	Right Bank	**2,541**
13BL	Left Bank	**2,615**
14BL	Right Bank	**592**
15BL	Left Bank	**1,643**
16BL	Right Bank	**801**
17BL	Right Bank	**711**
18BL	Right Bank	**129**
19BL	Right Bank	**988**

Table 45E
Suncook Riverside Development

Map Identifier	Impact Location	Impact LENGTH in Feet
1DT	One Side	**270**
2DT	One Side	**1,244**
3DT	One Side	**108**
4DT	One Side	**1,158**
5DT	One Side	**124**
6DT	One Side	**127**
7DT	One Side	**234**
8DT	One Side	**141**
9DT	One Side	**84**
10DT	One Side	**80**

Table 45E, continued
Suncook Riverside Development

Map Identifier	Impact Location	Impact LENGTH in Feet
11DT	One Side	660
12DT	One Side	9,418
13DT	One Side	845
14DT	One Side	164
15DT	One Side	99
16DT	One Side	515
17DT	One Side	504
18DT	One Side	1,628
19DT	One side	1,468

Table 45F
Encroachments on the Suncook River

Map Identifier	Impact Location	Impact HEIGHT in Feet	Impact LENGTH in Feet
1EC	One Side	12	2,605
2EC	One Side	12	1,120
3EC	One Side	12	1,162
4EC	One Side	-	447
5EC	One Side	-	977
6EC	One Side	-	166
7EC	One Side	9	450
8EC	One Side	9	9,471
9EC	One Side	7	886
10EC	One Side	7	312
11EC	One Side	7	448
12EC	One Side	20	822
13EC	One Side	7	1,140
14EC	One Side	7	1,499

Table 45G
Artificially Straightened Lengths on the Suncook River

Map Identifier	Human-Straightened LENGTH in Feet
1ST	**2,888**
2ST	**1,203**
3ST	**4,569**
4ST	**1,448**
5ST	**2,974**
6ST	**1,436**
7ST	**5,944**
8ST	**1,408**
9ST	**2,452**

Table 45H
Mass Failure of Banks along the Suncook River

Map Identifier	Location	Mass Failure HEIGHT in Feet	Mass Failure LENGTH in Feet	Total AREA in Sq. Ft.
1MF	Right Bank	14	33	**461**
2MF	Left Bank	8	22	**174**
3MF	Right Bank	6	11	**67**
4MF	Left Bank	20	36	**725**
5MF	Left Bank	30	26	**779**
6MF	Left Bank	30	20	**605**
7MF	Left Bank	10	22	**215**
8MF	Right Bank	8	19	**151**
9MF	Right Bank	8	14	**114**

See the ***Descriptions of Fluvial Geomorphology Features*** section and the ***Map 5 series*** for more details on what these features could mean for the Suncook River in the future.

Mapped Point Features

Locations of point geomorphology features are also identified on the ***Map 5 series***. These features include **Bridge or Culverts**, which are located at various locations along the Suncook River. Other impact features include **Flow Regulations/Water Withdrawal** at three locations between the Suncook River and Riverside Drive, **Grade Control** at six (**6**) locations near the Merrimack River, and **Channel Migration** at various points along the length of the Suncook River in Allenstown. A **Steep Riffle** was identified on the map (a site where the channel is slightly steeper than the reaches directly upstream or downstream of it), located just east of the Suncook River. Finally, an area of **Stormwater Input** was located just east of the Suncook River with eight (**8**) individual locations.

The Hazard Mitigation Committee opted to include the detail tables for each geomorphic line feature that was surveyed by Field Geology Services or the NH Geological Survey and mapped by the Central NH Regional Planning Commission. The ***Map Identifier*** columns correlate to the label on the ***Map 5 series***. The data *Sources:* for each of the following **Tables 46A** through **Table 46F** remains the same as for **Table 45A.**

Table 46A
Suncook River Grade Controls

Map Identifier	Type of Crossing	Grade Control HEIGHT in Feet	Grade Control HEIGHT ABOVE WATER in Feet
1GC	Dam	35	30
2GC	Ledge	3	1
3GC	Ledge	2	1
4GC	Ledge	2	0
5GC	Ledge	8	4
6GC	Ledge	3	2

Table 46B
Suncook River Crossings

Map Identifier	Type of Crossing	Description
1BR	Bridge	
2BR	Bridge	Two (2) Celled Bridge
3BR	Bridge	Old Buck Street Dam
4BR	Bridge	US Route 3
5BR	Bridge	
6BR	Bridge	Pipe Crossing

Table 46C

Flow Regulation and Water Withdrawal Locations on the Suncook River

Map Identifier	Type of Crossing	Description
1FW	Small Withdrawal	Left Bank, Both Upstream & DS Flow Regs
2FW	Large Store and Release	Hydro-electric
3FW	Large Store and Release	Hydro-electric

Table 46D

Channel Migration Locations on the Suncook River

Map Identifier	Type of Migration	Location Description
1MI	Flood Chute	Left Bank Side Channel
2MI	N/A	Right Bank Side Channel
3MI	N/A	Right Bank Side Channel
4MI	Flood Chute	Left Bank Potential Side Channel
5MI	Flood Chute	Right Bank Side Channel
6MI	Flood Chute	Old Flood Chute

Table 46E

Stormwater Inputs into the Suncook River

Map Identifier	Type of Input	Location Description
1SI	Road Ditch	Left Bank
2SI	Urban Storm Water Pipe	Left Bank
3SI	Road Ditch	Right Bank
4SI	Road Ditch	Right Bank
5SI	Hydro Raise(?)	Right Bank
6SI	Road Ditch	Right Bank
7SI	Mill Input	Left Bank
8SI	Road Ditch	Left Bank

Table 46F

Other Geomorphic Features on the Suncook River

Map Identifier	Type of Feature	Description
1SH	Steep Riffle or Head Cut	Steep Riffle

See the ***Descriptions of Fluvial Geomorphology Features*** section and the ***Map 5 series*** for more details on what these features could mean for the Suncook River in the future.

Descriptions of Fluvial Geomorphology Features

The following are descriptions of some the fluvial geomorphology data features collected during the **Suncook** River watershed which were identified in **Allenstown's** assessed reach. The descriptions include some of the issues surrounding the feature's appearance. Example photographs are provided to help illustrate the portrayal of the feature. The description data with photographs are provided by the NH Geological Survey (NHGS).

The descriptions attempt to answer, "***What does the data mean?***" to help recommend appropriate attention on the feature or to develop an action to address potential issues. The most important descriptor components are provided in bold format.

Bank Erosion = length of bank erosion (L and R banks) measured within the river reach

Bank erosion represents a considerable flood hazard, particularly when erosion is located near buildings and infrastructure, where such processes can cause damage. It is important to realize that bank erosion is a natural process, and most riverbanks (unless underlain by bedrock) will experience a small amount of erosion at the lowest part of the banks, termed background erosion. **Thus, bank erosion can never be eliminated.** Bank erosion is naturally enhanced at the outsides of meander bends. The bank erosion parameter captures situations where erosion is occurring beyond this background level, where whole or portions of bank faces show raw, barren soil, are not held by vegetation, or that have overhanging earth above them. Then, the water can access and erode during high flow events. **If more geomorphology features are present in a reach experiencing a high percentage of bank erosion relative to the reach length, then it suggests an active river channel with an enhanced ability to experience further erosion and lateral channel migration within its floodplain during high flow events.** For example, if flood chutes, active channel migration or braiding are occurring in a reach combined with erosion, then you have a clear indicator of an active channel in that area. Additionally, **river reaches where mapped straightening coincides with a high percentage of erosion is a potential sign of future risks to adjacent buildings and infrastructure, as rivers will over time look to recreate meanders for themselves.**

Bank Armoring = length of bank revetment (L and R banks) measured within the river reach

Bank armoring or revetment are features installed on riverbanks to stop erosion (such as riprap, walls, etc.). Their presence is a sign of erosion that has required protection. The presence of riprap along a streambank, increases the velocity of flow along the smooth surface of the revetment, which can lead to scour of the bed at the base of the installed riprap, leading to the potential for it to be compromised in the future. Revetment can also enhance erosion directly downstream of the installation, which could contribute to further issues, particularly if infrastructure is situated there.

(Vegetated) Buffer Less than 25 Feet = where the vegetated land buffer width is less than 25 feet (L and R banks) measured from top of the riverbank within the river reach

Buffers less than 25 feet represents locations where the width of land extending away from the top of the riverbank to naturally vegetated land ranges from 0 to 25 feet. **From the public safety perspective, a river experiencing a narrow or nonexistent vegetated buffer is a sign that the banks are potentially at greater risk for erosion,** given the reduced presence of vegetation that can assist in providing integrity to the banks. Situations where buffer width is less than 25 feet can be of particular concern where slopes adjoining a river channel are steep, as this can increase the velocity of runoff, and consequently, erosion.

Riverside development = length of development (L and R banks) measured within the river reach

Riverside corridor encroachment developments, which include buildings and parking lots, when placed near a river, are at particular risk for the effects of floodwater. Additionally, if a river experiences bank erosion and lateral movement at such a location, the development can be at risk for being encroached upon by the river.

Straightening = length and location of straightened channel within the river reach

Many river reaches throughout New Hampshire have been historically straightened (also **known as channelization)**. Rivers, left to their natural devices, meander across their floodplains over time. **Straightening is the process of creating a straight channel path by removing natural meanders.** The dredging of river channels, and the use of the dredged material to place berms on the banks was often part of this process. This was a historical practice designed to protect adjacent infrastructure and properties from flooding by increasing the speed at which water moved by a site, and thus this is often seen in town centers or adjacent to roads. Also, larger rivers in New Hampshire were sometimes straightened in the past to support log drives. **However, the increased flow speeds recurring over time increase the forces available to erode and scour of the channel bed and eventually, re-initiate meandering of the river channel.** This process has been seen occurring on multiple rivers in New Hampshire, and has threatened parking lots and buildings near riverbanks in recent years.

Head Cuts = location of slope breaks, or steps, in the channel within the river reach

Head cuts are steps in the channel where the river bed downstream of the step is lower than that upstream, constituting a slope break on the river bed. These are different than grade controls, which are comprised of bedrock and will not move on time scales of concern. Rather, head cuts are comprised of boulders or smaller size material that can be moved under high flow conditions. **High flows will erode into the step as the force cascades over it, causing the eroded material to be transported downstream and a gradual movement of the top of the step in the upstream direction. This can lead to erosion of the base of the river banks downstream of the head cut, and slumping of bank material, potentially threatening downstream infrastructure.** Left unchecked, a head cut typically will decrease in size and effect over time.

Flood Chutes (Migration) = location of additional interconnected river paths within the river reach

A type of river migration where movement of the channel is occurring, flood chutes are additional interconnected paths on a river which can be accessed during high flows. Chutes are often formed when sediment accumulation in the channel forces flow into the banks, creating erosion and ultimately cutting one or more additional accessible paths of least resistance. **If the main path of the river becomes blocked by additional sediment accumulation or trees, a flood chute can capture the flow and become the main flow path.**

Stormwater Inputs = location of one of several types of inputs to a stream channel which drain stormwater, typically from roads

Stormwater inputs can enhance streambank erosion across the channel or downstream, if placed in such a way that the output is directed into a streambank that is already eroding or is comprised of material that could be eroded in the future.

Flow Regulation Features = location (a dam) to store water from a river to support a number of uses,

including but not limited to: hydro-power, irrigation, public water supplies, snowmaking, flood control or recreation. **A dam that is large enough can lead to decreased flows downstream, storage of sediment upstream of them, and bed and bank erosion downstream.**

Steep Riffles = location where an accumulation of sediment has occurred, typically across the river reach

Steep riffles occurring across a river reach have a steep face in the downstream direction. The riffles can range in size and composition, from boulders to clay. However, riffles are typically comprised of cobbles and gravel.

Mass Failure = location where a stream erodes into or undercuts a high erodible landform

Mass failures are larger features than bank erosion, and occur when a stream erodes into or undercuts a high erodible landform, such as a tall terrace. These will be characterized by a tall feature adjacent to a river channel where part or all of the constituent material is exposed for the flow forces to further cut into and erode.

Roads = type of encroachment found in floodplains adjacent to rivers

Roads can be found in floodplains adjacent to rivers and can be at risk for effects during flood events. **If the road travel surface is raised above the floodplain elevation, and if they are close to the stream, roads can reduce the lateral access that floodwater would normally use to spread out during high water. If the road is very close to a river, and the river experiences severe erosion during a high flow event, the earth material between the river and road can be eroded by the river and the road can be compromised, creating a public safety risk, particularly if a route is severed and it proves the only access available to homes or businesses.**

Other fluvial geomorphology features present in the Suncook River but not found within the Allenstown reach include those remaining in the bulleted list in the prior section of ***Fluvial Geomorphology Data Collection in Allenstown.***

Fluvial Erosion Hazard Zone (Meander Belt) Mapping

The fluvial erosion hazard zone, or *meander belt*, data is derived for river reaches that have been assessed for projects within New Hampshire. A *meander belt* is that area of land on either side of a river or stream channel that a river can potentially access over time as a river naturally migrates across its floodplain.

Fluvial Erosion Hazard (FEH) Meander Belt *Sensitivity*
Very Low
Low
Moderate
High
Very High
Extreme

For identified river reaches, including those for the Suncook River, a suite of river geomorphology (condition) data is collected that provides an understanding of the river channel's *sensitivity* to future change (inclusive of bed and bank erosion) within the meander belt (or fluvial erosion hazard zone) as a result of high flow events. Sensitivity for a reach can be in any one of six categories, based on its condition, ranging from **Very Low** to **Extreme**, with the categories of **Low**, **Moderate**, **High** and **Very High** in between.

Sensitivity can be defined as the potential of a river to respond to flood events, through bank erosion and lateral migration (across the floodplain) processes. Rivers, as a result of the combination of the surrounding terrain in which they are located, and extent of past alterations, will vary in their likelihood to experience flood-event driven rapid changes. Past activities, such as for example channel straightening, can increase the potential for change in a flood. Reaches already experiencing erosion are prone to such rapid changes, given the exposed bank materials available for the power of water to erode into. The occurrences of such features are incorporated into the sensitivity rankings, where generally, the greater the number of features present that can cause changes, the higher the assigned sensitivity for a reach.

The fluvial geomorphology data collected about the river allows for delineation of meander belts, also known as fluvial erosion hazard zones. Fluvial erosion hazard mapping can display these reach sensitivities to channel changes, ranging from the highest **Extreme** to the lowest **Very Low** sensitivity rankings. Broadly, assignment of an **Extreme** category means a reach that is experiencing considerable erosion of its beds and banks, and typically has flood chutes and meander cutoffs that increase the potential for changing flow paths and further erosion during a large flood. Conversely, a rating of **Very Low** is typically found in a bedrock gorge, where the flow path will not change on time scales of concern to people.

Rivers can and do change over time. However, the potential for a bank to erode, or for the river to flow down the path of a new flood chute, or a change in flow path during and after a flood, cannot, unlike flood inundation, be assigned a risk percentage value because the precise location and time of such events are very hard to predict. Therefore, fluvial geomorphologists cannot say that a reach in the **Extreme** category has a certain percentage % chance of experiencing change during a flood. Rather, the six sensitivity categories are relative to each other. When rivers are most active during high flow, a reach with a category of **Extreme** is more likely to experience issues than a reach in the **High** category, for example.

The assessed Suncook Reaches were further divided to permit more accurate fluvial erosion hazard meander belt identification. Six (**6**) individual segments were rated as either **High** or **Very High** in **Allenstown** as shown in **Table 47** below. Assessment and mapping of other reaches in the Suncook River watershed are available from the NH Geological Survey (NHGS).

Table 47
Fluvial Erosion Hazard (FEH) Meander Belt Sensitivities

Assessed Reach Segment	FEH Meander Belt Sensitivity
Reach 1	High
Reach 3	High
Reach 5A	Very High
Reach 5B	High
Reach 5C	Very High
Reach 6A	High

Sources: Data collected by Field Geology Services and by the NH Geological Survey, 2013; Geomorphology assessments protocol determined by NH Geological Survey, 2014; Data distilled and formatted for display by Central NH Regional Planning Commission, 2015.
See also Map 6 Series: Fluvial Erosion Hazard Meander Belt

The map series of ***Map 6 Fluvial Erosion Hazard Meander Belts West (6A), Center (6B), and East (6C)*** were developed based upon this entire suite of collected data. Aerial photography background views display ground features, roads, and the FEH GIS data layers on top of the Suncook River.

Large Woody Material Assessment

As part of the overall Suncook River assessment but separate from the main data collection, NH Geological Survey field surveyed large wood material density in the river as described in ***Appendix A*** of the Suncook River ***Fluvial Geomorphology Assessment Discussion Guide*** in Spring 2015. This data comprised the three-map series of ***Map 7. Large Woody Material Density West (7A), Center (7B), and East (7C).***

The map series ***Map 7*** provides the main detail of the large woody material found within four assessed reaches within Allenstown on the Suncook River. Large woody material data was collected in number of pieces in each 200' river reach segment and the total density of woody material for each reach. Density of the large woody material is mapped by color in ranges of 99 ft^3 from zero to two thousand. **Table 48A** and **Table 48B** summarize density detail from the data collected.

Table 48A illustrates that the greatest number of individual large woody material pieces was found in Reach 5, with **178** woody pieces found in **116** 200' segments, totaling a density of **5,562** ft^3 in the reach. This seems unsurprising since this reach is the longest, has the greatest number of pieces, and therefore has the highest cubic feet of density found. To ensure the woody density is meaningful, the maps compare 200' segments within each reach to visually display the highest concentrations of large woody material.

Table 48A

Large Woody Material Found Within the Suncook River (Allenstown/Pembroke)

Reach Locations in the Suncook River Beginning South…Running North	Number of Woody Pieces in Reach in 200 Foot River Segments	Total Density of Woody Material in Reach *(Cubic Ft)*	Allenstown/ Pembroke Total Reach Length *(Linear Ft)*	River Reach Length *(Miles)*	Number of Approximate 200 Foot Segments Surveyed
Reach 1 Begins at Merrimack River confluence	**17.0**	598.3	2,452.3	**0.5**	12.0
Reach 3 Main Street to Library Street	**16.0**	570.4	1,408.2	**0.3**	7.0
Reach 5 Route 3/DW Hwy to west of Verville Rd	**178.0**	5,562.0	22,995.5	**4.4**	116.0
Reach 6 All-Pem R6 segment ends at Epsom border	**79.0**	2,093.0	7,696.0	**1.5**	38.0
Total Suncook River Length Assessed in Allenstown/Pembroke *Reaches 2 & 4 not assessed*			**34,552.1**	**6.5**	**173.0**
Total Suncook River Length in Allenstown/Pembroke			37,098.1	7.0	

Sources: Data collected by Field Geology Services and by the NH Geological Survey, 2013; Geomorphology assessments protocol determined by NH Geological Survey, 2014; Data distilled and formatted for display by Central NH Regional Planning Commission, 2015.
See also *Map 7. Series: Large Woody Material Density*

Table 48B below also corresponds to the map series ***Map 7. Large Woody Material Density Map West (7A), Center (7B), and East (7C)*** and further summarizes the large woody material, this time by the density range.

Table 48B
Mapped Density Range Value Characteristics in Allenstown/Pembroke

Mapped Density Range Values *(Cubic Feet)*	Number of Wood Pieces Surveyed	Large Woody Material Density *(Cubic Feet)*	Number of 200 Foot River Segments Assessed
0 ft^3	0.0	**0.0**	60.0
1 - 99 ft^3	149.0	**3,477.7**	82.0
100 - 199 ft^3	90.0	**3,566.5**	24.0
200 - 299 ft^3	42.0	**1,472.2**	6.0
300 - 399 ft^3	9.0	**307.3**	1.0
400 - 499 ft^3	0.0	**0.0**	0.0
500 - 599 ft^3	0.0	**0.0**	0.0
600 - 699 ft^3	0.0	**0.0**	0.0
700 - 1,199 ft^3	0.0	**0.0**	0.0
1,200 - 2,000 ft^3	0.0	**0.0**	0.0
Totals in Allenstown/Pembroke	**290.0**	**8,823.7**	**173.0**

Sources: Data collected by Field Geology Services and by the NH Geological Survey, 2013; Geomorphology assessments protocol determined by NH Geological Survey, 2014; Data distilled and formatted for display by Central NH Regional Planning Commission, 2015.
See also *Map 7. Series: Large Woody Material Density*

All of the large woody material found is within the densities range of **1-399** ft^3 as shown by the green/blue array of colors on the map series ***Map 7***. The greatest occurring range of densities scattered along the Allenstown Suncook River was the **100-199** ft^3 value, which held a total **3,567** ft^3 of material with **90** wood pieces surveyed.

The range of **1-99** ft^3 had the second greatest range of densities present along the river, with a total **3,478** ft^3 of material. Smaller volumes of large woody material was found with density ranges of **200-299 ft^3** and **300-399** ft^3 as shown in **Table 48B**.

Additional detail of overall Suncook River highest density locations is found within ***Appendix A*** of the Suncook River ***Fluvial Geomorphology Assessment Discussion Guide***, Spring 2015.

Roads and Areas Impacted by Flooding

Other than river flooding, Allenstown is subject to some road washouts. Some roads have been reconstructed or repaired after the flooding event(s), but many of the culverts remain to be upgraded. Remaining culverts and bridges (including box culvert bridges) will be upgraded as funding and staff time permit. The listed roads and bridges below have experienced washouts or other types of flooding, such as inundation.

Often, when the Suncook River floods, the few brooks in Town such as Pease Brook and others which flow under roads through culverts, also flood. Multiple areas in Town contain outdated culverts that are at risk of washout during flood events. Some residential streets experienced so much Suncook River flooding, homes were voluntarily purchased by the Town to be turned into open space flood storage.

- Albin Avenue (river)
- Bourque Road (river)
- Brookside Park (Route 28) (river)
- Clement Road (river)
- Deerfield Road (washout)
- Fanny Drive (river)
- Ferry Street Boat Landing (river)
- Granite Street
- Jasper Drive (river)
- Jill-Erik Road (river)
- Mount Delight Road (washout)
- New Rye Road (washout)
- Pineacre Road (Riverside Park) (river)
- Riverside Drive (river)
- River Road (river)
- Route 28 (river)

Some of the listed roads are State-owned and out of local control, such as Route 28 and Deerfield Road, but still have undersized culverts or other issues which continue to cause flooding. Washout potential or inundation still exists during heavy rain or rapid snow pack melt events, on both Town and State roads, and with it the potential to lose primary evacuation access in and out of Town.

Currently, the Town has a significant issue with the location and numbers of municipal culverts. Their locations and conditions are unknown. Mapping and culvert assessment are underway by Hoyle Tanner Associates with the assistance of the Highway Department. Allenstown uses VUEWorks for geographic information system (GIS) mapping of municipal infrastructure such as storm drain systems, sewer lines, roadways, sidewalks, street signs, and more. This GIS should be compatible with the more common ARCGIS layers available in New Hampshire at NH GRANIT.

The Town's other goal is to regulate the private drainage systems that tie into the municipal stormwater system. Private culverts must be maintained by their owners. This will be regulated under the Environmental Protection Agency (EPA) Stormwater Management MS4 Plan and regulations Allenstown is developing and should be completed by the end of 2015.

From the multitude of known culvert location problems, **Table 49** displays those in greatest need of replacement to help thwart the most significant flooding damage that isolates residents from road closings.

Table 49
Culverts in Need of Replacement

Road Name of Culvert(s)	Number of Culverts	Intersecting Water	Issue(s)	Total Approx. $ Cost for All
265 River Rd	1	small brook	Pipe is Rotted	$12,500
Mt Delight Bridge	2	Pease Brook	Under Size pipe	$151,225
168 River Rd	1		Culvert is Blocked	$4,500
Totals	**4**			**$168,225**

Source: Allenstown Public Works Department

In **Table 49**, four (**4**) culverts on River Road and Mount Delight Road need replacement to protect 20% f the Town's population that lives in this area. The replacements total approximately **$170,000**. These culverts contribute to local washout flooding conditions as indicated in the list above. However, there are hundreds of culverts in Allenstown and nearly all need upgrades. As noted, the Highway Department and the Stormwater Management MS4 Plan is attempting to address these identification problems.

Potential Future Flooding Threats

Past flood events in Allenstown and the surrounding area have been recounted within **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT**. The threat of flooding to the same extent as the April 2007 flood remains a 1% chance (equivalent of a 100-year flood) in any given year. Damage will occur to bridges and culverts which will require road closings; pavement will be undermined and require excavation to repair; mudslides may occur in some areas; residents along the Suncook River will need to be evacuated, and equipment damage will be caused by rescue and/or repair operations in high water. Emergency shelters will be required for those rendered homeless by high water. Low-lying areas are particularly susceptible when no major waterbody is present. Roads and areas susceptible to flooding include locations identified above.

As discussed in within **CHAPTER 2.**, Allenstown has several areas particularly susceptible to flooding. Riverside Park (on Pine Acre Road) has flooded repeatedly in the past. Every time a major flood has occurred in the last perhaps 40 years, Brookside Trailer Park (on Route 28) has been flooded.

Homes near the Suncook River, especially in low-lying areas, are at risk. Mobile home parks are especially at risk, and many reside in the floodplain. An aggressive effort has been undertaken to acquire the homes which are vulnerable to flooding. Houses at the highest risk remain on Riverside Park Drive, Albin Avenue, Fanny Drive, Clement Road, and Bourque Road. The Swiftwater Drive condominiums are also a priority to purchase and remove.

Several businesses fall within the floodplain and are vulnerable against the flooding by the Suncook River. They include the Doctor's Professional Park, NH Exteriors Residential Office Park, Twin Oaks Campground, and Johnson's Floral on Riverside Drive.

The Allenstown Wastewater Treatment Facility on Ferry Street is vulnerable to both the Suncook River and the Merrimack River.

SUNCOOK RIVER FLOODPLAIN

The principal streams in Allenstown are the Merrimack River and the Suncook River. Allenstown lies almost entirely within the Suncook River watershed. It also falls within the larger Merrimack River watershed, which encompasses most of the State. The Suncook River forms the border between the towns of Allenstown and Pembroke. The river meanders in a southwesterly direction for about six (**6**) miles as the Allenstown-Pembroke border starting near the intersection of Route 28 and North Pembroke Road and ending at the confluence of the Suncook and Merrimack Rivers.

The Suncook River is dammed at two locations on the Allenstown stretch of river, although the dams are technically in Pembroke: (1) the Webster Mill Dam behind the Post Office on Glass Street; (2) Pembroke Dam in the downtown area; and (3) the China Mill Dam at Main Street in downtown Suncook Village. The two dams were created to power the mills that dominated the economy of Allenstown and Pembroke during the industrial revolution. Presently, they are operated by Algonquin Power System and NH Hydro Systems (China Mill) to provide hydroelectric power. The two Buck Street Dams near the Route 28 and Deerfield Road intersection were removed in October 2011 to help lower the water levels upstream of the dam during floods.

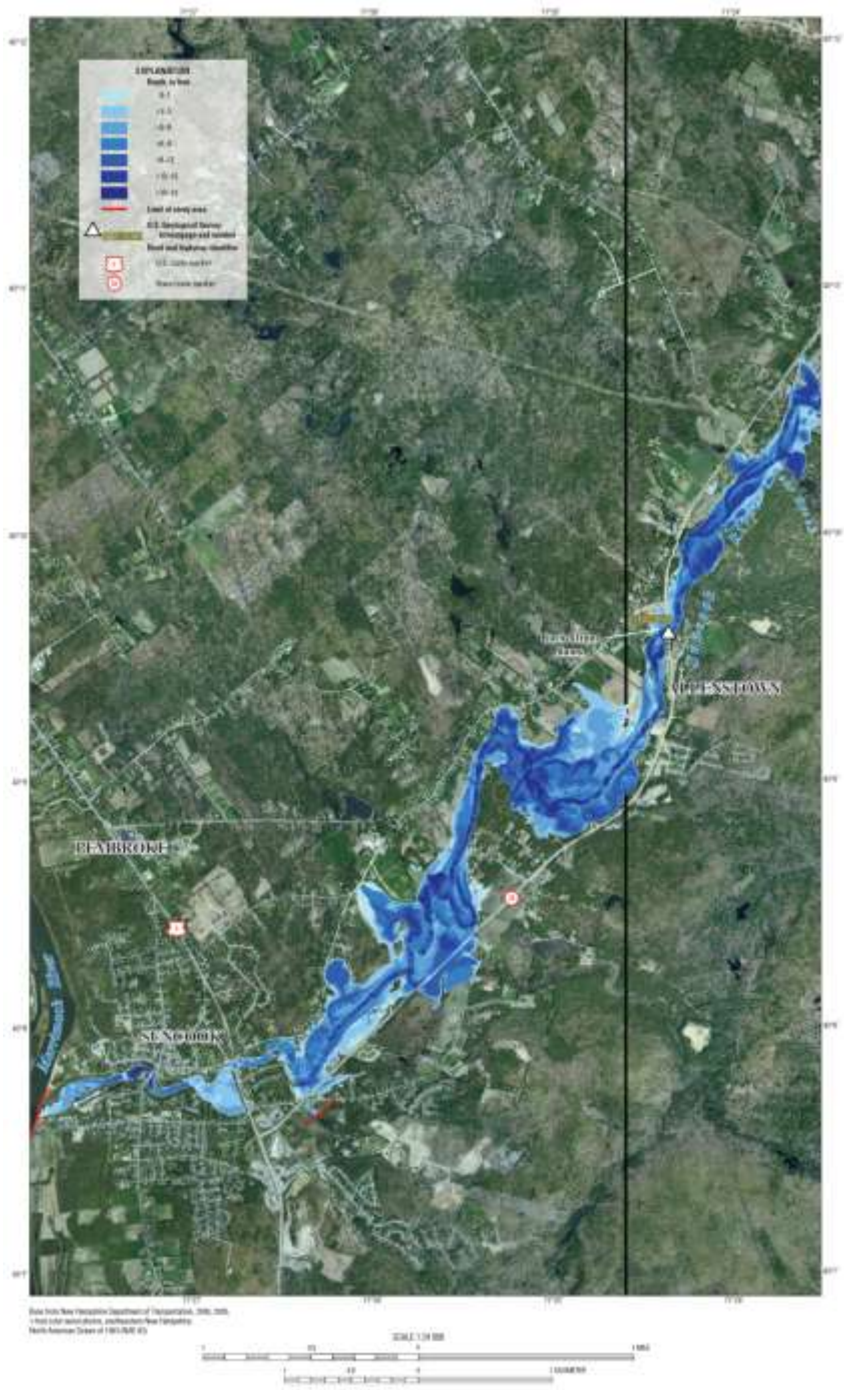
The ***USGS Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown New Hampshire 2009*** redefined the location of the Suncook River's floodplain. The study to update the 100- and 500- year flood elevation was conducted by the USGS in cooperation with FEMA. Changes in the 100-year recurrence interval flood elevation from the **USHUD 1978 Flood Insurance Study** were typically less than two (**2**) feet. The updated flood elevations were the result of the May 2006 and April 2007 floods and the May 2006 avulsion. The results are intended to be used to update the FIS and FIRMs for Allenstown.

The updated floodplain mapping layer has been used as a base layer of the four ***Maps*** of the Hazard Mitigation Plan: ***Map 1. Potential Hazards***, ***Map 2. Past Hazards***, ***Map 3. Assets and Risks***, and ***Map 4. Potential Hazards and Losses***.

