TOWN OF WASHINGTON,

NEW HAMPSHIRE

HAZARD MITIGATION PLAN

UPDATE 2016

Bear Hill Road, Washington, NH

Prepared by:

Town of Washington Hazard Mitigation Committee and

Upper Valley Lake Sunapee Regional Planning Commission

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I. INTRODUCTION

A. BACKGROUND

The New Hampshire Department of Homeland Security and Emergency Management (NH HSEM) has a goal for all communities within the State of New Hampshire to establish local hazard mitigation plans as a means to reduce future losses from natural or man-made hazard events before they occur. The NH HSEM has provided funding to the Town of Washington, to update their local Hazard Mitigation Plan. UVLSRPC wrote the first Washington Hazard Mitigation Plan that was approved in 2008. The *Washington Hazard Mitigation Plan* serves as a strategic planning tool for use by the Town of Washington in its efforts to reduce future losses from natural and/or man-made hazard events before they occur. This *Plan* does *not* constitute a section of the Master Plan.

The Washington Hazard Mitigation Committee updated the *Washington Hazard Mitigation Plan* with the assistance and professional services of the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC). After a public meeting held in the Washington Town Offices, the Washington Town Selectboard adopted the updated plan on DATE as shown in Appendix F.

B. PURPOSE

The Washington Hazard Mitigation Plan Update 2016is a planning tool for use by the Town of Washington in its efforts to reduce future losses from natural and/or man-made hazards. This plan does not constitute a section of the Town Master Plan, nor is it adopted as part of the Zoning Ordinance.

C. HISTORY

On October 30, 2000, President Clinton signed into law the Disaster Mitigation Act of 2000 (DMA 2000). The ultimate purpose of DMA 2000 is to:

- Establish a national disaster mitigation program that will reduce loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from disasters, and
- Provide a source of pre-disaster mitigation funding that will assist States and local governments in accomplishing that purpose.

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section: 322 – Mitigation Planning. This places new emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition to receiving any hazard mitigation grants. Local governments must review and if necessary, update the mitigation plan annually to continue program eligibility.

Why develop a Mitigation Plan?
Planning ahead to lessen or prevent a disaster will reduce the human, economic, and environmental costs. The State of NH is vulnerable to many types of hazards, including floods, hurricanes, winter storms, wildfires, wind events, and earthquakes. All of these types of events can have significant economic, environmental, and social impacts. The full cost of the damage resulting from the impact of natural hazards – personal suffering, loss of lives, disruption of the economy, and loss of tax base – is difficult to quantify and measure.

D. SCOPE OF THE PLAN

The scope of the *Washington Hazard Mitigation Plan Update 2016*includes the identification of natural hazards affecting the Town, as identified by the Washington Hazard Mitigation Committee. The hazards were reviewed under the following categories as outlined in the State of New Hampshire Multi-Hazard Mitigation Plan Update 2016:

- Dam Failure
- Flooding
- Hurricane
- Tornado & Downburst
- Thunderstorm/Lightning/Hail
- Severe Winter Weather
- Earthquake
- Drought
- Extreme Heat
- Erosion
- Wildfires
- Natural Contaminants
- Hazardous Materials Spill
- Terrorism

E. METHODOLOGY

Using the *Local Mitigation Planning Handbook by FEMA (2013)*, the Washington Hazard Mitigation Committee, in conjunction with the UVLSRPC, developed the content of the *Washington Hazard Mitigation Plan Update 2016*by tailoring the nine-task process set forth in the handbook appropriate for the Town of Washington. Many FEMA resources and multiple State and Federal websites were also used as well. The Committee held a total of two meetings in 2015. The first meeting of the committee was publicly noticed and the date for the second meeting was decided at the first, noticed, meeting. The public notice was posted on the town bulletin board and the town website, inviting all members of the public and interested parties to attend the meeting. No public attended the meeting.

The Washington Town Selectboard adopted the Plan after FEMA conditional approval as shown in Appendix E. Prior to the Town of Washington approving the updated Plan, a public meeting was held to gain additional input from the citizens of Washington and to raise awareness of the ongoing hazard mitigation planning process. No members of the public attended the committee meetings.

The following hazard mitigation meetings were vital to the development of this Plan:

July 1, 2015
August 5, 2015

To complete this updated Plan, the Hazard Mitigation Committee followed the following planning steps to re-evaluate the plan sections of the existing 2010 plan and to update it to reflect current information and issues:

Task 1: Determine the Planning Area and Resource (July 2015)
Washington is a rural town and chose to continue their planning process as a single town. The Town chose to work with the Upper Valley Lake Sunapee Regional Planning Commission to provide technical support.

Task 2: Build the Planning Team (July 2015)
Members of the Committee included all relevant personnel as well as any interested citizens. This included a Planning Board member and Selectboard member to represent municipal organizations with general and land use planning authority.

Task 3: Create an Outreach Strategy (July-October 2015)
The Committee chose to provide public notices to the public to encourage participation at the public meetings. They also put a notice on the town website. Notices were also sent to each of the neighboring towns to invite them to participate in the meetings, send comments, or request a final plan. The final plan will also be available for public review prior to adoption.

Task 4: Review Community Capabilities (July-October 2015)
Committee members identified facilities that were considered to be of value to the Town for emergency management purposes, for provision of utilities and services, and for historic, cultural and social value. A GIS-generated map was prepared to show critical facilities identified by the Washington Hazard Mitigation Committee. A summary listing of "Critical Facilities" is presented in Chapter IV. Costs were determined for losses for each type of hazard. Using information and activities in the handbook, the Committee and UVLSRPC staff identified existing mitigation strategies which are already implemented in the Town related to relevant hazards. A summary chart and the results of this activity are presented in Chapter VI.

Task 5: Conduct a Risk Assessment (July 2015):
The Committee determined natural and human-made hazards affecting the Town and updated a description, location, and extent of those previous and potential hazards. Existing and future assets were updated to determine vulnerability to potential hazard events. Critical facilities needed during an emergency were identified and given values based on tax data. It was also determined if these facilities are in a hazard zone or not. Other facilities identified are those needed to continue the daily operation of the municipality and those that have dense populations or valued historical structures and vulnerable natural areas.

Task 6: Develop a Mitigation Strategy (July-October 2015):
The Committee evaluated the goals in the previous plan and determined they were still appropriate. They then determined actions that they could take to meet those goals to reduce their risk to hazard events. They discussed existing regulations, ordinances, and the Master Plan and how they could continue to incorporate hazard mitigation strategies into these documents to include hazard mitigation in land use planning. Committee members agreed to pursue this integration with appropriate municipal boards.

Task 7: Keep the Plan Current:
The plan will be reviewed after every major event to evaluate the effectiveness of the plan. It will also be updated at least every five years as required.

Task 8: Review and Adopt the Plan:
The Committee will incorporate any feedback from Committee members, municipal officials, residents, businesses and institutions, and neighboring communities. The plan will be assessed by using FEMA's Local Mitigation Plan Review Tool prior to sending to NH Homeland Security and Emergency Management for preliminary review. If HSEM considers the plan to meet the requirements, they will forward the draft plan to FEMA for their review. Once FEMA determines the plan meets requirements, the municipality will hold a public meeting to obtain further comments and review the final draft. If there are no major suggested changes, the municipal government will adopt the plan and the adoption form will be sent to HSEM and then to FEMA to receive a final approval of the plan.

Task 9: Create a Safe and Resilient Community:
The municipality will implement the plan by committing to task accomplishment as indicated in the plan. The municipality will take advantage of available funding opportunities such as FEMA's mitigation grant programs. The process for monitoring and updating the Plan can be found in Chapter IX.

UVLSRPC staff compiled the results of tasks one through nine in a draft document, as well as helpful and informative materials from the *State of New Hampshire Multi-Natural Hazard Mitigation Plan Update 2013*, which served as a resource for the *Washington Hazard Mitigation Plan Update 2015*.

F. HAZARD MITIGATION GOALS

The Washington Hazard Mitigation Committee reviewed the hazard mitigation goals set forth in the previous Hazard Mitigation Plan and revised them as follows:

1. To identify, introduce and implement cost effective Hazard Mitigation measures so as to accomplish the Town's goals and to raise awareness and acceptance of hazard mitigation opportunities generally.

2. To improve upon the protection of the general population, the citizens, and visitors of the Town of Washington from natural and human-made hazards.

3. To reduce the potential impact of natural and human-made disasters to:
   - the Town of Washington's Critical Support Services,
   - Critical Facilities in the Town of Washington,
   - the Town of Washington's infrastructure,
   - private property,
   - the Town's economy,
   - the Town's natural environment, and
   - the Town's specific historic treasures and interests.

4. To improve the Town's Disaster Response and Recovery capability as a hazard mitigation strategy to be prepared for emergencies and reduce their impact.

G. ACKNOWLEDGEMENTS

The following people participated in developing the update of this plan as the Hazard Mitigation Committee:

- Edward Thayer, Town of Washington Emergency Management Director & Director of Public Works Department
- Janice Philbrick, Town of Washington Public Health Office
- Laura-Jean Gilbert, Town of Washington Rescue Squad Member
- John Corrigan, Town of Washington Police Department, Officer
- James Berry, Town of Washington Health Officer
- Brian Mosher, Town of Washington Fire Chief
- Lawrence Gaskell, Town of Washington Department of Public Works
- Bob Hofstetter, Town of Washington Assistant EMD
- Steven Marshall, Town of Washington Police Chief
- Tom Marshall, Town of Washington Selectman and Selectboard Representative to the Washington Planning Board
- Robert Wright, Town of Washington Rescue Squad Member

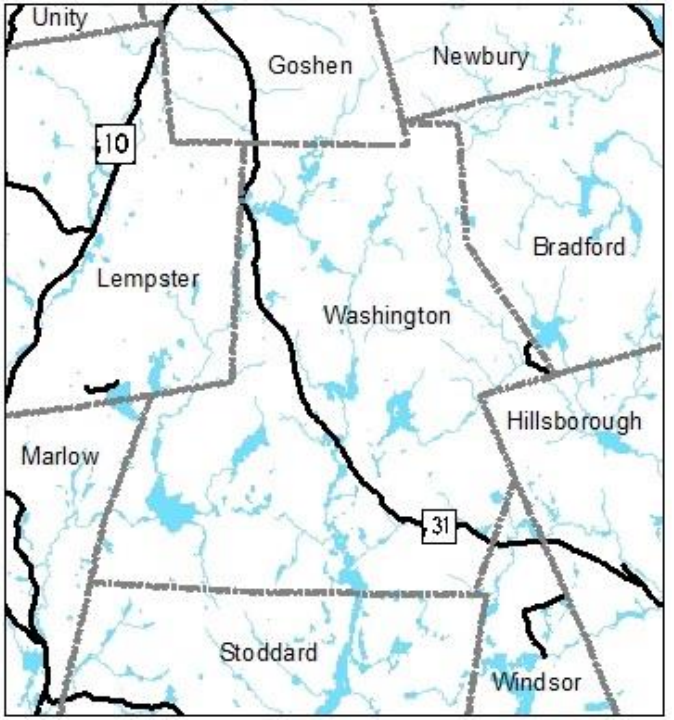
- Craig Beaulac, Field Representative, NH Homeland Security and Emergency Management
- Adam Ricker, Assistant Planner, UVLSRPC

The Hazard Mitigation Committee was composed of local officials, citizens of Washington and a staff representative of the UVLSPRC for meeting facilitation and plan development. Neighboring communities were invited by e-mail to participate. They were provided with the date of first meeting. The general public was invited to attend the final meeting by public posting at the town office, the post office 10 days prior to the meeting, and the Town web site a week prior to the meeting. No citizens attended the meeting. No surveys were requested town-wide due to a lack of broadband in Washington. No neighboring towns inquired about the update process or attended any of the meetings and no comments were submitted to be incorporated into the plan.

Historical information, relevant data and potential future mitigation strategies were contributed by all parties involved in the planning process. For a record of all meeting topics see Appendix C: Meeting Documentation. The staff representative of the UVLSRPC gathered all information from local officials, agency representatives and public input and compiled the information to develop the Plan.

II. COMMUNITY PROFILE

A. INTRODUCTION[1]



Washington, a town of about 53 sq. mi., lies in the southeast corner of Sullivan County some twenty miles west of Concord. Its rugged hills form two watersheds: via the Ashuelot River, the west slopes drain to the Connecticut, while drainage on the east flows to the Merrimack via the north branch of the Contoocook. The largest of Washington's 26 lakes and ponds are Ashuelot Pond (about 430 acres), Island Pond (200), Highland Lake (190 in Washington, the remainder in Stoddard), Millen Pond (150) and Halfmoon Pond (80).

Washington includes two villages: The town center has an elevation of 1507 feet, while East Washington is at 939 feet. The highest summit is Lovell Mountain, at 2496 feet, but several others reach to about 2000 feet. It is a rocky town, with many large boulders, outcrops and areas of ledge underlying stony loam. Maple, beech, birch, red oak, ash, red spruce, hemlock and scattered stands of white pine cover some 90% of the town. The mix of forest, farms, fields, ponds and wetlands is much admired by both residents and visitors.

Wildlife is both indigenous and migratory, but poorly planned development threatens the habitat. In Pillsbury State Park is a small rookery of Great Blue Herons, and other habitats could be protected by better forestry and agricultural management. The forest is one of the town's major assets. It stabilizes the soil, retards runoff, provides habitat, buffers sound and wind, enhances the scenery, and is a wood source for both industry and fuel, but it is gradually disappearing as land ownership becomes more fragmented. Two thirds of the taxable land (about 23,800 acres) is forest, capable of repeated crops of wood. State (8000 acres) and town (500 acres) forests continue to be managed in ways that are compatible with town goals, but smaller tracts are vulnerable to growth pressures.

[1] Town of Washington Master Plan (2006)

The town's largest landowner is the State. Pillsbury State Park, about 5000 acres, is largely in Washington, and the State also owns the 500 acre Max Israel tract about half a mile east of the park. Other public lands include the commons in the two villages, the town garage and transfer station, the roadways, and the 138 acre lakeshore recreation area known as Camp Morgan.

The town has fifteen owners of tracts of more than 200 acres, four of whom are organizations rather than individuals; about 200 owners of 10 – 200-acre tracts; and 100 owners of tracts between 2 and 10 acres. Smaller lots number some 1200, many in lakeside communities planned for summer cottages that are gradually being winterized. Maps have been prepared by the Upper Valley Lake Sunapee Regional Planning Commission showing a variety of natural features. Incorporated in this Master Plan by reference, these maps may be seen in the Town Hall, or on the Town web site (www.washingtonnh.org). One of them addresses soil types that are suitable for agriculture; only 5% of the total town area, these soils are largely in the two villages and the Faxon Hill area.

Only ten to fifteen percent of the town is suitable for industrial or commercial development,. They are defined by their slopes (less than 9%), good drainage, lack of ledge and the fact that they are not subject to flooding. Approximately 30-35%, of the land in town is suitable for houses with basements. This land has a slope of less than 16%, is not in a flood plain and is not poorly drained.

Steeper slopes, up to 50%, cover about a quarter of the town, including much of Lovewell Mountain, the northern corners of the town, Oak Hill and a line running northeast from Ames Hill to the town line.

Washington has more than 75 streams, evenly distributed except for Lovewell Mountain and part of Pillsbury, where streams are fewer. The maps show which of these streams are subject to overflow and land that is typically moist – about 10% of the town.

Another result of the County's analysis of soil types was the finding of eight possible gravel pits, leading to a potential supply of road gravel.

Route 31 runs through the Town of Washington and is the major thoroughfare, connecting to Route 10 to the north in Goshen and to Route 9 to the south in Hillsborough. In addition, Lempster Mountain Road and East Washington Road connect Washington to surrounding towns.

A three-member Board of Selectmen governs the Town of Washington. There is a volunteer Fire Department, full-time Police Department, volunteer Rescue Squad, paid Health Officer and a full-time Road Agent and Department. The Planning Board has elected members and the Conservation Commission is appointed by the Select Board. The Concord Hospital in Concord is the most used hospital from Washington and is about 34 miles from Washington. There are no central water or sewage collection systems; the residents rely on individual wells and septic systems.

B. DEVELOPMENT TRENDS

Development in Washington is primarily residential, split between year round and seasonal use. The 2000 Census data show that 53% of the homes are seasonal. The majority of those are clustered on relatively small lots around five of the town's twenty-some ponds - Ashuelot Pond, Island Pond, Highland Lake, Millen Pond and Halfmoon Pond.

Lake Ashuelot Estates (LAE), on the eastern shore of Ashuelot Pond, was developed in the late 1960s, prior to any land use regulations in Washington. With an original total of 482 lots, this is by far the largest single development in town. It is serviced by eleven miles of private roads, which are maintained by the homeowners' association. As the year round population in this area increases, there is pressure to have the town take over the roads. LAE is accessible via a paved town road and a dirt road with their junction at the entrance to the development.

The average lot size in Lake Ashuelot Estates is approximately one acre. To date, 153 lots have been built on. The main section of development, which abuts the pond, consists of lots averaging about 3/4 of an acre and is 80% built out. Another section that is further away from the pond for the most part can not be developed due to high incidence of ledge. The northern section, along the east bank of the Ashuelot River, has many open lots which range from one to two acres. While the lots within this development are generally undersized, most of the homes are substantial – not just small summer "camps." Many people have built homes to be used as summer residences for a time, with the intention of eventually using them as their retirement homes. Lately there has been a trend toward construction of year round homes on available lots. Obviously, as the population continues to age, there is potential for this trend to continue. The town has taken ownership of a number of lots for non-payment of back taxes, in some cases because the owner couldn't build due to unsuitability for sewage disposal purposes. In recent years, the town has sold most of these non buildable lots to abutters who have merged them to their properties, making them unavailable as potential building lots.

Island Pond was also developed in the late 1960s and consists of water front lots of less than one acre and off shore lots of three acres or more. Many of the homes are substantial but for the most part are for seasonal use. There are currently about 150 lots on the east side of the pond, but there is potential for future subdivision on the west side, greatly increasing the size of the overall developed area around the pond.

The west side of Highland Lake was subdivided into some 50 lots in the 1930s, and consists mostly of summer camps which are winterized, although a few houses built there during the last twenty years are substantial, year round homes. There are many trailers in the area, which due to recent changes in State Law and the Land Use Ordinance must each have its own septic disposal system. This is a heavily populated area in the summer and the town was forced in the early 1990s to take over the main access road, Valley Road,

which was formerly private, due in part to the number of properties that it serves Highland Haven, a development on the east side of Highland Lake contains some 75 lots, most of them not built on. There are about 10 lots on the shore of the lake which are small (1/2 acre or less) the remainder being two acres or more. Just south of this there is another 10-lot subdivision, approved in the early 1990s, while further south along the lake there is Highland Forest, a subdivision of some 40 ten-acre lots, which is actually close to if not south of the Washington/Stoddard town line. Most of these lots are not yet built on.

Millen Pond has many homes around it, many dating from early in the last century, some seasonal and some year round, on a total of 55 lots. Camp Morgan, a town-owned recreational facility, occupies a good deal of the northeastern shore of the pond. There are few remaining developable lots around the pond.

Halfmoon Pond has a few older summer cottages along the south eastern shore, but there is potential for a future sizable development along the western shore. A subdivision around Freezeland Pond was approved in 1990, consisting of 26 lots, ranging in size from 5 to 20 acres, but none has been built on. South of this, around Smith Pond, a subdivision of 10 to 15 lots has been created, with only about one half of the lots being developed to date with substantial homes on them and only a few occupied year round.

There are three major subdivisions in town which are not located on or near a body of water: Washington Heights, Martin Road and Sandy Knolls Road. These subdivisions all have larger lots (5 to 10 acres) and are geared toward year round residences. Washington Heights has 28 lots off Lempster Mountain Road, with an additional eight lots on Route 31. About one half of the lots in this subdivision have been built on, including a few seasonal homes. The Martin Road subdivision is on the western side of Lovell Mountain; there are a few houses, occupied year round, and also a couple of summer camps. The potential is there for this subdivision to be improved and fully occupied by year round residents. Sandy Knolls Road, off Mountain Road in East Washington, consists of 18 lots, 5 of which have year round homes; the remainder is as yet undeveloped. The status of these three developments has not substantially changed in the last ten years. A new subdivision was recently approved between Mill Street and East Washington Road consisting of 13 lots of approximately five acres.

There is still a lot of potential for future subdivisions in Washington, totaling perhaps as much as 1000 seasonal or year round homes, which eventually could more than double the town's present population. However, because of the minimum requirements of the present Land Use Ordinance and septic disposal designs it would appear that there can no longer be a summer cottage type development. The earliest projects in town were designed for purely summer use and did not have regulations to control them. There are no public water or sewer services in Washington, with all lots depending on individual wells and septic systems, and it is conceivable that a higher density of homes could lead to future groundwater pollution problems. A recent rise in the number of building permit applications, should the trend continue, could be cause for concern that the next ten or twenty years could bring on problems influencing the safety and quality of life in sections of Washington. On the other hand, with so many empty lots in

subdivisions already approved, it is unlikely that additional major subdivisions would be easily marketable, unless they had some amenity not found in existing developments. With so few available water front lots there may, however, be a certain amount of pressure on land near other as yet undeveloped ponds.

Commercial or industrial land use is presently limited to the general store, the post office and a few small businesses scattered throughout the town. There are no industrial businesses in town. As a whole, the development patterns, and expected development, of Washington are not perceived to have increased the vulnerability of Washington to the hazards identified in this plan. The committee believes the vulnerabilities in the future will stay consistent and that new development will not cause any further risk to the town.

Table II-1: AREA POPULATION TRENDS

Area	1980	1990	2000	2010
Washington	**411**	**629**	**907**	**1,123**
Goshen	549	718	744	810
Lempster	637	948	976	1154
Acworth	590	776	836	891
Marlow	542	650	727	742
Unity	1,092	1,341	1,530	1,671
Sullivan County	36,063	38,592	40,458	42,093
New Hampshire	920,475	1,109,252	1,235,786	1,315,000

Source: US Census

Table II-2: POPULATION GROWTH IN WASHINGTON

	1980	1990	2000	2010
Population	**411**	**629**	**907**	**1,123**
Decade Change in Population		53%	44%	24%

Source: 1980 – 2010 US Censuses

Table II-3: POPULATION PROJECTIONS FOR WASHINGTON

Area	2015	2020	2025	2030	2035	2040
Washington	**1,227**	**1,309**	**1,342**	**1,376**	**1,401**	**1,417**
Change in Population	6.3%	6.7%	2.5%	2.5%	1.8%	1.1%

Source: State of New Hampshire, Regional Planning Commissions, Office of Energy and Planning - County Population Projections, 2013

Year	Building Permits		Subdivisions	
	Residential	Commercial	Number of Subdivisions	Number of Lots
2010	11	0	0	0
2011	11	0	0	0
2012	9	0	0	0
2013	10	0	0	0
2014	7	0	0	0
2015	4	0	0	0

III. HAZARD IDENTIFICATION

The Washington Hazard Mitigation Committee reviewed the list of hazards provided in the *State of New Hampshire Multi-Hazard Mitigation Plan Update 2013*, and some hazard history for the State of New Hampshire and Sullivan County in particular. A list of past hazard events in Washington, Sullivan County, and the State of New Hampshire can be found in the following discussion and tables. After reviewing this information and the Emergency Operations Plan, the Committee conducted a Risk Assessment. The resulting risk designations are provided in the heading of each hazard table below as well as a more detailed discussion further into this chapter.

A. WHAT ARE THE HAZARDS IN WASHINGTON?

Washington is prone to a variety of natural and human-made hazards. The hazards that Washington is most vulnerable to were determined through gathering historical knowledge of long-time residents and town officials; research into the CRREL Ice Jam Database, FEMA and NOAA documented disasters, and local land use restrictions; and from the input of representatives from state agencies (NH HSEM). The hazards potentially affecting the Town of Washington are listed below. Each of these hazards and the past occurrences of these hazards are described in the following sections. Hazards that were eliminated from assessment are those that have not had a direct impact on the Town of Washington and are not anticipated to have an impact as determined by the Hazard Mitigation Planning Committee, representatives from state agencies and citizens of the Town of Washington. Eliminated hazards include Land Subsidence, Expansive Soils, Landslides, and Snow Avalanches.

B. DESCRIPTIONS OF HAZARDS

An assessment of each hazard relevant to Washington is provided below. An inventory of previous and potential hazards is provided. Past events are shown in the following tables and the potential for future events is then discussed. The "risk" designation for each hazard was determined after evaluations discussed later in this chapter.

- Dam Failure
- Flooding
- Hurricane
- Tornado & Downburst
- Thunderstorm/Lightning/Hail
- Severe Winter Weather
- Earthquake
- Landslide
- Drought
- Extreme Heat
- Erosion
- Wildfire
- Natural Contaminants
- Hazardous Materials Spill
- Terrorism

Dam Failure

Dam failure results in rapid loss of water that is normally held by the dam. These kinds of floods pose a significant threat to both life and property. Appendix D shows the location of active dams in Washington.

NH DES assigns a hazard designation to each dam in the state depending upon the potential damage it would cause if the dam failed:

- A "high hazard potential" is indicated if the dam is in a location and of a size that failure or mis-operation of the dam would result in the following: major economic loss to structures or property; structural damage to roads; major environmental; or public health losses; and probable loss of human life.

- A "significant hazard potential" would mean the dam is in a location and of a size that failure or mis-operation of the dam would result in any of the following: major economic loss to structures or property; structural damage to roads; major environmental or public health losses.

- A "low" hazard dam failure could cause some structural damage to buildings and roads.

- A "non-menace" dam failure would not cause any significant damage.

"High" and Significant" hazard potential dam owners must provide NH DES with maps of the potential inundation area if the dam were to fail. It should be noted that there are some exemptions from this requirement such as lagoons.

Past Dam Failure Events

There have been no dam failures within the Town of Washington or outside the town that would have affected the town. The beaver dam on the Chidester property on Faxon Hill Road breached and washed out the road in 2011 and caused a temporary road closure and required resetting headwalls and guardrails.

Table III-1 – DAMS

DAMS									
Dam #	**Class**	**Dam Name**	**Water Body**	**Owner** (Now or Formerly)	**Status**	**Type**	**Impoundment Area in Acres**	**Height of Dam (Ft)**	**Drainage Area in Acres**
245.01	S	MAY POND DAM	ASHUELOT RIVER	DRED	ACTIVE	EARTH	158	14	6.84
245.02		HALFMOON POND DAM	BOG BROOK	MS MIRIUM OKEEFE	RUINS	STONE/ EARTH	130	3	0
245.03	L	ISLAND POND DAM	TR BEARDS BROOK	WASHINGTON LAKE ASSOC	ACTIVE	CONCR ETE	192	12.5	2.76
245.04	S	MILLEN LAKE DAM	TR ASHUELOT RIVER	MILLEN LAKE ASSOC	ACTIVE	EARTH	156	23	1.23
245.05	S	ASHUELOT POND DAM	ASHUELOT RIVER	ASHUELOT POND DAM VILLAGE DISTRICT	ACTIVE	EARTH	360	13	25.3
245.06	NM	ASHUELOT RIVER	ASHUELOT RIVER	MR L HARRY MASON	ACTIVE		9.6	0	0
245.07		HIGHLAND LAKE DIKE	SHEDD BROOK	NH WATER RESOURCES COUNCIL	RUINS	EARTH	711	8	29.7
245.08		MOREY DAM	HALF MOON POND BROOK	MR DAVID E VIBBER	RUINS	TIMBER COMB	0	0	8
245.09	L	ROBINSON POND DAM	ISLAND POND BROOK	MS SANDRA I POOLE	ACTIVE	CONCR ETE	1	10	3.1
245.10		BEARDS BROOK DAM	BEARDS BROOK	MR JOSEPH PEREZ	BREACH ED	STONE/ EARTH	0	8	10.2
245.11	L	EAST WASHINGTON DAM	BEARDS BROOK	NH WATER RESOURCES COUNCIL	ACTIVE	CONCR ETE	3.2	10	10.74
245.12		PINE BROOK DAM	PINE BROOK	ECCARDT FARMS INC	REMOV ED	TIMBER COMB	0	3	0.67
245.13	NM	MILL POND DAM	ASHUELOT RIVER	DRED	ACTIVE	TIMBER COMB	21	6	4.3
245.14		NORTH POND DAM	ASHUELOT RIVER	DRED	RUINS	STONE/ EARTH	53	2.5	0

DAMS									
Dam #	**Class**	**Dam Name**	**Water Body**	**Owner** (Now or Formerly)	**Status**	**Type**	**Impoundment Area in Acres**	**Height of Dam (Ft)**	**Drainage Area in Acres**
245.15	NM	CEMETARY BROOK	CEMETARY BROOK	MR ROBERT BACHUND	ACTIVE	EARTH	1	5	0
245.16	NM	ULRICH DAM	UNNAMED BROOK	MR TIMOTHY MCGRANAHAN	ACTIVE	EARTH	0.25	13	0.09
245.17	NM	RECREATION POND	TR WOODWARD BROOK	MR TIMOTHY MCGRANAHAN	ACTIVE	EARTH	0.5	8	0.89
245.18	NM	CEMETARY BROOK II	CEMETARY BROOK	MS TESSIER	ACTIVE	EARTH	1	9	0
245.19	NM	FARM POND	FOOL BROOK	CRANE FARM INC	ACTIVE	EARTH	0.2	8	0.07
245.20		WILDLIFE POND DAM	SHEDD BROOK	MR THOMAS NEUBACHER	NOT BUILT	EARTH/ STONE	3	3	2.42
245.21	NM	WILDLIFE POND DAM	WOODARD BROOK	MR SUMNER A DOLE JR	ACTIVE	EARTH	1.1	13	0
245.22	NM	WILDLIFE POND	ULRICH SWAMP	MR TIMOTHY MCGRANAHAN	ACTIVE	EARTH	0.84	5	0
245.23		WOODBURY DAM	NATURAL SWALE	MR ALAN CUMMINGS	EXEMPT	EARTH	0.01	2	0
245.24	NM	HOWE REC DAM	NATURAL SWALE	MR JOHN HOWE	ACTIVE	EARTH	1	6	0
245.25	NM	SAUNDERS DAM	ASHUELOT RIVER	MR BRADFORD O SAUNDERS	ACTIVE	EARTH	1.2	6	0.42
245.26	NM	FONDA DAM	UNNAMED STREAM	*MRS ROBERT HAMILL*	ACTIVE	EARTH	0.3	4	0.3
245.27	NM	DETENTION POND	SHEDD BROOK	MR JOSEPH CARRRAFA	ACTIVE	STONE/ EARTH	0.53	9	1.42

Sourc136.19e: Dam information provided by the NH Dam Bureau in 2007; Significant & High Hazard dams must have an emergency action plan.
The State of 136.20New Hampshire classifies dams into the following four categories: Blank- Non-Active; NM – Non-menace; L – Low hazard; S – Significant hazard H – High Hazard 136.21 Type: S=stone; C=concrete; E=earth

Class of potential hazard: NM – non-menace; L-low; S-significant *Source: NH DES*
Material: T-timber; S-stone; E-earth; C-concrete

Potential Future Dam Failure Damage

Although there are 21 dams in Washington (2 not built at time of inventory), there are not any "high" and a single "significant" hazard dams within town. There are three "low hazard potential" dam. All active dams are shown on a map in Appendix D.

Outside the Town of Washington, the May Pond Dam in Washington has a "significant' hazard rating, and if it failed, would affect the Town of Washington.

The committee determined that the Dam Failure risk in Washington to be low.

Flooding

Flooding is the 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 inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination, and can disrupt travel routes on roads and bridges.

Floods in the Washington area are most likely to occur in the spring due to the increase in rainfall, snowmelt and ice flow; however, floods can occur at any time of the year. A sudden winter thaw or a major summer downpour can cause flooding. Floodplains indicate areas potentially affected by flooding. There are several types of flooding.

100-Year Floods The term "100-year flood" does not mean that flooding will occur once every 100 years, but is a statement of probability to describe how one flood compares to others that are likely to occur. What it actually means is that there is a one percent chance of a flood in any given year. These areas were mapped for all towns in New Hampshire by FEMA. Appendix D displays the "Special Flood Hazards Areas."

River Ice Jams Ice forming in riverbeds and against structures presents significant hazardous conditions storm waters encounter these ice formations which may create temporary dams. These dams may create flooding conditions where none previously existed (i.e., as a consequence of elevation in relation to normal floodplains). Additionally, there is the impact of the ice itself on structures such as highway and railroad bridges. Large masses of ice may push on structures laterally and/or may lift structures not designed for such impacts. A search on the Cold Regions Research and Environmental Laboratory (CRREL) did not reveal any historical ice jams.

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

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

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

Bank Erosion and Failure As development increases, changes occur that increase the rate and volume of runoff, and accelerate the natural geologic erosion process. Erosion typically occurs at the outside of river bends and sediment deposits in low velocity areas at the insides of bends. Resistance to erosion is dependent on the riverbank's protective cover, such as vegetation or rock riprap, or its soils and stability. Roads and bridges are also susceptible to erosion.

Past Flooding Events

The Committee identified several flooding events

Table III-2: FLOODING

FLOODING				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Flood / Severe Storm	April 16, 1987	Cheshire, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, & Sullivan Counties	FEMA Disaster Declaration # 789- DR (Presidentially Declared Disaster). Flooding of low-lying areas along river caused by snowmelt and intense rain.	$4,888,889 in damage, no Damage reported in Washington.
Flood	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan Counties, NH	FEMA Disaster Declaration # 876. Flooding caused by a series of storm events with moderate to heavy rains.	$2,297,777 in damage, no Damage reported in Washington
Flood (Ice Jam)	March 26, 1992	Cold River, Acworth	Ice jam (CRREL) which formed near a bend caused road flooding. Ice was removed by State equipment.	No Damage reported in Washington
Flood	October 29, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan Counties, NH	FEMA Disaster Declaration # 1144- DR. Flooding caused by heavy rains.	$2,341,273 in damage, No Damage reported in Washington
Flood	October 7-18, 2005	Cheshire, Grafton, Merrimack, Sullivan, and Hillsborough Counties, NH	FEMA Disaster Declaration # 1610. Severe storms and flooding; major devastation in Alstead	$3,000,000 in damages, No Damage reported in Washington

FLOODING				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Flood	October-November 2005	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan counties	FEMA Disaster Declaration # DR-1144- NH	No Damage reported in Washington
Flood	April 16, 2007	All counties, NH	FEMA Disaster Declaration # 1695. Severe storms and flooding; 2,005 home owners and renters applied for assistance in NH.	$27,000,000 in damages, No Damage reported in Washington
Flood	July 24, 2008	Central and Southern NH; Counties Declared: Belknap, Carroll, Merrimack, Rockingham, and Strafford	FEMA DR 1782	Severe storms, tornado, and flooding, No Damage reported in Washington
Flood	August 14, 2008	Central Northern NH; Counties Declared: Belknap, Carroll, Coos, and Grafton	FEMA Disaster Declaration #1787	$3 million in public assistance; primary damage to roads, No Damage reported in Washington
Flood	March 14-31, 2010	Statewide	FEMA DR-1913; severe storms & flooding; Declared Counties: Hillsborough and Rockingham Counties	75% federal match. No Damage reported in Washington
Flood	May 26-30, 2011	Coos and Grafton Counties	FEMA-4006-DR Federal assistance for Coos and Grafton Counties and hazard mitigation statewide	$1.8 million in public assistance; primary impact to roads and bridges, No Damage reported in Washington
Flood	May 29-31, 2012	Cheshire County	FEMA DR-4065; severe storm and flood event	$3,070,273 in public assist. No Damage reported in Washington
Flood	June 26-July 3, 2013	Grafton, Sullivan and Cheshire Counties	FEMA DR-4139; severe storms, flooding, and landslides	$6,252,800 in public assist., Baily Hill: Beaver Pond, a small set of culverts was compromised during storm event and was replace with a single pipe arch for $64,000 and the road was closed for a single day. Old Marlow Road: 1/3 mile of road washout/erosion causing $3,000 worth of damage. Bailey Hill Road: Additional 500-600 feet of washout

FLOODING				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
				require $10,000 worth of repairs. The town received $49,000 in public assistance.
Flood	July 2014	Washington, NH	Severe thunderstorm and flash flooding	Dole School House Road: culvert at turn around was overtopped, $5,000 in damage. Purlingbeck Road: Bridge over topped and washouts along road at the bridge, $3,000 in damage. Valley Road: Morse Hill Road Culvert at Cemetery Brook was overtopped and needed $2,000 repair. King Street: First culvert on street was overtopped due to storm and beaver dam, resulting in $2,000 in damage. Lovell Road: 300 ft washout causing $1,500 in damage.

Washington does participate in the National Flood Insurance Program. (Source: NH OEP office, 3/20/2013) The initial Flood Insurance Rate Map including Washington was published on 5/23/2006 and the current FIRM publication and FIS date is 5/23/2006. The official entry into the NFIP was on July 28, 2008. There are a total of 12 policies on single-family homes worth $3,365,000 and there as only been a single (non-repetitive loss) claim totaling $750.

Washington's 100-Year Special Flood Areas are located within the A and AE Zone, with no base flood elevations determined. See Appendix D for a map showing all Special Flood Hazard Areas.

Potential Future Flooding Events

Future flooding is likely as noted in the above table based upon local knowledge of past flood events. There are currently an estimated 56 properties located within the FEMA determined 100-year flood areas. The total structural value of these properties is estimated at

$5,951,512. The value was determined by identifying the structures in the floodplain and using the assessed building values. There are a total of nine state and town owned bridges within the floodplain.