USGS Flood Study Inundation Maps 2012

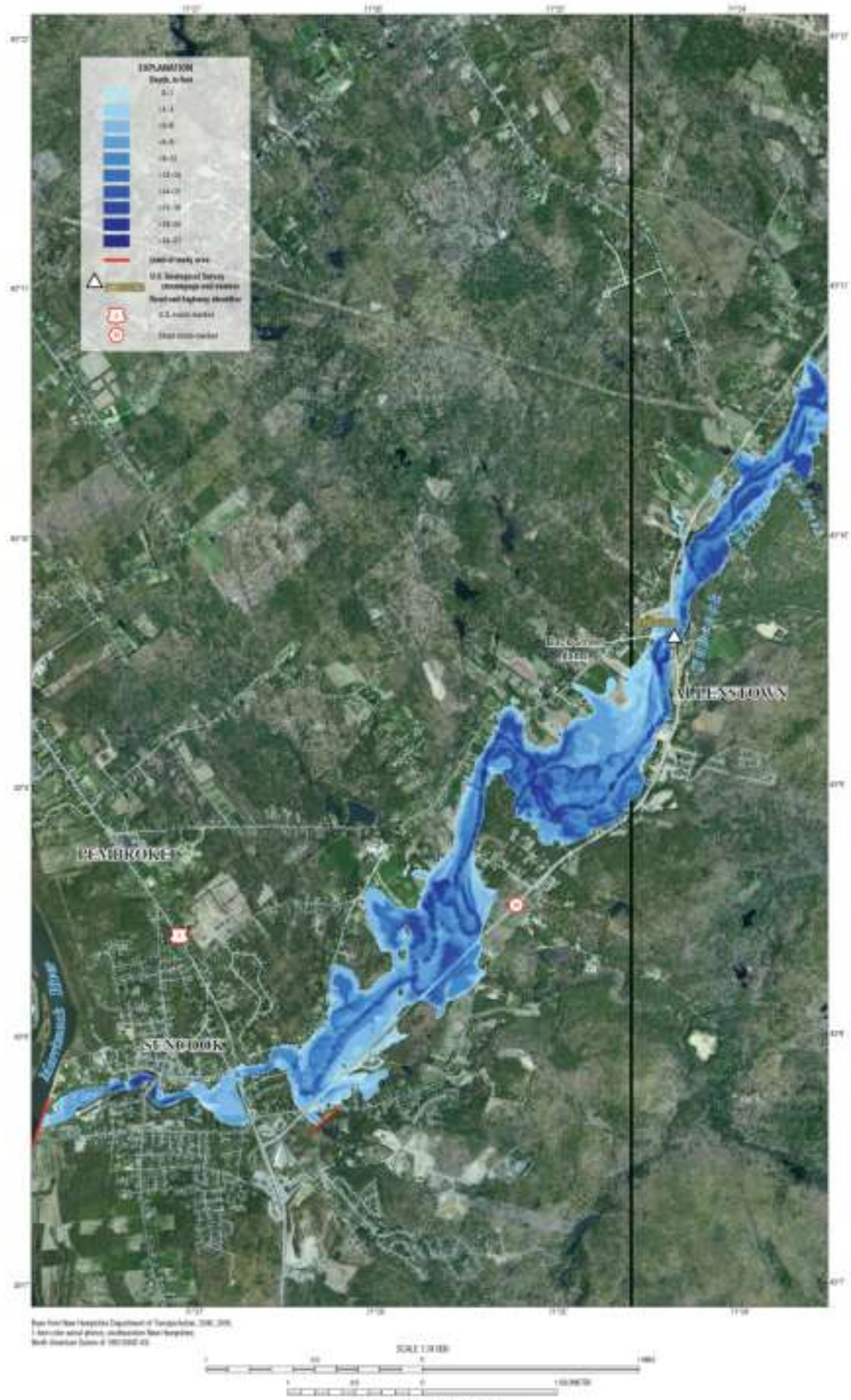
The USGS Flood Inundation Maps for the Suncook River in Epsom, Pembroke, Allenstown, and Chichester, NH 2012 was developed as a result of the intensive flooding in 2006, 2007, 2010, and the 2006 avulsion. Based on the North Chichester stream gage height, the surface water elevation for the **1%** annual exceedance probabilities (**100**-year floodplain) is **15.34** feet. **Figure 43** illustrates **15.0** feet of inundation.

Figure 43
15 Feet Inundation Area of the Suncook River (100-Year Flood)



The surface water elevation for the **0.2%** annual exceedance probabilities (**500**-year floodplain) is **18.0** feet. **Figure 44** illustrates **18.0** feet of inundation.

Figure 44
18 Feet Inundation Area of the Suncook River (500-Year Flood)



*Source for **Figure 43** and **Figure 44**: USGS Flood Inundation Map at North Chichester Streamgage, 2012; http://pubs.usgs.gov/sim/3196/*

The USGS flood inundation study was conducted in cooperation with the NH Department of Homeland Security and Emergency Management. The communities were interested in its development for emergency management purposes. The inundation maps, in conjunction with the USGS online inundation mapping program, real-time gage data from both the Route 28 and North Chichester stream gages, and the National Weather Service floodstage forecasts "can help to guide the general public in taking individual safety precautions and provide city officials with a tool to efficiently manage emergency flood operations and flood-mitigation efforts" according to the summary of the report.

Real-Time Inundation Mapping

An accompanying but separate resource of the ***USGS Flood Inundation Maps for the Suncook River in Epsom, Pembroke, Allenstown, and Chichester, NH 2012*** as mentioned above is a real-time online inundation mapping program available to anyone wishing to view data from the North Chichester stream gage. Different data layers are available for selection. One downside to the website is there is currently no printing capability of the maps generated. **Figure 45** displays an example inundation map of the Suncook River in Allenstown.

Figure 45
Example Online Inundation Map of Suncook River

Source: USGS Flood Inundation Mapper, July 26, 2013; http://wim.usgs.gov/FIMI/#

Historical Flooding – Gage Heights

A number of critical floods have impacted the Suncook River floodplain. A history of flooding crests is available with the North Chichester gage, which has been active for much of the past 100 years on the USGS website and the National Weather Service website.

Shown in **Table 50**, three (**3**) of the top 15 highest flood crests recorded along the Suncook River were experienced between 2006 and 2010.

Table 50
Historical Crests of Suncook River at North Chichester Gage

Rank	Feet	Date
1	17.10	03-19-36
2	15.97	04-17-07
3	13.55	05-14-06
4	13.00	04-07-23
5	12.55	03-27-53
6	12.50	02-11-70
7	12.40	04-05-60
8	12.19	03-14-77
9	11.99	03-22-48
10	11.88	05-10-54
11	11.80	02-23-37
12	11.47	04-01-34
13	11.35	04-13-40
14	11.34	02-26-10
15	11.30	04-19-33
16	11.25	04-07-24
17	11.03	03-10-42
18	11.01	04-03-59
19	11.00	04-02-76
20	10.80	03-19-68

Source: USGS Stream Gages 07-26-13;
http://water.weather.gov/ahps2/crests.php?wfo=gyx&gage=nchn3

The **#3** April 2007 flood, the **15.97** feet in elevation brought the crest between the 100-year (**15.43**) and the 500-year (**18.0**) flood recurrence interval. The **#2** May 2006 (Mother's Day Flood) was much lower at **13.55** feet, which was between the 25-year and 50-year recurrence interval. (***USGS 2009 Flood Study***) The February 2010 flooding event also made the records at **#14**, with **11.34** feet in elevation.

FLOOD INSURANCE STUDY (FIS) AND DFIRM 2010

Allenstown's first Flood Insurance Study (FIS) prepared by the US Department of Housing and Urban Development was dated October 1978 and its first Flood Insurance Rate Maps (FIRMs) was dated April 2, 1979. The current effective Flood Insurance Study (FIS) for Merrimack County, which includes Allenstown, is dated April 19, 2010; individual community FIS are not being developed. The current effective Digital Flood Insurance Rate maps (DFIRMs) were dated April 19, 2010.

The ***Merrimack County FIS Volumes 1 and 2*** were compiled using data from original FISs. For Allenstown, hydrologic and hydraulic analyses were used. The Merrimack River is described as the principal water course in Allenstown. The Suncook River originates at the outlet of the Upper and Lower Suncook Lakes in Barnstead and flows in a southwesterly direction to form the boundary between Allenstown and Pembroke before emptying into the Merrimack River.

The ***FIS Volume 1 of 2*** states "No flood protection measures exist on the Suncook River in the Towns of Allenstown and Pembroke and no plans have been disclosed for the implementation of any future flood protection measures." The Town's attention on purchasing vulnerable homes in the floodplain seems to have come later than when the 2010 document was authored, for this is a guaranteed flood protection measure.

The ***FIS*** also includes surface water elevations of floods and flood profiles through computer modeling. These are available in ***Volume 2 of 2*** for the Suncook River, Little Suncook River, West Channel Suncook River, and the Merrimack River. The ***Merrimack County FIS Volumes*** are available for free download on the NH GRANIT website at http://www.granit.unh.edu/dfirms/FIS.html.

The original 1979 Flood Insurance Rate Maps (FIRMs) were digitized into a Geographic Information System using aerial photography to adjust the boundaries (geo-rectified) to develop the 2010 Digital Flood Insurance Rate Maps (DFIRMs). The FIRMs themselves were not revised from the 1979 version. Allenstown is found on the ***DFIRM Map Index Panel 2 of 2***. These mapping files could be used as an overlay to different types of maps which display Allenstown's floodplain.

Nine **FIRM Map Panels** comprise the Town of Allenstown. They are ***Panels 564***, ***566***, ***567***, ***568***, ***569***, ***590***, ***677***, ***0685***, and ***705***. The DFIRMS are available for free download on the NH GRANIT website at http://www.granit.unh.edu/dfirms/Merrimack.html.

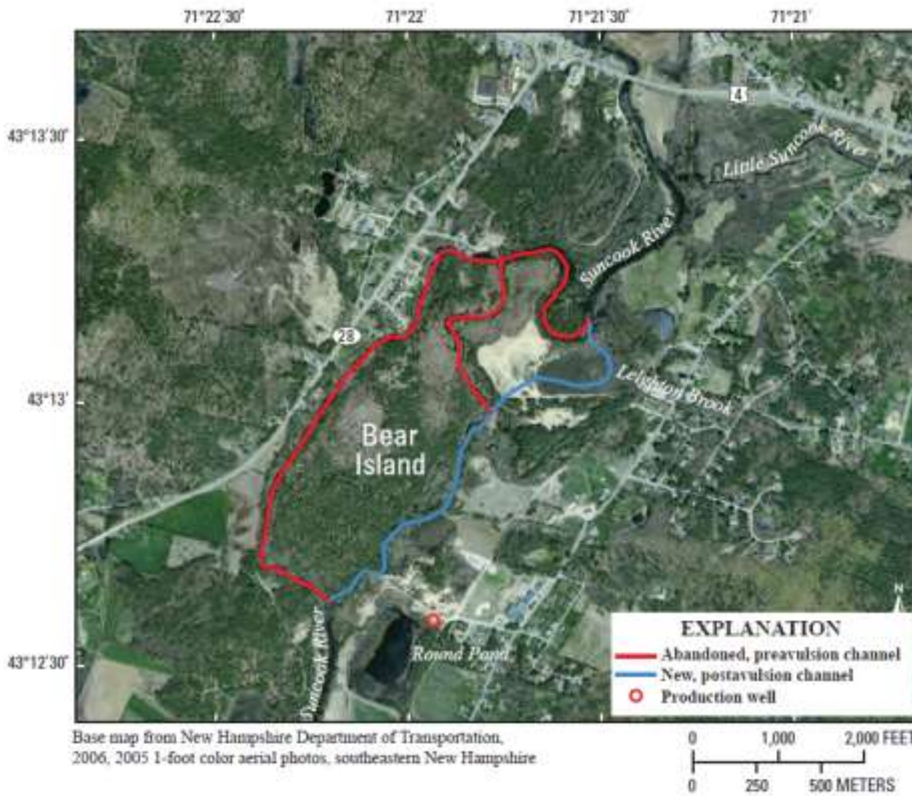
However, the US Geological Survey (USGS) re-mapped the floodplains for Allenstown, Pembroke, and Epsom in 2010 to accompany the ***USGS Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown New Hampshire, 2009***. The accuracy was improved with these digital floodplain layers, and they are used to portray the floodplain areas on the ***Maps*** of this Plan instead of the DFIRMs. The publication is available for download at http://pubs.usgs.gov/sir/2010/5127/.

SEDIMENT TRANSPORT FROM THE AVULSION

The ***USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire, after the May 2006 Flood 2011*** is a document funded by FEMA and developed in response to the Suncook River's avulsion in Epsom in 2006. The purpose of the report is to aid River restoration efforts by furthering the understanding of the impact of transported sediment.

Figure 46 displays the Suncook River's primary channel around Bear Island prior to the 2006 avulsion (in red) and its new primary channel (in blue) that is a more direct route which eliminates the original primary channel.

Figure 46
Suncook River Pre- and Post-Avulsion Channels



Source: USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire, after the May 2006 Flood 2011

The new channel is about **1.0** miles long and the abandoned channel is about **2.0** miles long. As this new river channel flowed through a gravel excavation site, "Cutter's Pit", the water began carrying sand and gravel down the Suncook River through Epsom, Pembroke, and Allenstown to empty in to the Merrimack River at its confluence with the Suncook. The report estimated **150,000** cubic yards of sediment of sand and silt up to five (**5**) feet thick was introduced into the River downstream of the avulsion, a direct result of the new channel through the sand pit and the adjacent wetlands.

Table 51
Predicted Water Surface Elevation Changes as a Result of Sediment Loads

	STREAMBED Elevation Change Average (Mean) (in feet)	
	Overall Average	Short Falls Road to Buck Street Dams
	-0.46	**0.88**
Annual Exceedance Probability Flood	Predicted WATER SURFACE Elevation Change Average (Mean) (in feet)	
	Overall Average	Short Falls Road to Buck Street Dams
50% (2-Year)	-0.39	0.20
10% (10-Year)	-0.28	0.17
2% (50-Year)	-0.19	0.12
1% (100-Year)	-0.18	0.04
0.2% (500-Year)	-0.16	0.06

Source: USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire, after the May 2006 Flood 2011

Shown in **Table 51**, data from field collection and model simulations indicate that downstream of the avulsion, during the average daily flow of the Suncook River, about **70** to **500** tons of sediment per day were moving downriver past the Short Falls Road Bridge in Epsom. About **0.02** to **50** tons of sediment per day were moving past the Route 28 bridge in Pembroke and Allenstown, and about **1.0** to **200** tons per day were moving past the Route 3 bridge in Pembroke and Allenstown. The report stated that the greatest potential for aggradation (increase height of the streambed) were downstream of the sand pit in Round Pond (Epsom) and meanders and downstream of the Short Falls Road to approximately **3,800** feet upstream of the Route 28 bridge in Allenstown/Pembroke.

A higher streambed means a higher risk for flooding as the designated flood zones have likely changed. Although the ***USGS Sediment Transport Analysis*** was completed in 2011, it used 2008-2010 data to power its model. It is unlikely the ***USGS Flood Study of the Suncook River*** from 2009 and its resultant revised floodplain mapping layer was able to take the sediment load changes into consideration since that report was generated later, but the ***USGS Flood Study*** did use new 2008 streambed elevations (post-avulsion) for their report.

The Buck Street Dams in Allenstown/Pembroke were removed in October 2011, and the sediment that had collected behind the dams was able to move downstream. This was unaccounted for in the report as the removal occurred after the study's publication. Therefore, some changes have likely resulted that differ from this report. However, the NH Department of Environmental performed some calculations regarding the impact of the dams removal on sediment transport and streambed elevation change which directly related to the cross sections the USGS developed. This information was presented at an April 2011 meeting:

Figure 47

Predicted Stream Bed Elevation Changes with Buck Street Dams Removed

Suncook River – Impact of Buck Street Dam Removals
Sediment Transport * with and without the dams

Location	River Mile	HEC RAS Cross Section	Bed Elevation Change with dams (ft)	Bed Elevation Change with out dams (ft)	Total Change (ft)
Short Falls Bridge d/s	8.9	92	-1.18	-2.88	-1.17
Upper Extent of Impoundment	8.78	82	-0.89	-0.32	-0.57
Batchelder Road-Bear Brook Confluence	6.74	67	-0.02	-0.93	-0.91
Pembroke Water Main – u/s	6.1	63	-0.01	0.00	0.01
Pembroke Water Main – d/s	5.82	62	-0.99	-0.96	0.03
Rte 28 Bridge –u/s		58	-0.09	-0.15	-0.06
Rte 28 Bridge –d/s	5.56	57	-0.55	-0.57	-0.02
		55	-1.00	-1.00	0
Upstream of Dams	5.5	50.5	-0.24	-0.95	-0.71
Downstream of Island		45	-2.75	-2.77	-0.02
		31	-2.98	-3.00	-0.02
		27	-1.95	-2.12	-0.17
Upstream Rte 3	1.20	22	4.19	4.21	0.02
Webster Dam u/s	0.85	18	6.44	7.11	0.67
Pembroke Dam u/s	0.60	11.2	1.08	-0.92	-0.16
China Mill Dam u/s	0.45	9.2	9.05	8.95	-0.10

* Period modeled - 5/8/2008 to 10/1/2010

Source: NH Department of Environmental Services, April 2011

Although the information does not compare directly to the ***USGS Sediment Transport Analysis*** narrative where **Table 51** was populated, the data in **Figure 47** might be more useful to the Town since streambed measurements relate to three (**3**) dams in Pembroke (more precisely, in Suncook Village at the Allenstown town line), the Webster Dam, Pembroke Dam, and China Mill Dam. With the Buck Street Dams removed, Webster Dam upstream has an elevation increase of **7.11** feet (from before the 2006 sediment transport), Pembroke Dam upstream has an elevation change of **-0.92** feet, and China Mill Dam has an elevation increase of **8.95** feet. The Webster and China Mill Dams have substantial streambed elevation increases that could have an impact on flooding conditions in downtown Allenstown.

For more information, the ***USGS Sediment Transport Analysis*** is available for download online at http://pubs.er.usgs.gov/publication/sir20115088.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The Federal Insurance and Mitigation Administration (FIMA) a component of the Federal Emergency Management Agency (FEMA) manages the NFIP, and oversees the floodplain management and mapping components of the Program.

Communities participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally subsidized flood insurance available to homeowners, renters, and business owners in these communities. Flood insurance, Federal grants and loans, Federal disaster assistance, and Federal mortgage insurance is unavailable for the acquisition or construction of structures located in the floodplain shown on the NFIP maps for those communities that do not participate in the program.

To get secured financing to buy, build, or improve structures in Special Flood Hazard Areas, it is legally required by federal law to purchase flood insurance. Lending institutions that are federally regulated or federally insured must determine if the structure is located in a SFHA and must provide written notice requiring flood insurance. Flood insurance is available to any property owner located in a community participating in the NFIP.

Flood damage is reduced by nearly $1 billion a year through partnerships with communities, the insurance industry, and the lending industry. Further, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance. Additionally, every $3 paid in flood insurance claims saves $1 in disaster assistance payments.

The NFIP is self-supporting for the average historical loss year, which means that operating expenses and flood insurance claims are not paid for by the taxpayer, but through premiums collected for flood insurance policies. The Program has borrowing authority from the U.S. Treasury for times when losses are heavy; however, these loans are paid back with interest.

More information on flood insurance can be found at www.fema.gov.

Allenstown has been a participant in the National Flood Insurance Program since **April 2, 1979**, the date of the Town's first effective National Flood Insurance Rate Maps (FIRMs). **Figure 48** displays historical details of the Town's first involvement with the NFIP.

Figure 48
NFIP History of Allenstown

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISION DATE(S)
Allenstown, Town of	April 5, 1974	November 5, 1976	April 2, 1979	None
Andover, Town of	June 28, 1974	November 8, 1977	April 2, 1986	None
Boscawen, Town of	March 15, 1974	December 24, 1976	July 16, 1979	None
Bow, Town of	May 3, 1974	September 24, 1976	April 16, 1979	October 16, 1981 November 20, 2000
Bradford, Town of	June 28, 1974	August 27, 1976	April 15, 1992	None
Canterbury, Town of	April 5, 1974	January 14, 1977	May 15, 1979	None
Chichester, Town of	April 5, 1974	None	September 1, 1978	None
Concord, City of	August 2, 1974	None	March 4, 1980	August 23, 1999
Danbury, Town of	June 14, 1977	None	January 1, 2003	None
Dunbarton, Town of	April 19, 2010	None	April 19, 2010	None
Epsom, Town of	March 15, 1974	November 12, 1976	July 3, 1978	None
Franklin, City of	March 8, 1974	August 20, 1976	September 28, 1979	None
Henniker, Town of	March 15, 1974	None	May 1, 1978	None

TABLE 7 — FEDERAL EMERGENCY MANAGEMENT AGENCY — MERRIMACK COUNTY, NH (ALL JURISDICTIONS) — COMMUNITY MAP HISTORY

Source: Merrimack County Flood Insurance Study Table 7, 2010

Allenstown's NFIP Statistics

Allenstown has been a participating member of the NFIP since April 2, 1979, with its first Flood Insurance Study (FIS) dated October 1978 prepared and its first Flood Insurance Rate Maps (FIRM) dated April 2, 1979. The Town was briefly suspended from the program on May 3, 1990 and was reinstated on October 18, 1990.

The current effective Flood Insurance Study (FIS) for Merrimack County, which includes Allenstown, is dated April 19, 2010; individual community FIS are not being developed. The current effective Digital Flood Insurance Rate (DFIRM) maps dated April 19, 2010 were adopted by the Board of Selectmen, superceding all previous FIRM maps.

In **Table 52A**, the number of NFIP policies in force in Allenstown has shown both significant increases and decreases between December 2002 and July 2013. Three snapshots of policy and loss statistics have been taken over the three versions of Hazard Mitigation Plan Updates.

In December 2002, the number of policies in force was **22**, which heavily increased by **52** to total **70** policies in September 2008. However, this number fell dramatically to only **32** policies in July 2013. Most of this decrease is accounted for by the **32** floodplain properties acquired by the Town.

Over this same period of time, the number of paid losses to individuals through the NFIP rose from **31** in 2002 to **71** in 2008 to reach **95** paid losses by July 2013. By May 2015, this data did not change. During this time span, there were no floods of note.

The total dollar amount of losses paid to individuals through the NFIP rose tremendously since 2002 to total **$2,107,718**, a difference of over **$2 million** since 2002. By July 2013, the average dollar amount paid by FEMA for losses was **$22,187** to each recipient. However, by May 2015, the number of policies had dropped to **28**, although the insurance in force (**$6,888,500)** remained the same as in 2013.

Table 52A

Allenstown Policy and Loss Statistics

Date	Policies in Force	Insurance in Force	Number of Paid Losses (since 1979)	Total Losses Paid (since 1979)
December 2002	22	$3,197,200	31	$79,688
September 2008	70	$9,947,600	71	$1,703,688
July 2013	32	$6,888,500	95	$2,107,718
May 2015	28	$6,888,500	95	$2,107,718

Sources: May 21, 2015 FEMA Policy and Claims database, Hazard Mitigation Plan 2010, Hazard Mitigation Plan 2003

The number of total parcels in the community in 2012 is **2,011**. While the entire Town of Allenstown is eligible to purchase federal flood insurance, only **20** parcels have NFIP insurance. As described in **CHAPTER 4. POTENTIAL LOSSES**, a total of **137** homes and non-residential buildings are thought to be situated in the Special Flood Hazard Areas.

REPETITIVE LOSS PROPERTIES

A specific target group of repetitive loss properties is identified and serviced separately from other NFIP policies by the Special Direct Facility (SDF). The target group includes every NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced four or more paid flood losses, two paid flood losses within a 10-year period that equal or exceed the current value of the insured property, or three or more paid losses that equal or exceed the current value of the insured property. The loss history includes all flood claims paid on an insured property, regardless of any changes of ownership, since the building's construction or back to 1978. Target group policies are afforded coverage, whether new or renewal, only through the SDF.

The FEMA Regional Office in Boston provides information about repetitive loss properties to state and local floodplain management officials. The FEMA Regional Office may also offer property owners building inspection and financial incentives for undertaking measures to mitigate future flood losses. These measures include elevating buildings above the level of the base flood, demolishing buildings, removing buildings from the flood area, and in some cases drainage improvement projects. If the property owners agree to mitigation measures, their property may be removed from the target list and would no longer be serviced by the SDF.

Allenstown's NFIP Repetitive Flooding Losses

Records on repetitive losses paid for a single property in a community are held maintained by the Federal Emergency Management Agency and held by the NH Office of Energy and Planning (NH OEP).These data records are confidential for the property-specific information they contain. Repetitive losses are determined by any repetitive damage claims on those properties that hold flood insurance through the NFIP.

Table 52B
Allenstown Repetitive Loss Properties

Building Type	Number of Repetitive Loss Properties
Single Family	23
Multi-Family	1
Non-Residential	0
Total Properties	24

Source: FEMA, March 2012

Table 52B displays a total of **24** repetitive loss properties in Allenstown as of March 2012. However, from this list, **16** properties have been purchased by the Town with grant funding and turned into open space, leaving eight (**8**) repetitive loss properties still active.

FLOODPLAIN ORDINANCE

A major objective for floodplain management is to continue participation in the National Flood Insurance Program.

Communities that agree to manage Special Flood Hazard Areas shown on NFIP maps participate in the NFIP by adopting minimum standards. The minimum requirements are the adoption of the Floodplain Ordinance and Subdivision/Site Plan Review requirements for land designated as Special Flood Hazard Areas.

Federally subsidized flood insurance is available to any property owner located in a community participating in the NFIP. Communities that fail to comply with NFIP will be put on probation and/or suspended. Probation is a first warning where all policyholders receive a letter notifying them of a $50 increase in their insurance. In the event of suspension, the policyholders lose their NFIP insurance and are left to purchase insurance in the private sector, which is of significantly higher cost. If a community is having difficulty complying with NFIP policies, FEMA is available to meet with staff and volunteers to work through the difficulties and clear up any confusion before placing the community on probation or suspension.

Community Assistance Visits in Allenstown

On September 15, 1998 Allenstown was the recipient of a Community Assistance Visit (CAV) held for review and education on NFIP policies. At this time, it was reported that there were minor problems with the floodplain management regulations. Upon review in spring of 2002, the Floodplain Ordinance was in compliance with NFIP policies. However, during the 1998 CAV, it was also reported that the required regulations within the Site Plan Review and Subdivision Regulations did not meet the standards of NFIP requirements.

On February 28, 2007, another CAV was held in Allenstown to review compliance with NFIP policies. The Zoning Ordinance, Subdivision Regulations and the Site Plan Review Regulation were reviewed for necessary NFIP language. Repetitive loss properties and record keeping were discussed. The only need action was to verify if the required NFIP language was contained within the Subdivision Regulations and the Site Plan Review Regulations.

Ordinance Revisions

In March of 2008, Allenstown again updated the Floodplain Development Ordinance to comply with recent changes to the NFIP program.

In 2010, the Town adopted the new FEMA Floodplain Maps, the current effective Digital Flood Insurance Rate (DFIRM) maps dated April 19, 2010. In March 2010, the Town also adopted the amended Floodplain District Ordinance, incorporating the necessary FEMA revisions. The Town is presently compliant with FEMA requirements.

Ordinance Management Techniques

According to NFIP policies, when an applicant files a request for a building permit in the floodplain, the applicant must include an elevation certificate in order to be in compliance. In addition, if an applicant intends to fill onsite, a letter of map of revision must be submitted along with the application. According to NFIP requirements in the Floodplain Ordinance, building permits should be reviewed to assure sites are reasonably safe from flooding and require anchoring to prevent flotation, collapse, or lateral movement and construction out of flood resistant materials.

Ongoing attention and familiarity with the NFIP will keep Town staff and volunteers in top form. In order to reduce flood risks, the Building Inspector, Planning staff, and other Town staff whose duties include review/inspection of development or construction should be familiar with the Floodplain Ordinance and the NFIP.

Because of their unique position to ensure development conforms with ordinances prior to approval, the Planning Board should be familiar with NFIP policies, especially those regulations that are required to be incorporated into the Subdivision and Site Plan Review regulations. A workshop sponsored by the NH Homeland Security and Emergency Management (NHHSEM) or the NH Office of Energy and Planning (NHOEP) would be appropriate to educate current staff and volunteers.

An essential step in mitigating flood damage is Town and property owner participation in the NFIP. Allenstown should work to consistently enforce NFIP compliant policies to continue its participation in this program. Town staff should promote flood insurance to property owners of the **1,948** parcels in Town as only **32** owners currently take advantage of the opportunity.

CHAPTER 7.
LOCAL HAZARD MITIGATION OBJECTIVES

2015 PLAN UPDATE

The objectives previously developed were reviewed and updated as needed by the Hazard Mitigation Committee during a public meeting. While the hazard incidents have remained the same, with a few additions over the course of the last five years, it was important to reassess the objectives' relevancy to the overall hazard mitigation actions which the Town has identified. Specific hazard objectives which address the most common hazard events that could impact Allenstown have been reviewed and were updated as necessary.

INTRODUCTION

The following objectives were developed by the Hazard Mitigation Committee to enable the Town to address the primary hazards in the community. Collectively, they will help formulate the mitigation strategies documented in the following chapters.

GENERAL OBJECTIVES

These objectives were excerpted from a former version of the State Hazard Mitigation Plan and amended as needed to reflect Allenstown's small community needs.

1. To improve upon the protection of the general population, the residents of the Town, functional needs populations, and visitors, and to reduce the Town's liability from all natural, technological, and human hazards.

2. To improve emergency preparedness, disaster response, and recovery capability for all natural, technological, and human hazards.

3. To reduce the potential impact of natural, technological, and human hazards on public and private property in Allenstown including the critical facilities, infrastructure , historic treasures, and the natural environment.

4. To identify and provide resources for residents, functional needs populations, and visitors.

HAZARD SPECIFIC OBJECTIVES

Objectives were developed to specifically address the predominant hazards, of the **41** different hazards examined, that are most likely to affect the Town. **CHAPTER 2. HAZARD IDENTIFICATION**'s **Hazard Vulnerability Assessment** was referenced to ascertain which hazards were the highest risk to Allenstown, and main categories are listed below. The Assessment is available in **CHAPTER 12. APPENDIX**. From these objectives, strategies will be developed for the community to implement.

Flood

5. To minimize the impact a flood or fluvial erosion would have on life, property, and infrastructure from the Suncook River and its floodplains, the Merrimack River, ponds and streams, and drainage areas.

Fire

6. To minimize the risk of fire, lightning, and wildfire damage to life, property, and infrastructure.

Severe Weather

7. To minimize the threat to life, property, and infrastructure from severe weather events, including wind, snow, and ice events.

Human

8. To minimize the threat of human disturbances to life, property, and infrastructure.

Technological

9. To minimize the threat to the operational efficiency of all communications systems, utilities, and roadways.

10. To minimize the threat of and damage from cyberterrorism experienced by Town residents and the Town of Allenstown.

CHAPTER 8.
EXISTING MITIGATION SUPPORT STRATEGIES

2015 PLAN UPDATE

The Committee reviewed each of their identified strategies from 2010 and updated the information. Some are currently in practice, others had improvements or changes from five years prior when they were first identified, and additional activities were added. Progress since the 2010 Plan was provided, and Future Improvements were identified for strategies. A listing of the existing plans reviewed for **CHAPTER 8** was provided. Action items from 2010 which were accomplished are listed in **Tables 54A-H** as existing mitigation strategies along with their completion date.

INTRODUCTION

The Hazard Mitigation Committee identified a number of pro-active protection mechanisms that are currently in place in Allenstown that could reduce the damages and losses in the event of a natural disaster or secondary disaster. Listed by Department or Board, the tables reflect what plans, activities, processes, or infrastructure that each has to mitigate disaster effects.

CHAPTER 8. EXISTING MITIGATION SUPPORT STRATEGIES contains an inventory of locally-important existing mitigation activities which have a positive impact on the way hazard events are handled within the community. Most activities are not hazard mitigation Actions. These strategies support the Action Plan and help decrease the community's hazard risk. **CHAPTER 10. EVALUATION AND IMPLEMENTATION OF ACTIONS** contains the Action Plan that the community is working to achieve between 2013-2018.These **CHAPTER 8.** supporting programs, policies, training programs, plans, activities, completed Actions, etc. are not STAPLEE-rated (Social Technical Administrative Political Legal Environmental and Economics questions) like the Actions in **CHAPTER 10.**, but instead serve to sustain and assist the community to maintain and accomplish its hazard mitigation Actions and priorities.

REVIEW OF EXISTING PLANS

During the Hazard Mitigation process and the identification of existing mitigation for **CHAPTER 8. EXISTING MITIGATION SUPPORT STRATEGIES**, the Hazard Mitigation Committee used their knowledge of the documents utilized for their duties with the Town of Allenstown to develop the existing and potential Actions. The following plans and documents in **Table 53** were referenced for the development of this Plan.