According to the State's Mitigation Plan, Sullivan County has a high hazard risk for flooding. The Committee determined flooding is a low/medium risk in Washington.

Table III-3: STRUCTURE VALUES IN 100-YEAR FLOOD AREAS BY TYPE

Flood Zone	Properties	
	#	Value
Zone A and AE	56	$5,951,512

Hurricane

A hurricane is an intense tropical weather system with a well-defined circulation and maximum sustained winds of 74 mph (64 knots) or higher. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may extend outward 400 miles. As a hurricane nears land, it can bring torrential rains, high winds, and storm surges. The torrential rains that the hurricanes can bring can cause significant flooding as a result of the hurricane. A single hurricane can last for more than 2 weeks over open waters and can run a path across the entire length of the eastern seaboard. August and September are peak months during the hurricane season that lasts from June 1 through November 30. Damage resulting from winds of this force can be substantial, especially considering the duration of the event, which may last for many hours (*NH Multi-Hazard Mitigation Plan Update 2013*; FEMA website).

The Saffir-Simpson Hurricane Wind Scale provides categories of sustained winds by miles per hour: 1 – 74-95 mph; 2 – 96-110 mph; 3 – 111-129 mph; 4 – 130 – 156 mph; and 5 – 157 mph or higher. Categories 3 -5 are considered to be major wind events that can cause devastating to catastrophic damage.

Past Hurricane Events

There have been several hurricanes over the years which have impacted New England and New Hampshire. Notably, any damage caused in the region at the time of Tropical Storm Irene was caused by the flooding associated with the torrential rains brought with

the storm systems. During Hurricane Sandy, Washington did not experience the storm damage that many other communities in the area did. A list of hurricanes are below.

Table III-4: HURRICANES & TROPICAL STORMS

HURRICANES AND TROPICAL STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Hurricane	August, 1635	n/a		No Damage reported in Washington
Hurricane	October 18-19, 1778	n/a	Winds 40-75 mph	No Damage reported in Washington
Hurricane	October 9, 1804	n/a		No Damage reported in Washington
Gale	September 23, 1815	n/a	Winds > 50mph	No Damage reported in Washington
Hurricane	September 8, 1869	n/a		No Damage reported in Washington
Hurricane	September 21, 1938	Southern New England	Flooding caused damage to road network and structures. 13 deaths, 494 injured throughout NH. Disruption of electric and telephone services for weeks. 2 Billion feet of marketable lumber blown down. Total storm losses of $12,337,643 (1938 dollars). 186 mph maximum winds.	No Damage reported in Washington
Hurricane (Carol)	August 31, 1954	Southern New England	Category 3, winds 111-130 mph. Extensive tree and crop damage in NH, localized flooding	No Damage reported in Washington
Hurricane (Edna)	September 11, 1954	Southern New England	Category 3 in Massachusetts. This Hurricane moved off shore but still cost 21 lives and $40.5 million in damages throughout New England. Following so close to Carol it made recovery difficult for some areas. Heavy rain in NH	No Damage reported in Washington
Hurricane (Donna)	September 12, 1960	Southern and Central NH	Category 3 (Category 1 in NH). Heavy flooding in some parts of the State.	No Damage reported in Washington

HURRICANES AND TROPICAL STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Tropical Storm (Daisy)	October 7, 1962	Coastal NH	Heavy swell and flooding along the coast	No Damage reported in Washington
Tropical Storm (Doria)	August 28, 1971	New Hampshire	Center passed over NH resulting in heavy rain and damaging winds	No Damage reported in Washington
Hurricane (Belle)	August 10, 1976	Southern New England	Primarily rain with resulting flooding in New Hampshire. Category 1	No Damage reported in Washington
Hurricane (Gloria)	September, 1985	Southern New England	Category 2, winds 96-110 mph. Electric structures damaged; tree damages. This Hurricane fell apart upon striking Long Island with heavy rains, localized flooding, and minor wind damage in NH	No Damage reported in Washington
Hurricane (Bob)	August 19, 1991	Southern New England	Structural and electrical damage in region from fallen trees. 3 persons were killed and $2.5 million in damages were suffered along coastal New Hampshire. Federal Disaster FEMA-917-DR	No Damage reported in Washington
Hurricane (Edouard)	September 1, 1996	Southern New England	Winds in NH up to 38 mph and 1 inch of rain along the coast. Roads and electrical lines damaged	Unknown. No Damage reported in Washington
Tropical Storm (Floyd)	September 16-18, 1999	Southern New England	FEMA DR-1305-NH. Heavy Rains	No Damage reported in Washington
Hurricane (Katrina)	August 29, 2005	East Coast of US and more	FEMA-3258-EM. Heavy rains and flooding devastating SE US	No Damage reported in Washington
Tropical Storm (Tammy)	October 5-13, 2005	East Coast of US	Remnants of Tammy contributed to the October 2005 floods which dropped 20 inches of rain in some places in NH.	No Damage reported in Washington
Tropical Storm (Irene)	August 26 – September 6, 2011	East Coast of US	FEMA-4026-DR for Coos, Carroll, Grafton, Strafford, Belknap, Merrimack and Sullivan Counties; EM-3333 Hillsboro, Rockingham, and Cheshire Counties;	$2 Million primarily for roads and bridges. $146,000 in damage in

HURRICANES AND TROPICAL STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
				Washington. Mill Street culvert carrying Mill Pond Outlet flooded and washed out requiring the culvert and road, a 3 month road closure.
Hurricane (Sandy)	October 26 – November 8, 2012	East Coast of US	FEMA-4095-DR-NH for Belknap, Carroll, Coos, Grafton and Sullivan Counties.	$2.1 million in public assistance statewide, No Damage reported in Washington

Potential Future Hurricane Damage

Hurricane events will affect the entire town. It is impossible to predict into the future what damage will occur in the town. However, the flooding that can be caused by the hurricane will occur in the floodplain and in the flood zone locations that can be seen on the hazards map in Appendix D. According to the State's mitigation plan, Sullivan County has a medium/high risk for hurricanes. The Committee determined the hurricane risk to be medium/high in Washington.

Tornado & Downburst

"A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. These events are spawned by thunderstorms and, occasionally by hurricanes, and may occur singularly or in multiples. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. Most vortices remain suspended in the atmosphere. Should they touch down, they become a force of destruction." (*NH Hazard Multi-Mitigation Plan Update 2013*). The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. Most tornadoes are in the F0 to F2 Class. Building to modern wind standards provides

significant property protection from these hazard events. New Hampshire is located within Zone 2 for Design Wind Speed for Community Shelters, which suggests that buildings should be built to withstand 160 mph winds.

Significantly high winds occur especially during tornadoes, hurricanes, winter storms, and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during severe wind occurrences. A downburst is a severe, localized wind blasting down from a thunderstorm. These "straight line" winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts fall into two categories: 1. Microburst, which covers an area less than 2.5 miles in diameter, and 2. Macroburst, which covers an area at least 2.5 miles in diameter. Most downbursts occur with thunderstorms, but they can be associated with showers too weak to produce thunder.

Past Tornado & Downburst Events

The following table displays tornadoes occurring in Sullivan County between 1950 and 1995 as provided by the "Tornado Project" (www.tornadoproject.com) and the *NH Natural Multi-Hazard Mitigation Plan Update 2013*. In 2013 the town had a downburst on Ashuelot Pond that moved the house off of its foundation. The damage from the storm was localized to the immediate area and there was not any damage to town infrastructure.

Table III-5: TORNADOES IN OR NEAR SULLIVAN COUNTY

TORNADOES & DOWNBURSTS – MEDIUM RISK			
	Date	**Fujita Scale**	**Damages**
Tornado	September 9, 1821	Most intense in NH	Killed 6 people; crossed Lake Sunapee
Tornado	July 14, 1963	F1	No deaths or injuries; costs unknown
Tornado	June 27, 1964	F0	No deaths or injuries; costs unknown
Tornado	August 11, 1966	F2	No deaths or injuries; costs unknown
Tornado	August 25, 1969	F1	No deaths or injuries; costs unknown
Tornado	May 31, 1972	F1	No deaths or injuries; costs unknown (Merrimack County)
Tornado	July 21, 1972	F1	No deaths or injuries; costs unknown
Tornado	May 11, 1973	F2	No deaths or injuries; costs unknown
Tornado	June 11, 1973	F0	No deaths or injuries; costs unknown
Tornado	August 15, 1976	F1	No deaths; 5 injuries; costs unknown (Merrimack County)
Tornado	August 13, 1999	F1	No deaths or injuries; costs unknown
Tornado	July 6, 1999	F2	No deaths or injuries; costs unknown (Merrimack County); in New London two roofs blown off structures; power outages,; downed trees, utility pole, and wires
Tornado	Summer 2006	NA	Began in Barnet, VT and moved to Monroe, NH

TORNADOES & DOWNBURSTS – MEDIUM RISK			
	Date	**Fujita Scale**	**Damages**
Tornado	April 15, 2007	NA	Numerous trees were knocked down in Enfield, NH
Tornado	July 24, 2008	(EF 2)	DR 1799: Numerous trees and utility poles down and tearing down houses near Concord; 1 fatality and 2 injuries

Source: www.tornadoproject.com

Table III-6 ENHANCED FUJITA SCALE

Enhanced Fujita Scale		
Scale	**Wind Strength (MPH)**	**Typical Damage**
EF0	65-85	**Minor damage:** Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
EF1	86-111	**Moderate damage:** Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
EF2	111-135	**Considerable damage:** Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	**Severe damage:** Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown
EF4	166-200	**Extreme damage:** Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
EF5	>200	**Massive damage:** Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds.); trees debarked; incredible phenomena will occur.

Source: http://www.spc.noaa.gov

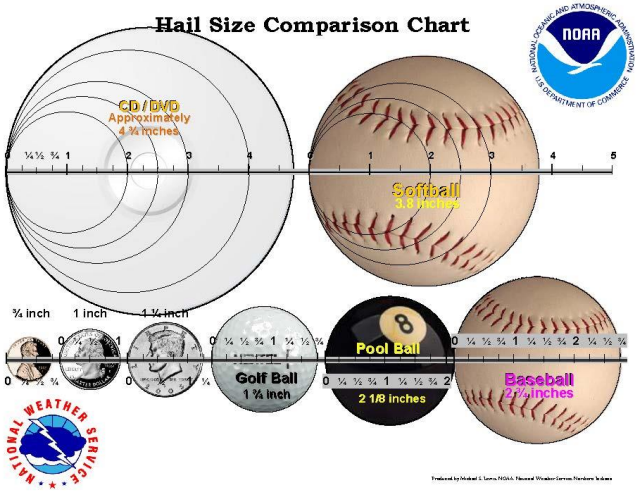
Potential Future Tornado and Downburst Damage

It is impossible to predict where a tornado or downburst will occur or what damage it will inflict. The Washington Committee does not recall tornadoes or downbursts in Washington. Due to the random nature of tornadoes/downbursts, the committee does not feel that one area of town is more vulnerable than another and that the entire town is at an equal risk. The FEMA website places the State of NH in the Zone II Wind Zone which provides that a community shelter should be built to a 160 mph "design wind speed." According to the State's mitigation plan, Sullivan County has a medium risk for tornadoes. The Committee determined there is a medium risk for tornadoes and downbursts in Washington.

Thunderstorms/Lightning/Hail

A thunderstorm is a rain shower during which you hear thunder. Since thunder comes from lightning, all thunderstorms have lightning. A thunderstorm is classified as "severe" when it contains one or more of the following: hail three-quarter inch or greater, winds gusting in excess of 50 knots (57.5 mph), tornado. Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. When the hail particle becomes heavy enough to resist the updraft, it falls to the ground. The resulting wind and hail can cause death, injury, and property damage. Below is a comparison charge for the various sizes of hail.

Figure III-1: HAIL SIZE COMPARISON CHART



An average thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Winter thunderstorms are rare because the air is more stable, strong updrafts cannot form because the surface temperatures during the winter are colder.

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

sun. Fires are a likely result of lightning strikes, and lightning strikes can cause death, injury, and property damage. It is impossible to predict where lightning will strike. There have probably been lightning strikes throughout Washington, but there is no record of damage.

A lightning activity level has been developed by the National Weather Service and is shown below:

Table III-7: LIGHTNING ACTIVITY LEVEL

Lightning Activity Level	Description
1	No thunderstorms
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.
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.
4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a 5 minute period.
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.
6	Dry lightning (same as LAL3, 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.

Source: http://graphical.weather.gov/definitions/defineLAL.html

Past Thunderstorm Events

A thunderstorm with lightning or hail could impact the entire town, although lightning is more likely in isolated areas where there would be no impact on structures. The damage reporting in flooding for 2014 is the result of flash flooding that was associated with severe thunderstorms that hit Washington.

Potential Future Thunderstorm Damage

It is inevitable that thunderstorms will occur in Washington's future. Lightning, hail, or wind from a thunderstorm could impact anywhere in town. It is not possible to estimate potential damage. According to the State's mitigation plan, Sullivan County has a

medium risk of a lightning hazard. The risk for future thunderstorm damage was determined by the Committee to be low medium risk in Washington. **Please see flooding table of past storms, damages from the July 2013 and August 2014 severe thunderstorms were in the form of flooding.***

Table III-8: Thunderstorm/Lightning/Hail

Thunderstorms/Lightning/Hail				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Hail	June 16, 2007	SW NH	A severe thunderstorm produced large hail (.75 in) in southwestern New Hampshire.	No Damage reported in Washington
Hail	August 3, 2007	Sullivan County	An isolated thunderstorm produced large hail in Sullivan County.	No Damage reported in Washington

Severe Winter Weather

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

Heavy Snow Storms A heavy snowstorm is generally considered to be one which deposits four or more inches of snow in a twelve-hour period… A blizzard is a sustained wind or frequent gusts greater than or equal to 35 miles per hour accompanied by falling and/or blowing snow, frequently reducing visibility to less than ¼ mile for three hours or more (NOAA National Weather Service). Therefore, intense Nor'easters, which occur in the winter months, are often referred to as blizzards. The definition includes the conditions under which dry snow, which has previously fallen, is whipped into the air and diminishes visual range. Such conditions, when extreme enough, are called "white outs."

Ice Storms Freezing rain occurs when snowflakes descend into a warmer layer of air and melt completely. When these liquid water drops fall through another thin layer of freezing air just above the surface, they don't have enough time to refreeze before reaching the ground. Because they are "supercooled," they instantly refreeze upon contact with anything that is at or below O degrees C, creating a glaze of ice on the ground, trees, power lines, or other objects. A significant accumulation of freezing rain lasting several hours or more is called an ice storm. This condition may strain branches of trees, power lines and even transmission towers to the breaking point and often creates treacherous conditions for highway travel and aviation. Debris impacted roads make emergency access, repair and cleanup extremely difficult.

The National Weather Service has developed a Scaled Predictive Ice Storm Aftermath (SPIA) Index. The potential impacts are scaled from 0 to 5 and suggest potential electrical outage coverage and duration. Current ice storm warnings are based on forecast of ice accumulation only. SPIA reports on the combined effects of the predicted ice and wind. Below is a chart of the SPIA index levels.

Table III-9: SCALED PREDICTIVE ICE STORM AFTERMATH INDEX

Ice & Wind: Average Ice in Inches and Wind in Miles per hour	<15 mph	15-25 mph	25-35 mph	≥35 mph
0.10 – 0.25 inches	0	1	2	3
0.25 – 0.50 inches	1	2	3	4
0.50 – 0.75 inches	2	3	4	5
0.75 – 1.00 inches	3	4	5	5
1.00 – 1.50 inches	4	5	5	5
>1.50 inches	5	5	5	5

"Nor'easters" Nor'easters can occur in the eastern United States any time between October and April, when moisture and cold air are plentiful. They are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surfs that cause severe beach erosion and coastal flooding. A Nor'easter is named for the winds that blow in from the northeast and drive the storm up the east coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast.

There are two main components to a Nor'easter: Gulf Stream low-pressure system (counter-clockwise winds) generate off the coast of Florida. The air above the Gulf Stream warms and spawns a low-pressure system. This low circulates off the southeastern U.S. coast, gathering warm air and moisture from the Atlantic. Strong northeasterly winds at the leading edge of the storm pull it up the east coast. As the strong northeasterly winds pull the storm up the east coast, it meets with cold Arctic high-pressure system (clockwise winds) blowing down from Canada. When the two systems collide, the moisture and cold air produce a mix of precipitation.

Winter conditions make Nor'easters a normal occurrence, but only a handful actually gather the force and power to cause problems inland. The resulting precipitation depends on how close you are to the converging point of the two storms. Nor'easter events which occur toward the end of a winter season may exacerbate the spring flooding conditions by depositing significant snow pack at a time of the season when spring rains are poised to initiate rapid snow pack melting.

Past Extreme Winter Weather Events

The following table provides a list of past extreme winter weather events in New Hampshire and Washington. In 2013, the Town of Washington received $10,000 in aid following Winter Storm NEMO, DR 4105. The money was provided to the town to cover costs of plowing and snow removal/response. The most extensive damages from the storm, other than heavy snowfall, included minor downed limbs.

Table III-10: SEVERE WINTER WEATHER

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Ice Storm	December 17-20, 1929	New Hampshire	Unprecedented disruption and damage to telephone, telegraph and power system. Comparable to 1998 Ice Storm (see below)	No Damage reported in Washington
Blizzard	February 14-17, 1958	New Hampshire	20-30 inches of snow in parts of New Hampshire	No Damage reported in Washington
Snow Storm	March 18-21, 1958	New Hampshire	Up to 22 inches of snow in south central NH	No Damage reported in Washington
Snow Storm	December 10-13, 1960	New Hampshire	Up to 17 inches of snow in southern NH	No Damage reported in Washington
Snow Storm	January 18-20, 1961	New Hampshire	Up to 25 inches of snow in southern NH	No Damage reported in Washington
Snow Storm	February 2-5, 1961	New Hampshire	Up to 18 inches of snow in southern NH	No Damage reported in Washington
Snow Storm	January 11-16, 1964	New Hampshire	Up to 12 inches of snow in southern NH	No Damage reported in Washington
Blizzard	January 29-31, 1966	New Hampshire	Third and most severe storm of 3 that occurred over a 10-day period. Up to 10 inches of snow across central NH	No Damage reported in Washington

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Snow Storm	December 26-28, 1969	New Hampshire	Up to 41 inches of snow in west central NH	No Damage reported in Washington
Snow Storm	February 18-20, 1972	New Hampshire	Up to 19 inches of snow in southern NH	No Damage reported in Washington
Snow Storm	January 19-21, 1978	New Hampshire	Up to 16 inches of snow in southern NH	No Damage reported in Washington
Blizzard	February 5-7, 1978	New Hampshire	New England-wide. Up to 25 inches of snow in central NH	No Damage reported in Washington
Snow Storm	February, 1979	New Hampshire	President's Day storm	No Damage reported in Washington
Ice Storm	January 8-25, 1979	New Hampshire	Major disruptions to power and transportation	No Damage reported in Washington
Snow Storm	April 5-7, 1982	New Hampshire	Up to 18 inches of snow in southern NH	No Damage reported in Washington
Ice Storm	February 14, 1986	New Hampshire	Fiercest ice storm in 30 yrs. in the higher elevations in the Monadnock region. It covered a swath about 10 miles wide from the MA border to New London NH	No Damage reported in Washington
Extreme Cold	Nov-Dec, 1988	New Hampshire	Temperature was below 0 degrees F for a month	No Damage reported in Washington
Ice Storm	March 3-6, 1991	New Hampshire	Numerous outages from ice-laden power lines in southern NH	No Damage reported in Washington
Snow Storm	1996	Regional	Two major storms with five feet of snow in a week	No Damage reported in Washington
Snow Storm	1997	New Hampshire	Power outages throughout region due to heavy snowfall	No Damage reported in

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
				Washington
Ice Storm	January 15, 1998	New Hampshire; Substantial power in NH	Federal disaster declaration DR-1199-NH, 20 major road closures, 67,586 without electricity, 2,310 without phone service, $17+ million in damages to Public Service of NH alone	No Damage reported in Washington
Snow Storm	2000	Regional	Heavy snow	No Damage reported in Washington
Snow Storm	March 5-7, 2001	New Hampshire	Heavy snow.	No Damage reported in Washington
Snow Storm	December 6-7, 2003	New Hampshire	Heavy snow. Fed Disaster Declaration FEMA-3193-NH	No Damage reported in Washington
Snow Storm	February 10-12, 2005	New Hampshire	Heavy snow. Fed Disaster Declaration FEMA-3208-NH	No Damage reported in Washington
Ice Storm	December 2008	New Hampshire	Debris removal. FEMA DR-1812; power outages in region for up to 10 days; downed trees blocked roads and damaged utility lines	$15 Million; some residents were without power for several days caused by the weight of the ice downing lines and downed limbs and trees on the lines.
Wind Storm	February 23 – March 3, 2010	New Hampshire	FEMA DR-1892; Federal funding to Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan Counties; power loss	$2 Million; No Damage reported in Washington

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Snow Storm	October 29-30, 2011	Statewide	EM-3344; FEMA-4049 Hillsborough & Rockingham Counties	Heavy snow throughout town with minor trees and limbs down.
Ice Storm	January 27, 2012	Region	Isolated power outages in region; several limbs down	Higher elevations in Washington experienced scattered power outages, but were not widespread.
Snow Storm	February 8-10, 2013	New Hampshire	Heavy Snow. FEMA DR-4105	Washington received $10,000 in public assistance for snow removal and response,.
Snow Storm	November 2014	New Hampshire	Heavy Snow	Washington experienced some power outages on this Thanksgiving Day storm, but no other major damages were reported.

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Snowstorm	January 26-28, 2015	Hillsborough, Rockingham, and Strafford Counties, NH	Severe Winter Storm and Snowstorm DR-4209	No major damage reported in Washington, typical snow storm removal was required.

Potential Future Severe Winter Damage:

There is the potential for severe winter damage every year. An event would affect the entire town. According to the State's mitigation plan, Sullivan County has a high risk for severe winter weather. The Committee determined severe winter weather to be a low/medium risk in Washington.

Earthquake

Earthquakes are characterized by a sudden and rapid shaking of the ground caused by the shifting of rock beneath the ground. The damage caused by an earthquake can be severe, causing the collapse and destruction of buildings, bridges, roads and other critical infrastructure. As a result, there can be many other hazards that occur, such has gas leaks, fires, electrical outages, landslides, etc. The magnitude and intensity of an earthquake can be rated on a scale such as the Richter or Mercalli, which are both illustrated below.

The following is a list of earthquakes which have impacted New England, New Hampshire, and potentially Washington.

Table III-11: EARTHQUAKES

EARTHQUAKES			
Date	**Location**	**Magnitude**	**Damage**
1638	Central NH	6.5-7	
October 29, 1727	Off NH/MA coast	NA	Widespread damage Massachusetts to Maine: cost unknown. No Damage reported in Washington
December 29, 1727	Off NH/MA coast	NA	Widespread damage Massachusetts to Maine: cost unknown , No Damage reported in Washington
November 18, 1755	Cape Ann, MA	6.0	Much damage: cost unknown. No Damage reported in Washington
1800s	Statewide	83 felt earthquake in NH	Unknown. No Damage reported in Washington
1900s	Statewide	200 felt earthquake in NH	Unknown. No Damage reported in Washington
March 18, 1926	Manchester, NH	Felt in Hillsborough Co	Unknown. No Damage reported in Washington
Dec 20, 1940	Ossipee, NH	Both earthquakes 5.5	Damage to homes, water main rupture: cost unknown. No Damage reported in Washington
December 24, 1940	Ossipee, NH	NA	Unknown. No Damage reported in Washington
December 28, 1947	Dover-Foxcroft, ME	4.5	Unknown No Damage reported in Washington
June 10, 1951	Kingston, RI	4.6	Unknown. No Damage reported in Washington
April 26, 1957	Portland, ME	4.7	Unknown. N No Damage reported in Washington o Damage reported in Washington
April 10, 1962	Middlebury, VT	4.2	Unknown.
June 15, 1973	Near Quebec Border	4.8	Unknown. No Damage reported in Washington
Summer 1977-1978*	Centered in Franklin	NA	Unknown. No Damage reported in Washington
January 19, 1982	West of Laconia	4.5	Structure damage 15 miles away in Concord: cost unknown
October 20, 1988	Near Berlin, NH	4	Unknown
September 26, 2010	New Hampshire	3.4	Centered in Boscawen, NH, The Committee recalls feeling the earthquake but no damage occurred in Washington.
August 23, 2011	Central Virginia, East Coast	5.8	Felt in region. No Damage reported in Washington
September 18, 2012	Concord, NH	1.2	Epicenter was Concord, NH and the quake was felt in the capital region of NH; No damage reported in Washington
October 16, 2012	Southern Maine	4.0	The earthquake was located southern Maine and felt throughout the area and into southern NH; No damage reported in Washington

Source: earthquake.usgs.gov/earthquakes/states/new_hampshire/history.php for earthquakes through 1964. NH Multi-Hazard Mitigation Plan, 2013 for 1973-1982; earthquake.usgs.gov/earthquakes (12/13/11)
**Committee recollection*

Table III-12 RICHTER SCALE AND MERCALLI INTENSITY

Richter Scale and Mercalli Intensity		
Richter Scale	**Modified Mercalli Intensity**	**Average Earthquake Effects**
1.0-3.0	I	**I** – Not felt except by a very few under especially favorable conditions.
3.0-3.9	II-III	**II** – Felt only by a few persons at rest, especially on upper floors of buildings. **III** – Felt quite noticeably by persons indoors. Standing motor cars may rock slightly.
4.0-4.9	IV-V	**IV** – Felt indoors by many, outdoors by few during the day. Dishes, windows, doors disturbed; walls make cracking sound. V – Felt by nearly everyone; many awakened. Some dishes, windows broken.
5.0-5.9	VI-VII	**VI** – Felt by all. Some heavy furniture moved; a few instances of fallen plaster. **VII** – Damage negligible in buildings of good design and construction, considerable damage in poorly built or badly designed structures; some chimneys broken.
6.0-6.9	VII-IX	**IX** – Damage considerable in specially designed structures; damage great is substantial buildings, with partial collapse.
7.0 and higher	VIII or higher	**VIII** and higher: damage slight in specially designed structures. Fall of chimneys, factory stacks, columns, monuments, walls. **X** – Some well-built wooden structures destroyed, most masonry and frame structures destroyed with foundations. **XI** – Few if any masonry structures remain standing. Bridges destroyed. **XII** – Total damage. Lines of sight and level are distorted. Objects thrown in air.

Potential Future Earthquake Damage:

A United States Geographic Survey mapping tool on the web (geohazards.cr.usgs.gov/ projects) projects a 5 – 6 peak ground acceleration (pga) with 10% probability of exceedance in 50 years for the Town of Washington. This pga rating is equivalent to a Modified Mercalli Intensity of "V" with moderate perceived shaking and very light potential damage. An earthquake event would impact the entire town. According to the State's mitigation plan, Sullivan County has a medium risk for earthquakes. The Committee determined the risk to be low/medium in Washington.

Drought

Droughts or abnormally low precipitation are generally not as damaging or disruptive as floods, but are more difficult to define. A drought is a natural hazard that evolves over months or even years and can last as long as several years or only a few months. Fortunately, droughts are rare in New Hampshire. The severity of the water deficit if gauged by the degree of moisture deficiency, its duration, and the size of the area affected. The effects of drought are indicated through measurements of soil moisture, groundwater levels and stream flow; however, not all of these indicators will be low during a drought. Not all of these indicators will be minimal during a particular drought. For example, frequent minor rainstorms can replenish the soil moisture without raising ground water levels or increasing stream flow.

Low stream flow correlates with low ground water level because it is ground water discharge to streams and rivers that maintain stream flow during extended dry periods. Low stream flow and low ground water levels commonly cause diminished water supply.

New Hampshire breaks the State into five Drought Management Areas, with one in the north, one across the central region, and three along the southern portion of the State. The National Oceanic and Atmospheric Administration (NOAA) and the US government use the Palmer Drought Survey Index for conditions of the nation. The Palmer Drought Management areas divide the State into two areas and use the Palmer Drought Severity Index which is based on rainfall, temperature, and historic data. The Town of Washington is in Area 2. The NH Drought Management Team, coordinated by the NH Department of Environmental Services Dam Bureau, use these maps to help determine which areas are hardest hit.

Past Drought Events

Around 2001-2002, Washington and other nearby towns had drought issues. This occurred again in 2010.

Figure III-2: DROUGHT MAPS

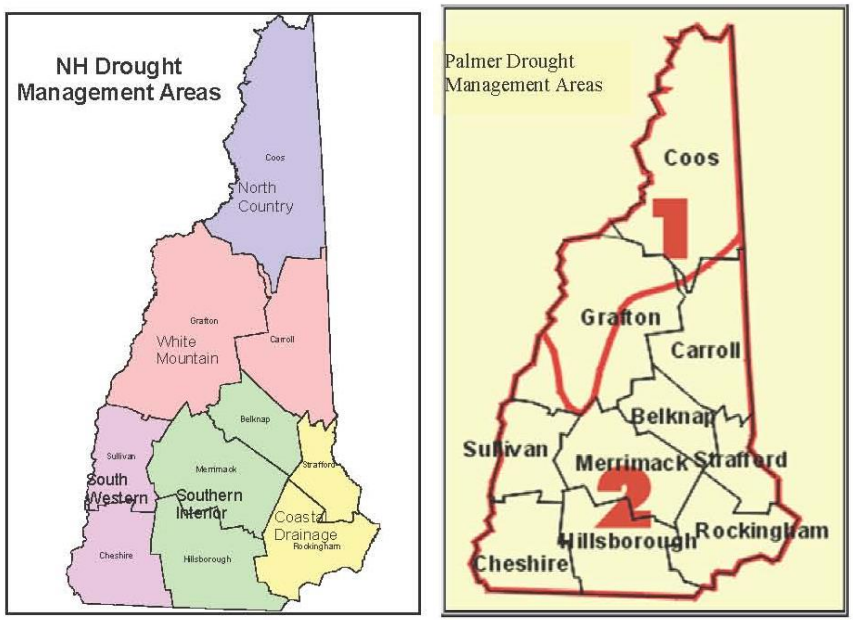


Table III-13: DROUGHT

Date	Location	Description	Damages
1929-1936	Statewide	Regional. Recurrence Interval 10 to > 25 years	Unknown. No Damage reported in Washington
1939-1944	Statewide	Severe in southeast and moderate elsewhere. Recurrence Interval 10 to > 25 years	Unknown. No Damage reported in Washington
1947-1950	Statewide	Moderate. Recurrence Interval 10 to > 25 years	Unknown. No Damage reported in Washington
1960-1969	Statewide	Regional longest recorded continuous spell of less than normal precipitation. Encompassed most of the Northeastern US. Recurrence Interval > 25 years	Unknown. No Damage reported in Washington
2001-2002	Statewide	Affected residential wells and agricultural water sources; third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942; recurrence level not determined yet	Unknown. No Damage reported in Washington

Date	Location	Description	Damages
2010	Mostly southern counties	Affected dug wells and those in hillsides.	Unknown. No Damage reported in Washington
2015	Southern & Central NH	Concord currently 5.17" below the average precipitation from March 1 to May 21, 2015; considered a "moderate drought" by the US Dept. of Agriculture	Minor impact in Washington with a few wells reported drying up

Source: NH DES through 2002; Concord Monitor August 22, 2010

Potential Future Drought Damage

Drought will affect the entire town. The damage will depend upon the crops being grown at the time of the drought. No cost has been assigned to residential wells going dry though new wells may have to be dug or drilled. According to the State's mitigation plan, Sullivan County has a medium risk for drought. The Committee determined that drought is a low risk in Washington.

Extreme Heat

Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures. These event conditions may impact the health of both humans and livestock. The National Weather Service developed a heat index based upon temperature and relative humidity. This is shown below.

Table III-14: HEAT INDEX

NOAA's National Weather Service

Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

Past Extreme Heat Events

The following table lists the extreme heat events in the past which included the Northeast and New Hampshire.

Table III-15: EXTREME HEAT

Date	Location	Description	Damage
July, 1911	New England	11-day heat wave in New Hampshire	Unknown. No Damage reported in Washington.
Late June to September, 1936	North America	Temps to mid 90s in the northeast	Unknown. No Damage reported in Washington.
June - August, 1999	Northeast	Mean temperatures well above long-	Unknown. No Damage

		term average	reported in Washington.
Early August, 2001	New Hampshire	Mid 90s and high humidity	Unknown. No Damage reported in Washington.
August 2-4, 2006	New Hampshire	Regional heat wave and severe storms	Unknown. No Damage reported in Washington.
July 2010	Northeast	Regional heat wave	Unknown. No Damage reported in Washington.

Potential Future Extreme Heat Events

Extreme heat would impact the entire town though those with air conditioning in their homes would have less impact. The costs of extreme heat are most likely to be in human life. The elderly are especially susceptible to extreme heat. The State did not develop a county risk factor for extreme heat in its *NH Multi-Hazard Mitigation Plan Update 2013*. The Committee determined extreme heat to be a low risk in Washington.

Erosion

Soil erosion, although a natural process, can be greatly accelerated by improper construction practices. Because of the climate in New Hampshire and the general nature of our topography, eroded soils can be quickly transported to a wetland, stream, or lake. The New Hampshire Department of Environmental Services (DES) regulates major construction activities to minimize impacts upon these resources. A properly conducted construction project should not cause significant soil erosion.

Soil becomes vulnerable to erosion when construction activity removes or disturbs the vegetative cover. Vegetative cover and its root system play an extremely important role in preventing erosion by: (1) Shielding the soil surface from the impact of falling rain drops; (2) Reducing the velocity of runoff; (3) Maintaining the soil's capacity to absorb water, and (4) Holding soil particles in place.

Because of the vegetation's ability to minimize erosion, limiting its removal can significantly reduce soil erosion. In addition, decreasing the area and duration of exposure of disturbed soils is also effective in limiting soil erosion. The designer must give special consideration to the phasing of a project so that only those areas actively under construction have exposed soils. Other factors influencing soil erosion are: (1) Soil types, (2) Land slope, (3) Amount of water flowing onto the site from up-slope, and (4) Time of year of disturbance.

Past Erosion Events

There have been several erosion events in Washington. Many were primarily road washes associated with flooding and are addressed in that section, page 19 and 20. There are also several road washes associated with major storms such as in May and July 2013 and July 2014.

Potential Erosion Events

Due to the topography of the town, there is always potential for erosion. The town also has a fair amount of dirt roads that can be prone to erosion. As properties are developed there will be less vegetative buffer to protect the town from erosion during rainstorms. The Committee determined there was a low/medium risk for erosion damage.

Wildfire

Wildfire is defined as any unwanted and unplanned fire burning in the 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 unsafe land-use practices, fire suppression and fire exclusion. Vegetation buildup can lead to more severe wildfires.

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, cultural and economic resources. Negative short term effects of wildfires include destruction of timber, forage, wildlife habitats, scenic vistas and watersheds. Some long term effects include erosion and lowered water quality.

There are many types and causes of fires. Wildfires, arson, accidental fires and others all pose a unique danger to communities and individuals. Since 1985, approximately 9,000 homes have been lost to urban/wild land interface fires across the United States (Northeast States Emergency Consortium: www.nesec.org). The majority of wildfires usually occur in April and May, when home owners are cleaning up from the winter months, and when the majority of vegetation is void of any appreciable moisture making them highly flammable.

The threat of wildfires for people living near wildland areas or using recreational facilities in wilderness areas is real. Dry conditions at various times of the year and in various parts of the United States greatly increase the potential for wildfires. Advance planning and knowing how to protect buildings in these areas can lessen the devastation of a wildfire. To reduce the risk to wildfire, it is necessary to consider the fire resistance of structures, the topography of property and the nature of the vegetation in the area.

According to the National Wildfire Coordination Group, there are categories of wildfire based upon size: Class A - one-fourth acre or less; Class B - more than one-fourth acre, but less than 10 acres; Class C - 10 acres or more, but less than 100 acres; Class D - 100 acres or more, but less than 300 acres; Class E - 300 acres or more, but less than 1,000 acres; Class F - 1,000 acres or more, but less than 5,000 acres; Class G - 5,000 acres or more.

Past Wildfire Events

Washington has experienced wildfire and brush fires in the past, but there are not any fires that caused significant and notable damage.

Potential Future Wildfire Events

There are many large, contiguous forest tracts in Washington. Due to the vast areas of forest the hazard could impact any part of Washington, with no one area determined to be at a great risk than another. Where development interfaces with the forested areas is called the "urban interface." These are the areas where structures could be impacted by a wildfire; these areas are scattered throughout the town. The most likely areas for wildfire are where ice storm impact downs trees and branches providing fuel for a fire. According to the State's mitigation plan, Sullivan County has substantial debris to fuel a wildfire remaining from the ice storm of 1998 and 2008 and heavy forest cover. The plan gives the county a high risk of wildfire. The Committee determined that the risk of wild and structure fire risk in Washington is medium/high.

Natural Water & Air Contaminants

Radium, radon and uranium are grouped together because they are radionuclides, unstable elements that emit ionizing radiation. These three particular substances are a health risk only if taken into the body by ingestion or inhalation. They occur naturally in the environment, uranium and radium as solids in rock while radon exists as a gas. Radionuclides are undetectable by taste, odor, or color, so only analytical testing can determine if they are present in water. Because they are associated with rock, wells drilled into bedrock are more likely to contain elevated levels of radionuclides than shallow or dug wells.