Table 53
Existing Mitigation Support Documents

Latest Adoption Date	Allenstown's Local Mitigation Support Documents *Plan, Agreement, Procedure, Guideline, Policy, Regulation, Ordinance, etc.*
July 7, 2013 (Selectmen)	**Allenstown Hazard Mitigation Plan Update**
Feb 13, 2012	**Allenstown Emergency Operations Plan**
July 7, 2013	**Allenstown Disaster Recovery Plan**
2003	**Allenstown Master Plan**
Dec 2014	**Allenstown Zoning Ordinance**
March 11, 2014	**National Floodplain Development Ordinance** *part of Zoning Ordinance*
N/A	**Wetlands Ordinance** *part of Zoning Ordinance*
March 17, 1990	**Hazardous Materials Cleanup Ordinance** *part of Zoning Ordinance*
March 8, 2011	**Groundwater Protection Overlay District** *part of Zoning Ordinance*
Sept. 4, 2013	**Subdivision Regulations**
Sept, 12, 2012	**Site Plan Review Regulations**
Under Development	**Capital Improvements Program**
March 10, 2015	**Stormwater MS4 Management Plan**
Feb 23, 2013	**911 Street Address System Ordinance** *Town ordinance*
Sept., 2013	**Police Department Standard Operating Procedures (SOPs)**
2014	**Police Department Mutual Aid Agreements**
Feb 2015	**Fire Mutual Aid Agreement**
Feb 23, 2015	**Fire Department Standard Operating Guidelines (SOGs)**
Dec 2014	**Tri-Town (Allenstown, Pembroke, Epsom) Ambulance Operating Plan**
December 2011	**Capital Area Fire Compact Mass Casualty Plan**
N/A	**PACE Academy and Pine Haven Schools Emergency Management Plans**
Aug 2014	**Allenstown School District Crisis Management Plan**
April 2010	**FEMA Flood Insurance Study for Merrimack County**
October 2011	**USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown New Hampshire, after the May 2006 Flood**

Table 53, continued
Existing Mitigation Support Documents

Latest Adoption Date	Existing Local Mitigation Support Documents *Plan, Agreement, Procedure, Guideline, Policy, Regulation, Ordinance, etc.*
2012	USGS Flood Inundation Maps for the Suncook River in Epsom, Pembroke, Allenstown, and Chichester New Hampshire,
2008	USGS Flood of April 2007 in New Hampshire
2007	USGS Flood of May 2006 in New Hampshire
2009	USGS Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown New Hampshire
May 28, 2008	Geomorphology-based Restoration Alternatives Suncook River, Epsom, New Hampshire, (with Appendix A), Vanasse Hangen Brustlin, Inc. (VHB)
July 2008	FEMA Independent Evaluation of Recent Flooding in New Hampshire, (with Appendix A & B)
Spring 2015	NH Geological Survey Suncook River Fluvial Geomorphic Assessment Discussion Guide

Source: Allenstown Hazard Mitigation Plan Committee, Town Administrator

DESCRIPTION OF SUPPORTING PROJECTS, PROGRAMS, AND ACTIVITIES

Each existing program, policy, activity, plan, training, process, regulation, ordinance, guidelines, agreement, improvement, Committee, drill, specialized equipment, partnership, etc. which assists with mitigating hazards was identified by the Hazard Mitigation Committee by each Town Department. The Committee discussed the ***Effectiveness*** of each strategy and recommended changes or improvements to their existing programs. ***Descriptions*** of the activity were provided, as well as the area of Allenstown covered by the activity. The responsible Department was identified. ***Effectiveness*** of the activity was rated on a **High-Moderate-Low** scale as described to the right. The results of existing mitigation strategies identification are displayed in **Table 54A-H.**

Strategy Effectiveness Level	Description
High	Strategy is working well and is regularly followed
Moderate	Strategy could use some revisions but is followed
Low	Strategy is not working and needs revisions

The ***Future Improvements*** are prioritized by the Committee using an estimated ***Action Timeframe*** for completion based upon the other Town activities (hazard mitigation-related or not), funding potential for the ***Improvement***, the need for the project, and possible staff time and volunteers available to complete the ***Improvement***. This **relative** Action importance priority is measured by the time indicated for project completion. Refer to Page 284 for definitions and further details.

In addition, the Actions which were **COMPLETED** from the 2010 Plan are listed within these **Tables**. The completion date of the Action from 2010 is listed and **CHAPTER 11 Action Plan's *Project Rationale*** were transferred to the ***Description*** column.

Table 54A

Supporting Strategies: Police Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements * *Ongoing-Short-Medium-Long Term (Page 284)*
Police Mutual Aid Agreements with Surrounding Towns	Auburn, Bow, Candia, Chichester, Concord, Deerfield, Epsom, Hooksett, Northwood, Pembroke, Pittsfield, Raymond	Regional	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Ensure all Police Department Mutual Aid agreements are up to date with the proper chief executives executing the agreements. **Ongoing**
Interoperability Communication Among Fire, Police, Public Works Departments	Radio network meets interoperability standards. Police and fire share portables with similar frequencies, so communication is easily accomplished, but communication with highway will require cell phones. Radio equipment upgraded to meet narrow banding requirements	State-wide	All Department Heads	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Maintain existing radio networks. Investigate the use of a town radio frequency. **Short Term**
Standard Operating Procedures	Numerous SOPS to address ICS, terrorism, explosives, information sharing. Initiated CALEA accreditation process	Town-Wide	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Explore CALEA certification. Undertake regular update and review of the Police Department's SOPs to keep them up to date and current with applicable laws and guidelines. **Medium Term**
Annual Training	Firearms, First Aid, CPR/AED, Disaster response, tactical, IED training in 2012 and 2013. Officers take part in annual exercises that will keep them trained on how to deal with large scale emergencies of natural and human made causes.	Town-Wide	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Train for ICS position. Train for enhanced IC/UC at TEEX for additional staff members in **Short Term**. Hold active school shooter training scheduled for **Short Term**.
Dispatch Service	Merrimack County Sheriffs Regional Dispatch Center. PolicePad information sharing program being fielded with new tablets to upgrade laptops	Town-Wide	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Field new tablet and PolicePad software with AVL and information integration software to be completed in **Short Term**.

Table 54A, continued
Supporting Strategies: Police Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Generator Backup Power	Generators will be maintained in accordance with applicable NFPA codes.	Town-Wide	Police Chief/EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Replacement of generators should be part of a capital improvement plan. **Long Term**
CNHSOU Regional Special Operations Unit	Member of the Central NH Special Operations Unit which provides regional (25 towns and cities) specialized LE services to include tactical, Incident Command, Crisis Negotiation Team, Disaster Response. Have utilized Unit for SWAT call outs, conducted several exercises with the unit.	Regional	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Train more APD personnel to be on the team. Develop mobile field force capability to respond to riots and other civil disturbances **Medium Term**
Mutual Aid Agreement with NH IAC	APD participates in the state Information Analysis Center to share intelligence information and to provide staff for intelligence work as needed. New agreements were signed in 2012	Statewide	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Conduct a joint exercise with NH Information Analysis Center members. **Medium Term**
Suspicious Package Protocol	Chief worked with collaborative team at the NH DHHS lab to develop statewide protocol. Protocol was placed on all laptops for field use. FBI quick reference sheet provided to all officers for suspicious packages and suspected IED.	Statewide	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Conduct exercise to test suspicious package protocol in **Short Term**.
Cybercrime Training	Train personnel on procedures to investigate cybercrime and purchase necessary equipment to investigate these crimes	Statewide	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Conduct cybercrime training and purchase necessary equipment. **Short Term**

Table 54A, continued

Supporting Strategies: Police Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Incident Command Post Vehicle	Purchased and equipped SUV 2012 with Incident Command Post equipment.	Town wide	Police chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Upgrade existing SUV Incident Command Post equipment and share existing regional IC vehicles for this purpose. **Medium Term**
Regional Terrorist Exercise	Participated in regional/statewide terrorism response exercise dealing with WMD. Full scale exercise conducted in 2012 with NG, SP, FBI, DHHS, Fire Marshal, CNHSOU involving Chemical and Nuclear weapons.	Regional/ Statewide	Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to participate in regional/statewide terrorism exercises when they are available. **Ongoing**

Source: Allenstown Hazard Mitigation Committee; Police Department

Table 54B
Supporting Strategies: Fire Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Fire Department Mutual Aid Agreement	Capital Area Mutual Aid Fire Compact (22 towns) member. Task force can be sent to the Town if the event of large fires.	Town-wide	Fire Chief	High	Added additional town to agreement, improved software.	Continue regional training for all Fire Dept in MUA including pre-alert toning and texting. **Ongoing**
Bear Brook State Park Management Plan (1994)	State management Plan for use of the Park. Park owned by NH Department of Resources and Economic Development, who wrote the Plan.	Bear Brook State Park	Fire Chief and Police Chief	High	Held 2012 wildland exercise with NH parks and forest ranger on large scale incidents	Distribute Bear Brook State Park Management Plan to all relevant local officials. Coordinate with NHDRED and NH F&G about nearby developments to Bear Brook State Park. **Short Term**
Firefighting Grant from FEMA	Funding source tapped for safety and communications equipment.	Town-wide	Fire Chief	High	Continued with applying for grants of all sources	Research ways to fund major fire equipment. **Ongoing**
Forestry Grant from NH DRED	Funding source tapped for equipment.	Town-wide	Fire Chief	High	Purchased 2011 Class A foam Inductor and Accessories. 2012 Headlamps.	Continue to submit NH DRED grant applications for wildland fire safety. **Ongoing**
FD Standard Operating Procedures	Ch.1 Administration SOGs Ch.2 Emergency Medical SOGs Ch.3 Facility Maintenance SOGs Ch.4 Supplies and Equipment SOGs Ch.5 Operations SOGs Ch.6 Prevention SOGs Ch.7 Training SOGs. Re-formatted SOGs and removed or changed existing SOGs	Entire Town	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to review Fire Department SOGs and update as standards changes. **Ongoing**
Dispatch Service	Use Capital Area Fire Dispatch, 24/7 service with 6 fulltime dispatchers and 1 supervisor. Updated CAD and Alert Notification system.	Town-wide	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to utilize Capital Area Fire Dispatch service and reports. **Ongoing**

Table 54B, continued

Supporting Strategies: Fire Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Emergency Services Backup Power	100kw diesel generator to operate entire facility	Town-wide	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to maintain Fire Department generator. **Ongoing**
Capital Area Public Health Plan	Capital Area Public Health Network	Entire Town	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to support the network with regional exercises. **Ongoing**
FD Public Outreach	Fire Prevention and Public Education through the schools and Open Houses. The Open Houses provide fire and EMS education	Entire Town	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to offer Fire Prevention and Public Education programs to the public. **Ongoing**
NIMS Adoption	Personnel are NMS and ICS 200 certified and upper management are ICS 300-400 certified. Personnel have attended TEEX Enhanced ICS training.	Entire Town	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to offer Fire Department personnel continuing education through the NHFA. **Ongoing**
Portable Digital Radios for Fire Department	Entire Town radio system is digitalized. Department complies with FCC regulation with narrow banding and worked to purchase digital radios. However, Capital Area Mutual Aid Fire Compact operates on analog frequencies and not digital frequencies.	Entire Town	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Seek grant funding for replacement portable digital/ analog radio equipment in coming years. **Short Term**
Dry Hydrants in Rural Areas	Seven (7) cisterns in rural areas. 30 thousand gallon capacity. One (1) dry hydrant in state park. Two (2) additional cisterns are in place in new development.	Rural Areas	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Add new cisterns in rural areas with little to no water supply for fire protection. **Long Term**

Table 54B, continued
Supporting Strategies: Fire Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Fire and Rescue Training	Weekly training proving by the members of dept and outside instructors. Added ALS personnel to the service.	Town-wide	Fire Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue with Fire and Rescue recruitment and retention. **Ongoing**
Replaced Aged Fire Suppression Equipment **COMPLETED March 2013**	Replaced aged fire suppression equipment. (2010)	Town-wide	Fire Chief	High	Completed in 2013 from the 2010 Haz Mit Plan	Continually monitor and upgrade for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**

Source: Allenstown Hazard Mitigation Committee; Fire Department

Table 54C
Supporting Strategies: Emergency Management

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Emergency Operations Plan 2011	Describes who's responsible for what actions during an emergency, includes evacuation plan. Includes general warning systems, including word-of-mouth, church bells, chain of command of Emergency Management people, and local radio stations. Previous Plan developed in 1992.	Town-wide	EMD	High	Annual updates made by the Town	Update Emergency Operations Plan 2011, add additional annexes. **Short Term**
PSNH Garvins Falls Dam Plan	Describes what to do in case of dam failure at Garvins Falls. Owned by PSNH.	Merrimack River floodplain	EMD	Moderate	Annual updates made by PSNH	Continually monitor for compliance to this supporting activity of the Hazard Mitigation Plan. **Ongoing**
Emergency Back-up Power for Departments	Emergency generator for the Highway Department not yet installed. Sewer Plant tests on a schedule; Police tests monthly and Fire tests weekly. Police station, Town Offices, Fire Dept. and AES now have generators.	Downtown	EMD	High	Annual maintenance occurs twice per year. Portable generator purchased for AES, Transfer Switch installed.	Applied for EMPG to install 45 K generator at the Highway Garage. **Short Term**
Town Shelter at Allenstown Elementary School Gym	The gymnasium will provide shelter in a disaster. Has worked effectively but lacks shower facilities.	Regional	EMD	Moderate	Shelter Annex developed. Regional shelter plan/Mutual Aid agreement signed.	Undertake regional shelter exercise. Provide training to shelter staff. **Short Term**
Warning System	The Emergency Operations Plan utilizes social media as well as traditional media to get messages out.	Town-wide	EMD	Moderate	Several exercises conducted to test system.	Awaiting statewide reverse 911 system. **Medium Term**
Disaster Recovery Plan	Written disaster recovery plan for the town with annexes. Plan was exercised and tested during table top exercise.	Town-wide	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Revise Town's DRP to include meeting FEMA's NDRF format. **Medium Term**

Table 54C, continued

Supporting Strategies: Emergency Management

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Town Wide Drills	HSEEP exercises conducted every year since 2007. Table tops, Drills, Workshops, Functional and Full Scale exercises. Exercised and tested EOP through various exercises.	Town-wide	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Undertake communication exercise and EOC/IMT exercise. **Short Term**
Public officials Notification Process During Emergencies	Allenstown Emergency Alert Notification System AEANS created providing email and text notification to public officials, Groups A,B,C. Notification list updated when needed.	Town-wide	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Review new technologies as they become available. **Ongoing**
Base Radio for EOC	Installed with grant funds in 2008. System fully functional.	Town-wide	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Maintain existing base radio system. **Ongoing**
Training	ICS and NIMS training. Higher level of training completed in all departments	Town-wide	EMD, Fire Chief, Police Chief	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Train Fire Department, Highway and Administrative staff on basic ICS and NIMS. Undertake position- specific ICS training. **Ongoing**
Emergency Operations Center	Located at Fire Station, 1 Ferry Street. EMPG funds provided electronic displays. Computers, forms and signing updated.	Town-wide	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Develop redundant notification procedures to address contingencies. **Medium Term**
NIMS Adoption	Re-Approved in 2011 during adoption of the newest version of the EOP. Continued implementation of NIMS objectives	Entire Town	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Additional NIMS and ICS training is needed as discussed above. **Ongoing**

Table 54C, continued

Supporting Strategies: Emergency Management

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term ((Page 284)*
Suncook River USGS Water Gage	River gage on the Suncook River at Rt. 28 bridge/ Pembroke town line. Provide real time water levels. Gage Installed with EMPG grant.	Suncook River Floodplain	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Work with NOAA and USGS to upgrade gage to provide water level predictions. **Ongoing**
Flood Zone Property Acquisition Project	Purchase flood-prone properties along the Suncook River Floodplain. 32 Homes purchased to date (July 2013), one (1) more home purchase pending.	Suncook River floodplain	EMD	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Apply for additional funding to purchase 14 more homes in the floodplain. **Medium Term**
Highridge Trail Radio Tower Generator	Backup power for the radio tower that provides police, fire, highway and emergency management radio repeater capability for Allenstown, Hooksett and the Sheriff's Dept. EMPG funds paid for generator which was installed at the site.	Allenstown and Hooksett	EMD, Fire Chief, Police Chief and Sheriff	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue Highridge Trail Radio Tower Generator maintenance to ensure the backup power continues to function. **Ongoing**
Community Rating System	Community Rating System process initiated but stopped and not completed to obtain certification.	Suncook River floodplain	EMD	Moderate	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Re-initiate the process and obtain certification **Long Term**
Developed Shelter Plan Agreement with American Red Cross **COMPLETED December 2012**	Developed agreement with American Red Cross for a shelter plan. (2010)	Allenstown Elementary School	EMD	High	Completed in 2012 from the 2010 Haz Mit Plan	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**
Updated Contractor and Equipment Operator List **COMPLETED July 2011**	Updated contractor and equipment operator list (2010) as part of the EOP update.	Town-wide	END	High	Completed in 2011 from the 2010 Haz Mit Plan	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**

Table 54C, continued

Supporting Strategies: Emergency Management

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Updated Volunteer Equipment and Operators List **COMPLETED July 2011**	Updated volunteer equipment and operators list (2010) as part of the EOP update.	Town-wide	END	High	Completed in 2011 from the 2010 Haz Mit Plan	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**
Enhanced Existing Radio Networks Among Town Departments **COMPLETED September 2012**	Radio network meets interoperability standards. Police, Fire, and Highway share portables with similar frequencies, so communication is easily accomplished. Replacement radios are necessary over the years. (2010)	Town-wide	END	High	Completed in 2012 from the 2010 Haz Mit Plan	Continually monitor and upgrade for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**
Developed Pre-Planned Incident Action Plans for Flooding and Severe Storms **COMPLETED September 2011**	Developed pre-planned Incident Action Plans for flooding and other more common disasters (Ice Storms, Blizzards, etc.). (2010) during the Suncook River Community Planning Team information sharing opportunity.	Town-wide	END	High	Completed in 2011 from the 2010 Haz Mit Plan	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**
Investigated Feasibility of Reverse 911 **COMPLETED June 2013**	Investigated feasibility of reverse 911. (2010) The State of NH accomplished this task for all NH communities, making the technology available.	Town-wide, Statewide	END	High	Completed in 2013 from the 2010 Haz Mit Plan	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**

Source: Allenstown Hazard Mitigation Committee; Emergency Management Director

Table 54D
Supporting Strategies: Highway Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Highway Mutual Aid Agreements with Surrounding Towns and Pembroke	Member of NH Public Works Mutual Aid network - have used it for building inspectors during the floods, not for road work. Also have MUA with Town of Pembroke to share generator, equipment, and detour signs for Route 28 flooding (also MUA with State for signs) and have not used it yet. Regularly share equipment daily with Pembroke for regular DPW operations.	Town-wide	Road Agent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Coordinate emergency exercises with the entire NH Public Works Mutual Aid network and Pembroke Department of Public Works. **Ongoing**
Generator at DPW	Currently have a portable generator for DPW. Generator is gasoline, with hand crank start from the 1950s. Does not cover the whole DPW facility.	DPW	Road Agent	Low	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Obtain a large generator - 45kw with installation, pad, 2 transfer switches, underground cables included. (Applied for EMPG grant in February 2013.) **Short Term**
Highway Department Training	All HD employees have ICS trainings, participate fully in school exercises. Training can also include CPR. chainsaw, flagging, traffic management, defensive driving, transfer station certification, first aid, blood borne pathogens, debris management training, etc. All attend annually for continuing certifications.	Town-wide	Road Agent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to undertake Highway Department training and participate in Town exercises. **Ongoing**
Innovative Debris Clearance Procedure	During Hurricane Sandy when the Department's loader was unavailable, a procedure was developed to use a plow truck to clear debris. The roads were closed by state officials and no other vehicles could get by. Purpose was to safely clear roads of debris during the storms using steel plows - more is done, with less effort. Work with local contractors for other emergency vehicles for debris removal.	Town-wide	Road Agent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Plan out strategic placement of Highway Department vehicles prior to the start of storm events. **Short Term**

Table 54D, continued
Supporting Strategies: Highway Department

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Debris Management Section of Recovery Plan	Debris Management section states how to pick up curbside materials, which goes out to residents. Different piles of debris are necessary for removal. The section follows the FEMA model.	Town-wide	Road Agent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Rewrite Debris Management Section of Recovery Plan to allocate pre-designated locations for landfills and include mapping of these locations. **Medium Term**
Standard Operating Procedures	DPW follows the MUTCD for Storms, the EOP's Checklist for Flooding, the ESF Highway for cleaning of storm drains, and the ESF for blizzards.	Town-wide	Road Agent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to use these documents to support the emergency management activities of the PWD. **Ongoing**

Source: Allenstown Hazard Mitigation Committee; Road Agent; Town Administrator

Table 54E
Supporting Strategies: Planning Board / Building Inspector / Health Officer

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term ((Page 284)*
NFIP Participant	Enrolled in program since 1979. OEP provided training.	Floodplain	Planning Board, Building Inspector	High	Continued participation in the NFIP.	Encourage Administrative staff and Planning Board members to attend NFIP training. **Ongoing**
Floodplain Development Regulations Zoning Ordinance	Includes separate standards for new or improved manufactured homes, residential homes, or non-residential development in floodplain zoning district. Last updated in 2010, adopted with new DFIRM maps. Enhanced flood plain management regulations and procedures beyond FEMA requirements.	Floodplain	Planning Board, Building Inspector	High	Continued to adhere to the floodplain ordinance specifications during Planning Board approvals and building permit process	Continue to update the Floodplain Development Regulations ordinance as FEMA requirements change, and update **Ongoing**
Manufactured Housing Regulations in Zoning	Contains a ratio of 1 new manufactured permit issued for every 15 new traditional residential permits issued. Works well by encouraging replacement of older manufactured homes.	Town-wide	Building Inspector	High	Continued to adhere to the manufactured housing ordinance specifications during Planning Board approvals and building permit process	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**
Fire Protection in Subdivision Regulations	Must satisfy improvement criteria (cisterns, road access) if deemed "scattered and premature."	Outskirts	Planning Board	High	Continued to require the placement of cisterns and adequate road access during Planning Board approvals	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**
Site Plan Review / Subdivision Regulations	The latest Site Plan Review and Subdivision Regulations were adopted in February 2012. They contain requirements for health and safety.	Town-wide	Planning Board	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**

Table 54E, continued

Supporting Strategies: Planning Board / Building Inspector / Health Officer

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Master Plan	The latest Master Plan was adopted by the Planning Board in March, 2003.	Town-wide	Planning Board	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Update the 2003 Master Plan with current data to provide relevant recommendations for the Town to fulfill. **Medium Term**
Capital Improvements Program	Last CIP developed in 2012 spanning 2013-2018.	Town-wide	Planning Board	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Update the CIP on an annual basis. **Short Term**
Telecommunication Towers and Antennas Ordinance	Adopted in 2001. States requirements for height, setbacks, security, and removal.	Town-wide	Planning Board	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**
Capital Area Public Health Emergency Preparedness and Response Plan for the Capital Area	The response plan provides the Capital area with a structure to guide planning for a public health emergency. The plan encompasses 3 phases including preparedness, response and recovery.	Town-wide	EMD and Health Officer	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation **Ongoing**
NH Health Officers Manual	This manual provides the health officer a collection of relevant guidance documents related to issues that health officers are likely to encounter including emergency response.	Town-wide	Health Officer	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation **Ongoing**

Source: Allenstown Hazard Mitigation Committee; Health Officer

Table 54F
Supporting Strategies: Town Administration

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Attendance at Seminars by Town Officials	ICS/NIMS training to include 100,200,300, 400, 700 and 800. ICS specific training especially Finance/Admin Section Chief training. ICS 100, 200, 300 completed for most staff, 3 personnel attended the TEEX course IC/UC enhanced.	Town-wide	Town Administrator	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Train remaining staff on the basic ICS/IMS courses and focus on Finance/Admin Section position specific training. **Short Term**
911 Numbering Ordinance	Numbering and street naming ordinance adopted. Several re-numbering, re-naming projects have been completed.	Town-wide	Board of Selectmen	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Complete the remaining re-numbering projects to ensure the entire town is in compliance with the standards and the ordinance. **Short Term**
Class VI Road Policy	Adoption of ordinance and policies in early 2013	Class VI roads	Board of Selectmen	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation. **Ongoing**
Recycling Ordinance	Recycling Ordinance procedures adopted and implemented in 2012.	Town-wide	Board of Selectmen	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation. **Ongoing**
Hazard Material Control and Clean Up Ordinance	Hazard Material Control and Clean Up Ordinance was adopted in 2003. A Capital Reserve Fund (CRF) is in place and has been utilized for several spills; fund has been replenished.	Town-wide	Board of Selectmen	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continually monitor and update for compliance to this supporting activity of the Hazard Mitigation. **Ongoing**
Cloud IT infrastructure for All Departments	Implementation of Cloud IT server to serve all departments with robust virus/hacker protection plan. Plan development is underway in 2013.	Town-wide	Town Administrator	Unknown	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Schedule implementation of Cloud IT Plan and hardware **Short Term**

Source: Allenstown Hazard Mitigation Committee; Town Administrator

Table 54G
Supporting Strategies: Allenstown Wastewater Treatment Facility

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Mutual Aid Agreement with State	Program allows municipalities to share equipment, staff, chemicals, and other items as needed if available to any participating town.	Town Wide	WWTF Superintendent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue participating in WWTF MUA program. **Ongoing**
Backup Generator Power	Generator is located at Facility and one at pump station.	Town Wide	WWTF Maintenance	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Upgrade backup generator using the Capital Improvements Program. **Medium Term**
Standard Operating Procedures	SOPs are followed to ensure proper testing, handling of chemicals, and to ensure safety of staff and community.	Town Wide	WWTF Superintendent and Assistant Superintendent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Improve WWTF standard operating procedures to follow the most recent regulations set by Federal and State rules. **Short Term**
Annual Training	Operators are required by NH DES to complete training each year for operator license renewals.	Town Wide	WWTF Administrative Assistant and Superintendent	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Complete in-house WWTF training for staff. **Short Term**

Source: Allenstown Hazard Mitigation Committee; Allenstown WWTF

Table 54H
Supporting Strategies: Allenstown Elementary and Armand R. Dupont Schools

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
Annual Drills	Drills include fire, haz mat, off-site, lock down, shelter in place, etc. Drills are done at least monthly, so there are a minimum of 10 drills per year.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to vary types of drills done each month. **Ongoing**
Determined Evacuation Sites	Evacuation procedures are outlined in both the Crises Management Plan and in the Emergency Procedures Quick Flip Chart. These procedures have been in place and will continue to be monitored.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Evacuation should be practiced at least every third year. **Short Term**
Student Tracking System	Student attendance is taken daily and absent students not reported as such will be checked with a call home. Attendance is taken with every drill. Student tracking for daily attendance and for drills is automatic and considered seriously for safety.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Monitoring is in place and works well to track students. **Ongoing**
Community Outreach & Safety Programs	Programs are developed & coordinated with the PD. Two of the Parent Forums sponsored by the SB focused of student safety.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Forums and programs will continue to be reviewed and improved. **Ongoing**
Emergency Management Plan for Elementary School (and ARD)	The EM Plan is reported to the NH DoE yearly. The Crisis Management Plan (below) is also reviewed. A comprehensive plan is in place & reviewed periodically.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to review process. **Ongoing**
Buzz-in Locked Door for Elementary (and ARD)	Both schools have had a Buzz-in system for the past two years. Safety concerns are continuously reviewed.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Security cameras will be installed. **Short Term**

Table 54H, continued
Supporting Strategies: Allenstown Elementary and Armand R. Dupont Schools

Existing Program, Policy or Activity	Description	Area of Town Covered	Respon-sibility	Effect-iveness	Progress Since Last Plan	Future Improvements* *Ongoing-Short-Medium-Long Term (Page 284)*
DARE Program	The DARE Program has not been done in the schools for a number of years. An SRO officer has been approved for next year and will reinstate the DARE Program.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	As the SRO works with the schools, a more comprehensive program may be put in place **Short Term**
Emergency Flip Chart 2009 in School Rooms	Emergency Flip Charts are located in every School room for quick access to emergency procedures. Last updated in 2009, they cover communications, evacuations, bomb threats, fire/explosion, gun/weapon on school property, kidnapping, power outage, shelter in place, lock down, and drop/cover/hold procedures. Flip chart was developed in 2009	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to update the flip charts as new information is made available and replace them in all school rooms. **Ongoing**
Crisis Management Plan 2009	The Crisis Management Plan was last updated in 2009. It includes sections on communications, evacuation procedures, chemical spills, death, fire/explosion, gun/weapon on school property, hostage/kidnapping, shooting, major disruption, power outage, and natural disasters.	AES & ARD	Administration	High	N/A. Recently added supporting strategy of the Hazard Mitigation Plan Update	Continue to update the Crisis Management Plan as new information is made available and distribute to all local emergency officials. **Ongoing**
Researched Grant Assistance for Purchasing a Generator for the Allenstown Elementary School **COMPLETED**	Researched grant assistance for purchasing a generator for the Allenstown Elementary School (2009) and obtained the generator for this emergency shelter.	AES (Emergency Shelter)	EMD, Administration	High	Completed from the 2010 Haz Mit Plan	Continually monitor and upgrade for compliance to this supporting activity of the Hazard Mitigation Plan **Ongoing**

Source: Allenstown Hazard Mitigation Committee; School District; Town Administrator

CHAPTER 9.
SUNCOOK RIVER PROPERTY ACQUISITIONS
Suncook River Plan

2015 PLAN UPDATE

This **CHAPTER 9. SUNCOOK RIVER PROPERTY ACQUISITIONS** is not an update to the previous Plan's Chapter, but serves as a new Chapter to address the Suncook River properties within Allenstown. This **Figure**- and **Table**-intensive Chapter illustrates the watershed area, Allenstown parcels and addresses, and those parcels that have been voluntarily acquired by the Town. Discussion and figures are provided on the floodplain maps, on some of the problems and issues experienced in areas, and on acquisition success and future priorities. The Town has been pro-active in obtaining grant funding to purchase priority properties to reduce future damage to life and property by flooding events.

INTRODUCTION

The Suncook River flows directly through seven communities, Allenstown, Epsom, Pembroke, Chichester, Pittsfield within the Central NH Regional Planning region and Barnstead and Gilmanton within the Lakes Region Planning region. The headwaters begin in Gilmanton at Crystal Lake and flow south through the other communities, ending at Allenstown where the Suncook River converges with the Merrimack River.

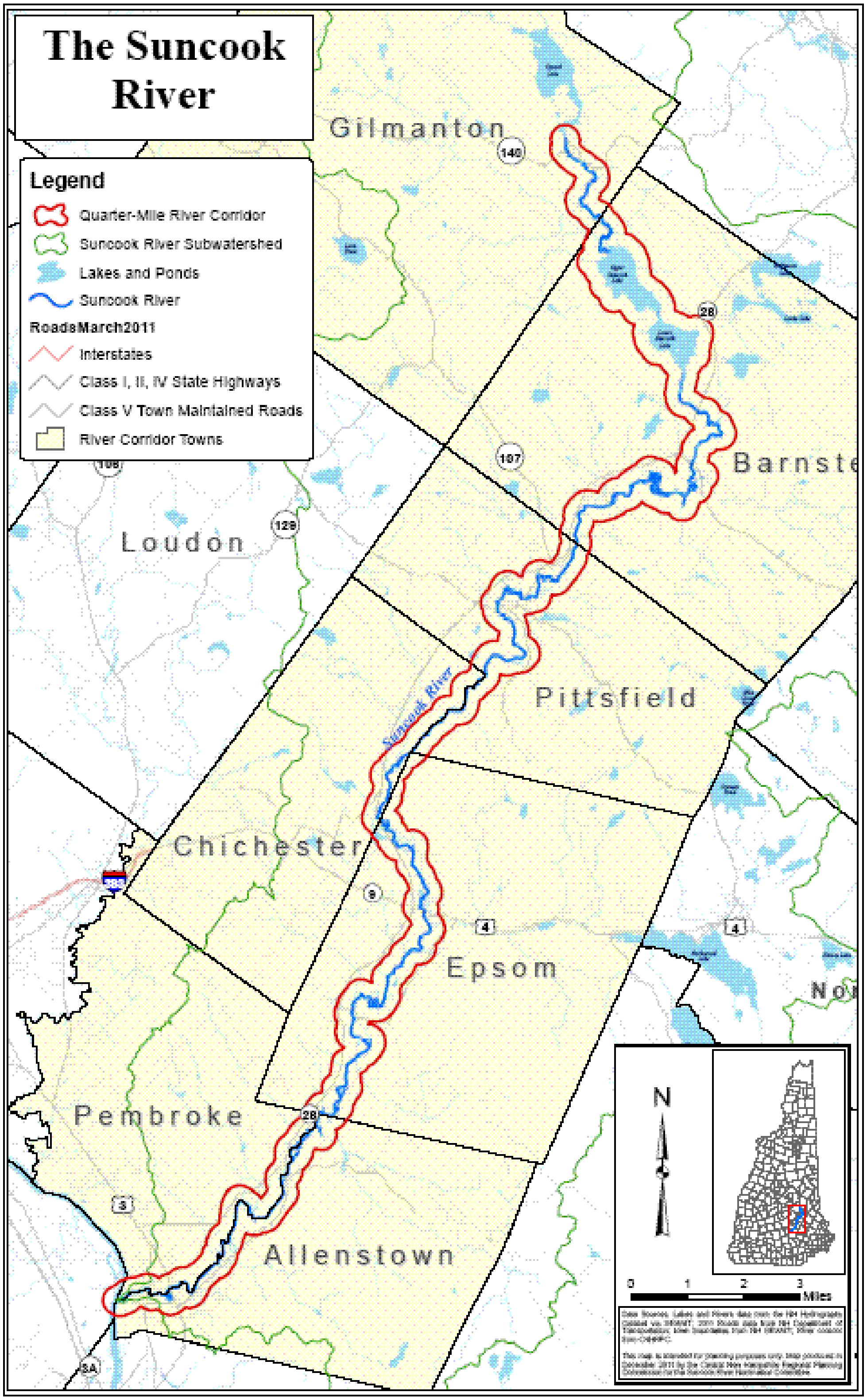
Recent severe flooding events of the Suncook River have severely damaged riverfront homes in Allenstown and other communities. The most recent floods of 2006, 2007, and 2010 (refer to **Table A-1** and **CHAPTER 2. HAZARD IDENTIFICATION**) have destroyed homes, equipment, and contents, resulting in multiple repetitive losses claimed to FEMA (see **CHAPTER 6. FLOODPLAIN MANAGEMENT**).