Radon gas can also be found in the soil. Openings between the soil and buildings, such as foundation cracks and where pipes enter, provide conduits for radon to move into structures. The difference in air pressure, caused by heated indoor air moving up and out of buildings, results in a flow of soil gas toward the indoors, allowing radon to potentially accumulate in structures. Air quality in a home can also be tested for radon. Following is a map of New Hampshire by the U.S. EPA to show radon zones.

There are many other natural contaminants which can render drinking water unsafe such as arsenic. The Drinking Water and Groundwater Bureau of the NH Department of Environmental Services has several fact sheets available to address these natural materials and suggests which materials to be included in testing. See their list of fact sheets at http://www.des.state.nh.us/dwg.htm.

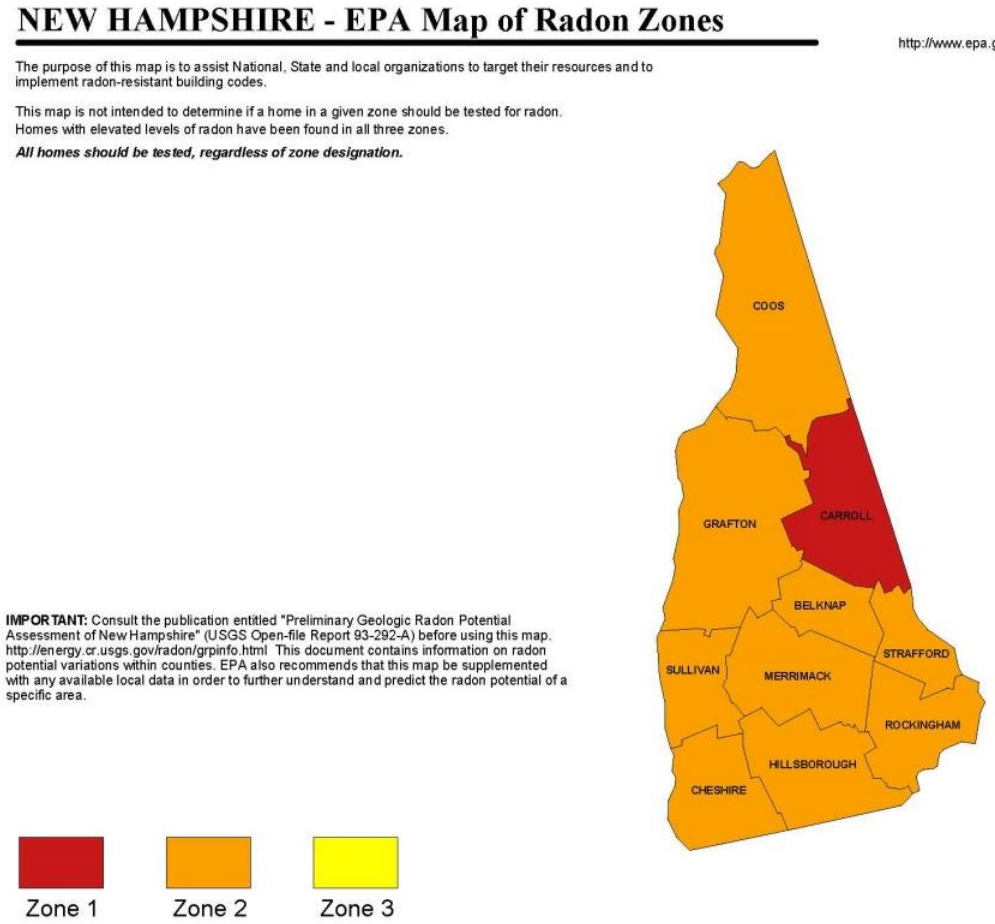
Past Natural Water & Air Contaminant Events

There have been no known events related to natural water and air contamination in Washington. It is also anticipated that although no one is aware of any radon contamination, given that we are in the "Granite State," it is likely that some homes are affected by radon.

Table III-16: RADON – LOW/MEDIUM RISK

RADON					
Summary Table of Short-term Indoor Radon Test Results in NH's Radon Database 11/04/2003)					
County	**# Tests**	**G. Mean**	**Maximum**	**% > 4.0 pCi/l**	**% > 12.0 pCi/l**
Belknap	744	1.3	22.3	14.4	1.3
Carroll	1042	3.5	478.9	45.4	18
Cheshire	964	1.3	131.2	15.6	2.3
Coos	1072	3.2	261.5	41	17
Grafton	1286	2.0	174.3	23.2	5.2
Hillsborough	2741	2.1	202.3	29.6	6.8
Merrimack	1961	2.0	152.8	25.2	6
Rockingham	3909	3.0	155.3	40	9.5
Strafford	1645	3.4	122.8	44	13
Sullivan	**466**	**1.4**	**29.4**	**15.7**	**2.1**
STATEWIDE	**15860**	**2.4 pCi/L**	**478.9 pCi/L**	**32.4**	**8.6**

Figure III-3: MAP OF RADON ZONES



Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCI/L (picocuries per liter) (red zones) **Highest Potential**

Zone 2 counties have a predicted average indoor radon screening level between 2 and 4 pCi/L (orange zones) **Moderate Potential**

Zone 3 counties have a predicted average indoor radon screening level less than 2 pCi/L (yellow zones) **Low Potential**

Potential Future Natural Air & Water Contaminant Damage:

Although there are no known records of illness that can be attributed to radium, radon, or uranium or other contaminants in Washington, residents should be aware that they are present. Houses with granite and dirt cellars are at increased risk to radon

gas infiltration. According to the table above, Sullivan County radon levels are below average for the State. According to the State's mitigation plan, Sullivan County has a medium probability of a radon related hazard.

In addition radium, radon, and uranium as well as other natural materials can be present in drinking water. Residents, especially with bedrock wells, should be aware of the possibility of water contamination and the availability of testing and remediation. The Committee determined that the risk of natural contaminants is low/medium.

Hazardous Materials Spills

Hazardous materials spills or releases can cause loss of life and damage to property. Short or long-term evacuation of local residents and businesses may be required, depending on the nature and extent of the incident. The spills may occur on-site at hazardous waste generators or in transport through town.

In Washington, there are 7 potential hazardous waste generators listed on the NH Department of Environmental Services (DES) "one-stop" list. Five of these are inactive at the moment or declassified and the two remaining sites probably only produce small amounts of hazardous waste.

Past Hazardous Waste Spill Events

No known significant spills have occurred in Washington.

Potential Future Hazardous Waste Spill Damage

Although there have not been any significant spills in Washington, hazardous materials spills could occur along the NH Route 10 or NH Route 31. In addition, heating fuel is delivered to homes on many of the town's roads: spills could occur at storage tanks during the filling of the tanks. There conceivably could be spills near any home in Washington due to home heating fuel delivery. The property owner is responsible for clean-up. The State oversees these reported spills.

The State did not determine county risk for hazardous waste spills in the *NH Multi-Hazard Mitigation Plan Update 2013*. The Committee determined a hazardous waste spill is a low/medium risk.

Terrorism

Terrorism has been defined in many ways. The word terrorism is derived from the Latin term "terrere" which means to frighten. Section 802 of the USA Patriot Act expanded the definition of terrorism to cover "domestic," as opposed to international terrorism. A person engages in domestic terrorism if they do an act "dangerous to human life" that is a violation of the criminal laws of a state or the United States, if the act appears to be intended to: (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping; and (C) occur primarily within the territorial jurisdiction of the United States."

Past Terrorism Events

There have been no terrorism events within Washington in the past.

Future Terrorism Events

Terrorism is not considered a major risk, although vandalism is an occasional problem. The Committee determined that the risk of terrorism is a low risk in Washington.

C. HAZARD RISK RATINGS

The Town of Washington Hazard Mitigation Committee reviewed each potential hazard and rated the probability of occurrence and vulnerability (cost if the hazard actually occurs) to come up with an overall risk rating. The ratings were based on past occurrences of hazards affecting the State of New Hampshire, Sullivan County, and the Town of Washington and were reevaluated during the 2013 meetings. The two highest risks in Washington were determined to be flooding and severe winter weather.

Assessing Probability

The process involved assigning a number to each hazard type based on its potential of occurring determined using the committee's knowledge of past events:

1 – Low: 0-33% chance of occurrence during a 10-year period
2 – Medium: 33-66% chance of occurrence during a 10 year-period
3 – High: 66-100% chance of occurrence during a 10-year period

An n/a score was given if there was insufficient evidence to make a decision. To ensure some balance with a more scientific measurement, the plan also identifies the probability of occurrence from the State Hazard Plan as shown in the table below. For comparative purposes the Low rating was given a designation of "1," the Medium rating a designation of "2," and the High rating a designation of "3." These figures are shown in Table III-18 and III-19.

Table III-17: PROBABILITY OF HAZARD

Probability of Hazard Occurring in Sullivan County from State Plan											
Flood	**Dam Failure**	**Drought**	**Wildfire**	**Earth-quake**	**Land-slide**	**Radon**	**Tornado**	**Hurricane**	**Lightning**	**Severe Winter**	**Avalanche**
H	L	M	H	M	M	M	M	M	M	H	L

Assessing Vulnerability

A relative scale of 1 to 3 was used to determine the impact and cost for human death and injury, property losses and damages, and business/agricultural impact: 1 – limited damage and cost; 2 - moderate amount of damage and cost, and 3 – high damage and cost.

Table III-18: VULNERABILITY OF EXISTING DEVELOPED AREAS

Committee Assessment of Vulnerability	Human Impact	Property Impact	Economic Impact	Vulnerability
	Probability of death or injury	Physical losses and damages	Cottage businesses & agriculture	Avg. of human/ property/ business impact
Dam Failure	1	1	1	1.0
Flooding	1	2	1	1.3
Hurricane	2	3	2	2.3
Tornado & Downburst	3	3	1	2.3
Thunderstorm/Lightning/Hail	1	1	1	1.0
Severe Winter/Ice Storms	1	2	1	1.3
Earthquake	3	3	3	3.0
Drought	1	1	1	1.0
Extreme Heat	1	1	1	1.0
Erosion	1	2	1	1.3
Wildfire	1	3	2	2.0
Natural Contaminants	1	1	1	1.0
HazMat Spills	1	1	1	1.0
Terrorism	3	1	1	1.7

Assessing Risk

The averages of each vulnerability and probability were multiplied to arrive at the overall risk the hazard has on the community. The overall risk or threat posed by a hazard over the next 25 years was determined to be high, medium, or low.

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

MEDIUM/HIGH: There is strong potential for a disaster of significant proportions during the next 25 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the town's emergency management training and exercise program.

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

MEDIUM/LOW: There is slight potential for disaster in the in the next 25 years. The modest threat warrants modest effort to prepare for, respond to, recover from, and mitigate this hazard. This hazard should be included in the town's emergency management training and exercise program.

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

Table III-13: RISK ASSESSMENT

Risk Assessment 0-1.9 Low 2-3.9 Low/Med 4-5.9 Med 6-7.9 Med-High 8-9 High				
Hazards	**Probability based on Committee Review**	**Vulnerability based on Committee Review**	**Risk Rating (Probability x Vulnerability)**	**Risk**
Dam Failure	1	1.0	1.0	Low
Flooding	3	1.3	3.9	Low/Medium
Hurricane	**3**	**2.3**	**7.5**	**Medium/High**
Tornado & Downburst	**2**	**2.3**	**4.6**	**Medium**
Thunderstorm/Lightning/Hail	3	1.0	3.0	Low/Medium
Severe Winter	3	1.3	3.9	Low/Medium
Earthquake	1	3.0	3.0	Low/Medium
Drought	1	1.0	1.0	Low
Extreme Heat	1	1.0	1.0	Low
Erosion	3	1.3	3.9	Low/Medium
Wildfire	**3**	**2.0**	**6.0**	**Medium/High**
Natural Contaminants	2	1.0	2.0	Low/Med
HazMat	2	1.0	2.0	Low/Med
Terrorism	1	1.7	1.67	Low

IV. CRITICAL FACILITIES/LOCATIONS

The Critical Facilities list, identified by the Washington Hazard Mitigation Committee, is divided into three categories. The first category contains facilities needed for emergency response in the event of a disaster. The second category contains non-emergency response facilities that are not required in an event, but that are considered essential for the everyday operation of the Town of Washington. The third category contains facilities/populations that the Committee wishes to protect in the event of a disaster. Values for all buildings in this document were obtained from town tax records for main structures plus accessory structures for 2013.

Table IV-1: EMERGENCY RESPONSE FACILITIES, SERVICES & STRUCTURES

Critical Facility	Hazard Vulnerability	Value
Public Works Garage (full service backup shelter)	Winter storms; hurricanes, tornado/downburst, earthquake	$183,000
Police Station	Winter storms; hurricanes, tornado/downburst, earthquake	$173,300
Center Fire & Rescue Station (EOC)	Winter storms; hurricanes, tornado/downburst, earthquake	$129,000
East Washington Fire Station	Winter storms; hurricanes, tornado/downburst, earthquake	$17,100
Evacuation Routes & Bridges: Route 31, East Washington Road, Lempster Mt. Road, Ashuelot Lake (via boat or snowmobile)	Winter storms; hurricanes, tornado/downburst, earthquake	N/A
Camp Morgan Lodge (full service primary shelter)	Winter storms; hurricanes, tornado/downburst, earthquake (truss roof difficult to access)	$325,400
Elementary School (full service secondary shelter)	Winter storms; hurricanes, tornado/downburst, earthquake, Terrorism	$991,800
Town Hall (shelter only) & Town Offices	Winter storms; hurricanes, tornado/downburst, earthquake, terrorism	$451,400
Three aquifers, public well for Camp Morgan and Elementary School	HazMat spills; Natural contaminants	N/A
Granite State Telephone Switch Station	Winter storms; hurricanes, tornado/downburst, earthquake	$84,400
Radio Tower on Faxon Hill	Winter storms; hurricanes, tornado/downburst, earthquake	N/A

Table IV-2: NON-EMERGENCY RESPONSE FACILITIES & STRUCTURES

Critical Facility	Hazard Vulnerability	Value
Roads & Bridges (non-evacuation)	Dam Failure, Flooding, Erosion, Earthquake, Severe Winter	N/A
Washington General Store (food & gas)	Winter storms; hurricanes, tornado/downburst, earthquake	$122,200

Beach House (LAE)	Winter storms; hurricanes, tornado/downburst, earthquake	$92,600

Table IV-3: FACILITIES & POPULATIONS TO PROTECT

Critical Facility	Hazard Vulnerability	Value
Camp Morgan beach & recreation area (Day Camp)	Winter storms; hurricanes, tornado/downburst, earthquake, flooding	$325,400
Pillsbury State Park – Route 31	Winter storms; hurricanes, tornado/downburst, earthquake	N/A
Joe's Hideaway Campground – Valley Road	Winter storms; hurricanes, tornado/downburst, earthquake	$53,900
Sunapee-Monadnock Greenway	Winter storms; hurricanes, tornado/downburst, earthquake	N/A
Shedd Library (brick) (N. Main Street)	Winter storms; hurricanes, tornado/downburst, earthquake	$197,800
Congregational Church (Halfmoon Pond Road)	Winter storms; hurricanes, tornado/downburst, earthquake	$203,600
Seventh Day Adventist Church (King Street)	Winter storms; hurricanes, tornado/downburst, earthquake	$106,900
Purling Beck Grange (Bradford Springs Road)	Winter storms; hurricanes, tornado/downburst, earthquake	N/A
East Washington Baptist Church (E. Washington Road)	Winter storms; hurricanes, tornado/downburst, earthquake	$53,200
Montfort Retreat (King Street, residential summer camp)	Winter storms; hurricanes, tornado/downburst, earthquake	
All non-residential	All Hazards	
All homes	All Hazards	

V. DETERMINING HOW MUCH WILL BE AFFECTED

A. IDENTIFYING VULNERABLE FACILITIES

It is important to determine which critical facilities and other structures are the most vulnerable and to estimate potential losses. The first step is to identify the facilities most likely to be damaged in a hazard event. To do this, the locations of critical facilities were compared to the location of past and potential hazard events. Facilities and structures located in federally and locally determined flood areas, dam inundation areas, etc. were identified and included in the analysis. There is neither large land areas slated for potential development nor large development projects in the works, so vulnerability of undeveloped land was not analyzed except to note logical future development areas.

Table V-1: VULNERABILITY OF EXISTING DEVELOPED AREAS

Area	Hazard	Critical Facilities	Buildings (residential & non-residential)	Infrastructure	Natural Resources	Total Known Building Value
A and AE Flood Zone	Flooding	None	**56 Builidngs $5,951,512**	Unknown	Unknown	

Table V-2: VULNERABILITY OF POTENTIAL DEVELOPMENT

Area	Hazard	Critical Facilities	Projected Buildings	Projected Infrastructure	Projected Value
None Known	All Hazards	None	N/A	N/A	N/A

B. IDENTIFYING VULNERABLE SPECIAL POPULATIONS

There are few centers of special populations in town including the elementary school, the town offices, the town hall during special meetings, and the library. The elderly and physically or mentally impaired residents are also residing throughout the town in their homes.

C. POTENTIAL LOSS ESTIMATES

This section identifies areas in town that are most vulnerable to hazard events and estimates potential losses from these events. It is difficult to ascertain the amount of damage caused by a natural hazard because the damage will depend on the hazard's extent and severity, making each hazard event quite unique. In addition, human loss of life was not included in the potential loss estimates, but could be expected to occur. FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses* (August 2001) was used in estimating loss evaluations. The value of structures was determined by using town records. The Town's tax maps were used to determine number of units within each hazard area. The land damage cost, structure content loss costs, and function loss cost were not determined.

Dam Failure – Low – $1,134,398
The Committee determined the risk for Dam Failure to be low. There are not any dams designated as "high" but two rated as "significant". The cost of Dam Failure is estimated to be $1.1 million which is 1% of the total structure value in Washington. The impact of the dam failure and subsequent inundation can be similar to those of flooding, road and infrastructure damage, building and home damage and destruction.

Flooding – Medium/High Risk - $1,666,423 Estimated Cost (not including roads, bridges)
There are approximately 56 homes located within the FEMA designated Special Flood Hazard areas. These areas are all "Zone A and AE." The total value of the buildings (including residential and non-residential) is $5,951,512. Assuming a 28 % structural damage to the buildings, the damage would total $1,666,423. There are 9 town and state bridges and several sections of road in these flood areas. No value estimate has been done for these structures. No estimate for contents of buildings was done.

Hurricane – Medium Risk – $1,134,398Estimated Cost
Damage caused by hurricanes can be severe and expensive. Washington has been impacted in the past by both wind and flooding damage as a result of hurricanes. The total assessed value of all structures within Washington is approximately $113 million. It is random which structures would be impacted and how much. There is no standard loss estimation available and no record of past costs. If 10% of the buildings received 10% damage, the damage cost would be about $1,134,398.