Suncook River Watershed

Depicted in **Figure 49**, the Suncook River watershed encompasses more than the seven towns the River runs through. However, the focus of Suncook River activities came to the forefront through the damages sustained by the lowest three communities, Allenstown, Pembroke, and Epsom.

Significant political pressure by these municipalities and their residents to the State to address the avulsion of the River which occurred in 2006 was the catalyst to form the ***Suncook River Community Planning Team*** of 2010-2011. The Community Planning Team was designed to undertake a series of tasks for the five lower Suncook communities, Allenstown, Pembroke, Epsom, Chichester, and Pittsfield in the Central NH Regional Planning region. One of these tasks was to bring the success of Allenstown's acquisition of vulnerable properties to the other communities. Epsom was able to acquire a few properties as a result of the training and support available by Allenstown officials and the Community Planning Team efforts.

Figure 49
Suncook River Watershed



Source: Central NH Regional Planning Commission 2010

SUNCOOK RIVER IN ALLENSTOWN

Within Allenstown, several large areas of residential homes are located in a low-lying floodplain between the Suncook River and Merrimack River, just upstream of their confluence. The residential areas of Riverside Drive are located in a low-lying floodplain along the River. The flood damage center consists of approximately 60 wood-framed homes south from Fanny Drive to Bourque Road to the north. The homes in the theses areas have, in general, been constructed on fill with finished floor elevations at or below the 100-year flood plan.

From 1984 to 2010, floodwaters have entered these homes through the garages at basement level and streets were flooded. The April 2006 and May 2007 floods realized flood depths of up to 9 feet in the homes. A similar flood occurred in February of 2010 as a result of the ice storm at that time (see **CHAPTER 2. HAZARD IDENTIFICATION**).

As also discussed in **CHAPTER 6. FLOODPLAIN MANAGEMENT**, Allenstown has several areas particularly susceptible to flooding. Riverside Park (on Pine Acre Road) has flooded repeatedly in the past. Every time a major flood has occurred in the last perhaps 40 years, Brookside Trailer Park (on Route 28) has been flooded. Homes near the Suncook River, especially in low-lying areas, are at risk. An aggressive effort has been undertaken to acquire the homes which are vulnerable to flooding. Houses at the highest risk remain on Riverside Park Drive, Albin Avenue, Fanny Drive, Clement Road, and Bourque Road. The Swiftwater Drive condominiums are also a priority to purchase and remove. Town culverts wash out local and state roads during flood events, strand residents, and require public.

Numerous studies have been completed examining causes and issues relating to flooding. From the ***USGS Analysis of the Transport of Sediment by the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire after the May 2006 Flood 2011***, the Suncook River is experiencing avulsion upstream and resulting in erosion of sediment downstream of Epsom and Chichester into Allenstown. This increased sediment results in higher floodplain elevations, initially shown on the 1979 Flood Maps, as identified in the US Geological Survey (USGS) ***Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire*** in 2009. Depending on the location along the Suncook River, severe storm events have the potential to cause flooding problems up and down the Suncook River area. Allenstown is a community which has experienced significant damage from the Suncook River and its tributaries.

To help with flooding concerns, an automated **USGS river gage** was installed in July 2011 at the Route 28 bridge at the Allenstown/Pembroke town line using FEMA 2010 Emergency Management Performance Grant (EMPG) funding to read river elevation height. Three years of gage maintenance was included, which ended July 2014. Allenstown will have to pay to continue service of the gage at this time. In addition, a static river height gage was installed at the same time on the Route 3 bridge which permits monitoring in the field. More information on stream gages is located in **CHAPTER 3. ASSET AND RISK IDENTIFICATION**.

Floodplain Maps

More than one version of floodplain layers is available for consideration. The Town of Allenstown adopted the 2010 Digital Flood Insurance Rate Map (DFIRM) as required by FEMA to retain their National Flood Insurance Program (NFIP) standing (see **CHAPTER 6. FLOODPLAIN MANAGEMENT**). This new layer was simply a digitization of the original paper FIRM floodplains, corrected by any Letters of Map Revision received by FEMA. The 2010 DFIRM floodplain layers are considered inaccurate as they do not represent any type of ground-truthing.

The opportunity for a true floodplain map became available when the USGS produced the ***Flood Study of the Suncook River in Epsom, Pembroke, and Allenstown, New Hampshire*** in 2009. According to the Study, the 100- and 500-year flood-plain and floodway boundaries were delineated using the flood elevations determined at 160 cross sections along the Suncook River. Other techniques for this detailed delineation included using one-foot contour intervals for the reach of the Suncook River from Route 4 to downstream of the Short Falls Bridge. From the bridge, four-foot contour intervals were used down to the Suncook's confluence with the Merrimack River. Using this information, the USGS developed a new 100-year and 500-year floodplain digital layer for the Suncook River running through Epsom, Allenstown, and Pembroke.

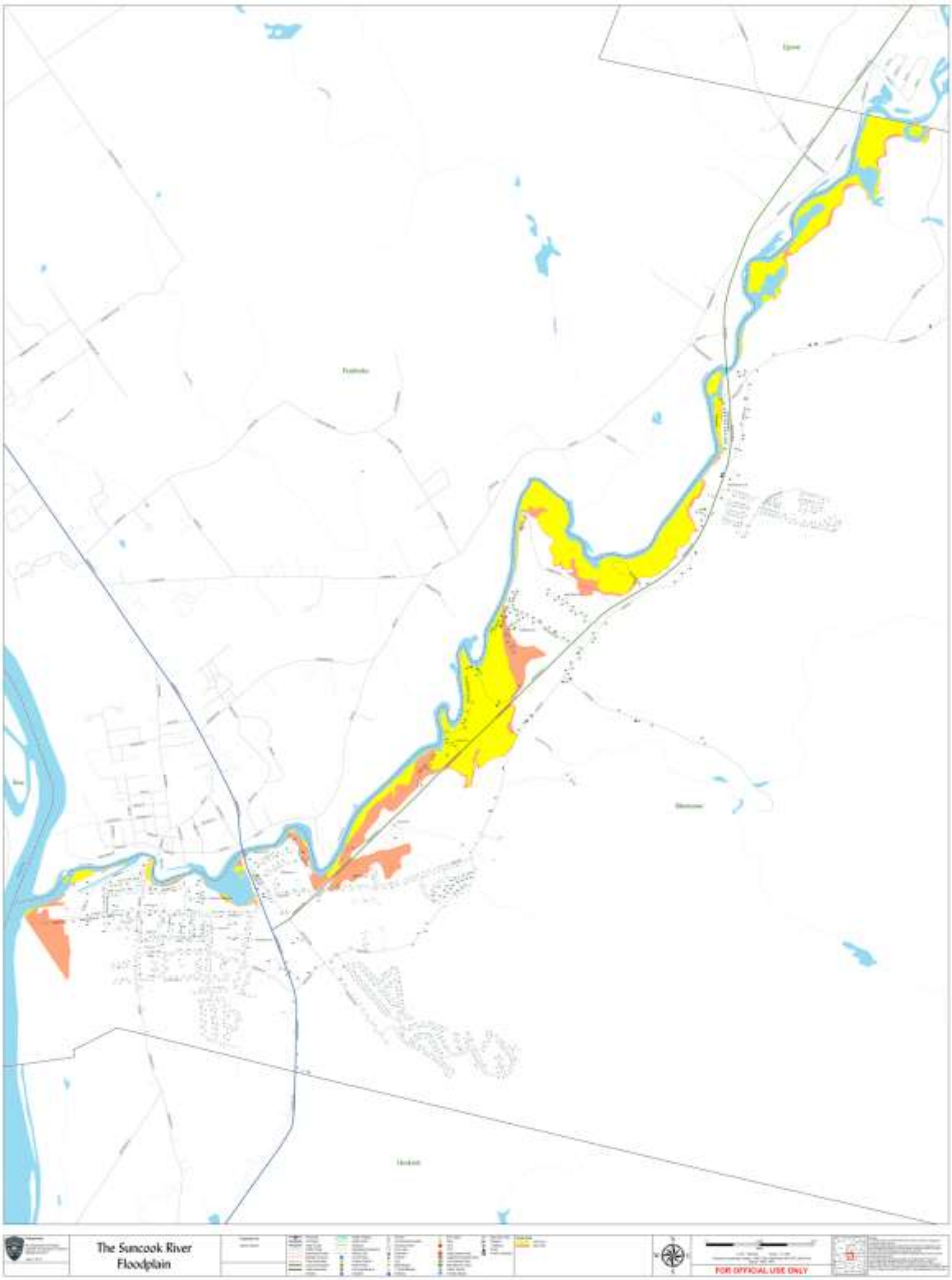
These commonly-known and used new 100-year and 500-year designations are now also known as a **1%** annual risk of flooding (100-year) and a **0.2%** annual risk of flooding (500-year). This change came about though FEMA to provide a national standard without regional discrimination, where the 1% annual exceedance probability (100-year) flood has been adopted by FEMA as the base flood for purposes of floodplain management. The 0.2% annual exceedance probability (500-year) flood is used to indicate additional areas of flood risk in the community.

Where possible, the USGS floodplain layer is used within this **HAZARD MITIGATION PLAN UPDATE**. While **Figure 50 Suncook River 100-Year and 500-Year DFIRM Floodplain** below is a 2013 map of the Town's section of the floodplains, it utilizes the FEMA DFIRM floodplains. Developed by the Department of Safety E-911 Bureau, the map displays buildings located in the floodplain. The 100-year DFIRM floodplain is depicted in yellow, hugging the inside meanders of the River. The 500-year floodplain in orange extends out from the yellow 100-year floodplain. Both designations cover numerous residential and commercial areas in Town.

From 2011, **Figure 51 Aerial Suncook River 100-Year and 500-Year USGS Floodplain and Parcels – South** and **Figure 52 Aerial Suncook River 100-Year and 500-Year USGS Floodplain and Parcels - North** are aerial depictions of the parcels and 100-year and 500-year floodplains in the community using the USGS floodplain layer, further refining potential future problem areas. **Figure 51 South** displays the southern section of Allenstown from Suncook Village at the Merrimack River to up past Martinson Lane off of Route 28. **Figure 52 North** begins at Martinson Lane and displays the floodplain parcels up to the Epsom town line. The addresses of the floodplain parcels are shown on the maps, giving a very clear picture of which have already been purchased as of 2010 and which are key to be pursued in future property acquisition grant rounds.

Maps like these are important tools that assist Town officials with identifying the areas to focus mitigation efforts on. They are of particular benefit in visualizing the locations of the voluntary acquisition project Allenstown has been conducting.

Figure 50
Suncook River 100-Year and 500-Year DFIRM Floodplain



Source: NH Department of Safety E-911 Bureau, July 2013

Figure 51
Aerial Suncook River 100-Year and 500-Year USGS Floodplain and Parcels - South

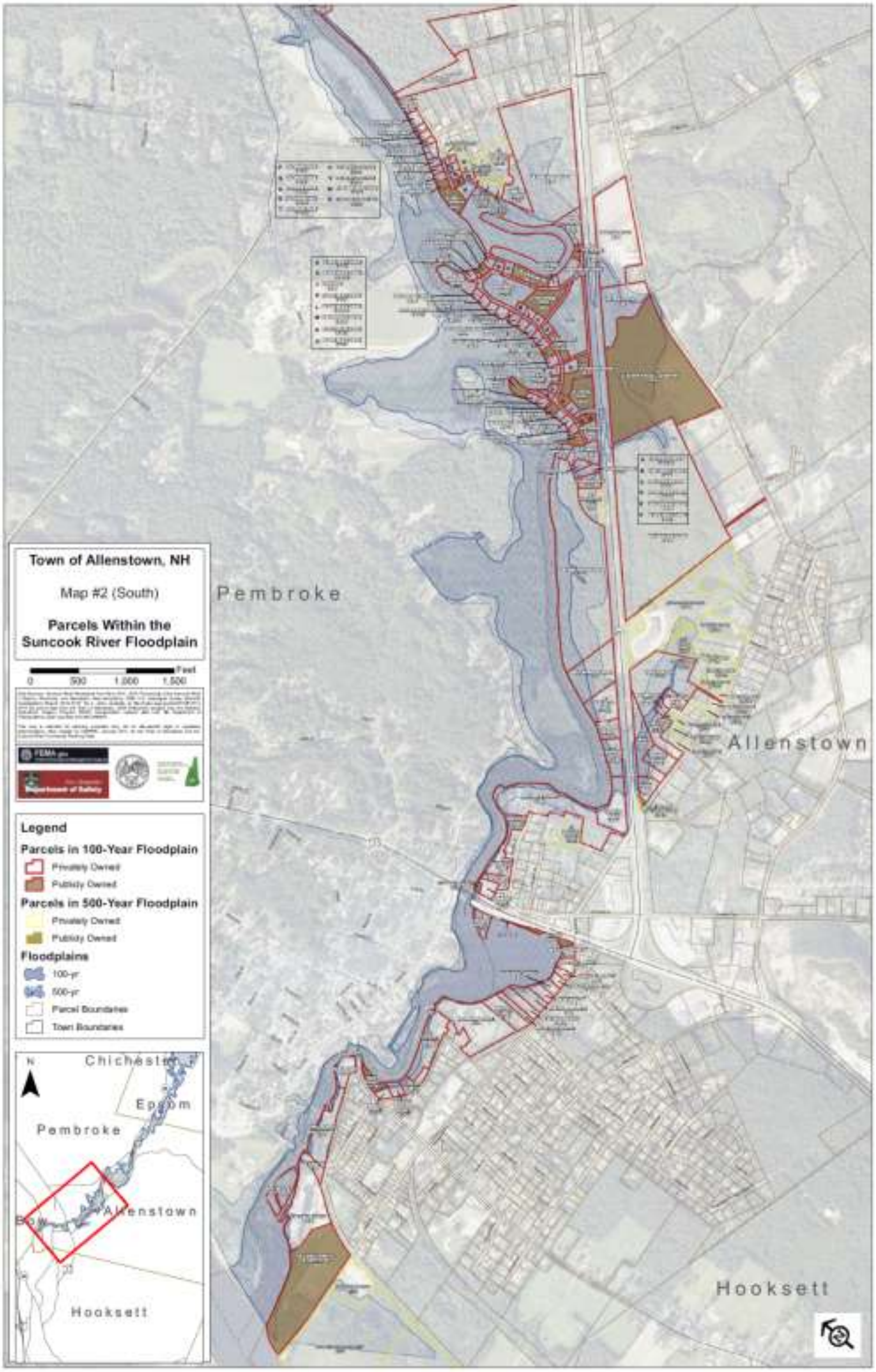
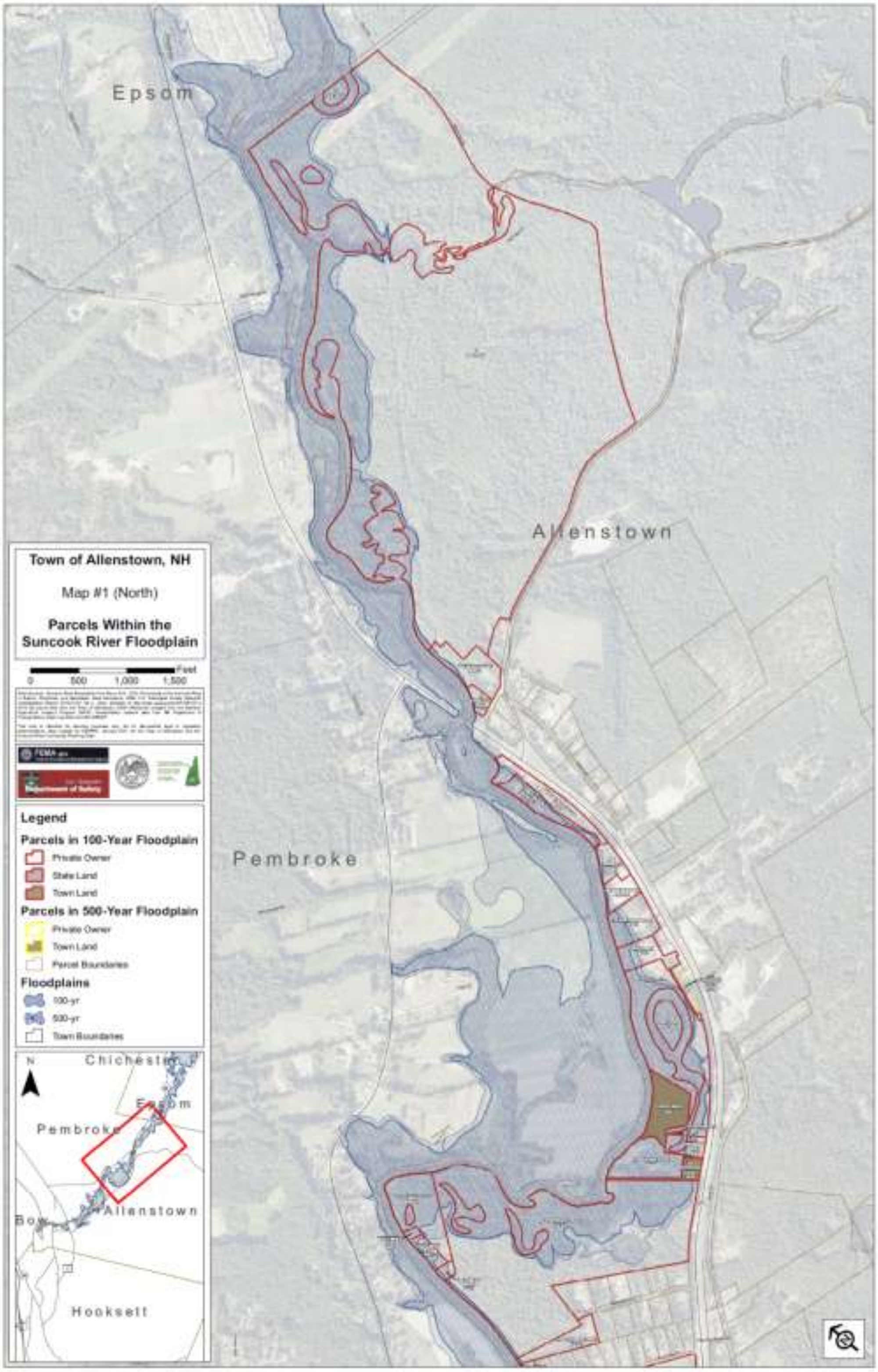


Figure 52
Aerial Suncook River 100-Year and 500-Year USGS Floodplain and Parcels - North



Source: Central NH Regional Planning Commission 2011; Town of Allenstown Parcels 2010

ACQUISITION OF PARCELS THROUGH VOLUNTARY SALE

The Town of Allenstown has focused on acquisition and relocation of homeowners as a definitive tool for creating both opportunities for removing people and property from flood hazard areas and creating open space for future flood storage to reduce impacts of flooding. The acquisition project is a voluntary sale without need for relocation assistance. The areas selected as a priority for acquisition are based on the frequency and severity of flooding; impact on the residents, both financial and emotional; and the cost of public services during flood conditions. Further, the areas are selected because of the ability to coordinate several acquisitions in one area thus obtaining parcels in close proximity to each other. This provides opportunity for greater open space over the acquisition site.

Allenstown's priority flooding problems to be mitigated are the impacts associated with frequent flooding to residences, particularly along Riverside Drive. The acquisitions can result in the following: 1. Eliminate the property losses. 2. Eliminate need for evacuation of residents and public safety costs. 3. Eliminate the need for public works support for home and residents. 4. Eliminate repetitive flood looses and commensurate Federal investments. 5. Eliminate health and safety threats to homeowners. 6. Eliminate road and utilities faced with repetitive flood impacts and higher maintenance obligations. 7. Create new open space and opportunities for flood storage. 8. Create new wetland resource areas. Allenstown's acquisition programs have helped to alleviate all of these conditions.

Rationale for Floodplain Parcel Acquisition

The Town has had a total of **95** claims on **28** FEMA flood insurance policies, with a total **$2,107,718** paid losses (see CHAPTER 6. FLOODPLAIN MANAGEMENT). The Suncook River floodplain area has faced considerable and repetitive flooding impacts and losses.

The properties in the Pre-Disaster Mitigation (PDM), Repetitive Flood Claims (RFC) and the Flood Mitigation Assistance (FMA) grant applications face flooding at depths which require evacuation due to loss of services such as sewer, and electrical. Health concerns associated with mold, effluent in the flood waters, and fuel oil add to the concerns and reasons for evacuation. Regular evacuation is often done by Police and Fire Department staff in conjunction with the Town Public Works Department. Without acquisition, the owners and properties will continue to face ever-increasing flooding impact, the health and safety threats that this poses, and public sector services will continue to respond and expend resources.

The possibilities of flood proofing, elevation or other less costly methods over acquisition do not address the need for evacuation or the health risks posed by the repetitive flooding and they do not prevent damages, they only reduce impacts. Expensive Federal funds for insurance, loans, and grants will continue to be applied to the homes if they remained. The acquisition and demolition will eliminate all of the above impacts and create open space for flood storage.

The rapidly rising flood waters of the Suncook River pose a particular safety threat to first responders. During the May 2007 flood, the floodwaters rose so quickly that firefighters were being swept off of their feet while trying to evacuate residents in the flood zone. The February 2010 flood resulted in contamination of wells. This caused four residents to be stricken by e. coli after drinking the contaminated water.

Funding for Acquisition of Floodplain Property

Serious injury to the people living in the floodplain and riverfront homes would still be a potential future hazard when flooding occurs again. As a result, the community pulled together to apply for FEMA funding, specifically the Hazard Mitigation Grant Program (HMGP), Repetitive Flood Claims (RFC) and the Flood Mitigation Assistance (FMA) grants available for property acquisition purposes to purchase priority properties, on a voluntary basis, from floodplain landowners.

The Town has, to date, received five (**5**) acquisition grants to purchase and demolish properties within the flood zone. The acquisition project has always been considered a long-term project. The Town has purchased and demolished **34** homes. One (**1**) additional home is in the process of being purchased and demolished within the next several months under existing grants. The total dollar amount of grants received for this purpose as of the Plan writing is nearly **$5.5 MILLION** as indicated in **Table 55**.

The five grants received to date between 2008 and 2012 to acquire flood-prone properties were the following:

Table 55
Acquisition Grants Received, 2008-2012

Grant Program	Year	Federal Funds	State Funds	Total Project Cost
HMGP	2008	$327,375	---	$436,500
FMA Phase I	2008	$2,170,985	$504,291	$2,908,255 *(under budget)*
FMA Phase II	2010	$456,224	$152,074	$608,299
RFC	2011	791,300	----	$791,300
State Capital Budget Appropriation	2012	-----	$734,400	$734,400
Totals		**$3,745,884**	**$1,390,765**	**$5,478,754**

Source: Allenstown Emergency Management Director and Town Administrator

The first homes acquired, by HMGP, were on Jasper Drive. The Flood Mitigation Assistance (FMA) grant for Phase I acquire **14** homes on Riverside Drive, Albin Drive and Jillerik Road, and Phase II acquired three (**3**) homes on Riverside Drive. Allenstown chose to break down the overall, long-term project into several phases, because there are so many homes affected by the flooding. The Town believes that the resources (both money and personnel) required to manage a project any larger would be too overwhelming to properly implement. Instead, the Town is focusing on conducting a well executed acquisition program for Phase III.

Acquisition Process

The Town's acquisition projects followed the methods outlined in the ***FEMA Property Acquisition Handbook for local Communities***. The process has been followed for the submission of the Repetitive Flood Claims (RFC), the Flood Mitigation Assistance (FMA), and the Hazard Mitigation Grant Program (HMGP) grant applications:

To Buy or Not to Buy 1. The Town sent a letter to area residents explaining the grant application process. 2. Town began data collection with available resources such as assessor's records and available studies. 3. Grant writer attended Benefit-Cost Analysis workshops in 2010 and 2011.

Getting Started 1. The Town estimated costs for demolition based on demolitions costs in Phase 1 and Phase 2, and property values were obtained from the 4/1/07 tax cards. 2. The Police Chief works with homeowners to explain process and obtain certifications such as Elevation Certificates, surveys, mortgage information, and other parameters of the acquisition program.

Sub-Grantee Steps 1. Begin permitting processes required. 2. Work with Homeowners to solidify agreements and assist them in planning for sale. 3. Obtain bids for demolition of homes. 4. Develop and release RFP for grant management services targeted to professional with specific PDM experience. 5. Contracts with legal representation for acquisition and closings. 6. Establish financial and operational recordkeeping system. 7. Hold meeting with residents and Board of Selectmen to update on progress. 8. Hold regular meetings with property owners to measure progress and ensure that they do not take definitive steps until award is official.

Acquire Properties 1. Hire grant manager. 2. Meet with property owners and review sale parameters. 3. Conduct titles search. 4. Obtain appraisals. 5. Duplication of Benefits determined and completed in prior stage and confirmed to adjust offer as necessary. 6. Offer made and officially accepted via offer to purchase form. 7. Request funds from State. 8. Acquire property. Demolition and Open Space 1. Establish committee from local Conservation Commission to develop management plan. 2. Hire and contract with demolition contractor 3. Demolish homes, roadway and utilities. 4. Grade site and retire to natural state of open space. 5. Implement management plan.

A total of **34** properties within the Suncook River floodplain were purchased through voluntary acquisition by Town after the recurrent flooding of the Suncook River. Various funding programs from **2008-2012** helped Allenstown accomplish this. Once of these funding sources used for acquisition was a special State of New Hampshire Capital Budget Suncook River Project Fund which partially arose from the efforts of the Suncook River Community Planning Team 2010-2011 and through a team of legislators, state officials, and dedicated local lobbyists.

Table 56
Floodplain Parcel Features

Suncook River Floodplain Features	Total	Building Value	Building Type			
			Single Family	Multi-Family	Manu-factured	Non-Residential
Buildings Remaining	94	$10,594,900	72	3	8	11
Total Parcels	197	---	109	13	10	65

Sources: Allenstown Assessing Database 2014; GIS 2010 Floodplain Layer over Tax Maps

In **Table 56**, **197** parcels are located within the 100-year and 500-year floodplain. These include the parcels already acquired by the Town. Of the **197** floodplain parcels, **72** contain single family homes, **3** contain multi-family homes, **8** contain manufactured homes, and **11** contain non-residential buildings, totaling **94** buildings in the floodplain at a total value of **$10,594,900**.

There are more parcels in the floodplain than there are buildings in the floodplain. The **197** floodplain parcels are categorized in the assessing database as **109** single family parcels, **13** multi-family parcels, **10** manufactured home parcels, and **65** non-residential parcels. Some of these parcels have buildings on them which are not in the floodplain and other parcels have no buildings on them.

The Town maintains a list of the properties within the floodplain which can help emergency responders in the event of an evacuation. It can also assist Town officials with developing further priorities for acquisition.

The building values in the floodplain are further explored in **CHAPTER 4. POTENTIAL LOSSES**.

Future Acquisition Priorities

There are dozens of remaining buildings in the floodplain, which counts the **40** Swiftwater Drive attached housing units and the six (**6**) Pinewood Drive attached businesses as one building per Lot Number. The official number totals **94** remaining buildings. From **Table 56**, **94** buildings are located in the floodplain, including **72** single family homes, **3** multi-family homes, **8** manufactured homes, and **11** non-residential buildings.

Riverside Drive is still a particular priority for the Town. From 1984 to 2007, floodwaters have entered these homes through the garages at basement level and streets were flooded.

The April 2007 flood realized flood depths of up to six (**6**) feet in several Riverside Drive homes. The flood resulted in flood water elevations exceeding all prior storms. The pattern of storms that severely impact the Riverside Drive area over the past 23 years include 1984, 1987, 1996, 1998, 2005, 2006, 2007 and 2010. The acquisition of these homes will mitigate the repetitive losses and threats to the health and safety of the occupants.

During the 2006 and 2007 floods, Riverside Drive had several feet of water in some sections of the road. Most of the residential structures are ranch, cape or cottage style homes. Most of the flood water came into the structures through basements, walk outs and garages. Water varied from one (**1**) foot to nine (**9**) feet in structures. Damages occurred to garages, basements and in many cases finished rooms leading off the garages. A number of residents reported damage to furnaces, electrical systems, furniture and carpeting. Floodwaters made it necessary to evacuate people and provide them with emergency shelter, clothing and food and then resettle them.

Future grant application rounds will consider some of the Riverside Drive properties as priorities for voluntary acquisition.

Alternatives to Acquisition

The Town considered other alternatives to the acquisition and demolition project, all of which were actions that were prohibited by state and federal regulations, or were simply not feasible. The alternatives are:

1. Dredging of increasing amounts of sediment on the riverbed of the Suncook River to reduce the flood level elevation. This not only has environmental impacts but is also highly regulated by the NH Department of Environmental Services.

2. Construction of a berm to prevent floodwaters from entering the area. Due to the location of some homes inside the floodway, parts of the berm would have to be located in the floodway which is prohibited by the National Flood Insurance Program and the Town's Floodplain Ordinance.

3. Elevation of the homes to at or above historical flood levels. This alternative is not feasible due to the height that some would have to be elevated (9 feet). In addition, this would not eliminate the possibility of loss of life and the expenses incurred on the Town as residents would still need to be evacuated.

Restoration Activities

After the property is sold to the Town, demolition of the buildings, roadway, and utilities and razing of the site occur. The site is graded and returned to its natural state of open space. The Town implements its management plan for each site, which includes seeding to stabilize the soil and often includes planting trees. The Department of Public Works is responsible for monitoring the open space. This new open space will serve as additional flood storage to reduce the impacts of future flooding. Restoration for each purchased property is recorded at the Town Hall.

CHAPTER 10.
NEWLY IDENTIFIED MITIGATION ACTIONS

2015 PLAN UPDATE

The 2010 Actions were reviewed by the Committee to ensure their relevancy, and were updated or removed as needed. The Committee identified new Actions, many of which came from the expanded **CHAPTER 8. EXISTING MITIGATION SUPPORT STRATEGIES**, which can be undertaken for natural, human, or technological event mitigation. Objectives which the Action met were also identified.

INTRODUCTION

In addition to the programs and activities that Allenstown is currently undertaking to protect its residents and property from natural, human, or technological disasters, a number of additional strategies were identified by the Hazard Mitigation Committee for consideration. Many of these newly identified mitigation strategies will be considered for further action in the Mitigation Action Plan in **CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS**. Many of these potential mitigation Actions are the result of improvements to the existing mitigation strategies identified in **Tables 54A-H** in **CHAPTER 8. EXISTING MITIGATION SUPPORT STRATEGIES**.

DESCRIPTION OF POTENTIAL MITIGATION PROJECTS, PROGRAMS, AND ACTIVITIES

These types of activities were considered when determining new projects, programs and activities, listed in **Tables 57A-E**, which Allenstown can develop:

- Life and Property Protection
- Emergency Services
- Public Information and Involvement
- Training and Preparation
- Planning and Implementation

The Hazard Mitigation Committee considered improvements to existing strategies, new programs or activities, and new projects that would improve the conditions in many of the assets identified in **CHAPTER 3. ASSET AND RISK IDENTIFICATION**. All strategies are considered Actions that the community can take, and will later be integrated into a Mitigation Action Plan in **CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS** with the responsible party identified, how much the Action will cost, and when and how the Action will be completed.

Table 57A
Potential Mitigation Actions: Flood
Suncook River Plan

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Severe Weather, Technological	Establish Culvert Replacement Program	Bring drainage culverts up to standard to prevent flooding. Could set up an area-by-area program. Get support of Budget Committee for regular funding. Road washouts would strand residents in some locations. Project will be recurring. Culvert replacement funding might be available through Hazard Mitigation Grants Program (HMGP). Culverts include : Park & Howe Ave, Bailey Ave, Ridge Road East, Oak St, Sunset Ave, Canal St, Reynolds, Houle, Bartlett, Dodge Rd, River Rd, Chester Tpk, Granite St, Townhouse, Gilbert Rd, New Rye, Wing Rd, Deerfield Rd, Podunk Bridge, Mt. Delight, Mt. Delight Bridge, Dowst Rd, Chestnut Dr.	Culverts (48) + 8 new on Chestnut Drive	Life and Property Protection
General, Flood, Severe Weather	Participate in National Flood Insurance (NFIP) Training	Volunteers, staff could invite a person from NHHSEM or NH Office of Energy and Planning to offer a workshop on the NFIP at the Town Offices and review the Zoning Ordinance and Subdivision/Site Plan Review Regulations for NFIP compliance and training. Administrative staff, Building Inspector, and Planning Board members should attend. (2010)	Town-wide	Training and Preparation
General, Flood, Severe Weather	Update the Zoning Ordinance to Comply with NFIP Requirements	The Zoning Ordinance needs to be updated as new requirements to the National Flood Insurance Program are necessary for retention of NFIP participation. The Floodplain Ordinance protects life and property by regulating distance of structures to flood hazard areas, regulating elevation, clarifying definitions, regulating new structures and encroachments, stating duties of the Code Enforcement Officer, etc. In 2010, 2011, and 2012, the ordinance was updated. The new maps were adopted 2010.	Floodplains	Planning and Implementation
General, Flood, Severe Weather, Technological	Work with NOAA and USGS to Upgrade Gage to Provide Water Level Predictions	Suncook River gage at Rt. 28 bridge/ Pembroke town line. Provide real time water levels.	Route 28 Bridge at Pembroke TL	Emergency Services
General, Flood, Severe Weather	Apply for Additional Funding to Purchase 10 More Homes in the Floodplain	Purchase flood-prone properties along the Suncook River Floodplain. 31 Homes purchased to date as of July 2013, one (1) more home purchase pending. (2010)	Floodplains	Life and Property Protection

Table 57A, continued

Potential Mitigation Actions: Flood

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Severe Weather	Re-initiate Community Rating System Process and Obtain Certification	Community Rating System process initiated but stopped and not completed. Town certification is the goal.	Town-wide	Planning and Implementation
General, Flood, Severe Weather, Technological	Upgrade 265 River Road Culvert over Small Brook	The single 20" galvanized culvert is a rotted pipe in bad condition. Approximate cost to upgrade is $12,500.	265 River Road	Life and Property Protection
General, Flood, Severe Weather, Technological	Upgrade Mount Delight Bridge Culvert over Pease Brook	Two culverts forming Mount Delight Bridge are undersized and need to be replaced. One is 40" cement and the other is 20" galvanized. Approximate cost to upgrade is $151,225.	Mount Delight Bridge	Life and Property Protection
General, Flood, Severe Weather, Technological	Upgrade 168 River Road Culvert	The single granite culvert has a blocked pipe that does not function. Approximate cost to upgrade is $4,500.	168 River Road	Life and Property Protection
General, Flood, Severe Weather	Include the Suncook River Fluvial Erosion Hazard Assessment Results into the Haz Mit Plan	Add the problems and projects identified by the NHDES FEH Study of the Soucook River, when completed, to the Allenstown-Suncook River Hazard Mitigation Plan Update 2015.	Along the Suncook River	Life and Property Protection
General, Flood, Severe Weather	Work with NHDES and Epsom to Mitigate Allenstown Flood Hazards on the Suncook River	Work with NHDES and Epsom town officials to mitigate flood hazards on the Suncook River in Epsom that impact Allenstown. (2010)	Suncook River	Life and Property Protection

Source: Allenstown Hazard Mitigation Committee; Road Agent

Table 57B
Potential Mitigation Actions: Fire

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Fire, Technological	Continue Regional MUA Fire Department Training	Training for all 22 Capital Area Mutual Aid Fire Compact members, including pre-alert toning and texting.	Town-wide, Region-wide	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technological	Request Bear Brook State Park Management Plan Update from NH DRED and Integrate into EOP	Request update to the 1994 Bear Brook State Park Management Plan from NH DRED. Once Update is obtained, integrate into the Town EOP as an Appendix. (2010)	Bear Brook State Park / Deerfield Road	Planning and Implementation
General, Flood, Fire, Severe Weather, Human, Technological	Review and Update Fire Department SOGs	Recently modified the SOGs, which need to be updated as new standards are adopted.	Town-wide	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technological	Continue Fire Department Participation in Regional Exercises	Town is member of Capital Area Public Health Network.	Town-wide, Region-wide	Training and Preparation
General, Fire	Continue to Offer Fire Prevention and Public Education Programs	Fire Prevention and Public Education are offered through the schools and Open Houses. The Open Houses also provide Fire and EMS education. (2010)	Fire Department, Elementary & Middle Schools	Public Information and Involvement
General, Fire	Continue to Offer Fire Department Personnel Continuing Education	Continue to offer Fire Department personnel continuing education through the NH Fire Academy (NHFA), Emergency Management Institute, Texas A&M Extension (TEEX), etc.	Town-wide	Training and Preparation
General, Fire	Add New Cisterns in Rural Areas without Water Supply for Fire Protection	New cisterns should be added to the rural areas of Wing Road, Old Town Co-op (manufactured housing), and Catamount Hill Co-op (manufactured housing).	Wing Road, Old Town Co-op, and Catamount Hill Co-op Rural Areas	Life and Property Protection
General, Fire	Continue with Fire and Rescue Recruitment with Enhancing Explorer Programs	Department has very active Explorer Program. Currently have 5 active Explorers. Program is for young adults ages 15-21, sponsored under Daniel Webster Counsel. FD provides weekly Wednesday night trainings. Explorers are called in for large incidents or disasters to supplement fire fighters. When eligible at 18, Explorers can take NHFA certification.	Town-wide	Training and Preparation

Source: Allenstown Hazard Mitigation Committee; Fire Department

Table 57C
Potential Mitigation Actions: Severe Weather

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Severe Weather, Technological	Develop Plowing Policy	Policy needs to be developed for resident information and new employees. Town is required to develop policy to meet EPA stormwater management regulations EPA for MS4 permits.	Roads	Planning and Implementation
General, Flood Severe Weather, Technological	Coordinate Emergency Exercises with NH Public Works Mutual Aid and Pembroke Department of Public Works	Highway Department is a member of NH Public Works Mutual Aid network – have used it for building inspectors during the floods, not for road work. Also have MUA with Town of Pembroke to share generator, equipment, and detour signs for Route 28 flooding (also MUA with State for signs) and have not used it yet. Regularly share equipment daily with Pembroke for regular DPW operations.	Region-wide, Statewide	Training and Preparation
General, Flood, Severe Weather, Technological	Plan Strategic Placement of Highway Department Vehicles Prior to Start of Storm Events	During Hurricane Sandy when the Department's loader was unavailable, a procedure was developed to use a plow truck to clear debris. The roads were closed by state officials and no other vehicles could get by. Purpose was to safely clear roads of debris during the storms using steel plows – more is done, with less effort. Work with local contractors for other emergency vehicles for debris removal.	Roads	Life and Property Protection
General, Flood, Severe Weather, Technological	Continue to Perform Drive-by Tree Examinations and notification of Utility Companies	Highway Department should continue to perform drive-by tree examinations and notify utility companies when in need of trimming. (2010)	Roads	Life and Property Protection

Source: Allenstown Hazard Mitigation Committee

Table 57D
Potential Mitigation Actions: Human / Pandemic / Technological

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Technical	Finalize CALEA Certification for Police Department	Explore CALEA Certification for Police Department, which is Council of Accreditation for law enforcement Agencies. Process in Allenstown already started to complete initial assessment and to obtain final certification for the Department.	Town-wide	Training and Preparation
General, Human, Technical	Review and Update Police Department Standard Operation Procedures	Currently, the PD has numerous SOPs including ICS, terrorism, explosives, information sharing. Police Department SOPs should be updated as needed to stay current.	Town-wide	Training and Preparation
General, Human, Technical	Undertake Police Department Training for Enhanced IC/UC at TEEX	Core staff have already taken these classes. Incident Command/Unified Command Training should be also provided for additional staff members in 2014.	Town-wide	Life and Property Protection
General, Human, Technical	Hold Active School Shooter Training Exercises	Hold trainings in all 4 schools (Elementary School, Armand Dupont Middle School, PACE Academy, Pine Haven Boys Center) for 2014. Involve with MUA PDs, CNHR Spec Op Units, FD, Schools, Tri-town	All 4 Schools - Elementary, Armand Dupont Middle, PACE Academy, Pine Haven Boys Center	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technical	Train More Police Department Personnel for the Central NH Special Operations Unit Team	Town is a member of the Central NH Special Operations Unit which provides regional (25 towns and cities) specialized LE services to include tactical, Incident Command, Crisis Negotiation Team, and Disaster Response. Allenstown has utilized Unit for SWAT call outs and have conducted several exercises with the unit.	Town-wide, Area-wide	Training and Preparation
General, Human, Technical	Develop Police Department Field Capability to Respond to Civil Disturbances and Riots	Allenstown PD has membership in Central NH Regional Special Operations Unit. The process now for responding to civil disturbances comes from a FEMA resource listing. CNHRSOU provides the service, training, and equipment for the entire region. Allenstown wants to develop a town process for civil disturbance and riot response.	Town-wide	Training and Preparation
General, Technical	Conduct Joint Exercise with NH Information Analysis Center	Police Department participates in the state Information Analysis Center to share intelligence information and to provide staff for intelligence work as needed.	Town-wide State-wide	Training and Preparation

Table 57D, continued

Potential Mitigation Actions: Human / Pandemic / Technological

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Human	Conduct Exercise to Test Suspicious Package Protocol	Chief worked with collaborative team at the NH DHHS lab to develop statewide protocol. Protocol was placed on all laptops for field use. FBI quick reference sheet provided to all officers for suspicious packages and suspected IED. Schedule exercise for 2014.	Town-wide State-wide	Training and Preparation
General, Human, Technological	Conduct Cybercrime Training and Purchase Necessary Equipment	Train personnel on procedures to investigate cybercrime and purchase necessary equipment to investigate these crimes	Town-wide	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technological	Upgrade SUV Incident Command Post Equipment	Purchased and equipped SUV 2012 with Incident Command Post equipment.	Town-wide (Police SUV)	Training and Preparation
General, Human, Technological	Continue to Participate in Available Regional/ Statewide Terrorism Exercises	Police have participated in regional/statewide terrorism response exercise dealing with WMD. Full scale exercise conducted in 2012 with NG, SP, FBI, DHHS, Fire Marshal, CNHSOU involving Chemical and Nuclear weapons. 2010	Regional/ Statewide	Training and Preparation
General, Technological	Continue Highridge Trail Radio Tower Generator Maintenance	Highridge Trail Radio Tower provides Police, Fire, Highway and Emergency Management radio repeater capability for Allenstown, Hooksett and the Sheriff's Dept. Generator works to ensure the backup power continues to function.	Highridge Trail Radio Tower	Emergency Services
General, Human, Technological	Implement Cloud IT Plan and Hardware	` Implementation of Cloud IT server to serve all departments with robust virus/hacker protection plan. Plan development is underway. Scheduled for Dec 2013-Jan 2014	Town Buildings	Planning and Implementation
General	Improve WWTF Standard Operating Procedures	WWTF SOPs are followed to ensure proper testing, handling of chemicals, and to ensure safety of staff and community. Updates to follow the most recent regulations set by Federal and State rules.	Wastewater Treatment Facility	Training and Preparation
General	Complete In-House WWTF Staff Training	Operators are required by NH DES to complete training each year for operator license renewals.	Wastewater Treatment Facility	Training and Preparation
General, Fire, Severe Weather, Human, Technological	Continue to Vary Types of Monthly School Drills	Drills at both Elementary and Middle Schools include fire, haz mat, off-site, lock down, shelter in place, etc.	AES & ARD School	Training and Preparation

Table 57D, continued

Potential Mitigation Actions: Human / Pandemic / Technological

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Fire, Severe Weather, Human, Technological	Practice Annual Evacuation Procedures at Elementary and Middle Schools with Staff	Evacuation procedures are outlined in both the Crises Management Plan and in the Emergency Procedures Quick Flip Chart for staff members.	AES & ARD School	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technological	Review and Improve Community Outreach Forums and Safety Programs	Programs are developed & coordinated with the Police Department.	AES & ARD School	Public Information and Involvement
General	Develop a More Comprehensive DARE Program with the SRO	The DARE Program has not been done in the schools for a number of years. An SRO officer has been approved for 2013-2014 and will reinstate the DARE Program.	AES & ARD School	Public Information and Involvement
General, Flood, Fire, Severe Weather, Human, Technological	Update the Allenstown School District 2009 Emergency Flip Chart	Emergency Flip Charts are located in every School room for quick access to emergency procedures. Last updated in 2009, they cover communications, evacuations, bomb threats, fire/explosion, gun/weapon on school property, kidnapping, power outage, shelter in place, lock down, and drop/cover/hold procedures. Continue to update the flip charts as new information is made available and upgrade them in all school rooms.	AES & ARD School	Planning and Implementation
General, Human, Technological	Develop IT Security Procedures to Prevent Cyberterrorism	Develop IT security procedures to prevent cyberterrorism and the training needed for the procedures to function. Develop Secure email policies, and computer usage procedures (change in passwords, shut off pic, etc).	Town Departments	Planning and Implementation
General	Develop Spill and Chemical Response Plan for WWTP	Liquid chemicals can combine and explode in a noxious cloud. Cross contamination of chemicals, leakage into the Merrimack River, overflows.	WWTP	Planning and Implementation
General, Human	Continue to Participate in Capital Area Public Health Network for Public Health Threats	Continue to participate and coordinate plans with the CAPHN (Capital Area Public Health Network) in regards to pandemic and other public health threats. (2010)	Capital Area Region	Emergency Services
General	Upgrade Radiological Detection Equipment and Conduct Training	Upgrade radiological detection equipment (provided through HSEM) and conduct training to use equipment. (2010) Training was done, but not the equipment upgrade.	Town-wide	Training and Preparation

Source: Allenstown Hazard Mitigation Committee

Table 57E
Potential Mitigation Actions: Multiple Hazards

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Fire, Severe Weather, Human, Technological	Ensure All Regional Police Department Mutual Aid Agreements Are Current	The proper chief executives need to execute the Mutual Aid Agreements as Police Chiefs change.	Allenstown, Auburn, Bow, Candia, Chichester, Concord, Deerfield, Epsom, Hooksett, Northwood, Pembroke, Pittsfield, Raymond	Training and Preparation
General	Require Finance/Admin Section Position Specific ICS Training	Admin Town staff need to become trained in ICS specific to their function. ICS specific training especially for Finance/Admin Section Chief training.	Town-wide	Training and Preparation
General, Technological	Field Test Tablet and PolicePad Software	Tablet field testing headed by the Merrimack County Sheriffs Regional Dispatch Center. Field tested first in Allenstown, to be fully incorporated into Sherriff's Dept (test not over yet). Software includes AVL and information integration software. Field testing is to be completed by the end of 2013.	Town-wide, County-wide	Emergency Services
General, Flood, Severe Weather, Human, Technological	Include Generator Replacement in the Capital Improvements Program	Police Dept, Town Offices, Fire Dept, and AES now have generators. Generators to include in the CIP for replacement include the Police Department's and Wastewater Treatment Facility's generators	Police Department, Wastewater Treatment Facility	Planning and Implementation
General, Flood, Fire, Severe Weather, Human, Technological	Update Emergency Operations Plan 2011 and Add Additional Annexes	The EOP Includes general warning systems, including word-of-mouth, church bells, chain of command of Emergency Management people, and local radio stations.	Town-wide	Planning and Implementation
General, Flood, Severe Weather, Human, Technological	Obtain a 45kw Generator for Highway Department	The Highway Department has no emergency generator. Applied for EMPG funding in February 2013.	Highway Department	Emergency Services

Table 57E, continued
Potential Mitigation Actions: Multiple Hazards

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Fire, Severe Weather, Human, Technological	Conduct Regional Shelter Exercise	The Allenstown Elementary School gymnasium will provide shelter in a disaster. Has worked effectively but lacks shower facilities. Exercise is planned for Fall of 2013.	Town-wide, Region-wide	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technological	Revise Disaster Recovery Plan to Include Meeting FEMA's NDRF Format	Written disaster recovery plan for the town with annexes. Plan was exercised and tested during table top exercise.	Town-wide	Planning and Implementation
General, Flood, Fire, Severe Weather, Human, Technological	Conduct Communications Exercise and EOC/IMT Exercise	Town-wide drills/exercises conducted every year since 2007. Includes table tops, drills, workshops, functional and full scale exercises. Both exercises are scheduled for Fall 2013.	Town-wide	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technological	Review and Adopt New Public Information Notification Technologies	Allenstown Emergency Alert Notification System AEANS created providing email and text notification to public officials, Groups A, B, & C. Notification list updated when needed. Public notified via Town website, Facebook, and Twitter. (2010)	Town-wide	Public Information and Involvement
General, Flood, Fire, Severe Weather, Human, Technological	Train Fire Department, Highway and Administrative Staff on Basic ICS and NIMS	Higher levels of training have been completed in all departments. Train remaining staff on the basic ICS/NIMS courses to include 100, 200, 300, 400, 700 and 800. ICS 100, 200, 300 completed for most staff, 3 personnel attended the TEEX course IC/UC enhanced. (2010)	Town-wide	Training and Preparation
General, Flood, Fire, Severe Weather, Human, Technological	Develop Redundant Notification Procedures to Address Contingencies	EOC is Located at Fire Station, 1 Ferry Street.	Town-wide	Emergency Services
General, Flood, Fire, Severe Weather, Human, Technological	Continue to Undertake Highway Department Training and Participate in Town Exercises	All HD employees have ICS trainings, participate fully in school exercises. Training can also include CPR. chainsaw, flagging, traffic management, defensive driving, transfer station certification, first aid, blood borne pathogens, debris management training, etc. All attend annually for continuing certifications. Send Highway Department employees to more training and exercises.	Town-wide	Training and Preparation

Table 57E, continued
Potential Mitigation Actions: Multiple Hazards

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Fire, Severe Weather, Human	Rewrite Debris Management Section of Recovery Plan to Allocate Pre-Designated Landfill Locations	Debris Management section states how to pick up curbside materials, which goes out to residents. Different piles of debris are necessary for removal. The section follows the FEMA model. Update to include landfills and mapping of these locations.	Pre-designated locations	Planning and Implementation
General, Flood, Severe Weather, Technological	Continue to Use Documents to Support the Emergency Management Activities of Highway Department	DPW follows the MUTCD for Storms, the EOP's Checklist for Flooding, the ESF Highway for cleaning of storm drains, and the ESF for blizzards.	Roads	Emergency Services
General, Flood, Fire, Severe Weather, Human, Technological	Update the 2003 Master Plan with Current Data	The latest Master Plan was adopted by the Planning Board in March, 2003. Include Haz Mit information and Actions.	Town-wide	Planning and Implementation
General, Flood, Fire, Severe Weather. Human, Technological	Update the 2012 CIP Annually to Add Hazard Mitigation Purchases	Last CIP developed in 2012 spanning 2013-2018. Need to update the CIP to add Haz Mit purchases.	Town-wide	Planning and Implementation
General, Flood, Fire, Severe Weather. Human, Technological	Complete Remaining 911 Re-Numbering Projects	Completion will ensure the entire town is in compliance with the standards and the ordinance.	Town-wide Addresses	Emergency Services
General, Flood, Fire, Severe Weather. Human, Technological	Update the Allenstown School District Emergency Management Plan	The EM Plan is reported to the NH DoE yearly. Update Plan as new information is made available and distribute to all local emergency officials.	AES & ARD School	Planning and Implementation
General, Flood, Fire, Severe Weather. Human, Technological	Update the Allenstown School District 2009 Crisis Management Plan	The Crisis Management Plan was last updated in 2009. It includes sections on communications, evacuation procedures, chemical spills, death, fire/explosion, gun/weapon on school property, hostage/kidnapping, shooting, major disruption, power outage, and natural disasters. Update Plan as new information is made available and distribute to all local emergency officials.	AES & ARD School	Planning and Implementation

Table 57E, continued

Potential Mitigation Actions: Multiple Hazards

Meets Chap 7 Hazard Objectives	Name of Potential Action	Description of Potential Action	Affected Location	Type of Activity
General, Flood, Fire, Severe Weather. Human, Technological	Develop Critical Facilities Emergency Evacuation Plans	Identify critical facilities that need emergency evacuation plans and develop such plans. (2010)	Critical Facilities	Planning and Implementation
General, Flood, Severe Weather	Update Wetlands Ordinance to Reflect New DES Standards	Update wetlands ordinance to reflect new DES standards. (2010)	Town-wide	Planning and Implementation

Source: Allenstown Hazard Mitigation Committee

CHAPTER 11.
EVALUATION AND IMPLEMENTATION OF ACTIONS

2015 PLAN UPDATE

The new mitigation strategies which were identified in **CHAPTER 10. NEWLY IDENTIFIED MITIGATION ACTIONS** and the relevant 2010 Actions have been placed into one of five Action tables categorized by the type of activity, **Tables 57A-E**. A few older Actions remain which did not have respective discussion and appearance in the 2010 Newly Identified Mitigation Actions Chapter. All Actions were prioritized using the enhanced STAPLEE method below, and new costs, timeframes, and rationales were identified. An updated cost-benefit analysis was developed. Actions from 2010 which have not been completed have been indicated as **DEFERRED**. The **COMPLETED** Actions of the Plan are now documented in **Table 58A,** and the **DELETED** Actions are documented in **Table 58B.**

New to **CHAPTER 11** is the addition of several Actions identified as a result of fluvial geomorphic assessment (FGA) data (see the acronym after the Action name). These new Actions try to address certain problem areas as a result of the Suncook River assessments undertaken in 2014 as described previously.

INTRODUCTION

After the hazard identifications, asset and vulnerability identifications, potential hazard identifications, demographic considerations, and mitigation strategies and future improvements already employed by the Allenstown, a series of Actions can be developed to help rectify issues identified within the Plan. These Actions are newly numbered for easier following and implementation.

Some of these Actions will be project-based, such as culvert replacement, road and drainage reconstruction, Town Hall restoration which are **Life and Property Protection** Actions. **Planning and Implementation** Actions support the development of updated Emergency Operations Plans, Master Plans, municipal ordinances, assessments, and capital improvements programs that will support the Hazard Mitigation Plan and its Actions.

Actions which develop policies to use during emergencies, purchase equipment, or join mutual aid networks are examples of **Emergency Services** Actions. **Training and Preparation** Actions are critical preparedness activities of importance to Allenstown, as volunteer fire fighters and paid staff members alike engage in life safety training, local and regional exercises, and school drills that can prepare to save lives during an emergency. Actions which engage the Allenstown citizenry are **Public Participation and Involvement Actions**, such as providing written materials on how to handle different hazards, classes about fire prevention, or reminding people to test their water for radon and arsenic.

All of these different types of Actions have merit and are important to the Town of Allenstown no matter whether they are actual *mitigation* projects (**Life and Property**

Protection and **Planning and Implementation)** or are *preparedness* projects (the remaining three categories).

The newly-numbered Actions displayed in an overall Action Plan, **Tables 59A- 59E** will be evaluated using the STAPLEE method and prioritized using relative timeframes for completion. **NEW**, **DEFERRED**, **COMPLETED** and **DELETED** Actions are categorized to provide a way of tracking Actions over time. A simple COST TO BENEFIT ANALYSIS further provides community officials with information on which projects could provide the most benefit for the least amount of money.

STATUS OF EXISTING 2010 AND NEW 2015 ACTIONS

The status of all Hazard Mitigation Plan Actions varies and are recorded in the **CHAPTER 11 Tables**. **NEW** 2015 Actions and **DEFERRED** 2010 Actions are evaluated and prioritized in **Tables 59A-59E**. The other existing Actions from 2010 are categorized into **COMPLETED** or **DELETED** and are described in the following sections.

Many Actions have been **COMPLETED** and are listed in **Table 58A**. The status of the remaining Actions, plus the **NEW** Actions developed by the 2015 Hazard Mitigation Committee, was addressed in this **2015 PLAN** in the following manner:

COMPLETED Actions	Listed in **Table 58A**. **Mitigation Actions Completed Since 2010** and placed in **CHAPTER 8. EXISTING MITIGATION SUPPORT STRATEGIES.** Indicated as **COMPLETED** under the Action heading.
DELETED Actions	Listed in **Table 58B**. **Mitigation Actions Deleted from the 2010 Plan.** Indicated as **DELETED** under the Action heading. Reason for deletion is indicated.
DEFERRED Actions	Indicated as **DEFERRED** under the Action heading in **Action Plan Tables 59A-Table 59E**. Reason for deferral is indicated.
NEW Actions	Indicated as **NEW** under the Action heading in **Action Plan Tables 59A-Table 59E.** Action just developed for this **2015 PLAN**.

Actions that were **DELETED** from the 2010 Plan are no longer relevant to the Town, may not have been able to receive funding, or are no longer a priority to Allenstown.

Actions which were **DEFERRED** from 2010 are still important to the Town but did not have the staff capability or the funding to undertake them, other Actions took higher priority, more time is required for completion, or they may need to be repeated in order to be effective. They remain in the Action Plan and have been re-prioritized with the **NEW** Actions.

Changes in priority of the 2010 Actions occurred over the last five years. The former ***Ranking Score*** of the **DEFERRED** Actions is listed in parentheses after **DEFERRED** so a comparison can be readily made.

Completed Mitigation Actions

The Town has implemented several Actions identified in 2010 since the original plan was adopted. Departments have undertaken the challenges inherent in getting the Actions implemented to ensure that the Town will benefit from the identified mitigation strategies. These **COMPLETED** Actions, are displayed in **Table 58A**. Several of the mechanisms for implementing Actions include insertion into existing plans and documents, discussed in **CHAPTER 11. PLAN MONITORING, EVALUATING, AND UPDATING**.

The **COMPLETED** Actions are also identified in **CHAPTER 8. EXISTING MITIGATION SUPPORT STRATEGIES**, joining the other strategies, policies, plans, procedures, guidelines, training, equipment, etc. which have the potential to mitigate a hazard.

Table 58A
Mitigation Actions Completed Since 2010

Action Time-frame	Action	Who is Responsible	Completed By Date	Approx Cost*	How Funded
Short Term	Update Contractor and Equipment Operator List **COMPLETED**	Emergency Management Director	July 2011	$0	N/A
Short Term	Update Volunteer Equipment and Operators List **COMPLETED**	Emergency Management Director	July 2011	$0	N/A
Short Term	Develop Pre-Planned Incident Action Plans for Flooding and Severe Storms **COMPLETED**	Emergency Management Director	September 2011	$6,000	HMGP
Short Term	Research Grant Assistance for Purchasing a Generator for the Allenstown Elementary School. **COMPLETED**	Emergency Management Director	November 2011	$58,000	EMPG
Short Term	Enhance Existing Radio Networks Among Town Departments **COMPLETED**	Emergency Management Director	September 2012	$132,000	EMPG/Capital budget
Medium Term	Develop Shelter Plan Agreement with American Red Cross **COMPLETED**	Emergency Management Director	December 2012	$0	N/A
Medium Term	Upgrade Aged Fire Suppression Equipment **COMPLETED**	Fire Chief	March 2013	$420,000	Capital Budget

Deleted Mitigation Actions

The Town has **DELETED** several Actions identified in 2010. **DELETED** Actions are displayed in **Table 33A**. **DELETED** Actions are no longer necessary or are no longer priorities to the Town, are not relevant, could not be realistically undertaken, were not financially feasible, or were changed/incorporated into another Action listed in **Tables 59A-59E** of the **ACTION PLAN**.

Table 58B
Mitigation Actions Deleted from the 2010 Plan

Action Time-frame	Action	Who is Responsible	Deleted By Date	Approx Cost*	How Funded
Medium Term	Investigate Feasibility of Reverse 911 **COMPLETED**	Emergency Management Director	June 2013	$8,000	Project declined awaiting E 911 solution
Medium Term	Purchase Emergency Management Software Compatible with NIMS/ICS **DELETED** This Action was deleted because it was not financially feasible.	Emergency Management Director	August 2013	Not identified	Federal Grants
Medium Term	Upgrade and Relocate Highway Department Building **DELETED** This Action was deleted because it was not financially feasible.	Highway Department	August 2013	Not identified	Warrant Article
Medium Term	Upgrade Culvert and Upgrade Ditch-Lines on Mount Delight Road and Deerfield Road **DELETED** This Action was deleted because it was modified and incorporated into another Action *(Mount Delight work)* and it was not financially feasible *(Mount Delight work)*.	Highway Department	August 2013	Not identified	Highway Department Operating Budget

Source: Allenstown Hazard Mitigation Committee

ACTION EVALUATION AND PRIORITIZATION METHODS

A variety of methods were utilized to attempt to evaluate and prioritize the Actions. These methods include the enhanced STAPLEE (Social Technical Administrative Political Legal Environmental and Economics) criteria, designating the Action to be completed within a certain timeframe, and completing a basic COST TO BENEFITS ANALYSIS, a later section. These prioritization methods are meant to enable the community to better identify which Actions are more important and are more feasible than others.

STAPLEE Method

The Hazard Mitigation Committee ranked each of the new or improved mitigation Actions derived from the Suncook River assessment. The total in the ***Ranking Score*** (**STAPLEE total**) column in **Tables 59A-59E** serves as a guide to the **relative** ease of Action completion by scoring numerous societal and ethical impact questions and does not represent the Town's Action *importance* priority. Instead, the STAPLEE process evaluates each Action and attempts to identify some potential barriers to its success. A score of **36** would indicate that the mitigation strategy, or Action, would be relatively among the easiest Actions to complete from a social and ethical standpoint.

STAPLEE Totals Range	STAPLEE Action Ranking: Relative Ease of Completion
36 -25	Easiest
24 - 13	Harder
12 - 0	Most Difficult

The Committee answered these questions with a numeric score of "**1**" (indicating a **NO** response), "**2**" (indicating a **MAYBE/PARTIALLY** response), or "**3**" (indicating a **YES** response).

- Does the action reduce damage and human losses?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures?
- Can the action be implemented quickly?
- 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 in implementing?
- Is the action environmentally sound?

The STAPLEE scores ranged from a high of **36** to a low of **20**. The full scoring matrix is located in CHAPTER 13. APPENDIX. The totals are indicated in the ***Ranking Score*** column in the MITIGATION ACTION PLAN **Tables 59A-59E** on the following pages. All STAPLEE answers are subjective and depend on the opinions of the Committee members discussing them.

Action Timeframes

Action Timeframe	Description of Timeframe
Ongoing	Action undertaken throughout the life of the 5-year Plan
Short Term	Action should be undertaken during Years 1-2 of the Plan
Medium Term	Action should be undertaken during Years 3-4 of the Plan
Long Term	Action should be undertaken during Years 4-5 of the Plan

After the STAPLEE ranking, the Actions are further discussed by the Committee who prioritizes them on an estimated ***Action Timeframe*** for completion based upon the other Town activities (hazard mitigation-related or not), funding potential for the Action, the need for the Action project, and possible staff time and volunteers available to complete the Action. This **relative** Action importance priority is measured by the time indicated for project completion. All Action projects within the **MITIGATION ACTION PLAN** have been assigned an ***Action Timeframe***.

Those projects which are designated as **Ongoing** mean the Action should be undertaken on a regular basis throughout the five-year lifespan of the Plan. Actions that could qualify as **Ongoing** include training activities, public education, zoning ordinance or regulation revisions, Capital Improvements Program updates, and more.

Short Term projects are those which are the more important Actions and should be undertaken during **Years 1-2** of the Plan's lifespan if possible. **Medium Term** Actions are recommended by the Hazard Mitigation Committee to be undertaken during **Years 3-4** of the Plan's lifespan, while **Long Term** Actions are those which should wait until last, with suggested implementation undertaken during Plan **Years 4-5**. It is important to remember the Action timeframes are relative to one another and are an indication of Action importance, so that if an Action cannot be completed within the *Action Timeframe*, it may still be a higher priority than other Actions.

Both the ***Action Timeframe*** and the ***Ranking Score*** are incorporated into the **ACTION PLAN** to assist the Town with implementing both the hazard mitigation and the fluvial hazard mitigation Actions. **Tables 59A-59E** displays sorted priorities - first according to the ***Action Timeframe*** and second according to ***the Ranking Score***. The Hazard Mitigation Committee hopes this combined rationale can provide decision makers with the best possible information when deciding to implement Action items.

In reality, the annual struggle to obtain municipal funding at Town Meetings and the local support needed for hazard mitigation projects, the limited staff time available to administer and complete the projects, and the dwindling volunteer support to help locate grants and work on the Action Plan items all reduce the Town's ability to complete successful hazard mitigation projects within the Plan's lifespan. This statement is especially true for the Central NH region's small communities that rely on voter support for staff hiring and hazard mitigation project budget funding, which is 19 out of 20 municipalities. Projects are generally completed on an "as-needed basis" or on an "as-available basis" despite the different ways of evaluation and prioritization shown within the HAZARD MITIGATION PLAN. Small New Hampshire communities do the best they can with the resources available to them to make ends meet, particularly in times of economic duress or hardship. Town Meeting voters decide whether to approve new zoning ordinances which can help mitigate hazards such as flooding and setbacks. In terms of fluvial erosion, cooperation with other communities along the Suncook River would be essential to the overall river management and Action completion success.

ALLENSTOWN'S MITIGATION ACTION PLAN 2015

At the meetings, the Committee identified mitigation Actions specific to the general natural hazards of flooding (all subcategories included), fire (includes fire and lightning), wind (includes subcategories), radon, and severe winter weather. These were the most highly ranked of the natural hazards from CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT, many of which could qualify for FEMA or other federal grant programs. The remaining natural hazards, both low- and high-ranking, were considered for their applicability and the availability of options for Actions. Many of the Actions listed here have an indirect benefit to several different types of disaster events.

Locally-important Actions for natural, technological, or human disasters that are preparedness Actions are also identified and prioritized here since the ALLENSTOWN HAZARD MITIGATION PLAN UPDATE 2015 is an essential tool for the Town's emergency management program. The Plan would not be complete without these other Actions. Funding for these projects may be available at the local level through the Town budget or through small grants.