Tornado & Downburst –Medium Risk – $1,134,398 Estimated Cost
Tornadoes, downbursts, and microbursts are relatively uncommon natural hazards in New Hampshire, although microbursts in 2007 caused substantial damage. On average, about six tornado events strike each year. In the State of NH, the average annual cost of tornadoes between 1950 and 1995 was $197,000 (The Disaster Center). These wind events occur in specific areas, so calculating potential town-wide losses is difficult. An estimated loss of 1% of the total structure value equates to an estimated cost of

$1,134,398; however, the randomness of a tornado or downburst can significantly impact the total cost and if the storms hit a more developed area, the cost could be significantly higher.

Thunderstorm/Lightning/Hail –Medium/High Risk – No Recorded or Estimated Cost

According to the Federal Alliance for Safe Homes, in an average year, hail causes more than $1.6 billion worth of damage to residential roofs in the United States, making it, year in and year out, one of the most costly natural disasters. Lightning is one of the most underrated severe weather hazards, yet it ranks as the second-leading weather killer in the United States. More deadly than hurricanes or tornadoes, lightning strikes in America each year killing an average of 73 people and injuring 300 others, according to the National Weather Service. There is no cost estimation model for thunderstorms due to their random nature. The cost can vary significantly due to the wide range of damage that the storms can cause, including electrical damage from wind or lightning strikes and wind damage to structures. Hail can also cause widespread damage to homes in the area.

Severe Winter Weather – Medium/High Risk – $1,134,398 Estimated Cost

Ice storms often cause widespread power outages by downing power lines, and these storms can also cause severe damage to trees. New England usually experiences at least one or two severe snowstorms, with varying degrees of severity, each year. All of these impacts are a risk to the community and put all residents, especially the elderly, at risk. Due to the wide variety and varied severity of damage than can be caused by severe winter weather, a cost is difficult to determine, but 1% of the total structure value provides the estimate of $1,134,398 in damage

According to a study done for the Institute for Catastrophic Loss Reduction (Canada) and the Institute for Business and Home Safety (U.S.), the 1998 Ice Storm inflicted $1.2 billion (U.S.) worth of damage in the U.S. and Canada. In New Hampshire alone, over 67,000 people were without power (http://www.meteo.mcgill.ca/extreme/Research_Paper_No_1.pdf). U.S. average insurance claim was $1,325 for personal property, $1,980 for commercial property, and $1,371 for automobiles.

Earthquake – Low Risk - $11.3 million Estimated Cost if All Buildings Impacted

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and precipitate landslide and flash flood events. Four earthquakes in NH between 1924 and 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. Buildings have not been subject to any seismic design level requirement for construction and would be susceptible to structural damage. The dams, bridges, and roads would be vulnerable to a sizable earthquake event.

FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Costs*, August 2001 provides that an earthquake with a 5% peak ground acceleration (as determined by the US Geologic Survey for the area) could cause damage to single family residences by

around 10% of the structural value. If 10% of buildings in Washington were impacted by an earthquake, the estimated damage could be around $11.3 million.

Drought – Low Risk – No Recorded or Estimated Cost
A long drought would cause damage to crops and dry up wells. There is no cost estimate for this hazard in Washington.

Extreme Heat – Low Risk – No Recorded or Estimated Cost
Excessive heat kills more people in the U.S. than tornadoes, hurricanes, floods, and lightning combined. The elderly, very young, obese and those who work outdoors or have substance abuse problems are most at risk from succumbing to heat. Additionally, people in urban areas are more susceptible as asphalt and cement tend to hold in heat throughout the night (Federal Alliance of Safe Homes website). The costs for this hazard are in terms of human suffering. It is not anticipated that there would be any structural or infrastructure costs.

Erosion – Low/Medium Risk – No Recorded or Estimated Cost
Development on steep slopes can cause substantial erosion in the adjacent area. This can impact the adjacent roads in the area by making them more susceptible to erosion and washout. Construction itself can cause erosion if best management practices are not used to control run-off from disturbed soils, and the rooftops of buildings displace water which would have gone into the ground. This is then exacerbated by the steep slopes where the run-off moves more quickly and can cause more damage**.**

Wildfire – High Risk – $567,200 Estimated Cost
The risk of fire is difficult to predict based on location. Forest fires are more likely to occur during drought years. In addition, areas and structures that are surrounded by dry vegetation that has not been suitably cleared are at high risk. Fire danger is generally universal, however, and can occur practically at any time. Dollar damage would depend on the extent of the fire and the number and type of buildings burned. Since the entire developed area of Washington interfaces with forest, all structures are potentially vulnerable to wildfire. The estimated value of all structures in the Town is approximately $113 million. If 1% of the structures received 50% damage, the total estimated cost would be about $567,200.

According to the Sullivan County Forester, big wildfires are uncommon in Sullivan County as the weather here is generally not favorable for a high probability of ignition and rapid spread. Additionally, there are enough roads and people in the county that fires are generally spotted and addressed before they are too large. Occasionally weather conditions are more favorable as was seen in the 1950s on Croydon Mountain.

Natural Contaminants – Low Risk – No Recorded or Estimated Cost
The cost of a radon hazard would be the health of individuals exposed to radon. No cost estimate is provided for this hazard.

Hazardous Material Spills –Low/Medium Risk – No Recorded or Estimated Cost
The cost of a hazardous material spill would depend upon the extent of the spill, the location of the spill in relation to population, structures, infrastructure, and natural resources, as well as the type of hazardous material. The cost of any clean-up would be imposed upon the owner of the material. However, other less tangible costs such as loss of water quality might be borne by the community. No cost estimate has been provided for this possible hazard.

Terrorism – Low Risk – No Recorded or Estimated Cost
The cost of any terrorism event is unpredictable and not estimated in this document. The Committee does not feel that terrorism is a substantial threat in Washington.

VI. EXISTING & NEW ACTIONS

A. EXISTING HAZARD MITIGATION PROGRAMS

The following table provides the existing mitigation actions in Washington. The fourth or "Effectiveness" column ranks each program as one of the following: "high" – the existing program works as intended and meets its goals; "average" – the existing program works though there is room for improvement; and "low" – the existing program does not work as intended or falls short of its goals. The fifth column lists if there were recommendations for improvement in the previous hazard mitigation plan and if those recommendations were put into action or not and if not, why not. The final column provides either an update of the mitigation action or proposed improvements that are currently being recommended for the future. Any proposed actions or actions to be continued are shown in red and will be shown again in future tables for evaluation, prioritization, and scheduling for implementation.

Existing Mitigation Action & Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met*	Update/Future Proposed Improvements
Town Master Plan	All Hazards/Entire Town	Planning Board	Average	Incorporated Hazard Mitigation Planning and Water resources chapter in plan / MP has not been updated since the 2010 Hazard Mitigation Plan	2015/16 Master Plan Update will incorporate the Hazard Mitigation Plan.
National Flood Insurance Program	Flooding/Entire Town	Selectboard	High	More public awareness through web site and notices to property owners in inundation areas. / COMPLETED	Continue to provide information through public outreach and participate in NFIP trainings when they are available.
Land Use Ordinance	Flooding, Erosion/Entire Town	Planning Board and Selectboard	High	Add water body buffers and add driveway standards / 2009 update COMPLETED	No further action required.
Best Management Practices for Erosions/Sediment Control	Erosions/Entire Town	Selectboard	Avergae	Need permit checklist with start date; put info on web / COMPLETED 2010, the Conservation Commission works to provide checklist and educational materials.	No further action required.
Flood Zone Land Protection	Flooding/Entire Town	Conservation Commission	Average	More Education / COMPLETED; the CC works to educate the public on protecting land in the floodplain.	No further action required

Flood Zone Land Protection	Flooding/Entire Town	Conservation Commission & SB	Average	More land conservation in the flood zone/COMPLETED, the conservation commission is continually work to conserve lands and notably in 2014 obtained conservation easements to protect a large parcel of land (100+/- acres) included some areas in the flood zone.	No further action required.
Road and Bridge Improvements – Mill Street Bridge	Flooding & Erosion/Mill Street Bridge	DPW Director	High	Replace culvert inadequate for water flow with larger culvert/ COMPLETE December 2012	No Future Improvements
Road and Bridge Improvements – Faxom Hill Road	Flooding & Erosion/Faxon Hill Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert at northern intersection with Millen Pond Road /COMPLETE July 2013	No Future Improvements
Road and Bridge Improvements – Bailey Road	Flooding & Erosion/Bailey Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert at Beaver Bog / COMPLETE July 2014	No Future Improvements
Road and Bridge Improvements – East Washington Road	Flooding & Erosion/East Washington Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert; improve roadway alignment for culvert flow at Freezeland Pond outlet / COMPLETE October 2011	No Future Improvements
Road and Bridge Improvements – Valley Road	Flooding & Erosion/Valley Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert at intersection with Cove Road and Beech Way / COMPLETE June 2015	No Future Improvements
Road and Bridge Improvements – Lovell Mountain Road	Flooding & Erosion/Lovell Mountain Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert on summer maintenance section of Class V road / DEFERRED due to lack of resources	Complete in October/Novemebr 2015
Road and Bridge Improvements – Millen Pond Road	Flooding & Erosion/Millen Pond Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert at Camp Morgan entrance / DEFERRED due to lack of resources	Complete in summer of 2017
Road and Bridge Improvements –Millen Pond Road	Flooding & Erosion/Millen Pond Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert at Rochfords' camp / COMPLETE July	No Future Improvements

				2013	
Road and Bridge Improvements – Halfmoon Pond Road	Flooding & Erosion/Halfmoon Pond Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert after boat landing / DEFERRED due to lack of resources	Complete in summer of 2018
Island Pond Road & Dam	Dam Failure/Island Pond Road	DPW Director	High	Install slip liner in existing culvert which is part of dam system to mitigate future dam breach / COMPLETE July 2010	No Future Improvements
Road and Bridge Improvements – Valley Road	Flooding & Erosion/Valley Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert by Jane Kelly's / COMPLETE July 2011	No Future Improvements
Road and Bridge Improvements – Valley Pond Road	Flooding & Erosion/Valley Pond Road	DPW Director	High	Replace culvert inadequate for water flow with larger culvert by Bob & Rita Joys' / COMPLETE July 2011	No Future Improvements
Road and Bridge Improvements – Ayers Pond Road	Erosion/Ayers Pond Road	DPW Director	High	Improve drainage work by Marshalls / COMPLETE July 2011	No Future Improvements
Road and Bridge Improvements – Bear Hill Road	Erosion/Bear Hill Road	DPW Director	High	Improve drainage with ditches and blasting / DEFERRED due to lack of resources	Complete in 2018
Road and Bridge Improvements – Halfmoon Pond Road	Erosion/ Halfmoon Pond Road	DPW Director	High	Improve drainage with ditch work; tree work; and pavement to prevent drainage clogging on very steep grade near Jagers' / DEFERRED due to lack of resources	Plan to Improve drainage with ditch work and tree work, but do not pave the steep hill, complete in 2018
Road and Bridge Improvements – Old Marlow Road	Erosion/Old Marlow Road	DPW Director	High	Improve drainage and pave to prevent drainage clogging on very steep grade / DEFERRED due to lack of resources	Plan to Improve drainage with ditch work and tree work, but do not pave the steep hill, complete in 2018
Road and Bridge Improvements – Farnsworth Hill Road	Erosion/Farnsworth Hill Road	DPW Director	High	Pave road to prevent clogging of drainage on very steep grade / DEFERRED due to lack of resources	Complete in 2020
Road and Bridge Improvements – Bailey Hill Road	Erosion/Bailey Hill Road	DPW Director	High	Improve drainage and pave road to prevent drainage clogging / Improvements complete without paving which was not needed, COMPLETED in 2014	No Future Improvements

Road and Bridge Improvements – Halfmoon Pond Road	Erosion/ Halfmoon Pond Road	DPW Director	Low	Improve drainage on gradual slope over ledge north of Lovell Mountain Road / NOT COMPLETED; remove from plan	No Future Improvements, remove from plan.
Wildfire – Water Source for fire fighting	Wildfire/Entire Town	Forest Fire Warden	Average	Map and assess water sites and other resources along woods roads and trails for wildland firefighting. / DEFERRED due to lack of resources	Complete in 2016
Fire Suppression – Dry Hydrants Valley Road	Wildfire/Valley Road Area	Fire Chief	High	Install dry hydrant to provide year-round access to water fire protection / DEFERRED due to lack of resources	Complete in 2017
Fire Suppression – Dry Hydrants Boat Launch Peninsula Road	Wildfire/Boat Launch Peninsula Road	Fire Chief	Average	Install dry hydrant to provide year-round access to water fire protection / Not technically feasible, remove from plan	No Future Improvements remove from plan.
Fire Suppression – Dry hydrants Washington Drive Dam Area	Wildfire/ Washington Drive Dam Area	Fire Chief	Average	Install dry hydrant to provide year-round access to water fire protection / Not technically feasible, remove from plan	No Future Improvements, remove from plan.
Fire Suppression – Cisterns Eastern side of Highland Lake	Wildfire/ Eastern side of Highland Lake	Fire Chief	Average	Install cistern to provide year-round access to water fire protection / Not technically feasible, remove from plan	No Future Improvements, remove from plan.
Fire Suppression – Cisterns Washington Heights Road	Wildfire/Washington Heights Road	Fire Chief	Average	Install cistern to provide year-round access to water fire protection / Not technically feasible, remove from plan	No Future Improvements, remove from plan.
Fire Suppression – Cisterns Martin Road	Wildfire/Martin Road	Fire Chief		Install cistern to provide year-round access to water fire protection / Not technically feasible, remove from plan	No Future Improvements, remove from plan.
Hazard Tree Trimming – Equipment Purchase	All Hazards/Entire Town	DPW Director	Average	Purchase bucket truck for Public Works to limb and remove hazard trees / COMPLETE 2010	No Future Improvements

The Town of Washington will add to their existing public education and outreach program by using brochures and the town website to reach their citizens. There will also be one-on-one outreach as appropriate. Below is a table showing the potential topics and outreach methods. Dam failure is not included as this is performed by the State Dam bureau in their assessment of all dams in the State.

Table VI-1: PUBLIC EDUCATION AND OUTREACH TOPICS

Natural Hazard	Educational Topics	Outreach Methods
Multi-Hazard	Shelters; evacuation routes; proper evacuation procedures; emergency kits and family plans	Town web site Town meeting display
Flooding	Benefits of joining the National Flood Insurance Program participation; building in a floodplain; stormwater runoff; driving on flooded roads; protecting natural systems which provide flood mitigation; securing property items such as propane tanks prior to a flood	Town web site Brochures
Wind Events (Hurricane, Tornado, Downburst	Wind retrofits such as shutters, hurricane clips; school and town official sheltering basics; resident and business sheltering basics; window coverings	Town web site
Severe Winter Weather	Installation of carbon monoxide monitor and alarms; ventilation of fuel-burning equipment; protecting water pipes	Town web site
Thunderstorms/Lightning/Hail	Taking cover; staying inside when it thunders	Town web site
Earthquake	Structural and non-structural home retrofitting; securing furnishings	Town web site
Drought	Water-saving measures; crop insurance; soil and water conservation practices by farmers	Town web site
Extreme Heat	Preparing for extreme heat; air conditioning; cooling shelters	Town web site
Erosion	High risk areas; stormwater management; bank stabilization; water body buffers	Town web site
Wildfire	Most vulnerable areas; reducing fuel for fires such as dry brush	Town web site; Fire Department and Fire Warden interactions
Natural Contaminants	Testing for contaminants in air and water	Town web site
Hazardous Materials Spills	What to do if there's a fuel delivery spill	Town web site

B. NEW MITIGATION PROGRAMS

The Committee evaluated the existing programs and proposed improvements to determine if they were addressing all the hazards they felt could impact the town. Table VII-3 summarizes this evaluation and notes where new programs could be implemented to address all hazards.

Table VI-2: Committee Assessment for New Hazard Mitigation Actions

Hazard	Committee Ideas and Assessment
Dam Failure	Most of the dams are privately owned, the committee feels that the state inspections are adequate and that there are not additional actions they can take at this time.
Flooding	Flooding often creates problems on town roads where culverts and bridges are not large enough – the town has identified several projects to complete, Bridges on Ayers Pond Road and Smith Pond Road and a culvert on Faxson Hill Road and King Street.
Hurricane	The committee feels that the result of most hurricanes in Washington is flooding which they have designated several mitigation actions to address. The town will continue to trim trees to prevent damage; the DPW keeps an annual list of trees to be trimmed.
Tornado & Downburst	The committee feels the wind damage would be very similar to that of a hurricane which they addressed.
Thunderstorm/Lightning/Hail	The town has installed lightning rods on the town hall due to past strikes. They do not feel that any other town buildings are at risk. The wind resulting would be similar to that of Tornado and Hurricane. The committee would like to develop and execute a comprehensive policy for surge protectors on all town computers and electrical equipment.
Severe Winter Weather	The tree trimming would aid in winter storm. The committee did not think there were additional actions that could be taken to reduce the impacts of severe winter weather.
Earthquake	The committee did not feel that there were any additional mitigation actions that were feasible for the town.
Drought	The committee did not feel that there were any additional mitigation actions that were feasible for the town.
Extreme Heat	The committee did not feel that there were any additional mitigation actions that were feasible for the town.
Erosion	The erosion issues are many times part of the culvert and drainage projects. The committee felt that the already identified projects address all of the current erosion issues they have.
Wildfire	The committee did not feel that there were any additional mitigation actions that were feasible for the town. The town recently started inspecting each fire ring that was being issued for a fire permit.
Natural Water & Air Contaminants	The committee did not feel that there were any additional mitigation actions that were feasible for the town.
Hazardous Material Spills	Currently members of Southwest Mutual Aid, they did not feel they needed to take additional action.
Terrorism	Terrorism is not seen to be a large concern at this time in Washington. Though the committee recognizes the sometimes random and unexpected nature of terrorism.

Table VI-4 provides a list of proposed new mitigation actions including ones that had been proposed in the previous plan. If these actions had not been accomplished since the last plan, then there is an explanation, however, both new mitigation actions are new.

Table VI-3: Proposed New Mitigation Actions

Proposed New Mitigation Action Description	Hazard Type/Service Area	Responsible Local Agent	If Recommended in Previous Plan, why was it not put into place?
Faxson Hill Road – Upsize culvert at the Fire Pond	Flooding, Erosion / Faxson Hill Road	DPW Director	
Ayers Pond Road Bridge – Expand Bridge to allow for additional water flow in storm conditions	Flooding / Ayers Pond Road	DPW Director	
Smith Pond Road Bridge - Red List Bridge, rehab culvert to accommodate increased capacity for additional water flows in storm conditions	Flooding / Smith Pond Road	DPW Director	
King Street Culvert – Increase capacity of undersized culvert on King Street	Erosion, Flooding / King Street	DPW Director	
Tree Trimming – Execute a tree trimming plan town wide to prevent storm damage from downed limbs	Severe Winter Weather, Hurricane, Tornado & Downburst, Thunderstorm, Lightning & Hail / Entire Town	DPW Director	
Electrical Equipment – Install and maintain surge protection on critical electronic equipment at all town facilities	Lightning, Severe Winter Weather, Hurricane / Entire Town	Selectmen	
Culvert Inventory	Flooding, Erosion	DPW Director	

C. CRITICAL EVALUATION FOR IMPROVEMENTS TO EXISTING PROGRAMS AND NEW PROGRAMS

The Washington Hazard Mitigation Committee reviewed each of the proposed improvements to existing programs and proposed new programs identified for existing mitigation programs using the following factors:

- Does it reduce disaster damage?
- Does it contribute to community objectives?