The total in the ***Ranking Score*** column in **Table 59A** to **Table 59E** serves as a guide to the *relative ease of project completion*, not the Town's importance priority. Actions which are most important to the Town were assigned an ***Action Timeframe*** of either **Ongoing** or **Short Term** during the Plan's life span. The Committee then determined who would be responsible for ensuring that each Action would be completed, the approximate cost for completing the Action, and how the Action would be funded. The MITIGATION ACTION PLAN is a comprehensive proposal designed to help the Town of Allenstown prepare in advance for the impacts of disasters. Combined with the Maps of this HAZARD MITIGATION PLAN UPDATE, the ACTION PLAN should guide future hazard mitigation efforts.

As an accompaniment to the ALLENSTOWN HAZARD MITIGATION PLAN UPDATE 2015, the Hazard Mitigation Committee developed several Action projects from the extensive geomorphic assessment data. These new Actions can assist with life and property protection, emergency services, and planning and implementation when considering the Suncook River's dynamic changes during high flow and flooding events. These are contained within the Suncook River Fluvial Geomorphic Features Addendum (FGA) in addition to their insertion here.

Action Plan 2015

A total of **72** Actions that Allenstown can undertake were identified and prioritized both by ***Ranking Score*** (relative ease of completion) and ***Action Timeframe*** (relative importance).

The **10** special Actions identified within the ACTION PLAN **Tables** as ***Suncook River Plan Actions*** are directly attributed toward the ***Suncook River Plan*** component of the Hazard Mitigation Plan.

Five (**5**) new Actions that **Allenstown** can undertake to address fluvial hazard and erosion issues were also developed and prioritized. These Actions were developed using the data, maps, and ideas provided by the fluvial geomorphology assessment of the Suncook River along the Town boundary with Pembroke; these are denoted by an (FGA) suffix. The Actions are intended to complement and be incorporated into the HAZARD MITIGATION PLAN UPDATE and be considered for implementation by the Town and are incorporated into the ACTION PLAN **tables**.

An Action number was assigned to each project, numbered consecutively from **#1** to **#72** and with the **-2010** or **-2015** suffix to designate which year the Action originated. This Action numbering is also reflected on the STAPLEE Ranking Score matrix that is provided in **CHAPTER 13**. This new Action numbering system will help the Town track each project for implementation during **CHAPTER11**'s annual update.

Table 59A
Allenstown's Mitigation Action Plan 2015: Life and Property Protection

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #14- 2015	**Establish Culvert Replacement Program** ***Suncook River Plan Action***	Long Term 4-5 Years	27	**Highway Department**	**$245,000**	**Hazard Mitigation Grants Program (HMGP) Highway Operating Budget**
	Road washouts and flooding conditions would strand residents in some locations. Ineffective culverts to upgrade include: Park & Howe Ave, Bailey Ave, Ridge Road East, Oak St, Sunset Ave, Canal St, Reynolds, Houle, Bartlett, Dodge Rd, River Rd, Chester Tpk, Granite St, Townhouse, Gilbert Rd, New Rye, Wing Rd, Deerfield Rd, Podunk Bridge, Mt. Delight, Mt. Delight Bridge, Dowst Rd, Chestnut Dr (22 culverts + 1 box culvert). Get the program operational to be self-sustaining until it is able to be updated annually				Cost is for $2,500 for each culvert (22) plus $190,000k for the box culvert on Mount Delight Road - materials, installation, labor.	Grant funding for the box culvert, Highway Operating Budget for the rest.
DEFERRED #1- 2010	**Apply for Additional Funding to Purchase 10 More Homes in the Floodplain** ***Suncook River Plan Action***	Long Term 4-5 Years	30	**Emergency Management Director**	**$1,031,400**	**Flood Mitigation Assistance (FMA) grant funding**
Deferred because the Town did not have the (federal grant) funding to undertake purchase of all 42 priority homes.	Voluntary purchase of flood-prone homes removes people from the floodplain, which gives a 100% guarantee to eliminate risk to property and lives. Five phases have already been completed (32 homes acquired) and two more phases are hoped for to purchase the remaining 10 homes.		30- 2010		Cost is for the assessed valuation of the 10 homes. Use the tax records of 2013 ($827,400)	Additional cost for each home $16,000 demolition ($160,000), legal $1,600, ($16,000), and $2,800 administration ($28,000).

Table 59A, continued

Allenstown's Mitigation Action Plan 2015: Life and Property Protection

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #15- 2015	**Upgrade 265 River Road Culvert over Small Brook** ***Suncook River Plan Action***	Medium Term 3-4 Years	30	**Highway Department**	**$1,500 - $4,000**	Highway Department Operating Budget
	The culvert was replaced but has collapsed and the road is now sinking in again. The Highway Department must remove the top coat and determine the status of the culvert. If it is crushed, it will be replaced as well as the road reconstruction.				Cost is for gravel top layer over the pipe and pavement by Highway Department	Staff ($1,500) and if a new culvert is needed, it will be replaced ($2,500).
NEW #16- 2015	**Upgrade Mount Delight Bridge Culvert over Pease Brook** ***Suncook River Plan Action***	Short Term 1-2 Years	28	**Highway Department**	**$190,000**	Hazard Mitigation Grants Program (HMGP)
	The existing one 3' and one 4' culvert side-by-side are not adequate for water pass through and need to be replaced. A box culvert is now needed.				Cost is for an engineering study, box culvert, new guardrails, raising the profile of the roadway, and wing walls by a contractor	Grant funding
NEW #17- 2015	**Upgrade 168 River Road Culvert** ***Suncook River Plan Action***	Medium Term 3-4 Years	30	**Highway Department**	**$150,000**	**Bond**
	The existing culvert functions, but it will need to be replaced since it is a critical highway route to evacuate people from Suncook River flooding. This is the emergency detour route to get North-South as Buck Street floods.				Cost is for the box culvert and labor by a contractor	

Table 59A, continued

Allenstown's Mitigation Action Plan 2015: Life and Property Protection

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
DEFERRED #2- 2010	**Work with NHDES and Epsom to Mitigate Allenstown Flood Hazards on the Suncook River** ***Suncook River Plan Action***	**Medium Term 3-4 Years**	**28**	**Emergency Management Director**	**>$100,000**	**Pre-Disaster Mitigation (PDM) grant funding**
Deferred from 2010 because the NHDES Suncook River Fluvial Erosion Hazard (FEH) Assessment by NHDES for the River had not yet been completed.	Projects might prevent the further erosion of land in Epsom. The sediment from Epsom fills the Suncook River channel in Allenstown, which makes the flooding more dramatic here. Waiting for the NH Department of Environmental Services fluvial geomorphic assessment of the river. New FEH/FGA projects [completed spring 2015] would include studies, permits, equipment, purchase property, protect floodplain projects, etc.		28 -2010		Cost is unknown as the potential projects from the FEH Assessment are not yet determined but are assumed to be high.	PDM grants could fund the different river projects identified in the Assessment
NEW #18- 2015	**Add New Cisterns in Rural Areas without Water Supply for Fire Protection**	**Medium Term 3-4 Years**	**32**	**Fire Department**	**$150,000**	**PDM grant funding, USDA Rural Development grant funding**
	New cisterns should be added to the rural areas of Wing Road, Old Town Co-op (manufactured housing), and Catamount Hill Co-op (manufactured housing). There are no hydrants in these populated areas, no adequate water supply for fire suppression, no nearby streams or brooks, and fire trucks have to tank in their own water to fight fires in these areas.				Cost is for tanks, site work, purchase of property, permits,	Cost is also for work done by a contractor for each of the three cisterns at $50,000 each.

Table 59A, continued
Allenstown's Mitigation Action Plan 2015: Life and Property Protection

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #19- 2015	**Plan Strategic Placement of Highway Department Vehicles Prior to Start of Storm Events**	**Short Term, then Ongoing**	**34**	**Highway Department**	**$0**	**N/A**
	The roads around Bear Brook State Park were closed by state officials and no other vehicles could get by during a recent storm. A procedure was developed to use a plow truck to clear roads of debris safely during the storms using steel plows - more is done, with less effort. Setting up the Highway Department vehicles in advance of the storms will permit speedier clean up and storm recovery.	Regular procedure to follow once developed in the short term			Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	
DEFERRED #3- 2010	**Continue to Perform Drive-by Tree Examinations and Notification of Utility Companies**	**Ongoing**	**34**	**Highway Department**	**$0**	**N/A**
Deferred from 2010 because this is an Action to be repeated at regular intervals in order to be effective.	PSNH, Unitil, and NH Cooperative are Allenstown's electricity providers. While driving the roads, the Highway Department informs them when trees are in need of trimming to be pro-active in avoiding as many power disruptions as possible. The companies send Asplundh to cut down the dangerous trees.	Regular activity	34 -2010		Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	
NEW #20-2015	**Engage in Bank Armoring of Town Owned Mass-Failure Properties (FGA)**	**Long Term 4-5 Years**	**35**	**Town Administrator**	**$10,000 to $25,000**	**Land Use Change Tax Fund**
	Assess the areas requiring support, talk with officials to assess Town owned land. Purpose is to use riprap to prevent more mass failure. Task performed off season by HD, placing the riprap with rented machinery. Several places of Mass Failure were mapped, consult w/ NHGS. Complete in phases, different sections each year until completed.			Conservation Commission, Highway Department NH Geological Survey	Cost is for potential boulders, other materials, equipment rental.	CIP

Table 59A, continued

Allenstown's Mitigation Action Plan 2015: Life and Property Protection

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #21- 2015	**Include the Suncook River Fluvial Erosion Hazard Assessment (FEH)** ***Suncook River Plan Action***	Short Term 1-2 Years	31	Emergency Management Director	$0	N/A
	When completed, add the problems and projects identified by the NHDES Suncook River FEH Assessment to the Allenstown-Suncook River Hazard Mitigation Plan Update 2015. The FEH project is funded by the NH Department of Environmental Services, and identifies the fluvial hazards and the steps to mitigate them. Including issues from the Assessment will reduce the damage to life and property as the problems can be converted into Action items.				Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	

Source: Allenstown Hazard Mitigation Committee. See also ***CHAPTER 9*** *and* ***Figure17***

Table 59B
Allenstown's Mitigation Action Plan 2015: Emergency Services

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #22- 2015	**Work with NOAA and USGS to Upgrade Route 28 Stream Gage to Provide Water Level Predictions** ***Suncook River Plan Action***	**Short Term 1-2 Years**	**34**	**Emergency Management Director**	**>$50,000**	**National Oceanic and Atmospheric Administration (NOAA)**
	The ability of the River gage in Allenstown to predict water levels would provide early warning and emergency planning to reduce the risk of injury, death and property damage.			Cost is unknown at this time but is expected to be high depending on projects	Cost is unknown at this point until talks with NOAA and USGS commence	Cost and funding sources will be inserted into the Plan when determined.
NEW #23- 2015	**Continue Highridge Trail Radio Tower Generator Maintenance**	**Ongoing**	**32**	**EMD with Merrimack County Sheriff's Dept. (MCSD)**	**$425 annually**	**MCSD operating budget**
	Highridge Trail Radio Tower provides Police, Fire, Highway and Emergency Management radio repeater capability for Allenstown, Hooksett and the Sheriff's Dept. Generator works to ensure the backup power continues to function.	Regular servicing and maintenance for operation			Cost is for MCSD service agreement for a major and minor service each year.	
DEFERRED #4- 2010	**Continue to Participate in Capital Area Public Health Network for Public Health Threats**	**Ongoing**	**32**	**Emergency Management Director**	**$0**	**N/A**
Deferred from 2010 this is an Action to be repeated at regular intervals in order to be effective.	**Public health threats are a growing risk to NH residents. This Committee generated and updates a Public Health Plan that identifies Points of Distribution and various resources.**	Regular participation	32- 2010		Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action	State funds provided to NH Department of Health & Human Services (DHHS) through Federal Govt fund the CAPHN project.

Table 59B, continued
Allenstown's Mitigation Action Plan 2015: Emergency Services

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #24- 2015	**Field Test Tablet and PolicePad Software**	**Short Term 1-2 Years**	**34**	**Police Chief**	**$34,000**	**Police Dept operating budget**
	Tablets and PolicePad Software allow for seamless communication with supporting law enforcement agencies.				Cost is for purchase of equipment / license fees, cell monthly fees.	
NEW #25- 2015	**Obtain a 45kw Generator for Highway Department**	**Short Term 1-2 Years**	**32**	**Emergency Management Director**	**$35,000**	**EMPG, Highway Operating Budget**
	Provides emergency power source when the normal electric power service is interrupted. Highway facility is a key facility during emergency operations.				Cost is for purchase and installation of generator at the facility.	
NEW #26- 2015	**Develop Redundant Notification Procedures to Address Contingencies**	**Short Term, then Ongoing**	**34**	**Emergency Management Director**	**$0**	**N/A**
	Utilization of social media, and redundant communications capability increases the chances of emergency services to function fully during crisis situations.	Regular Activity after developed in the short term			Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	
NEW #27- 2015	**Continue to Use Documents to Support the Emergency Management Activities of Highway Department**	**Short Term, then Ongoing**	**34**	**Emergency Management Director**	**$0**	**N/A**
	Documentation of debris management is critical to assessment of recovery operations. Fluvial geomorphic assessment (FGA), culverts and drainage, and fluvial erosion hazard (FEH) data and maps will provide essential information. Protocol for usage must be established	Regular Activity once protocol for usage is established in the short term			Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	

Table 59B, continued
Allenstown's Mitigation Action Plan 2015: Emergency Services

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #28- 2015	**Complete Remaining 911 Re-Numbering Projects**	**Short Term 1-2 Years**	**31**	**Building Inspector**	**$0**	**N/A**
	Completion will ensure the entire town is in compliance with the standards and the ordinance.				Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	
NEW #29-2015	**Certify Highway Department Staff to Become Culvert Maintainer (FGA)**	**Short Term 1-2 Years**	**36**	**Highway Department**	**$750**	**Highway Dept Operating Budget**
	The NH DES has a program by which municipal HD members can train to become Certified Culvert Maintainers. The advantage is the ability to allow small upsizing of culverts without a permit.				Cost is for 2 people to be trained at UNH T2	

Source: Allenstown Hazard Mitigation Committee. See also ***CHAPTER 9*** *and* ***Figure 17***

Table 59C
Allenstown's Mitigation Action Plan 2015: Public Information and Involvement

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
DEFERRED #5- 2010	**Continue to Offer Fire Prevention and Public Education Programs**	**Ongoing**	**32**	**Fire Chief**	**$1,000 annually**	**Fire Department Operating Budget**
Deferred from 2010 because this is an Action to be repeated at regular intervals in order to be effective.	Fire Prevention and Public Education are offered through the schools and Open Houses. The Open Houses also provide Fire and EMS education	Regular annual public programs are in place	32- 2010		Cost is for materials and salaries for personnel participating in education programs.	
NEW #30- 2015	**Review and Improve Community Outreach Forums and Safety Programs**	**Short Term, then Ongoing**	**34**	**Fire Chief**	**$500 annually**	**Fire Department Operating Budget**
	Citizen readiness to respond and endure disasters reduces the impact of disasters and there costs.	Regular Activity once improvements are made in the short term			Cost is for materials for citizen education.	
NEW #31- 2015	**Develop a More Comprehensive DARE Program with the SRO**	**Short Term 1-2 Years**	**30**	**Police Department**	**$2,000**	**Police Department Operating Budget**
	Citizens who are better educated in regards to the hazards in the community are more resilient than those who are not.				Cost is for salaries for training and materials.	
DEFERRED #6- 2010	**Review and Adopt New Public Information Notification Technologies**	**Short Term 1-2 Years**	**36**	**Emergency Management Director**	**$10,000**	**EMPG and Operating Budget**
Deferred from 2010 because we are awaiting the roll out of IPAWS and similar technology.	For public safety, Allenstown Emergency Alert Notification System AEANS created providing email and text notification to public officials, Groups A, B, & C. Notification list updated when needed. Public notified via Town website, Facebook, and Twitter Software & hardware not yet available for advanced notification desired		36- 2010		Cost is for software and hardware but is unknown at this point as they have not been priced out)	estimated $10,000

Table 59C

Allenstown's Mitigation Action Plan 2015: Public Information and Involvement

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #32-2015	**Provide Landowner Education on Erosion Mitigation (FGA)**	**Short Term 1-2 Years**	**36**	**Conservation Commission**	**$200**	**Cons Comm Budget**
	Many banks of the river are eroded and they are on private property. To help reduce erosion, develop a brochure on the importance of vegetated buffers and provide specific guidance of what landowners can do. Develop and mail brochures to 60+ riverfront landowners, see website.				Print materials, mailing costs, in-kind	

Source: Allenstown Hazard Mitigation Committee. See also ***CHAPTER 9*** *and* ***Figure 17***

Table 59D
Allenstown's Mitigation Action Plan 2015: Training and Preparation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
DEFERRED #7- 2010	**Participate in National Flood Insurance (NFIP) Training** ***Suncook River Plan Action***	Short Term, then Ongoing	36	**Emergency Management Director**	**$500 annually**	**Town Operating Budget**
Deferred from 2010 because this is an Action to be repeated a repeated at regular intervals in order to be effective.	In order for Planning Board members, Zoning Board of Adjustment members, Town Administration, and the Building Inspector to remain current with NFIP procedures and policies, regular training must be taken. This training would broaden the Town's identification of building projects that may be in the floodplain. Workshops are offered by the State and/or FEMA (or in other training) and addresses flood hazard planning and management.	Regular activity, annual costs	36- 2010		Cost is for staff salaries for training sessions.	
NEW #33- 2015	**Continue Regional MUA Fire Department Training**	Short Term, then Ongoing	36	**Fire Chief**	**$5,000 annually**	**Fire Department Operating Budget**
	This training allows firefighters to work together to resolve field problems. MUA training is available monthly	This is a regular activity, annual costs are incurred			Cost is for salaries of Fire Departme nt personnel.	
NEW #34- 2015	**Continue Fire Department Participation in Regional Exercises**	Short Term, then Ongoing	36	**Fire Chief**	**$1,000 annually**	**Fire Department Operating Budget and HSEEP funds**
	Coordinated exercises test and strengthen the ability of FD assets to operate in concert with regional FD assets. Participation should occur in at least 1 annual exercise	This is a regular activity, annual costs are incurred			Cost is for salaries of Fire Departme nt personnel.	Homeland Security Exercise and Evaluation Program

Table 59D, continued

Allenstown's Mitigation Action Plan 2015: Training and Preparation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #35- 2015	**Continue to Offer Fire Department Personnel Continuing Education**	**Ongoing**	**36**	**Fire Chief**	**$3,000 annually**	**FEMA, National Fire Academy, NH FA budget and FD Operating Budget**
	Continue to offer Fire Department personnel continuing education through the NH Fire Academy (NHFA), Emergency Management Institute, Texas A&M Extension (TEEX), etc.	Regular activity, annual costs			Cost is for Fire Department salaries, travel expenses and tuition	If grant sources are available, cost to the Town will decrease.
NEW #36- 2015	**Continue with Fire and Rescue Recruitment with Enhancing Explorer Programs**	**Ongoing**	**20**	**Fire Chief**	**$1,500 annually**	**Donations and Fire Department Operating Budget**
	Explorer posts develop base of future firefighter applicant pool.	Regular activity, annual costs			Cost is for materials, uniforms and equipment	
NEW #37- 2015	**Coordinate Emergency Exercises with NH Public Works Mutual Aid and Pembroke Department of Public Works**	**Ongoing**	**34**	**Road Agent and Emergency Management Director**	**$750 every two years**	**HSEEP Grant, Highway Department Operating Budget**
	Exercising PW assets in coordinated efforts is critical to ensuring they can operate effectively in coordination during an emergency.	Bi-annual activity			Cost is for salaries and materials.	
NEW #38- 2015	**Finalize CALEA Certification for Police Department**	**Short Term 1-2 Years**	**31**	**Police Chief**	**$7,500 over three year period**	**Police Department Operating Budget**
	Standardized procedures and certification will aid in ensuring a high level of performance of the PD during emergencies.				Cost is for certification fee and salaries	

Table 59D, continued

Allenstown's Mitigation Action Plan 2015: Training and Preparation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #39- 2015	**Hold Active School Shooter Training Exercises**	Short Term, then Ongoing	35	Police Chief	$14,000 annually, depending upon scope	HSEEP Grant, Police Department Operating Budget
	Hold trainings in all 4 schools (Elementary School, Armand Dupont Middle School, PACE Academy, Pine Haven Boys Center) annually. Involve with MUA PDs, CNHR Spec Op Units, FD, Schools, Tri-Town Ambulance.	Regular annual activity once developed in the short term			Cost is for salaries for OT	Cost also for supplies and consultants to coordinate and evaluate the exercise.
NEW #40- 2015	**Train More Police Department Personnel for the Central NH Special Operations Unit Team**	Ongoing	29	Police Chief	$5,000 annually	Police Department Operating Budget
	Develop closer relationship with Central NH SOU. Additionally if we have trained and equipped personnel on patrol this will allow for immediate response compared to delayed response of CNHSOU.	Regular activity, annual desired			Cost is for OT salary expense for training	
NEW #41- 2015	**Develop Police Department Field Capability to Respond to Civil Disturbances and Riots**	Short Term, then Ongoing	30	Police Chief	$2,500 annually	Police Department Operating Budget
	Work with Central NH SOU to conduct joint civil disturbance control operations.	Regular activity with SOU			Cost is for OT salary expense for training	
NEW #42- 2015	**Conduct Joint Exercise with NH Information Analysis Center**	Short Term, then Ongoing	36	Police Chief	$1,000 annually	HSEEP Grant
	Test communications flow and quality control of intelligence and information exchange.	Regular annual activity is expected after first exercise			Cost is for OT salary expense for training	

Table 59D, continued

Allenstown's Mitigation Action Plan 2015: Training and Preparation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #43- 2015	**Conduct Exercise to Test Suspicious Package Protocol**	**Short Term 1-2 Years**	**36**	**Police Chief**	**$10,000**	**HSEEP Grant**
	Conduct coordinated exercise with Regional Fire Hazmat Team, NHSP EOD Unit and State Public Health Lab. Test new protocol.				Cost is for OT salary of personnel	Cost also of hiring a consultant to coordinate the exercise.
NEW #44- 2015	**Conduct Cybercrime Training and Purchase Necessary Equipment**	**Short Term, then Ongoing**	**36**	**Police Chief**	**$8,500**	**Department of Justice (DOJ) Grants and Police Department Operating Budget**
	The PD must be able to investigate cybercrimes as this continues to take up a larger portion of criminal activity in Allenstown	Annual activity of training, purchases may be needed			Cost is for OT salary of personnel	Cost also for training, equipment to be purchased and tuition for courses
NEW #45- 2015	**Upgrade SUV Incident Command Post Equipment**	**Short Term 1-2 Years**	**36**	**Fire Chief**	**$12,500**	**Fire Department Operating Budget**
	Completion of the up fit of the back of the Ford Explorer command vehicle for FD ICP operations.				Cost is for command post kit for vehicle.	
DEFERRED #8- 2010	**Continue to Participate in Available Regional/ Statewide Terrorism Exercises**	**Short Term, then Ongoing**	**33**	**Police Chief**	**$2,000 annually**	**Police Department Operating Budget**
Deferred from 2010 because more time is required for completion	Participation in regional and statewide exercises when they are conducting ensures connectivity with those organizations.	Regular annual participation expected	33- 2010		Cost is for OT salary for training on an annual basis	

Table 59D, continued

Allenstown's Mitigation Action Plan 2015: Training and Preparation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #46- 2015	**Complete In-House WWTF Staff Training**	Short Term, then Ongoing	35	**WWTF Superintendent**	**$0**	N/A
	Wastewater Treatment Facility Operators are required by NH DES to complete training each year for operator license renewals. The training would be conducted during their normal operating hours.	Regular annual activity			Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	
NEW #47- 2015	**Continue to Vary Types of Monthly School Drills**	Ongoing	36	**School Principals**	**$0**	N/A
	Monthly drills in both Allenstown Elementary and Armand R. Dupont Schools ensure that staff and students are familiar with emergency response procedures.	Regular activity, monthly proposed			Cost is $0 for in-kind staff labor conducted during normal duties to fulfill this Action.	There is no additional cost as this would be done during the school day.
NEW #48- 2015	**Practice Annual Evacuation Procedures at Elementary and Middle Schools with Staff**	Short Term, then Ongoing	36	**School Principals**	**$0**	N/A
	Regular annual drills ensure that staff and students are familiar with emergency response procedures.	Annual activity			Cost is $0 for in-kind staff labor conducted during normal duties to fulfill this Action.	There is no additional cost as this would be done during the school day.

Table 59D, continued

Allenstown's Mitigation Action Plan 2015: Training and Preparation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
DEFERRED #9- 2010	**Upgrade Radiological Detection Equipment and Conduct Training**	4-5 Years Long Term	33	**Emergency Management Director**	**$10,000**	**EMPG/State Operating Budget**
Deferred from 2010 because Allenstown was not eligible for state grants	Town is not in either of the zones around the two nuclear power facilities impacting the state, so funding was not available. Local funding is not available for this project.		**33- 2010**		Cost is for purchase of modern radiological equipment	
NEW #49- 2015	**Ensure All Regional Police Department Mutual Aid Agreements Are Current**	Ongoing	36	**Police Chief**	**$0**	**N/A**
	Required by state statute when new police chiefs are appointed.	Regular activity			Cost is $0 for in-kind staff labor conducted during normal duties to fulfill this Action.	
NEW #50- 2015	**Require Finance/Admin Section Position Specific ICS Training**	Short Term, then Ongoing	31	**Emergency Management Director**	**$500**	**Emergency Management Operating Budget**
	Admin/Finance Section staff participate in position level training at regional ICS training.	Regular activity once established in the short term			Cost is for annual lodging, meals and travel.	
NEW #51- 2015	**Conduct Regional Shelter Exercise**	Short Term, then Ongoing	36	**Emergency Management Director**	**$7,500 bi-annually**	**HSEEP Grant**
	Testing and exercising the plan on a regular basis to ensure a high state of readiness.	Bi-annual activity			Cost is for OT salaries of personnel and consultant to coordinate the exercise, biannually	

Table 59D, continued
Allenstown's Mitigation Action Plan 2015: Training and Preparation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #52- 2015	**Conduct Communications Exercise and EOC/IMT Exercise**	**Short Term, then Ongoing**	**36**	**Emergency Management Director**	**$4,500 bi-annually**	**HSEEP Grant**
	Testing and exercising communication and IT infrastructure on a frequent basis to ensure effectiveness.	Biannual activity			Cost is for OT salaries of personnel and consultant to coordinate the exercise, biannually	
DEFERRED #10- 2010	**Train Fire Department, Highway and Administrative Staff on Basic ICS and NIMS**	**Ongoing**	**36**	**Emergency Management Director**	**$2,000 annually**	**Department Operating Budgets**
Deferred from 2010 because Action needs to be repeated at regular intervals in order to be effective		Regular annual activity	**36- 2010**		Cost is for staff OT or stipend for training.	
NEW #53- 2015	**Continue to Undertake Highway Department Training and Participate in Town Exercises**	**Short Term, then Ongoing**	**36**	**Road Agent**	**$750 annually**	**HSEEP Grant and Highway Department Operating Budget**
	The highway department is a critical component of the emergency operations plan	Regular activity, annual costs once established in the short term			**Cost is for HD personnel overtime**	

Source: Allenstown Hazard Mitigation Committee. See also ***CHAPTER 9*** *and* ***Figure 17***

Table 59E

Allenstown's Mitigation Action Plan 2015: Planning and Implementation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #54- 2015	**Update the Zoning Ordinance to Comply with NFIP Requirements** ***Suncook River Plan Action***	Ongoing	35	Planning Board	$0	N/A
	The Zoning Ordinance needs to be updated as new requirements to the National Flood Insurance Program are necessary for retention of NFIP participation. The Floodplain Ordinance protects life and property by regulating distance of structures to flood hazard areas, regulating elevation, clarifying definitions, regulating new structures and encroachments, stating duties of the Code Enforcement Officer, etc. In 2010, the Town adopted the recommended updates to the ordinance. The existing ordinance is amended with federal updates on a recurring basis.	Regular activity whenever updates are required by FEMA			Cost is $0 due to in-kind staff and/or volunteer labor, and language is provided by the NH Office of Energy and Planning.	
NEW #55- 2015	**Re-initiate Community Rating System Process and Obtain Certification** ***Suncook River Plan Action***	Medium Term, then Ongoing	33	Building Inspector	$0	N/A
	The CRS certification requires regulations and actions that reduce the impact of flooding on the community.	Regular activity to work on once reinitiated until completion in the medium term			Cost is $0 as the building inspector would be conducting this process as part of his job duties	
DEFERRED #11- 2010	**Request Bear Brook State Park Management Plan Update from NH DRED and Integrate into EOP**	4-5 Years Long Term	36	Emergency Management Director	$0	N/A
Deferred from 2010 because more time is required for completion. This also requires action by state agencies.	Other state agencies including NHDRED would be undertaking this effort. Allenstown could initiate discussions and request the update.		36- 2010		Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	

Table 59E, continued
Allenstown's Mitigation Action Plan 2015: Planning and Implementation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #56- 2015	**Review and Update Fire Department SOGs**	Short Term, then Ongoing	36	Fire Chief	$0	N/A
	A list of Fire Department SOGs is awaiting update and integration into document	Regular activity once update is completed in short term		This is part of the normal duties of the fire chief.	Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties to fulfill this Action.	
NEW #57- 2015	**Develop Plowing Policy**	Short Term 1-2 Years	36	Road Agent	$0	N/A
	A comprehensive plowing policy with ensure that the roadways are properly cleared minimizing risk to road users and highway staff.				Cost is $0 for in-kind staff labor conducted during normal duties to fulfill this Action.	
NEW #58- 2015	**Implement Cloud IT Plan and Hardware**	Short Term 1-2 Years	36	Town Administrator	$35,000 over 3 yrs	Town operating budget
	Town-wide use of a cloud solution will allow for redundancy and the elimination of 4 organic servers.				Cost is for installation of hardware and the service agreement	
NEW #59- 2015	**Improve WWTF Standard Operating Procedures**	Short Term, then Ongoing	35	WWTF Superintendent	$0	N/A
	Wastewater Treatment Facility (WWTF) SOPs are followed to ensure proper testing, handling of chemicals, and to ensure safety of staff and community. Updates to follow the most recent regulations set by Federal and State rules.	Regular activity once update is completed in short term			Cost is $0 for in-kind staff labor conducted during normal duties to fulfill this Action.	

Table 59E, continued

Allenstown's Mitigation Action Plan 2015: Planning and Implementation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #60- 2015	**Develop IT Security Procedures to Prevent Cyberterrorism**	Short Term 1-2 Years	34	**Town Administrator**	**$0**	**N/A**
	Development of town wide IT security procedures will lessen the frequency and magnitude of cyber terrorist acts.				Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties	
NEW #61- 2015	**Develop Spill and Chemical Response Plan for WWTP**	Short Term 1-2 Years	35	**WWTF Superintendent**	**$0**	**N/A**
	Required for MS4 compliance and EPA regulations that pertain to the Wastewater Treatment Facility (WWTF).				Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties	
NEW #62- 2015	**Include Generator Replacement in the Capital Improvements Program**	Medium Term, then Ongoing	32	**Emergency Management Director**	**$0**	**N/A**
	The generator replacement should be updated annually in the CIP until its purchase.	Regular annual activity of CIP update, purchase is medium term			Cost is $0 for in-kind staff and/or volunteer labor conducted during normal duties	
NEW #63- 2015	**Update Emergency Operations Plan 2011 and Add Additional Annexes**	Short Term 1-2 Years	34	**Emergency Management Director**	**$15,000**	**Hazard Mitigation Grant Program (HMGP)**
	The 5-year update is due in December of 2016.				Cost is for consultant services to update the plan.	

Table 59E, continued

Allenstown's Mitigation Action Plan 2015: Planning and Implementation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #64- 2015	**Revise Disaster Recovery Plan to Include Meeting FEMA's NDRF Format**	**Short Term 1-2 Years**	**34**	**Emergency Management Director**	**$15,000**	**Hazard Mitigation Grant Program (HMGP)**
	The present plan needs to be re-written due to deficiencies discovered during the exercise in 2011. It also needs to be re-written to follow the FEMA format of RSFs. Grant funds were applied for in 2012 however the grant was denied due to lack of funds at the state level.				Cost is for consultant services to re-write the plan.	
NEW #65- 2015	**Rewrite the Recovery Plan to Include a Debris Management Section to Allocate Pre-Designated Landfill Locations**	**Medium Term 3-4 Years**	**33**	**Emergency Management Director**	**$25,000 to $50,000**	**HMGP**
	Debris Management section of Allenstown Recovery Plan states how to pick up curbside materials, which goes out to residents. Different piles of debris are necessary for removal. The section follows the FEMA model. Update to include landfills and mapping of these locations. Contained in Disaster Recovery Plan, want to place it as an Annex within EOP 2016			Match is needed, 25-50%	Cost is for an HMGP grant consultant services to write the plan, develop maps and new ordinances	Looking for direct assistance from Washington to create model for small communities FEMA REGION 1
NEW #66- 2015	**Update the 2003 Master Plan with Current Data**	**Short Term 1-2 Years**	**36**	**Planning Board**	**$16,000**	**Grant through CNHRPC, Planning Board Operating Budget**
	The Master Plan would have provisions to limit the impact of disasters if it were updated. Several Chapters have been in the process of revision.				Cost is for consultant services through Central NH Regional Planning Commission to re-write the plan.	

Table 59E, continued
Allenstown's Mitigation Action Plan 2015: Planning and Implementation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #67- 2015	**Update the 2012 CIP Annually to Add Hazard Mitigation Purchases**	**Ongoing**	**32**	**Planning Board**	**$0**	**N/A**
	Update the CIP yearly to incorporate the year's priority hazard mitigation projects or capital reserve funds deposits	Regular activity, annual			Cost is $0 for in-kind staff and/or volunteer labor	Labor conducted during normal duties
NEW #68- 2015	**Update the Allenstown School District Emergency Management Plan**	**Medium Term, then Ongoing**	**35**	**School Board**	**$2,500 annually**	**Emergency Management Performance Grant (EMPG)**
	Update the Allenstown School District Emergency Management Plan yearly using a consultant. Town should speak with School Board to initiate	Annual activity once updated in the medium term			Cost is for consultant services to re-write the plan or amend it as needed	
NEW #69- 2015	**Update the Allenstown School District 2009 Crisis Management Plan**	**Short Term 1-2 Years**	**35**	**School Principals**	**$2,500**	**School District Budget, EMPG**
	The plan is due for one update during this period between the time of the implementation of this plan and the end date of this plan.				Cost is for consultant to re-write the plan	
DEFERRED #12- 2010	**Develop Critical Facilities Emergency Evacuation Plans**	**Long Term 4-5 Years**	**35**	**Emergency Management Director**	**$4,000**	**EMPG**
Deferred from 2010 because the Town did not have the funding needed	Identify critical facilities that need emergency evacuation plans and develop such plans		35- 2010		Cost is for consultant to write the plans	
DEFERRED #13- 2010	**Update Wetlands Ordinance to Reflect New NH DES Standards**	**Long Term 4-5 Years**	**33**	**Planning Board**	**$5,000**	**Planning Board Operating Budget**
Deferred from 2010 because the Town did not have the funding needed	NHDES culvert replacement standards and requirements have changed. The Wetlands Ordinance needs to be revised accordingly		33 -2010		Cost is for consultant to update the ordinance	

Table 59E, continued
Allenstown's Mitigation Action Plan 2015: Planning and Implementation

Action Number	Action	Action Timeframe	Ranking Score - Relative Ease of Completion	Who is Responsible	Approx Cost to Town*	How Funded
NEW #70- 2015	**Continue to use Central NH Regional Planning Commission to Update the Hazard Mitigation Plan**	Medium Term 3-4 Years	36	Emergency Management Director	$6,000	Pre-Disaster Mitigation (PDM) grant funding
	The CNHRPC is a professional regional planning organization in Concord that regularly works with Allenstown on a variety projects and is familiar with the community. CNHRPC developed the first 2003 Hazard Mitigation Plan and this 2015 Plan Update, and has worked with the Town in other emergency management capacities. Update in 2020.				Cost is for consultant services to re-write the plan.	
NEW #71-2015	**Investigate Regulatory Options of Zoning in Areas of Highest Flooding Sensitivity (FGA)**	Medium Term 3-4 Years	31	Planning Board	$50,000 to $100,000	Operating Budget
	Land use control may be unpopular, but the Town should try. Ensuring enforcement of these regulations happens is critical. This Action will take a lot of time and it has a relatively unknown cost due to possible legal battles.			CNHRPC can assist	Cost is for enforcement staff time, and a legal budget.	
NEW #72-2015	**Include a Drainage Infrastructure Vulnerability Assessment as part of the EPA MS4 Stormwater Management Plan (FGA)**	Short Term 1-2 Years	36	Road Agent	$18,000	Stormwater Budget and PB Operating Budget
	Add a Vulnerability Assessment of drainage infrastructure to existing EPA MS4 Stormwater Management plan in progress. The Planning Board has a component but mostly it is with the Highway Dept. The FGA mapping depicts input features that might not be recorded in the MS4.			Planning Board, NHDOT	Cost is for CNHRPC to finish Stormwater Mgt Plan with a drainage infrastructur e Vulnerability Assmt	

Source: Allenstown Hazard Mitigation Committee. See also CHAPTER 9 and Figure 17
**The Approximate Cost for each project and is a rough estimate agreed upon by the Hazard Mitigation Committee utilizing their various fields of expertise.*
The costs are total approximate costs for the entire project.
In-kind staff time is not considered as part of out-of-pocket expense.

The prioritization exercise performed on ***Figure 17*** in CHAPTER 13. APPENDIX helped the Committee evaluate both the **NEW** and **DEFERRED** hazard mitigation Actions that they had brainstormed throughout the hazard mitigation planning process. While the Actions would all help improve the Town's disaster responsiveness capability and overall safety, funding and staff availability will be the predominant factors in determining which and when the mitigation Actions are completed.

COST TO BENEFIT ANALYSIS

There are **72** Actions within the **MITIGATION ACTION PLAN**. As indicated in the above tables, those Actions that cost the least or impart the highest benefit to residents and businesses are not necessarily the first Actions to be completed based on their priority listing. This cost to benefit analysis evaluates the Actions in a different way which should also be considered by the Town when working to complete activities from the Action Plan. When an Action displays a cost range, the *lower figure* of the costs is categorized.

$1,000 and Under Cost

Thirty two (**32**) of the **72** Action items to address emergency hazard events are of zero (**$0**) out-of-pocket or very low cost, **$1,000** and under. These are typically considered nominal costs that are paid for during the Town staff's or volunteer's normal duties. Many of these Actions require a moderate in-kind effort by Town Department staff or volunteers to complete. Costs include paid labor, office supplies, photocopying budgets, small equipment rentals, and training costs. Many of the typical Actions less than **< $1,000** consist of **Emergency Services** and **Planning and Implementation** activities.

The highest cost to benefit gained for each Action is again dependent on the probability of a hazard event, the type of hazard, the location, and its magnitude. Potential loss of life and property are extremely difficult to predict or place a dollar figure on.

The following six (**6**) Actions may provide the best cost to benefit relationship within this monetary category based on their capability to positively affect a large number of people:

Actions Having Probable High Cost to Benefit for $1,000 and Under

NEW #59- 2015	**Improve WWTF Standard Operating Procedures**	**Ongoing**	**$0**
NEW #19- 2015	**Plan Strategic Placement of Highway Department Vehicles Prior to Start of Storm Events**	**Ongoing**	**$0**
NEW #30- 2015	**Review and Improve Community Outreach Forums and Safety Programs**	**Ongoing**	**$500** ***annually***
NEW #29-2015	**Certify Highway Department Staff to Become Culvert Maintainer (FGA)**	**Short Term 1-2 Years**	**$750**
NEW #21- 2015	**Include the Suncook River Fluvial Erosion Hazard Assessment (FEH) *Suncook River Plan Action***	**Short Term 1-2 Years**	**$0**
NEW #32-2015	**Provide Landowner Education on Erosion Mitigation (FGA)**	**Short Term 1-2 Years**	**$200**

$1,001 to $10,000 in Cost

Twenty one (**21**) of the **72** Action items are of fairly low cost, between **$1,001** and **$10,000**. Costs are those which should be placed in the Capital Improvements Program (CIP) and/or those for which a warrant article should be approved at the annual Town Meeting. Many of these Actions require a moderate but one-time effort by Town Departments to complete. Costs include paid labor, equipment rentals, and materials for installation of culverts and dry hydrants, and training costs, and emergency supplies. Most of the Actions within this price range are in the **Life and Property Protection** or **Emergency Services**, or **Planning and Implementation** Tables.

The highest cost to benefit gained for each Action is again dependent on the chances of a hazard event, the type of hazard, and its magnitude. Potential loss of life and property are extremely difficult to predict or place a dollar figure on.

The following five (**5**) Actions may provide the best cost to benefit relationship within this monetary category based on their capability to positively affect a large number of people:

Actions Having Probable High Cost to Benefit for $1,001 to $10,000

DEFERRED #10- 2010	Train Fire Department, Highway and Administrative Staff on Basic ICS and NIMS	Ongoing	**$2,000** *annually*
NEW #68- 2015	Update the Allenstown School District Emergency Management Plan	Ongoing	**$2,500** *annually*
NEW #51- 2015	Conduct Regional Shelter Exercise	Ongoing	**$7,500** *bi-annually*
DEFERRED #6- 2010	Review and Adopt New Public Information Notification Technologies	Short Term 1-2 Years	**$10,000**
NEW #15- 2015	Upgrade 265 River Road Culvert over Small Brook ***Suncook River Plan Action***	Medium Term 3-4 Years	**$15,000**

$10,001 to $50,000 in Cost

Eleven (**11**) of the **72** Action items cost between **$10,001** and **$50,000**, a moderate amount of funding, often spread out over time and requiring a Warrant Article. Costs are those which should be placed into the Capital Improvements Program (CIP) to be paid for over time or those for which a warrant article should be approved at the annual Town Meeting. All of these Actions are **Life and Property Protection** tasks which require a lengthy effort by Town Departments to complete. Costs include paid labor and materials for installation of culverts and drainage systems, developing long-range planning documents, and capital reserve funds.

The highest cost to benefit for these Actions is difficult to anticipate, as these expenditures are necessary for public safety and Town operations.

The following four (**4**) Actions may provide the best cost to benefit relationship within this monetary category based on their capability to positively affect a large number of people:

Actions Having Probable High Cost to Benefit for $10,001 to $50,000

NEW #63- 2015	Update Emergency Operations Plan 2011 and Add Additional Annexes	Short Term 1-2 Years	$15,000
NEW #64- 2015	Revise Disaster Recovery Plan to Include Meeting FEMA's NDRF Format	Short Term 1-2 Years	$15,000
NEW #25- 2015	Obtain a 45kw Generator for Highway Department	Short Term 1-2 Years	$35,000
NEW #20-2015	Engage in Bank Armoring of Town Owned Mass-Failure Properties (FGA)	Long Term 4-5 Years	$10,000 to $25,000

$50,000+ in Cost

Eight (**8**) of the (**72**) Action items of high cost are **$50,000** and over and should be analyzed separately from the prior categories. This cost category offers a significant amount of flexibility for high-cost capital items, ranging from a low of **$50,000** to a high of **millions of dollars**. These costs are those which should be placed into the Capital Improvements Program (CIP) for planned funding, or those for which a warrant article or a bond should be approved at the annual Town Meeting. Most of these Actions are **Life and Property Protection** or **Planning and Implementation** Actions which require a lengthy effort by Town Departments and/or paid consultants to complete. These Actions often repair or upgrade Town assets such as roads, bridges, drainage systems, wastewater systems.

The highest cost to benefit for these Actions is difficult to anticipate, as these expenditures are necessary for public safety and Town operations.

The following three (**3**) Actions may provide the best cost to benefit relationship within this monetary category based on their capability to positively affect a large number of people:

Actions Having Probable High Cost to Benefit for $50,000+

NEW #16- 2015	Upgrade Mount Delight Bridge Culvert over Pease Brook ***Suncook River Plan Action***	Short Term 1-2 Years	$190,000
DEFERRED #2- 2010	Work with NHDES and Epsom to Mitigate Allenstown Flood Hazards on the Suncook River ***Suncook River Plan Action***	Medium Term 3-4 Years	>$100,000
NEW #14- 2015	Establish Culvert Replacement Program ***Suncook River Plan Action***	Long Term 4-5 Years	$245,000

***** This Action will recur during the duration of the Plan period. For the rationale behind its recurrence, see Mitigation Action Plan Tables 59A-59E.

CHAPTER 12.
PLAN MONITORING, EVALUATING, AND UPDATING

2015 PLAN UPDATE

The Town received FEMA approval for the prior Hazard Mitigation Plan in **JULY 2010**. This Chapter was completely re-developed, with all of the following sections added. **MAINTENANCE AND UPDATE SCHEDULE** was added, the **Tasks of the Plan Update** section was added to guide the update efforts of the community, the **IMPLEMENTATION** section was added, The ***Process to Incorporate Actions*** was added to reflect specific tasks to get the Hazard Mitigation Plan Update's Actions implemented, and new avenues were presented. The **CONTINUED PUBLIC INVOLVEMENT** section was updated.

INTRODUCTION

The completion of a planning document is merely the first step in its life as an evolving tool. The Hazard Mitigation Plan Update is a dynamic document that should be reviewed on a regular basis as to its relevancy and usefulness and to add new tasks as old tasks are completed. This Chapter will discuss the methods by which the Town of Allenstown will review, monitor, and update its new **ALLENSTOWN-SUNCOOK RIVER HAZARD MITIGATION PLAN UPDATE 2015**.

MONITORING AND UPDATE SCHEDULE OF THE HAZARD MITIGATION PLAN

The Board of Selectmen should vote to establish a permanent Hazard Mitigation Committee in **SUMMER 2015**, or shortly after the FEMA **Letter of Approval** has been received as indicated in **CHAPTER 1. INTRODUCTION**. The purpose is to meet on a regular basis to ensure the Hazard Mitigation Plan's Actions are being actively worked on.

The Emergency Management Director or designee should continue to serve as Chair of the Committee for Hazard Mitigation meetings, and should be appointed in such a capacity by the Board of Selectmen. Current Hazard Mitigation Committee members can be appointed to continue to participate as members of the permanent Committee. Committee membership should include the Emergency Management Director, Town Administrator, Fire Chief, Rescue Chief, Police Chief, Public Works Director, Building Inspector, Health Officer, 1 (one) Selectman, 1 (one) Planning Board member, 1 (one) School District Representative, Business Community members, Non-profits, local State or Federal agency representatives, and Members at large. This provides a wide spectrum of potential interests and opportunities for partnership to accomplish Actions.

This Committee will aim to meet **quarterly** according to the following potential future meeting schedule to update CHAPTER 11 on an annual basis as displayed in Table 60.

Table 60
Hazard Mitigation Committee Annual Future Meeting Schedule

Month	Preliminary Agenda
April	Committee to determine Action Plan items to pursue for next year, including $0 cost items. Committee to assist Department Heads with getting next year's high-cost Action Plan items into the CIP.
July	Committee to assist Department Heads with their budget requests to include Action Plan items, and to determine which Action Plan items should have warrant articles. Committee gets $0 Action Plan items started with appropriate responsible party.
September	Committee begins to update the Hazard Mitigation Plan's CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS. Committee attends Selectmen budget meetings and suggests warrant articles for Action Plan items. Committee attends Budget Committee meetings scheduled through January to champion Action item funding.
January	Committee completes update to the Hazard Mitigation Plan's CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS. Committee provides revised copies to Department Heads, keeps original Word and Excel files accessible on Town computer system.

Sources: Allenstown Hazard Mitigation Committee 2015

For each of these meetings, the Emergency Management Director (or designee) will invite Department Heads and Board Chairs, and Town Staff to participate in the meetings as well as coordinating the permanent Hazard Mitigation Committee. Public notice will be given as press releases in local papers, will be posted in the public places in Allenstown, and will be posted on the Town of Allenstown website at www.allenstownnh.gov. See section CONTINUED PUBLIC INVOLVEMENT for more details.

Annual Plan Evaluation and Implementation Worksheets are available to use in CHAPTER 13. APPENDIX. The Hazard Mitigation Plan's CHAPTER 12. EVALUATION AND IMPLEMENTATION OF ACTIONS will be updated and evaluated annually according to the Meeting Schedule in Table 60. All publicity information, agendas, meeting summaries, attendance sheets, department support letters, should be retained and compiled for inclusion into CHAPTER 13. APPENDIX.

The Emergency Management Director will work with the Board of Selectmen to schedule the required meetings to update the Hazard Mitigation Plan as part of the budget process cycle in the fall of each year. Strategies, actions, or items identified will be placed into the following fiscal year's budget request.

The Federal Emergency Management Agency (FEMA) encourages communities to upload their Hazard Mitigation Plan Actions into an online database. The **Mitigation Action Tracker** follows municipal Actions through their completion. This added attention to the Town's Actions could enable additional support for grant opportunities when it is shown the Town can complete its mitigation projects. The Town would need to set up an account to enter their Actions into the **FEMA Mitigation Action Tracker** at https://mat.msc.fema.gov.

Tasks of the Plan Update

A number of tasks will be accomplished for the complete (five-year, FEMA approved) update to the Hazard Mitigation Plan. Note that information from many Chapters will be used or referenced by other Chapters. The **2015 PLAN UPDATE** section of each Chapter will be updated as changes are made. See the **APPENDIX** for **Annual Plan Evaluation and Implementation Worksheets**.

The annual **CHAPTER 12. EVALUATION AND IMPLEMENTATION OF ACTIONS** update tasks are indicated in **Table 60**, and are below under Chapter 10's basic instructions.

At least once every five years, the complete update (all 13 Chapters, the Appendix, and the Maps 1-4) will be undertaken and provided to FEMA**. For the full Plan update, the Town should contact the Central NH Regional Planning Commission (CNHRPC) at least two (2) years prior to expiration whether funding and planning assistance will be available for the update.** If not, the Emergency Management Director and Hazard Mitigation Committee will follow the Agendas in the **CHAPTER 13. APPENDIX** of this Hazard Mitigation Plan to ensure the Plan update is thoroughly completed, in addition to consulting any new FEMA guidance publication after the *Local Mitigation Plan Review Guide* dated October 1, 2011.

Individual Chapter Revisions

Acknowledgements.
Add the new Hazard Mitigation Committee members, contributors, and the public.

Chapter 2. Hazard Identification and Risk Assessment
Update any available socio-demographic information from **CHAPTER 5**. Add significant new hazard events since the last Plan into **Table 1**. Revise the methodology to reflect the new meetings, tasks, and public notification.

Chapter 3. Asset and Vulnerability Identification
Add new hazard events that have affected the area and Allenstown, and describe new potential future hazards. Add new Town special events in **Table 23**. Update **Figure 1, Figure 2**, and **Figure 3** if the probability, magnitude, and overall risks are recalculated for the **CHAPTER 2** hazards. Edit evacuation routes as needed.

Chapter 3. Asset and Vulnerability Identification
Update the Town sites and hazards each is susceptible to in **Tables 24** through **36**. Update future development sites in **Table 37**. Update buildings in the floodplain from **CHAPTER 4.**

Chapter 4. Potential Losses
Update **Table 38, Table 39, Table 39A, Table 56** (Chapter 6) with current building value information and dollar damage ranges per building type for flood hazards. With the revised total building assessment value, update the potential dollar values for all natural disasters. Modify technological and human losses as needed. The text analysis will need to be revised to reflect all changes. Update the Town's relation to natural hazards and add any changes since the last Plan.

Chapter 5. Development Trends
Revise **Table 40** and **Table 1** with new demographic and housing information as it becomes available. Update the building permit figures in **Table 42**. Revise land use data in **Tables 43** and **43A** as it becomes available. The text analysis will need to be revised to reflect all changes.

Chapter 6. Floodplain Management
Update the numbers of buildings in the floodplain and flooding information, including new roads and areas. Update the culverts in need of replacement in **Table 49**. Update **Table 50** with any new records for Suncook River crests at North Chichester Gage. Update **Table 52A** with current flood policy and loss statistics. Update **Table 52B** with new repetitive loss information and revise the repetitive loss discussion. Update the ordinance and community assistance visit discussion as new information becomes available. Update all other subsections' information as needed. The text analysis will need to be revised to reflect all changes. The fluvial geomorphic assessment tables within Chapter 6 will not be updated as this study has completed and will not have revisions.

Chapter 7. Local Hazard Mitigation Objectives
Revise and update the general and hazard-specific objectives to ensure their continued relevance to the Town.

Chapter 8. Existing Mitigation Support Strategies
Update **Table 54A** through **Table** 54H with new existing mitigation strategies that are being undertaken, add progress since last plan and future improvements. Move any completed potential Actions from **CHAPTER 10** to the appropriate existing mitigation strategies **CHAPTER 8** table; completed Actions from **CHAPTER 11** will also be added to **CHAPTER 8** tables. Combine the duplicate entries.

Chapter 9. Suncook River Property Acquisitions ***Suncook River Plan***
Record any additional land acquisition grants into **Table 55**. From the assessing records, revise **Table 56** to update the Town's floodplain parcels and their associated feature data.

Chapter 10. Newly Identified Mitigation Actions
Add new potential mitigation Actions for the Town to undertake in **Tables 57A** through **57E**. Move the completed potential Actions to **CHAPTER 8**.

Chapter 11. Evaluation and Implementation of Actions - ANNUAL UPDATE
Remove completed Actions from **Table 59A** through **Table 59E** and place into **Table 58A.** Also place completed Actions into **CHAPTER 8** the existing mitigation strategies tables. Add newly deleted Actions to **Table 58B** and identify why they were deleted. Revise **Table 59A** through **Table 59E** as each Action gets addressed. New Actions may be added there, and also place the new Actions in the appropriate **CHAPTER 10** potential Actions tables. Reevaluate each **CHAPTER 11** Action not yet completed and any new Actions utilizing the enhanced STAPLEE method Action prioritization matrix in **CHAPTER 13 Figure 53**. Modify project and cost rationales as needed, as well as the approximate cost, date for completion, and funding changes. Rewrite the cost to benefit analysis based upon the newly revised **Table 59A** through **Table 59E**. **CHAPTER 11** tasks should be completed on an **annual** basis, with the supporting documentation (agendas, publicity, attendance, etc.) compiled for **CHAPTER 13. APPENDIX** documentation.

Chapter 12. Plan Monitoring, Evaluating, and Updating
Modify **Table 60** with revised quarterly agendas/tasks if needed. Updates dates within the Chapter. Add progress since the last Plan for implementation programs. Review continued public involvement for accuracy. Add new information to the Chapter or revise as needed if new information becomes available.

Chapter 13. Appendix
Revise the processes or grant information as new information becomes available and update website links. Update the STAPLEE Action Prioritization matrix in **Figure 53** whenever **CHAPTER 11** is updated based upon the new projects and priorities. Update the glossary with additional terms as needed. Update the multiple **APPENDIX DOCUMENT** sections with additions. These include new hazard event photographs. Provide copies of all agendas, meeting summaries, attendance sheets, and publicity for inclusion into the Appendix as documentation of the Plan process.

Maps.
Update **Map 1**, **Map 2**, **Map 3**, and **Map 4** of the Plan as needed to reflect the changes in **CHAPTERS 2** and **3**. Mapping assistance may be sought elsewhere, such as with the Central NH Regional Planning Commission. **Map 5 series**, **Map 6 series**, and **Map 7 series** will not be updated as they were developed under the Suncook River fluvial geomorphic assessment 2013.

IMPLEMENTATION OF THE PLAN THROUGH EXISTING PROGRAMS

In addition to work by the Hazard Mitigation Committee and Town Departments, several other mechanisms exist which will ensure that the **ALLENSTOWN-SUNCOOK RIVER HAZARD MITIGATION PLAN UPDATE 2015** receives the attention it requires for optimum benefit. Incorporating Actions from the Plan is the most common way the Hazard Mitigation Plan is integrated into other existing municipal Programs, as described below.

Master Plan

The Allenstown Master Plan was adopted in **MARCH 2003**, developed by the Planning Board with assistance from the CNHRPC. Implementation of the Master Plan has been occurring since its adoption. The Master Plan is still being updated in 2015.

The Planning Board should consider adopting the Hazard Mitigation Plan Update as a separate Chapter to its Master Plan in accordance with RSA 674:2.II(e). The Hazard Mitigation Plan Update should be presented to the Planning Board in **SUMMER 2016** after FEMA approval for consideration and adoption after a duly noticed public hearing, just as any typical Chapter of a Master Plan.

Process to Incorporate Actions

The Hazard Mitigation Committee will present the Hazard Mitigation Plan Update to the Planning Board in **SUMMER 2016** or after FEMA approval for consideration and adoption into the Master Plan after a duly noticed public hearing, just as any typical Chapter of a Master Plan. The Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to ensure that the Hazard Mitigation Plan Update Actions are incorporated into the Master Plan.

Progress in Implementation through this Program Since the Last Hazard Mitigation Plan

The existing **2003** Master Plan developed by the Planning Board does not contain the **HAZARD MITIGATION PLAN UPDATE 2010** as an Appendix.

- *How Was This Accomplished?*
  The **2003** Master Plan has yet not been fully revised, but Chapter revisions are occurring as of **SUMMER 2015**. The Planning Board was given a copy of the **HAZARD MITIGATION PLAN UPDATE 2015** and can choose to incorporate several Action items that pertain to the Planning Board or incorporate the entire Haz Mit plan by reference. Several Actions included revisions to Board regulations and to Capital Improvements, or Zoning Amendments. The Floodplain Ordinance under the purview of the Planning Board has been updated since 2009. The Emergency Management Director will recommend that the Board incorporate the Planning Board Actions as appropriate into the Future Land Use and Implementation Chapters, and include the **HAZARD MITIGATION PLAN UPDATE 2015** into the Master Plan Appendix whenever the Planning Board updates the Master Plan.

Capital Improvements Program

Allenstown developed its newest Capital Improvements Program (CIP) for **2013-2018**, with the intention of an annual update. Strategies or purchases requiring capital improvements from the Hazard Mitigation Plan Update will be inserted into the Capital Improvements Program. Depending on the Town's funding needs, a Capital Reserve Fund for Hazard Mitigation Program Projects may be established to set aside funding for the many projects identified in the Hazard Mitigation Plan Update.

Process to Incorporate Actions

The Hazard Mitigation Committee will oversee the process to begin working with the Planning Board's CIP Committee to incorporate the various Hazard Mitigation Plan projects into the yearly CIP. As the CIP is updated on a yearly basis, a representative from the Hazard Mitigation Committee could request to sit on the CIP Committee to ensure the projects are added.

Progress in Implementation through this Program Since the Last Hazard Mitigation Plan

Many of the **COMPLETED** Actions were able to be completed because of their placement into and purchase out of the Capital Improvements Program. See **Table 33. Mitigation Actions Completed Since 2010.**

- *How Was This Accomplished?*
  Based on guidance from the Department heads which served on the Hazard Mitigation Committee, the Planning Board worked together with the Departments and Boards to identify the items needed for the Hazard Mitigation Plan Action implementation. The appropriate Actions identified were then added to the CIP.

Zoning Ordinance and Regulations

Several of the implementation strategies proposed involve revisions to the Zoning Ordinance, Subdivision Regulations, and/or the Site Plan Review Regulations. The Town staff and Planning Board annually draft Zoning Ordinance amendments for Town Meeting approval, and will be requested to do so in order to accommodate Actions. The Regulations are updated by the Board as needed.

Process to Incorporate Actions

A Hazard Mitigation Committee representative will work with Town staff and the Planning Board to develop appropriate language for modifications to the Zoning Ordinance and the Subdivision and Site Plan Regulations, as appropriate, to accommodate Actions in the **ALLENSTOWN-SUNCOOK RIVER HAZARD MITIGATION PLAN UPDATE 2015**. The representative, if requested, can help Town staff draft language for respective changes to the Regulations or the Zoning Ordinance, and assist Town staff with presenting the language to the Planning Board for consideration.

The Hazard Mitigation Committee representative will request from the Planning Board a copy of the required language for any FEMA Zoning Ordinance Updates for incorporation into the Plan.

Progress in Implementation through this Program Since the Last Hazard Mitigation Plan
Although not listed in **Table 33. Mitigation Actions Completed Since 2010**, the Town adopted NFIP updates to the Zoning Ordinance.

- *How Was This Accomplished?*
  The Planning Board directly obtains the required NFIP floodplain ordinance revision information from the NH Office of Energy and Planning, brings it to the Board of Selectmen for development of a warrant article, and the Town Meeting votes on the proposed floodplain ordinance revisions for the Zoning Ordinance.

Town Meeting
In Allenstown, the annual Town Meeting is held in March where the voters of the Town vote to raise money for capital projects and approve the annual operating budget of the Town. This is an opportunity to get some of the Actions of the Hazard Mitigation Plan Update funded.

Process to Incorporate Actions
The Hazard Mitigation Committee will oversee the process to begin working with the Budget Committee and Board of Selectmen to develop warrant article language for appropriate Actions. A representative from the Hazard Mitigation Committee will provide a copy of the ACTION PLAN to both the Budget Committee and Board of Selectmen and validate the need for funding at the annual Town Meeting to accomplish the projects. The representative will work with the Town Administrator to write warrant article language for approval Action items.

Progress in Implementation through this Program Since the Last Hazard Mitigation Plan
Town Voting Sessions were used to accomplish many of the Action purchases displayed in **Table 33. Mitigation Actions Completed Since 2010** through separate warrant articles, warrant articles to remove funds from the Capital Improvements Program, or through adoption of Department Operating Budgets and the General Fund.

- *How Was This Accomplished?*
  The Emergency Management Director, a member of the Hazard Mitigation Committee, brings Action items to be purchased to the Board of Selectmen and Budget Committee for consideration. The CIP contains many of the Actions, as discussed previously. The Board of Selectmen and Budget Committee bring Actions to the Town Meeting via warrant articles, as well as the Operating Budgets, additional warrant articles which may include Action items in the CIP, and warrant articles to add funding into the capital reserve funds. Most of the Action items are funded in this manner.

Operating Budgets

Many of the Actions will not require specific funding but are identified as needing in-kind Staff labor to perform the work required to undertake the Actions. Town Departments and Staff have rigorous job functions that demand their undivided attention to the tasks required to run their respective Departments. Additions to the work load to accommodate the Actions can put a strain on their ability to serve the public during performance of their normal job duties. When possible, Allenstown Departments and Staff will be able to prioritize their tasks to work on **HAZARD MITIGATION PLAN UPDATE 2015** Actions. Any work performed comes out of the operating budget for that particular Department.

Process to Incorporate Actions

The responsible Department Head or Staff position identified in the **Who is Responsible** column of the preceding Tables will work on the Actions allocated to him/her, or delegate the Action to another person, when their normal job duties permit. The funding for the Actions comes out of the Department's operating budget as work is undertaken by the Staff person on an as-time-permits basis unless the Action is a component of the Staffs' normal work duties.

The individual will attempt to follow the **Completed by Date** as a guideline for completion. A yearly review of CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS by the Hazard Mitigation Committee will reprioritize the Actions, and the members can report on their progress, asking for assistance or more time as needed.

Progress in Implementation through this Program Since the Last Hazard Mitigation Plan

The Operating Budgets of the Town Departments have served to implement many of the Actions displayed in **Table 24. Mitigation Actions Completed Since 2010.**

- *How Was This Accomplished?*
  Department heads who participated in the Hazard Mitigation Committee submitted their Action items to Board of Selectmen and Budget Committee for consideration. Individual Department needs are recognized as part of their respective Operating Budgets and are proposed to the Board of Selectmen and Budget Committee. All Operating Budgets go to Town Meeting for residents' affirmative vote.

EVALUATION AND IMPLEMENTATION OF THE PLAN

During the Committee's annual review of CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS' ACTION PLAN, the Actions are evaluated as to whether they have been **COMPLETED**, **DELETED**, or **DEFERRED.** Those Action types are placed into their respective CHAPTER 11 Tables, **Table 33 Mitigation Actions Completed Since 2010**, **Table 33A Mitigation Actions Deleted from the 2014 Plan**, and the ACTION PLAN **Tables 59A** through **59E** if they are **DEFERRED**. Any **NEW** Actions will be added into **Tables 59A** through **59E** as necessary. Each of the Actions remaining within the ACTION PLAN will undergo the STAPLEE ranking as discussed in CHAPTER 10's INTRODUCTION and will be displayed in the ACTION EVALUATION AND PRIORITY RANKING SCORING (STAPLEE) matrix in CHAPTER 13. APPENDIX.

Annual Plan Evaluation and Implementation Worksheets to assist the community with Plan implementation are included within the APPENDIX DOCUMENTS.

The five-year full Plan update will evaluate the Actions in the same manner in addition to fulfilling all of the **Tasks of the Plan Update** within this **CHAPTER 12**.

CONTINUED PUBLIC INVOLVEMENT

On behalf of the Hazard Mitigation Committee, the Emergency Management Director, under direction of the Town Administrator, will be responsible for ensuring that Town Departments and the public have adequate opportunity to participate in the planning process. Administrative staff may be utilized to assist with the public involvement process.

For each meeting in **Table 60** for the yearly and five-year update process, procedures that will be utilized for public involvement include:

- Provide personal invitations to Town volunteer Board and Committee Chairs, and Budget Committee members;
- Provide personal invitations to Town Department heads;
- Provide personal invitations to the following entities below;
- Post public meeting notice flyers on the Town's website at www.allenstownnh.gov and in the Town Hall, Police Station, Fire Station, Bi-Wise Market, and Allenstown Elementary School
- Submit media releases to the Union Leader newspaper (a state-wide newspaper) and the Hooksett Banner newspaper (a regional paper serving nine communities including Concord and Manchester).

Entities to invite to future Hazard Mitigation plan updates include the Allenstown Sewer Department; the Allenstown School District; Bear Brook State Park; citizen representatives; Emergency Management Directors of the neighboring communities of Epsom, Deerfield, Hooksett, Bow, and Pembroke; and local businesses and organizations of Someday's Floral, Pizza Market, Pento's Automotive, Ed's Automotive, PACE Career Academy and St. John Catholic Church; and the NH Homeland Security and Emergency Management.