- Does it meet existing regulations?
- Can it be quickly implemented?
- Is it socially acceptable?
- Is it technically feasible?
- Is it administratively possible?
- Does the action offer reasonable benefits compared to cost of implementation?

Each mitigation strategy was evaluated and assigned a score (High – 3; Average – 2; and Low – 1) based on the criteria.

The Washington Hazard Mitigation Committee assigned the following scores to each strategy for its effectiveness related to the critical evaluation factors listed above, and actions had the following scores, with the highest scores suggesting the highest priority. These scores are re-evaluated during each update process for new and existing strategies.

Table VI-4: PRIORITIZING PROPOSED & EXISTING HAZARD MITIGATION IMPROVEMENTS TO EXISTING PROGRAMS

Rank	Strategy	Reduce Damage	Community Objectives	Existing Regulations	Quickly Implemented	Socially Acceptable	Technically Feasible	Administration. Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
1	**Road and Bridge Improvements – Millen Pond Road** Replace culvert inadequate for water flow with larger culvert at Camp Morgan entrance	3	3	3	2	3	3	2	3	22	New
1	**Road and Bridge Improvements – Halfmoon Pond Road** Replace culvert inadequate for water flow with larger culvert after boat landing	3	3	3	2	3	3	2	3	22	New
1	**Culvert Inventory – Entire town inventory**	2	3	3	3	3	3	3	2	22	New
2	**Electrical Equipment – Install and maintain surge protection on critical electronic equipment at all town facilities**	2	2	3	2	3	3	3	3	21	New
3	**Tree Trimming – Execute a tree trimming plan town wide to prevent storm damage from downed limbs**	1	2	3	3	3	2	2	3	19	Both
4	**Faxon Hill Road – Upsize culvert at the Fire Pond**	2	2	3	2	2	2	2	2	17	New
4	**Road and Bridge Improvements – Farnsworth Hill Road** Pave road to prevent clogging of drainage on very steep grade	1	2	3	2	2	2	2	3	17	Both
4	**Master Plan -** 2015/16 Master Plan Update will incorporate the Hazard Mitigation Plan.	1	2	2	2	2	3	3	2	17	Both

Rank	Strategy	Reduce Damage	Community Objectives	Existing Regulations	Quickly Implemented	Socially Acceptable	Technically Feasible	Administration. Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
4	**National Flood Insurance Program -** Continue to provide information through public outreach and participate in NFIP trainings when they are available.	1	3	2	3	2	2	2	2	17	Both
5	**King Street Culvert – Increase capacity of undersized culvert on King Street**	1	2	3	2	2	2	2	2	16	New
5	**Road and Bridge Improvements – Lovell Mountain Road** Replace culvert inadequate for water flow with larger culvert on summer maintenance section of Class V road	1	2	3	2	2	2	2	2	16	Both
5	**Road and Bridge Improvements – Bear Hill Road** Improve drainage with ditches and blasting	1	2	3	2	2	2	2	2	16	Both
5	**Road and Bridge Improvements – Halfmoon Pond Road** Plan to Improve drainage with ditch work and tree work, but do not pave the steep hill, complete in 2018	1	2	3	2	2	2	2	2	16	New
5	**Road and Bridge Improvements – Old Marlow Road** Plan to Improve drainage with ditch work and tree work, but do not pave the steep hill, complete in 2018	1	2	3	2	2	2	2	2	16	New
6	**Ayers Pond Road Bridge – Expand Bridge to allow for additional water flow in storm conditions**	1	2	3	2	2	2	2	1	15	New
6	**Smith Pond Road Bridge - Red List Bridge, rehab culvert to accommodate increased capacity for additional water flows in storm conditions**	1	2	3	2	2	2	2	1	15	New
7	**Wildfire – Water Source for firefighting** Map and assess water sites and other resources along woods roads and trails for wildland firefighting.	1	2	3	1	2	2	2	1	14	Both

D. EMERGENCY PREPAREDNESS ACTIONS

Although this is a hazard mitigation plan, the Committee felt it was important to address new and proposed emergency preparedness actions. It is sometimes difficult to distinguish between hazard mitigation and emergency preparedness. Essentially, emergency preparedness is the preparation to act once a hazard has occurred. And as has been discussed previously, hazard mitigation includes

actions to eliminate or reduce hazards before they happen. Table VI-7 below is a list of the emergency preparedness actions that the Committee felt should be addressed and included in this plan.

Table VI-5: EMERGENCY PREPAREDNESS ACTIONS & PROPOSED IMPROVMENTS

Existing Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met*	Update/Future Proposed Improvements
Local Emergency Operations Plan – Plan to deal with emergencies	All Hazards/Entire Town	EMD	High	Receive more training / *Completed on an ongoing basis and during the 2014 LEOP update.*	No further actions required.
Haz/Mat Program – Southwest Mutual Aid	HazMat Spills/Entire Town	Fire Chief	High	Purchase more personal protection equipment and water recovery equipment; more training. / The town has continual been updating it's equipment.	Continue to update equipment as funds become available.
Dam Emergency Plans and Maintenance	Dam Failure/Dam Inundation Areas	NH Dam Bureau and Dam Owners	High	More Public Awareness through web site and notices to property owners in inundation areas / Started and education program	No Further actions required.
Mutual Aid - Police–	All hazards/Entire Town	Police Chief	High	No Actions recommended in previous plan	Continue to participate in Mutual Aid
Mutual Aid – Fire – Southwest Mutual Aid	All Hazards/Entire Town	Fire Chief	High	No Actions recommended in previous plan	Continue to participate in Mutual Aid
Mutual Aid – Public works	All Hazards/Entire Town	DPW Director	High	No New actions recommended in previous plan	Continue to participate in Mutual Aid
Reverse 911	All Hazards/Entire Town	Police Chief	Average	Acquire Reverse 911 system / Not needed due to state system	Remove from next plan.
911 Numbering -	All Hazards/ Entire Town	Police Chief	Low	Enforce numbering and require replacement of illegible numbers.	Continue replacement and enforcement policy.

Existing Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met*	Update/Future Proposed Improvements
Source Water Protection	Flooding & Erosion / Entire Town	Planning Board and Conservation Commission		Develop water resource protection plan to address issues pertaining to water quantity and quality for the town's many water bodies / Attempted; lack of support from town residents	
ICS & NIMS	All Hazards/Entire Town	EMD	Average	Provide additional training to town office staff and school personnel.	Continue to provided the training as available.

VII. PRIORITIZED IMPLEMENTATION SCHEDULE

The Washington Hazard Mitigation Committee created the following action plan for implementation of proposed and continuing hazard mitigation strategies:

The timeframe's for project completion are defined as:

SHORT TERM: 1 years or less, or ongoing
MEDIUM TERM: 2-3 years
LONG TERM: 4-5 years

Table VII-1: PRIORITIZED IMPLEMENTATION SCHEDULE FOR EXISTING PROGRAM IMPROVEMENTS

Location: Mitigation Action	Who (Leadership)	When	How (Funding Sources)	Cost (Estimated)
Faxon Hill Road – Upsize culvert at the Fire Pond	DPW Director	Medium Term	Taxes	$30,000
Ayers Pond Road Bridge – Expand Bridge to allow for additional water flow in storm conditions	DPW Director	Long Term	Taxes	$200,000

Location: Mitigation Action	Who (Leadership)	When	How (Funding Sources)	Cost (Estimated)
Smith Pond Road Bridge - Red List Bridge, rehab culvert to accommodate increased capacity for additional water flows in storm conditions	DPW Director	Medium Term	Taxes, HMGP/PDM	$200,000
King Street Culvert – Increase capacity of undersized culvert on King Street	DPW Director	Medium Term	Taxes, HMGP/PDM	$80,000
Tree Trimming – Execute a tree trimming plan town wide to prevent storm damage from downed limbs	DPW Director	Ongoing, throughout the life of the plan.	Taxes	Staff Time
Electrical Equipment – Install and maintain surge protection on critical electronic equipment at all town facilities	Selectmen	Medium Term	Taxes, HMGP/PDM	$5,000
Road and Bridge Improvements – Lovell Mountain Road Replace culvert inadequate for water flow with larger culvert on summer maintenance section of Class V road	DPW Director	Medium Term	Taxes, HMGP/PDM	$4,000
Road and Bridge Improvements – Millen Pond Road Replace culvert inadequate for water flow with larger culvert at Camp Morgan entrance	DPW Director	Medium Term	Taxes, HMGP/PDM	$60,000
Road and Bridge Improvements – Halfmoon Pond Road Replace culvert inadequate for water flow with larger culvert after boat landing	DPW Director	Short Term	Taxes, HMGP/PDM	$4,000
Road and Bridge Improvements – Bear Hill Road Improve drainage with ditches and blasting	DPW Director	Medium Term	Taxes, HMGP/PDM	$5,000
Road and Bridge Improvements – Halfmoon Pond Road Plan to Improve drainage with ditch work and tree work, but do not pave the steep hill, complete in 2018	DPW Director	Medium Term	Taxes, HMGP/PDM	Staff Time
Road and Bridge Improvements – Old Marlow Road Plan to Improve drainage with ditch work and tree work, but do not pave the steep hill, complete in 2018	DPW Director	Medium Term	Taxes, HMGP/PDM	Staff Time
Master Plan – Include Hazard Mitigation in 2015/2016 Master Plan Update	Planning Board	Short Term	Taxes	Staff & Volunteer Time
NFIP - Continue to provide information through public outreach and participate in NFIP trainings when they are available.	Selectboard	Ongoing throughout life of plan	Taxes	Staff Time

Location: Mitigation Action	Who (Leadership)	When	How (Funding Sources)	Cost (Estimated)
Road and Bridge Improvements – Farnsworth Hill Road Pave road to prevent clogging of drainage on very steep grade	DPW Director	Long Term	Taxes HMGP/PDM,	$20,000
Wildfire – Water Source for firefighting Map and assess water sites and other resources along woods roads and trails for wildland firefighting.	Fire Chief/ Fire Warden	Long Term	Taxes	$5,000

VIII. ADOPTION & IMPLEMENTATION OF THE PLAN

A good plan needs to provide for periodic monitoring and evaluation of its successes and challenges, and to allow for updates of the Plan where necessary. In order to track progress and update the Mitigation Strategies identified in the Plan, the Town of Washington will revisit the Hazard Mitigation Plan *annually, or after a hazard event*. The Washington Emergency Management Director will initiate this review and should consult with the Hazard Mitigation Committee. Changes will be made to the plan to accommodate for projects that have failed, or that are not considered feasible after a review for their consistency with the evaluation criteria, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked highest, but that were identified as potential mitigation strategies, will be reviewed as well during the monitoring and update of this plan, to determine feasibility for future implementation. The plan will be updated and submitted for FEMA approval at a minimum every five years as required by the Disaster Mitigation Act 2000.

A. IMPLEMENTATION THROUGH EXISTING PROGRAMS

The Hazard Mitigation Committee will meet annually to reassess the plan and to assure that they are accomplishing their goals. Additionally, the Hazard Mitigation Committee will revisit the plan within 90 days of a declared disaster to review and revise the goals and actions of the plan. The Town had not incorporated hazard mitigation into Town documents in the past. The Town Selectboard, during the Capital Improvement Process, will review and include any proposed structural projects outlined in this plan. Reference will be made to the Hazard Mitigation Plan and Local Emergency Operations Plan as well as importance of hazard mitigation in appropriate Master Plan sections. In the past, the town has not formally reviewed the plan each year, but has used it informally has a planning tool. The town will also add hazard mitigation information to town web site.

Many municipalities have web sites where they can share information about hazard mitigation and emergency management. The use of the web site by its citizens is often dictated by the availability of broadband service to easily access the web. The Town of Washington will provide a link to the Regional Planning Commission's web page, "A Citizen's Guide to Hazard Mitigation and Emergency Management."

Municipalities have documents to convey town goals and objectives that are used to guide future programs. They can be used to promote and implement hazard mitigation. A Municipal Master Plan outlines how the community wants to grow and develop. It includes overall goals and objectives of the community and recommendations for ordinances and regulations to accomplish those goals.

A zoning ordinance is a common vehicle to implement goals of the master plan and regulates land use. It can be used to restrict development in flood zones, steep sloped areas, buffer zones around wetlands and water bodies, drinking water recharge areas, hillsides, and ridgelines. These areas may be "overlay districts" mapped out for protection. A zoning ordinance can also require best management practices in forestry and timber harvesting and stormwater management to prevent erosion. A floodplain management plan is part of the zoning ordinance and has typically followed a format recommended by the NH Flood Management Program. Other municipal documents include regulations such as Curb Cut Regulations, Excavation Regulations, Subdivision Regulations and Site Plan Review Regulations. Curb Cut Regulations are used to make sure the culverts at the intersection of driveways and roads are adequate to handle runoff water or stream flow. Excavation Regulations are used to restrict the removal of earth including distance to seasonal high water table and the requirements to restore the site once the excavation is completed. This is essential to make sure the area is graded and re-vegetated to reduce the chances of erosion. Subdivision Regulations determine how lots are to be laid out in a subdivision. This might include requirements for fire protection, stormwater runoff management, vegetated buffers, and reference back to the zoning ordinance where one exists. Site Plan Review Regulations are for multi-family housing and commercial development. The regulations can determine site specific development requirements such as parking, open space, vegetated buffers, and traffic flow.

Subdivision Regulations and Site Plan Review Regulations typically refer back to the Zoning Ordinance, so it may be more effective to amend the zoning ordinance to address hazard mitigation through specific restrictions though this can vary by municipality. In addition these regulations do not apply to single lot development of single-family residential homes. When there is not zoning ordinance as in Washington, there is much less control to guide development away from hazard areas.

Another important municipal document is the Capital Improvements Program which is a "budget of the future" to consider potential capital expenditures such as new roads, equipment, schools, parks. This allows a systematic evaluation of potential projects. Any capital expenditures related to hazard mitigation will be incorporated into this document.

There are other regulations and ordinances that municipalities may adopt such as to regulate water use during a drought or restrict development in areas around drinking water sources. This all varies by municipality.

It should also be noted that many municipalities do not update these documents very often, and some towns do not have them at all. However, where they exist, they offer the potential to include hazard mitigation and emergency management topics.

In Washington, the most recent version of the Master Plan is 2006, the latest version of Subdivision Regulations is 2010, and the Driveway Permit Application is 2014. The most critical documents to reference hazard mitigation are primarily the master plan and the zoning ordinance. Washington is undergoing a Master Plan update and a Hazards and Emergency Management Chapter is being

included in the update. The town will continue to evaluate its documents to include hazard mitigation. The Town reviews their Capital Improvement Program annually and uses the actions in the Hazard Mitigation Plan as a tool to aid in the CIP process.

B. CONTINUED PUBLIC INVOLVEMENT

The public will continue to be invited to participate in the hazard mitigation planning process. In future years, a public meeting will be held (separate from the adoption hearing) to inform and educate members of the public. Additionally, a press release will be distributed to local papers (it is up to the newspaper if they will print press releases or not), and information will be posted on the Town website.

Copies of the Hazard Mitigation Plan have been or will be sent to the following parties for review and comment:

- NH Homeland Security & Emergency Management
- Washington Select Board, Conservation Commission, and Planning Board
- Upper Valley Lake Sunapee Regional Planning Commission

RESOURCES USED IN THE PREPARATION OF THIS PLAN

FEMA *Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000,* March 2004, Last Revised June 2007

FEMA 386-1 *Getting Started: Building Support for Mitigation Planning*, September 2002

FEMA 386-2 *Understanding Your Risks: Identifying Hazards and Estimating Costs,* August 2001

FEMA 386-3 *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies*, April 2003

Ice Storm '98 by Eugene L. Lecomte et al for the Institute for Catastrophic Loss Reduction (Canada) and the Institute for Business & Home Safety (U.S.), December 1998

Town of Washington Emergency Operations Plan, 2014

Town of Washington Master Plan, 2006

NH HSEM's *State of New Hampshire Multi-Hazard Mitigation Plan*, 2013

www.fema.gov/news/disasters.fema: Website for FEMA's Disaster List
www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms: Website for National Oceanic & Atmospheric Administration Disaster List

www.tornadoproject.com: Website for The Tornado Project

www.crrel.usace.army.mil/: Website for Cold Regions Research and Engineering Laboratory Website (CRREL)

www.nesec.org: Website for Northeast States Emergency Consortium

http://earthquake.usgs.gov/research/hazmaps/products_data/2002/ceus2002.php: Website for area earthquake information

APPENDICES

Appendix A: **Technical Resources**

Appendix B: **Hazard Mitigation Assistance Grants**

Appendix C: **Meeting Documentation**

Appendix D: **Map of Hazard Areas and Critical Facilities**

Appendix E: **Town Adoption & FEMA Approvals of Hazard Mitigation Plan**

APPENDIX A:

Technical Resources

APPENDIX A: TECHNICAL RESOURCES

1) Agencies

New Hampshire Homeland Security and Emergency Management
Hazard Mitigation Section 271-2231
Federal Emergency Management Agency ..... (617) 223-4175
NH Regional Planning Commissions:
Upper Valley Lake Sunapee Regional Planning Commission 448-1680
NH Executive Department:
Governor's Office of Energy and Community Services 271-2611
New Hampshire Office of State Planning 271-2155
NH Department of Cultural Affairs: 271-2540
Division of Historical Resources 271-3483
NH Department of Environmental Services: 271-3503
Air Resources 271-1370
Waste Management 271-2900
Water Resources 271-3406
Water Supply and Pollution Control 271-3504
Rivers Management and Protection Program 271-1152
NH Office of Energy and Planning 271-2155
NH Municipal Association 224-7447
NH Fish and Game Department 271-3421
NH Department of Resources and Economic Development: 271-2411
Natural Heritage Inventory 271-3623
Division of Forests and Lands 271-2214
Division of Parks and Recreation 271-3255
NH Department of Transportation 271-3734
Northeast States Emergency Consortium, Inc. (NESEC) ..... (781) 224-9876
US Department of Commerce:
National Oceanic and Atmospheric Administration:
National Weather Service; Gray, Maine 207-688-3216