The Hazard Mitigation Committee will ensure that the Town website's Emergency Management webpage at www.allenstownnh.gov is updated with the Hazard Mitigation meeting notices. A number of Action Plan items which will be undertaken relate to public education and involvement. The website could be a good way to get the word out.

The public will be invited to participate in the yearly process of updating the Hazard Mitigation Plan using poster flyers, press releases, and local cable television channels. The Fire Department and Police Department anticipate holding drills which show people where to go and how to conduct themselves in the event of a disaster. The colorful public meeting notice flyers will be physically posted in the Town Hall, Police Station, Fire Station, Bi-Wise Market, and Allenstown Elementary School.

These outreach activities will be undertaken during the Plan's annual review and for Hazard Mitigation Committee meetings the Emergency Management Director calls to order.

CHAPTER 13.
APPENDIX

2015 PLAN UPDATE

The 2010 Plan did no t contain most of this information, nor did it have an Appendix. Contact information was provided for disaster relief and grant programs. Information on the FEMA Hazard Mitigation, National Incident Management System (NIMS) programs, and new Hazard Mitigation Assistance grant program was provided. The Action Matrix was updated with current prioritization information which was incorporated into **CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS**, and the hazard vulnerability matrices were updated as displayed in **CHAPTER 2. HAZARD IDENTIFICATION AND RISK ASSESSMENT**.

INTRODUCTION

The Appendix contains supplemental information to this Hazard Mitigation Plan Update. The intent of this Plan is to provide information about potential disasters, assets at risk, and a means of implementing the actions to help minimize loss to life and property. In addition, the process by which grant and relief money can be obtained and what programs are available to assist the Town and its residents are equally important. When the annual **HAZARD MITIGATION PLAN UPDATE** process is repeated for **2017** and the interim years provide minimal updates for **CHAPTER 11** and other necessary chapters, materials used for publicity and meetings are exhibited to lay out the process for future Hazard Mitigation Committees.

PROCESS FOR DISASTER DECLARATION IN ALLENSTOWN

There are two phases to a disaster – first response and recovery. The recovery phase, or clean-up efforts, is where the majority of grant funds could be applied for. Having an approved Hazard Mitigation Plan Update in place before a disaster occurs, according to the US Disaster Mitigation Act of 2000 and its amendments, is required after November 2004 in order to be eligible to apply for these recovery funds. These grant programs are briefly explained later in this chapter under the **HAZARD MITIGATION ASSISTANCE GRANT PROGRAMS** section. Much of the information following is taken directly from the FEMA website.

FEMA Information

The Federal Emergency Management Agency (FEMA) has extensive resources related to disaster prevention and disaster recovery on its website at www.fema.gov. The following is an excerpt from their on-line library:

The first response to a disaster is the job of local government's emergency services with help from nearby municipalities, the state and volunteer agencies. In a catastrophic disaster, and if the governor requests, federal resources can be mobilized through the Federal Emergency

Management Agency (FEMA) for search and rescue, electrical power, food, water, shelter and other basic human needs.

It is the long-term recovery phase of disaster that places the most severe financial strain on a local or state government. Damage to public facilities and infrastructure, often not insured, can overwhelm even a large city.

A governor's request for a major disaster declaration could mean an infusion of federal funds, but the governor must also commit significant state funds and resources for recovery efforts. A Major Disaster could result from a hurricane, earthquake, flood, tornado or major fire which the President determines warrants supplemental federal aid. The event must be clearly more than state or local governments can handle alone. If declared, funding comes from the President's Disaster Relief Fund, which is managed by FEMA, and disaster aid programs of other participating federal agencies.

A Presidential Major Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, and designed to help disaster victims, businesses and public entities.

An Emergency Declaration is more limited in scope and without the long-term federal recovery programs of a Major Disaster Declaration. Generally, federal assistance and funding are provided to meet a specific emergency need or to help prevent a major disaster from occurring.

The Major Disaster Process

A Major Disaster Declaration usually follows these steps:

- The Local government responds, supplemented by neighboring communities and volunteer agencies. If overwhelmed, turn to the state for assistance;
- The State responds with state resources, such as the National Guard and state agencies;
- Damage assessment by local, state, federal, and volunteer organizations determines losses and recovery needs;
- A Major Disaster Declaration is requested by the governor, based on the damage assessment, and an agreement to commit state funds and resources to the long-term recovery;
- FEMA evaluates the request and recommends action to the White House based on the disaster, the local community and the state's ability to recover;
- The President approves the request or FEMA informs the governor it has been denied. This decision process could take a few hours or several weeks depending on the nature of the disaster.

Emergency Declaration

An **Emergency Declaration** can be declared for any occasion or instance when the President determines federal assistance is needed. Emergency Declarations supplement State and local efforts in providing emergency services, such as the protection of lives, property, public health, and safety, or to lessen or avert the threat of a catastrophe in any part of the United States. The total amount of assistance provided for a single emergency may not exceed $5 million. If this amount is exceeded, the President shall report to Congress.

Disaster Aid Programs

There are two major categories of disaster aid: Individual Assistance is for damage to residences and businesses or personal property losses, and Public Assistance is for repair of infrastructure, public facilities and debris removal.

Individual Assistance

Disaster assistance is money or direct assistance to individuals, families and businesses in an area whose property has been damaged or destroyed and whose losses are not covered by insurance. It is meant to help people with critical expenses that cannot be covered in other ways. This assistance is not intended to restore damaged property to its condition before the disaster.

While some housing assistance funds are available through our Individuals and Households Program, most disaster assistance from the Federal government is in the form of loans administered by the Small Business Administration.

Disaster aid to individuals generally falls into the following categories:

- Disaster Housing is available to individuals in several forms. **Temporary Housing** (a place to live for a limited period of time): Money is available to rent a different place to live, or a government provided housing unit when rental properties are not available. **Repair**: Money is available to homeowners to repair damage from the disaster to their primary residence that is not covered by insurance. The goal is to make the damaged home safe, sanitary, and functional. **Replacement**: Money is available to homeowners to replace their home destroyed in the disaster that is not covered by insurance. The goal is to help the homeowner with the cost of replacing their destroyed home. **Permanent Housing Construction**: Direct assistance or money for the construction of a home. This type of help occurs only in insular areas or remote locations specified by FEMA, where no other type of housing assistance is possible.

- Other than Housing Needs, money is available for necessary expenses and serious needs caused by the disaster. This includes: disaster-related medical and dental costs, disaster-related funeral and burial cost, clothing; household items (room furnishings, appliances); tools (specialized or protective clothing and equipment) required for your job; necessary educational materials (computers, school books, supplies), fuels for primary heat source (heating oil, gas), clean-up items (wet/dry vacuum, dehumidifier), disaster damaged vehicle, moving and storage expenses related to the disaster (moving and storing property to avoid additional disaster damage while disaster-related repairs are being made to the home), and other necessary expenses or serious needs as determined by FEMA.

- Other Disaster Aid Programs include crisis counseling, disaster-related unemployment assistance, legal aid, and special tax considerations.

- Low-Interest Disaster Loans are available after a disaster for homeowners and renters from the US Small Business Administration (SBA) to cover uninsured property losses. Loans may be for repair or replacement of homes, automobiles, clothing or other damaged personal property. Loans are also available to businesses for property loss and economic injury.

Visit www.disasterassistance.gov for more information.

Public Assistance

The objective of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President.

Through the PA Program, FEMA provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The PA Program also encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process.

The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration. The grantee (usually the State) determines how the non-Federal share (up to 25%) is split with the subgrantees (eligible applicants).

Visit www.disasterassistance.gov for more information.

HAZARD MITIGATION

Hazard Mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects. Mitigation focuses on breaking the cycle of disaster damage, reconstruction, and repeated damage. Mitigation efforts create safer communities and reduce loss of life and property. Mitigation includes such activities as:

- Complying with or exceeding NFIP floodplain management regulations.
- Enforcing stringent building codes, flood-proofing requirements, seismic design standards and wind-bracing requirements for new construction or repairing existing buildings.
- Adopting zoning ordinances that steer development away from areas subject to flooding, storm surge or coastal erosion, or other hazards.
- Retrofitting public buildings to withstand hurricane-strength winds or ground shaking and for installing sprinkler systems for fire events.
- Acquiring damaged homes or businesses in flood-prone areas, relocating the structures, and returning the property to open space, wetlands or recreational uses.
- Building community shelters and tornado safe rooms to help protect people in their homes, public buildings and schools in hurricane- and tornado-prone areas.
- Replacing malfunctioning culverts and drainage systems to alleviate debris impacted infrastructure conditions and to reduce rural and urban flooding conditions along roadways.
- Installing cisterns in housing or non-residential developments to suppress fires until a constant water source becomes available or installing dry hydrants along fire ponds or rivers sources to provide quick access to a water supply to combat fire hazards.

Mitigation is achieved through risk analysis, which results in information about a community that provides a foundation for mitigation activities that reduce risk. The goal of risk reduction is to reduce the risk to life and property, which includes existing structures and future construction, in the pre and post-disaster environments. Risk reduction is achieved through regulations, local ordinances, land use and building practices, and mitigation projects that reduce or eliminate long-term risk from hazards and their effects.

For more information, visit www.fema.gov/multi-hazard-mitigation-planning, or contact NH Homeland Security and Emergency Management at (800) 852-3792 or visit www.nh.gov/safety/divisions/hsem.

NATIONAL INCIDENT MANAGEMENT SYSTEM (NIMS)

The National Incident Management System (NIMS) provides a systematic, proactive approach to guide departments and agencies at all levels of government, nongovernmental organizations, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment. Most State and local governments follow the NIMS protocol for disaster response.

A basic premise of NIMS is that all incidents begin and end locally. NIMS does not take command away from State and local authorities. NIMS simply provides the framework to enhance the ability of responders, including the private sector and NGOs, to work together more effectively. The Federal Government supports State and local authorities when their resources are overwhelmed or anticipated to be overwhelmed. Federal departments and agencies respect the sovereignty and responsibilities of local, tribal, and State governments while rendering assistance. The intention of the Federal Government in these situations is not to command the response, but rather to support the affected local, tribal, and/or State governments.

Elected and appointed officials are responsible for ensuring the public safety and welfare of the people of that jurisdiction. Specifically, these officials provide strategic guidance and resources during preparedness, response, and recovery efforts. Elected or appointed officials must have a clear understanding of their roles and responsibilities for successful emergency management and response. At times, these roles may require providing direction and guidance to constituents during an incident, but their day-to-day activities do not focus on emergency management and response. Their awareness of NIMS is critical to ensuring cooperative response efforts and minimizing the incident impacts.

Preparedness is essential for effective incident and emergency management and involves engaging in a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action to achieve and maintain readiness to respond to emergencies. As such, the NIMS Preparedness Component serves as a baseline concept that links all the NIMS Components. Preparedness spans jurisdictions, governments, agencies and organizations. Though individuals certainly play a critical role in preparedness and are expected to prepare themselves and their families for all types of potential incidents, they are not directly included in NIMS preparedness. NIMS primarily discusses the preparedness role for governments, organizations geared specifically toward preparedness, elected and appointed officials, nongovernmental organizations, and the private sector.

NIMS works hand in hand with the National Response Framework (NRF). NIMS provides the template for the management of incidents, while the NRF provides the structure and mechanisms for national-level policy for incident management. Free online courses are available for emergency management officials, first responders, Town staff, Board members, and Town officials.

Visit www.training.fema.gov/IS/NIMS.asp to take courses.

HAZARD MITIGATION ASSISTANCE GRANT PROGRAMS

Through the NH Homeland Security and Emergency Management (NHHSEM), the Federal Emergency Management Agency provides funds for assistance to municipalities in the event of a disaster through the **Hazard Mitigation Assistance (HMA)** program which includes the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA) funding programs. The programs are described briefly here in addition to a few additional grants. For more details about these funding sources, contact the NHHSEM or visit the FEMA website at http://www.fema.gov/hazard-mitigation-assistance or www.nh.gov/safety/divisions/hsem/HazardMitigation/hmgp.

For more information on the FY2015 grant programs, download the HMA Guidance and Addendum at http://www.fema.gov/media-library/assets/documents/103279 .

Pre-Disaster Mitigation Program (PDM) - 75%/25%

The Pre-Disaster Mitigation (PDM) program (provides technical and financial assistance to States and local governments for cost-effective pre-disaster hazard mitigation activities that complement a comprehensive mitigation program, and reduce injuries, loss of life, and damage and destruction of property. FEMA provides grants to States and Federally recognized Indian tribal governments that, in turn, provide sub-grants to local governments (to include Indian Tribal governments) for mitigation activities such as planning and the implementation of projects identified through the evaluation of natural hazards. For more information, visit FEMA's www.fema.gov/pre-disaster-mitigation-grant-program or NHHSEM's https://apps.nh.gov/blogs/hsem/?page_id=988.

Flood Mitigation Assistance Program (FMA) - 75%/25%

This program requires a 25% match (half in-kind and half local cash) and awards funds for Planning Grants, Technical Assistance Grants, and Project Grants. A Flood Mitigation Plan must be in place before funds can be sought for Technical Assistance or Projects. This program awards funding for Flood Mitigation Plans, structural enhancements, acquisition of buildings or land, and relocation projects. For more information, visit FEMA's www.fema.gov/flood-mitigation-assistance-program.

Repetitive Flood Claims (RFC) - Now within the FMA

The Biggert Waters Flood Insurance Reform Act of 2012 consolidated the RFC program into the Flood Mitigation Assistance (FMA) program. Repetitive Flood Claims provided funding to States and communities to reduce or eliminate the long-term risk of flood damage to structures insured under the NFIP that have had one or more claims for flood damages, and that cannot meet the requirements of the Flood Mitigation Assistance (FMA) program for either cost share or capacity to manage the activities. For more information, visit FEMA's http://www.fema.gov/media-library/assets/documents/106315#.

Severe Repetitive Loss (SRL) – Now within the FMA

The Biggert Waters Flood Insurance Reform Act of 2012 consolidated the RFC program into the Flood Mitigation Assistance (FMA) program. Severe Repetitive Loss (SRL) funds used to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP). Projects included property acquisition and structure demolition and relocation, structure elevation, and minor localized flood reduction projects. For more information, visit FEMA's http://www.fema.gov/media-library/assets/documents/106315#.

Hazard Mitigation Grant Program (HMGP) - 75%/25%

A disaster must be declared to take advantage of this program, which is designed to protect public and private property from future disasters. This program typically awards funding for projects that are structural in nature or for the acquisition of buildings or land. It covers the broadest range of mitigation project activities. The funding award is 75% with a 25% match. For more information, for a listing of criteria, or to request an application to these or any other grant programs, please contact the NH Homeland Security and Emergency Management at (800) 852-3792 or visit FEMA's www.fema.gov/hazard-mitigation-grant-program or NHHSEM's https://apps.nh.gov/blogs/hsem/?page_id=977.

Emergency Management Performance Grant (EMPG) - 50%/50%

Preparedness Grant: The Emergency Management Performance Grant (EMPG) Program assists State and Local Governments and other eligible agencies in preparing for all hazards. The EMPG focuses on Planning, Organization/Administrative, Equipment, Training, Exercises, Mitigation and Maintenance/Sustainment to enhance and sustain all-hazards emergency management capabilities. A 50/50% match is required. For more information, for a listing of criteria, or to request an application to these or any other grant programs, please contact the NH Homeland Security and Emergency Management at (800) 852-3792 or visit FEMA's https://www.fema.gov/emergency-management-performance-grant-program or www.nh.gov/safety/divisions/hsem/grants.

Community Development Block Grant (CDBG) Disaster Recovery Program

A disaster must be declared to take advantage of this program, which awards emergency funds to cover unmet needs in a community. At least one of three national objectives must be met: the funds must have a direct benefit to low and moderate income persons; or must prevent or eliminate slums and blight in neighborhoods; or must eliminate conditions which threaten the public health and welfare. Several grant programs are offered under CDBG. The NH Community Development Finance Authority (CDFA) administers this program. The CDBG website is

https://www.hudexchange.info/programs/cdbg-dr/ or www.nhcdfa.org/block-grants/program.

ACTION EVALUATION AND RANKING SCORES (STAPLEE)

Figure 53 displays the social and ethical relative ease of completion ***Ranking Score*** of each of the Actions as displayed in **Tables 59A – 59E** in **CHAPTER 11. EVALUATION AND IMPLEMENTATION OF ACTIONS.** The ranking was completed by the Hazard Mitigation Committee for each STAPLEE criteria by responding accordingly to each (social and ethical) question. The higher the Ranking Score, the more theoretically easy it should be for completion when considering social and ethical constraints:

Does/Is the Action …..3= YES, **2** = PARTIALLY/MAYBE, **1** = NO.

Figure 53

Action Plan Evaluation Ranking Score (for Relative Ease of Completion)

Action #	Does/Is the Action…… Action	Reduce Damage?	Contribute to Town Objectives?	Meet Regulations?	Protect Sensitive Structures?	Implemented Quickly?	Socially Acceptable?	Technically Feasible?	Administratively Realistic?	Politically Acceptable?	Legal?	Have a Reasonable Cost to Benefits?	Environmentally Sound?	Ranking Score
14- 2015	Establish Culvert Replacement Program	3	3	3	1	1	3	3	2	1	3	1	3	27
1- 2010	Apply for Additional Funding to Purchase 10 More Homes in the Floodplain *Suncook River Plan Action*	3	3	3	1	1	3	3	3	3	3	1	3	30
15- 2015	Replace 265 River Road Culvert over Small Brook *Suncook River Plan Action*	3	3	3	1	1	3	3	3	1	3	3	3	30
16- 2015	Replace Mount Delight Bridge Culvert over Pease Brook *Suncook River Plan Action*	3	3	3	1	1	3	3	3	1	3	1	3	28
17- 2015	Replace 168 River Road Culvert *Suncook River Plan Action*	3	3	3	1	1	3	3	3	1	3	3	3	30
2- 2010	Work with NHDES and Epsom to Mitigate Allenstown Flood Hazards on the Suncook River *Suncook River Plan Action*	3	3	3	1	1	3	3	3	1	3	1	3	28
18- 2015	Add New Cisterns in Rural Areas without Water Supply for Fire Protection	3	3	3	1	1	3	3	3	3	3	3	3	32
19- 2015	Plan Strategic Placement of Highway Department Vehicles Prior to Start of Storm Events	3	3	3	1	3	3	3	3	3	3	3	3	34
3- 2010	Continue to Perform Drive-by Tree Examinations and Notification of Utility Companies	3	3	3	1	3	3	3	3	3	3	3	3	34
21- 2015	Include the Suncook River Fluvial Erosion Hazard Assessment Results into the Haz Mit Plan *Suncook River Plan Action*	3	3	3	1	1	3	2	3	3	3	3	3	31
22- 2015	Work with NOAA and USGS to Upgrade Gage to Provide Water Level Predictions	3	1	3	3	3	3	3	3	3	3	3	3	34
23- 2015	Continue Highridge Trail Radio Tower Generator Maintenance	1	3	3	1	3	3	3	3	3	3	3	3	32
4- 2010	Continue to Participate in Capital Area Public Health Network for Public Health Threats	1	3	3	1	3	3	3	3	3	3	3	3	32
24- 2015	Field Test Tablet and PolicePad Software	3	3	3	1	3	3	3	3	3	3	3	3	34
25- 2015	Obtain a 45kw Generator for Highway Department	2	3	1	2	3	3	3	3	3	3	3	3	32
26- 2015	Develop Redundant Notification Procedures to Address Contingencies	3	3	3	1	3	3	3	3	3	3	3	3	34
27- 2015	Continue to Use Documents to Support the Emergency Management Activities of Highway Department	3	3	3	1	3	3	3	3	3	3	3	3	34
28- 2015	Complete Remaining 911 Re-Numbering Projects	1	3	3	2	3	3	3	3	1	3	3	3	31
5- 2010	Continue to Offer Fire Prevention and Public Education Programs	3	3	3	3	3	2	3	3	2	3	3	1	32
30- 2015	Review and Improve Community Outreach Forums and Safety Programs	3	3	3	3	2	2	3	3	3	3	3	3	34

Figure 17, continued

Action Plan Evaluation Ranking Score (for Relative Ease of Completion)

Action #	Does/Is the Action...... Action	Reduce Damage?	Contribute to Town Objectives?	Meet Regulations?	Protect Sensitive Structures?	Implemented Quickly?	Socially Acceptable?	Technically Feasible?	Administratively Realistic?	Politically Acceptable?	Legal?	Have a Reasonable Cost to Benefits?	Environmentally Sound?	Ranking Score
31- 2015	Develop a More Comprehensive DARE Program with the SRO	1	3	1	1	3	3	3	3	3	3	3	3	30
6- 2010	Review and Adopt New Public Information Notification Technologies	3	3	3	3	3	3	3	3	3	3	3	3	36
7- 2010	Participate in National Flood Insurance (NFIP) Training *Suncook River Plan Action*	3	3	3	3	3	3	3	3	3	3	3	3	36
33- 2015	Continue Regional MUA Fire Department Training	3	3	3	3	3	3	3	3	3	3	3	3	36
34- 2015	Continue Fire Department Participation in Regional Exercises	3	3	3	3	3	3	3	3	3	3	3	3	36
35- 2015	Continue to Offer Fire Department Personnel Continuing Education	3	3	3	3	3	3	3	3	3	3	3	3	36
36- 2015	Continue with Fire and Rescue Recruitment with Enhancing Explorer	1	3	1	1	2	2	1	1	2	2	3	1	20
37- 2015	Coordinate Emergency Exercises with NH Public Works Mutual Aid and Pembroke Department of Public Works	2	2	3	3	3	3	3	3	3	3	3	3	34
38- 2015	Finalize CALEA Certification for Police Department	3	3	3	1	1	3	3	2	3	3	3	3	31
39- 2015	Hold Active School Shooter Training Exercises	3	3	3	3	3	3	2	3	3	3	3	3	35
40- 2015	Train More Police Department Personnel for the Central NH Special Operations Unit Team	1	3	3	1	1	3	3	2	3	3	3	3	29
41- 2015	Develop Police Department Field Capability to Respond to Civil Disturbances and Riots	3	3	3	3	1	2	3	2	2	3	2	3	30
42- 2015	Conduct Joint Exercise with NH Information Analysis Center	3	3	3	3	3	3	3	3	3	3	3	3	36
43- 2015	Conduct Exercise to Test Suspicious Package Protocol	3	3	3	3	3	3	3	3	3	3	3	3	36
44- 2015	Conduct Cybercrime Training and Purchase Necessary Equipment	3	3	3	3	3	3	3	3	3	3	3	3	36
45- 2015	Upgrade SUV Incident Command Post Equipment	3	3	3	3	3	3	3	3	3	3	3	3	36
8- 2010	Continue to Participate in Available Regional/ Statewide Terrorism Exercises	3	3	3	3	2	2	3	3	2	3	3	3	33
46- 2015	Complete In-House WWTF Staff Training	3	3	3	3	2	3	3	3	3	3	3	3	35
47- 2015	Continue to Vary Types of Monthly School Drills	3	3	3	3	3	3	3	3	3	3	3	3	36
48- 2015	Practice Annual Evacuation Procedures at Elementary and Middle Schools with Staff	3	3	3	3	3	3	3	3	3	3	3	3	36
9- 2010	Upgrade Radiological Detection Equipment and Conduct Training	2	3	3	3	1	3	3	3	3	3	3	3	33
49- 2015	Ensure All Regional Police Department Mutual Aid Agreements Are Current	3	3	3	3	3	3	3	3	3	3	3	3	36
50- 2015	Require Finance/Admin Section Position Specific ICS Training	1	3	3	1	2	3	3	3	3	3	3	3	31
51- 2015	Conduct Regional Shelter Exercise	3	3	3	3	3	3	3	3	3	3	3	3	36
52- 2015	Conduct Communications Exercise and EOC/IMT Exercise	3	3	3	3	3	3	3	3	3	3	3	3	36
10- 2010	Train Fire Department, Highway and Administrative Staff on Basic ICS and NIMS	3	3	3	3	3	3	3	3	3	3	3	3	36
53- 2015	Continue to Undertake Highway Department Training and Participate in Town Exercises	3	3	3	3	3	3	3	3	3	3	3	3	36
54- 2015	Update the Zoning Ordinance to Comply with NFIP Requirements *Suncook River Plan Action*	3	3	3	3	3	3	3	3	2	3	3	3	35

Figure 17, continued

Action Plan Evaluation and Prioritization

Action #	Does/Is the Action...... Action	Reduce Damage?	Contribute to Town Objectives?	Meet Regulations?	Protect Sensitive Structures?	Implemented Quickly?	Socially Acceptable?	Technically Feasible?	Administratively Realistic?	Politically Acceptable?	Legal?	Have a Reasonable Cost to Benefits?	Environmentally Sound?	Ranking Score
55- 2015	Re-initiate Community Rating System Process and Obtain Certification Suncook River Plan Action	3	3	3	3	1	3	3	3	2	3	3	3	33
11- 2010	Request Bear Brook State Park Management Plan Update from NH DRED and Integrate into EOP	3	3	3	3	3	3	3	3	3	3	3	3	36
56- 2015	Review and Update Fire Department SOGs	3	3	3	3	3	3	3	3	3	3	3	3	36
57- 2015	Develop Plowing Policy	3	3	3	3	3	3	3	3	3	3	3	3	36
58- 2015	Implement Cloud IT Plan and Hardware	3	3	3	3	3	3	3	3	3	3	3	3	36
59- 2015	Improve WWTF Standard Operating Procedures	3	3	3	3	2	3	3	3	3	3	3	3	35
60- 2015	Develop IT Security Procedures to Prevent Cyberterrorism	3	3	3	3	2	2	3	3	3	3	3	3	34
61- 2015	Develop Spill and Chemical Response Plan for WWTP	3	3	3	3	2	3	3	3	3	3	3	3	35
62- 2015	Include Generator Replacement in the Capital Improvements Program	3	3	3	3	1	3	3	3	1	3	3	3	32
63- 2015	Update Emergency Operations Plan 2011 and Add Additional Annexes	3	3	3	3	2	3	3	3	2	3	3	3	34
64- 2015	Revise Disaster Recovery Plan to Include Meeting FEMA's NDRF Format	3	3	3	3	2	3	3	3	2	3	3	3	34
65- 2015	Rewrite the Recovery Plan to Include a Debris Management Section to Allocate Pre-Designated Landfill Locations	3	3	3	3	3	3	3	1	2	3	3	3	33
66- 2015	Update the 2003 Master Plan with Current Data	3	3	3	3	3	3	3	3	3	3	3	3	36
67- 2015	Update the 2012 CIP Annually to Add Hazard Mitigation Purchases	3	3	3	3	1	3	3	3	1	3	3	3	32
68- 2015	Update the Allenstown School District Emergency Management Plan	3	3	3	3	3	3	3	2	3	3	3	3	35
69- 2015	Update the Allenstown School District 2009 Crisis Management Plan	3	3	3	3	3	3	3	2	3	3	3	3	35
12- 2010	Develop Critical Facilities Emergency Evacuation Plans	3	3	3	3	3	3	3	2	3	3	3	3	35
13- 2010	Update Wetlands Ordinance to Reflect New NH DES Standards	3	3	3	3	2	2	3	3	2	3	3	3	33
70- 2015	Continue to Use Central NH Regional Planning Commission to Update the Hazard Mitigation Plan	3	3	3	3	3	3	3	3	3	3	3	3	36
32- 2015	Provide Landowner Education on Erosion Mitigation (FGA)	3	3	3	3	3	3	3	3	3	3	3	3	36
20- 2015	Engage in Bank Armoring of Town Owned Mass-Failure Properties (FGA)	3	3	2	3	3	3	3	3	3	3	3	3	35
71- 2015	Investigate Regulatory Options of Zoning in Areas of Highest Flooding Sensitivity (FGA)	3	3	3	3	1	2	3	3	1	3	3	3	31
29- 2015	Certify Highway Department Staff to Become Culvert Maintainer (FGA)	3	3	3	3	3	3	3	3	3	3	3	3	36
72- 2015	Include a Drainage Infrastructure Vulnerability Assessment as part of the EPA MS4 Stormwater Management Plan (FGA)	3	3	3	3	3	3	3	3	3	3	3	3	36

Source: CHAPTER 11 ACTION PLAN Tables 59A- 59E

GLOSSARY OF TERMS

The Allenstown Hazard Mitigation Plan Update utilizes numerous terms throughout the document to refer concepts and ideas surrounding hazards of all types. A selection of the more commonly used, or easily confused, terms and acronyms have been defined for the user of this Plan.

100 Year Flood – A flood event which has a one percent (1%) chance of occurring in a given year

Accessory Building – A structure which is detached from the principal building and located on the same lot, which is incidental to the principal building or use such as a shed, barn, garage, etc.

Action - A strategy which fulfills an objective

Central New Hampshire Regional Planning Commission (CNHRPC) - A non-profit voluntary organization of municipalities which is staffed by professional planning and support personnel. CNHRPC has 20 member communities.

Disaster Mitigation Act (DMA) – Enacted in 2000, it requires states and municipalities to have local natural hazard mitigation plans in place in order to be eligible for disaster funding programs

Federal Emergency Management Agency (FEMA) – Agency of the United States Government tasked with disaster mitigation, preparedness, response and recovery planning

Flood – Temporary overflowing of water onto land which is usually devoid of surface water

Flood Insurance Rate Map (FIRM) – The official map on which the Federal Insurance Administration has identified both the areas of special flood hazards and the risk premium zones for a community

Floodplain – The relatively flat area adjacent to a channel of a natural stream or river which either has been or may be covered by flood water

Geographic Information Systems (GIS) – A technology that manages, analyzes and disperses geographic knowledge

Goal – A broad statement of intent

Hazard Mitigation Planning – A collaborative process identifying hazards affecting a community, assessing vulnerability to those hazards, and reaching consensus on how to minimize or eliminate the effects of those hazards.

HAZUS-MH – Software program developed by the Federal Emergency Management Agency to be used for risk assessment and estimation of hazard related damage

Human Hazard – Hazards caused by human circumstances, such as terrorism, hostage situations, civil unrest, mass hysteria, riots, etc.

Information Technology – The use of computers in order to process, store, transmit, etc. information from anywhere at any time

Infrastructure – Facilities and services needed to sustain everyday land-use activities, such as telephone wires, roads, power lines, etc.

Manufactured Homes – Factory-built, single-family structures, commonly referred to as "mobile homes"

Manufactured Housing Parks – An area where space for two or more manufactured homes is rented

Multi-Unit Housing – Structures containing three or more housing units, such as apartment buildings and condos

New Hampshire Homeland Security and Emergency Management (NHHSEM) – Established in order to protect the lives, property and environment of the people of New Hampshire from the threat or occurrence of emergencies resulting from any natural or human-made disaster. A division of the NH Department of Safety (NHDOS).

National Flood Insurance Program (NFIP) – Created in 1968, NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages

Natural Hazard - Hazards caused by the natural environment such as drought, avalanche, hurricane/typhoon/cyclone, tornado, extreme heat/cold, etc.
Objective – Specific explanation of the broad goal

Property – A collection of land, buildings and vehicles of which someone can claim ownership

Richter Magnitude Scale – A base-10 logarithmic scale which assigns a single number to quantify the size of an earthquake

Technological Hazard – Hazards caused by problems with technology such as power/utility failure, radiological accident, dam/levee failure, fuel/resource shortage, hazardous material release, etc.

APPENDIX DOCUMENTS LISTING

When additional information is useful or necessary for the HAZARD MITIGATION PLAN but its incorporation into the Plan itself would prove too onerous to an already full document, a set of APPENDIX DOCUMENTS is provided. These sets of documents may be provided or reproduced individually as needed.

The APPENDIX DOCUMENTS which are intended for regular update either annually or every 5 years as applicable by the ***Hazard Mitigation Committee*** are indicated by a ⍟.

Separate exhibits of the following APPENDIX DOCUMENTS are available and should be archived with this Plan:

- ⇨ **Photographs of Allenstown Disasters or Hazard Events** ⍟
- ⇨ **Chronological Publicity and Meeting Information** ⍟
- ⇨ **Resource Materials for the Hazard Mitigation Plan and the *Suncook River Plan***
- ⇨ **Suncook River Fluvial Geomorphic Features Addendum, 2015**
- ⇨ **Annual Plan Evaluation and Implementation Worksheets** ⍟
- ⇨ **Bank Assessment for Non-point Source Consequences of Sediment (BANCS)'s Worksheets**
- ⇨ **Map of Priority Areas for Invasive Plant Management in Allenstown**
- ⇨ **Approvable Pending Adoption (APA) Notification from FEMA [October 23, 2015]**
- ⇨ **Formal Approval Letter from FEMA [date]**
- ⇨ **FEMA's Final Review Tool Evaluation [date]**
- ⇨ **Set of Four 11x17 Hazard Mitigation Maps** ⍟
- ⇨ **Set of Nine 11x17 Suncook River Fluvial Geomorphic Assessment 2015 Maps**