US Department of the Interior:
US Fish and Wildlife Service 225-1411
US Geological Survey 225-4681
US Army Corps of Engineers..... (978) 318-8087
US Department of Agriculture:
Natural Resource Conservation Service 868-7581

2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP) ..... NH Homeland Security and Emergency Management
406 Public Assistance and Hazard Mitigation ..... NH Homeland Security and Emergency Management
Community Development Block Grant (CDBG)..... NH HSEM, NH OEP, also refer to RPC
Dam Safety Program ..... NH Department of Environmental Services
Disaster Preparedness Improvement Grant (DPIG) ..... NH Homeland Security and Emergency Management
Emergency Generators Program by NESEC‡ ..... NH Homeland Security and Emergency Management
Emergency Watershed Protection (EWP) Program ..... USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP) ..... NH Homeland Security and Emergency Management
Flood Plain Management Services (FPMS) ..... US Army Corps of Engineers
Mitigation Assistance Planning (MAP) ..... NH Homeland Security and Emergency Management
Mutual Aid for Public Works..... NH Municipal Association
National Flood Insurance Program (NFIP) † ..... NH Office of Energy and Planning
Power of Prevention Grant by NESEC‡ ..... NH Homeland Security and Emergency Management
Project Impact..... NH Homeland Security and Emergency Management
Roadway Repair & Maintenance Program(s) ..... NH Department of Transportation
Section 14 Emergency Stream Bank Erosion & Shoreline Protection..... US Army Corps of Engineers
Section 103 Beach Erosion..... US Army Corps of Engineers
Section 205 Flood Damage Reduction..... US Army Corps of Engineers
Section 208 Snagging and Clearing ..... US Army Corps of Engineers
Shoreland Protection Program..... NH Department of Environmental Services
Various Forest and Lands Program(s)..... NH Department of Resources and Economic Development
Wetlands Programs..... …..NH Department of Environmental Services

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

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

3) Websites

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	http://www.colorado.edu/litbase/hazards/	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	http://wxp.eas.purdue.edu/hurricane	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	http://nemaweb.org	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center "Disaster Finder:	http://www.gsfc.nasa.gov/ndrd/disaster/	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	http://ltpwww.gsfc.nasa.gov/ndrd/main/html	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	http://www.statelocal.gov/	General information through the federal-state partnership.
National Weather Service	http://nws.noaa.gov/	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	http://h20.usgs.gov/public/realtime.html	Provisional hydrological data
Dartmouth Flood Observatory	http://www.dartmouth.edu/artsci/geog/floods/	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	http://www.fema.gov/fema/csb.htm	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	http://www.met.fsu.edu/explores/tropical.html	Tracking and NWS warnings for Atlantic Hurricanes and other links

Sponsor	Internet Address	Summary of Contents
National Lightning Safety Institute	http://lightningsafety.com/	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	http://www.ghcc.msfc.nasa.gov/otd.html	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	http://wwwep.es.llnl.gov/wwwep/ghp.html	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	http://www.tornadoroject.com/	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	http://www.nssl.uoknor.edu/	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster Risk Map	http://www.iiaa.iix.com/ndcmap.htm	A multi-disaster risk map.
Earth Satellite Corporation	http://www.earthsat.com/	Flood risk maps searchable by state.
USDA Forest Service Web	http://www.fs.fed.us/land	Information on forest fires and land management.

APPENDIX B:

Hazard Mitigation Assistance Grants

APPENDIX B:
HAZARD MITIGATION ASSISTANCE GRANTS

Hazard Mitigation Assistance (HMA) grant programs of the Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA), presents a critical opportunity to protect individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds. The HMA programs provide pre-disaster mitigation grants annually to local communities. The statutory origins of the programs differ, but all share the common goal of reducing the loss of life and property due to natural hazards. Eligible applicants include State-level agencies including State institutions; Federally recognized Indian Tribal governments; Public or Tribal colleges or universities (PDM only); and Local jurisdictions that are participating in the National Flood Insurance Program (NFIP).

All subapplicants for Flood Mitigation Assistance Program (FMA) must currently be participating in the National Flood Insurance Program (NFIP) to be eligible to apply for this grant. Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) mitigation project subapplications for projects sited within a special flood hazard area are eligible only if the jurisdiction in which the project is located is participating in the NFIP. There is no NFIP participation requirement for HMGP and PDM project subapplications located outside the special flood hazard area. Properties included in a project subapplication for FMA funding must be NFIP-insured at the time of the application submittal. Flood insurance must be maintained at least through completion of the mitigation activity.

The HMA grant assistance includes three programs:

1. *Hazard Mitigation Grant Program (HMGP*): This program assists in the implementation of long-term hazard mitigation measures following a major disaster.

2. *The Pre-Disaster Mitigation (PDM) program*: This provides funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are awarded on a competitive basis.

3. *The Flood Mitigation Assistance (FMA) program*: This provides funds so that cost-effective measures can be taken to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the NFIP. The long-term goal of FMA is to reduce or eliminate claims under the NFIP through mitigation activities.

Potential eligible projects are shown in the following table by grant program. For further information on these programs visit the following FEMA websites:

HMGP - http://www.fema.gov/hazard-mitigation-grant-program

PDM – www.fema.gov/government/grant/pdm/

FMA – www.fema.gov/government/grant/fma

Mitigation Project:	HMPG	PDM	FMA
1. Mitigation Projects	**X**	**X**	**X**
Property Acquisition and Structure Demolition	**X**	**X**	**X**
Property Acquisition and Structure Relocation	**X**	**X**	**X**
Structure Elevation	**X**	**X**	**X**
Mitigation Reconstruction	**X**	**X**	**X**
Dry Floodproofing of Historic Residential Structures	**X**	**X**	**X**
Dry Floodproofing of Non-residential Structures	**X**	**X**	**X**
Localized Flood Reduction Projects	**X**	**X**	**X**
Non-Localized Flood Risk Reduction Projects	**X**	**X**	
Structural Retrofitting of Existing Buildings	**X**	**X**	**X**
Non-structural Retrofitting of Existing Buildings and Facilities	**X**	**X**	**X**
Safe Room Construction	**X**	**X**	
Wind Retrofit for One- and Two-Family Residences	**X**	**X**	
Infrastructure Retrofit	**X**	**X**	**X**
Soil Stabilization	**X**	**X**	**X**
Wildfire Mitigation	**X**	**X**	
Post-Disaster Code Enforcement	**X**		
Generators	**X**	**X**	
5% Initiative Projects	**X**		
Advance Assistance	**X**		
Misc./Other	**X**	**X**	**X**
2. Hazard Mitigation Planning	**X**	**X**	**X**
Planning Related Activities	**X**		

3. Technical Assistance			**X**
4. Management Costs	**X**	**X**	**X**

OTHER HAZARD MITIGATION ASSISTANCE FUNDING

Environmental Protection Agency

The EPA makes available funds for water management and wetlands protection programs that help mitigate against future costs associated with hazard damage.

Mitigation Funding Sources Program	Details	Notes
Clean Water Act Section 319 Grants	Grants for water source management programs including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and regulation. http://www.epa.gov/OWOW/NPS/cwact.html	Funds are provided only to designated state and tribal agencies
Clean Water State Revolving Funds	State grants to capitalize loan funds. States make loans to communities, individuals, and others for high-priority water-quality activities. http://www.epa.gov/owow/wetlands/initiative/srf.html	States and Puerto Rico
Wetland Program Development Grants	Funds for projects that promote research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. http://www.epa.gov/owow/wetlands/initiative/#financial	See website

National Oceanic and Atmosphere Administration (NOAA)

NOAA is the major source for mitigation funding related to coastal zone management and other coastal protection projects.

Mitigation Funding Sources Program	Details	Notes
Coastal Services Center Cooperative Agreements	Funds for coastal wetlands management and protection, natural hazards management, public access improvement, reduction of marine debris, special area management planning, and ocean resource planning. http://www.csc.noaa.gov/funding/	May only be used to implement and enhance the states' approved Coastal Zone Management programs
Coastal Services Center Grant Opportunities	Formula and program enhancement grants for implementing and enhancing Coastal Zone Management programs that have been approved by the Secretary of Commerce. http://www.csc.noaa.gov/funding/	Formula grants require non-federal match
Coastal Zone Management Program	The Office of Ocean and Coastal Resource Management (OCRM) provides federal funding and technical assistance to better manage our coastal resources. http://coastalmanagement.noaa.gov/funding/welcome.html	Funding is reserved for the nation's 34 state and territory Coastal Zone Management Programs

Marine and Coastal Habitat Restoration	Funding for habitat restoration, including wetland restoration and dam removal. http://www.nmfs.noaa.gov/habitat/recovery/	Funding available for state, local and tribal governments and for- and non-profit organizations.

Floodplain, Wetland and Watershed Protection Programs

USACE and the U.S. Fish and Wildlife Service offer funding and technical support for programs designed to protect floodplains, wetlands, and watersheds.

Funding and Technical Assistance for Wetlands and Floodplains Program	Details	Notes
USACE Planning Assistance to States (PAS)	Fund plans for the development and conservation of water resources, dam safety, flood damage reduction and floodplain management. http://www.lre.usace.army.mil/planning/assist.html	50 percent non-federal match
USACE Flood Plain Management Services (FPMS)	Technical support for effective floodplain management. http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&MyCategory=126	See website
USACE Environmental Laboratory	Guidance for implementing environmental programs such as ecosystem restoration and reuse of dredged materials. http://el.erdc.usace.army.mil/index.cfm	See website
U.S. Fish & Wildlife Service Coastal Wetlands Conservation Grant Program	Matching grants to states for acquisition, restoration, management or enhancement of coastal wetlands. http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home	States only. 50 percent federal share
U.S. Fish & Wildlife Service Partners for Fish and Wildlife Program	Program that provides financial and technical assistance to private landowners interested in restoring degraded wildlife habitat. http://ecos.fws.gov/partners/viewContent.do?viewPage=home	Funding for volunteer-based programs

Housing and Urban Development

The Community Development Block Grants (CDBG) administered by HUD can be used to fund hazard mitigation projects.

Mitigation Funding Sources Program	Details	Notes
Community Development Block Grants (CDBG)	Grants to develop viable communities, principally for low and moderate income persons. CDBG funds available through Disaster Recovery Initiative. http://www.hud.gov/offices/cpd/communitydevelopment/programs/	Disaster funds contingent upon Presidential disaster declaration
Disaster Recovery Assistance	Disaster relief and recovery assistance in the form of special mortgage financing for rehabilitation of impacted homes. http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm	Individuals
Neighborhood Stabilization Program	Funding for the purchase and rehabilitation of foreclosed and vacant property in order to renew neighborhoods devastated by the economic crisis. http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/	State and local governments and non-profits

Bureau of Land Management

The Bureau of Land Management (BLM) has two technical assistance programs focused on fire mitigation strategies at the community level.

Mitigation Funding Sources Program	Details	Notes
Community Assistance and Protection Program	Focuses on mitigation/prevention, education, and outreach. National Fire Prevention and Education teams are sent to areas across the country at-risk for wildland fire to work with local residents. http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html	See website
Firewise Communities Program	Effort to involve homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire before a fire starts. http://www.firewise.org/	See website

U.S. Department of Agriculture

There are multiple mitigation funding and technical assistance opportunities available from the USDA and its various sub-agencies: the Farm Service Agency, Forest Service, and Natural Resources Conservation Service.

Mitigation Funding Sources Agency Program	Details	Notes
USDA Smith-Lever Special Needs Funding	Grants to State Extension Services at 1862 Land-Grant Institutions to support education-based approaches to addressing emergency preparedness and disasters. http://www.csrees.usda.gov/funding/rfas/smith_lever.html	Population under 20,000
USDA Community Facilities Guaranteed Loan Program	This program provides an incentive for commercial lending that will develop essential community facilities, such as fire stations, police stations, and other public buildings. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population under 20,000
USDA Community Facilities Direct Loans	Loans for essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population of less than 20,000
USDA Community Facilities Direct Grants	Grants to develop essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population of less than 20,000
USDA Farm Service Agency Disaster Assistance Programs	Emergency funding and technical assistance for farmers and ranchers to rehabilitate farmland and livestock damaged by natural disasters. http://www.fsa.usda.gov/	Farmers and ranchers
USDA Forest Service National Fire Plan	Funding for organizing, training, and equipping fire districts through Volunteer, State and Rural Fire Assistance programs. Technical assistance for fire related mitigation. http://www.forestsandrangelands.gov/	See website
USDA Forest Service Economic Action Program	Funds for preparation of Fire Safe plans to reduce fire hazards and utilize byproducts of fuels management activities in a value-added fashion. http://www.fs.fed.us/spf/coop/programs/eap/	80% of total cost of project may be covered
USDA Natural Resources Conservation Service Emergency Watershed Protection Support	Funds for implementing emergency measures in watersheds in order to relieve imminent hazards to life and property created by a natural disaster. http://www.nrcs.usda.gov/programs/ewp/	See website

Mitigation Funding Sources Agency Program	Details	Notes
Services		
USDA Natural Resources Conservation Service Watershed Protection and Flood Prevention	Funds for soil conservation; flood prevention; conservation, development, utilization and disposal of water; and conservation and proper utilization of land. http://www.nrcs.usda.gov/programs/watershed/index.html	See website

Health and Economic Agencies

Alternative mitigation programs can be found through health and economic agencies that provide loans and grants aimed primarily at disaster relief.

Federal Loans and Grants for Disaster Relief Agency Program	Details	Notes
Department of Health & Human Services Disaster Assistance for State Units on Aging (SUAs)	Provide disaster relief funds to those SUAs and tribal organizations who are currently receiving a grant under Title VI of the Older Americans Act. http://www.aoa.gov/doingbus/fundopp/fundopp.asp	Areas designated in a Disaster Declaration issued by the President
Economic Development Administration (EDA) Economic Development Administration Investment Programs	Grants that support public works, economic adjustment assistance, and planning. Certain funds allocated for locations recently hit by major disasters. http://www.eda.gov/AboutEDA/Programs.xml	The maximum investment rate shall not exceed 50 percent of the project cost
U.S. Small Business Administration Small Business Administration Loan Program	Low-interest, fixed rate loans to small businesses for the purpose of implementing mitigation measures. Also available for disaster damaged property. http://www.sba.gov/services/financialassistance/index.html	Must meet SBA approved credit rating

Research Agencies

The United States Geological Survey (USGS) and the National Science Foundation (NSF) provide grant money for hazard mitigation-related research efforts.

Hazard Mitigation Research Grants Agency Program	Details	Notes
National Science Foundation (NSF) Decision, Risk, and Management Sciences Program (DRMS)	Grants for small-scale, exploratory, high-risk research having a severe urgency with regard to natural or anthropogenic disasters and similar unanticipated events. http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&org=SES	See website
U.S. Geological Survey (USGS) National Earthquake Hazards Reduction Program	The purpose of NEHRP is to provide products for earthquake loss reduction to the public and private sectors by carrying out research on earthquake occurrence and effects. http://www.usgs.gov/contracts/nehrp/	Community with a population under 20,000

Appendix C: Meeting Documentation

Washington, NH Hazard Mitigation Committee Meeting
Wednesday, July 1, 2015 12:00

Session One

- General discussion of requirements and in-kind match process
- Review goals of hazard mitigation plan and revise
- Review hazards
- Identify and map past/potential hazards
- Flooding – Are there any non-FEMA flood areas?
- Specific past and potential events of hazards not in 2010 Plan (Recent Storms and Damage)
- Potential development areas in town (compare with list in 2010 plan)
- Identify critical facilities (update map and list)
- Determine Vulnerability to Hazards for Town
- Determine Probability of Hazards for Town
- Review Critical Facilities & hazard vulnerability

BREAK

Session 2

- Review previously determined potential mitigation efforts (were they implemented? If not, why not and are they still on the table to be implemented?)
- Brainstorm improvements to existing mitigation efforts
- Brainstorm potential new mitigation efforts

BREAK

Session 3

- Evaluate the past and potential mitigation efforts
- Develop a prioritized implementation schedule and discuss the adoption and monitoring of the plan

Washington, NH Hazard Mitigation Committee Meeting
Wednesday, July 1, 2015 2:00

- Review List of Dams
- Past Storms and Related Damages
- Review Projects and project details
- Review Plan

Washington Hazard Mitigation Committee - Wednesday, July 1, 2015		
Name	**Postion**	**Email**
Brian P. Moser	Fire Chief	bmoser@washingtonnh.org
John CORRIGAN	POLICE/FIRE/EMS	jcorrigan@washingtonnh.org
~~BOB~~ HOFSTETTER	ASST ~~EMD~~ EMD	BOBHOFSTETTER@ "
EDWARD G. THAYER	EMD / Public Works	ethayer@washingtonnh.org
Steve Marshall	Police Chief	smarshall@washingtonnh.org
Janice Philbrick	Aux + DHO	JandJ@gsinet.net
JAMES BERRY	HO	"
Lawrence LARRY GASKELL	DPW -	ljg@gsinet.net
Laura-Jean Holly Gilbert	Rescue	lgilbert@washingtonnh.org
Tom Marshall	Selectman	marshall@gsinet.net

Washington Hazard Mitigation Meeting - 8/5/15		
Name	**Position**	**E-Mail**
EWARD G. THAYER	EMD / PWD	ethayer@washingtonnh.org
2 Hr. outside work Janice Philbrick	DHO	Jandje@gsinet.net
Laura-Jean Gilbert	Rescue	lgilbert@washingtonnh.org
John Corrigan	Police	jcorrigan@washingtonnh.org
Jim Berry	HO	JANDJ@GSI NET. NET
Brian P. Moser	Fire Chief	bmoser@washingtonnh.org
Lawrence Gaskell	DPW / Fire Dept.	LJG@gsi net.net
~~BOB HOFSTETTER~~	ASST EMD	~~BOBHOFSTETTER~~ @ GSI.NET. NET
Steven Marshall	Police Chief	Smarshall@washingtonnh.org
Tom Marshall	Selectman.	tmarshall@washingtonnh.org
Robert WRIGHT	RESCUE	bwright@washington NH. org.

PUBLIC NOTICE

Hazard Mitigation Committee Meeting

Washington Fire Station

75 Lempster Mountain Road,

Washington, NH 03280

The Town of Washington Hazard Mitigation Committee will meet to update the Hazard Mitigation Plan on Wednesday, **July 1, 2015** at **12:00 PM**. The meeting is open to the public and all are welcome and encouraged to attend.

Adam Ricker

From:	Adam Ricker
Sent:	Thursday, June 25, 2015 3:00 PM
To:	Barbara Richards; selectmen@goshennh.org; Dennis Pavlicek (townadmin@newburynh.org); 'hillsboro@hillsboroughnh.net'; 'administrator@bradfordnh.org'; 'stoddardtownhall@myfairpoint.net'; 'marlowtownoffice@myfairpoint.net'; 'windsor.nh@gsinet.net'
Subject:	Washington Hazard Mitigation Committee

Good Afternoon,

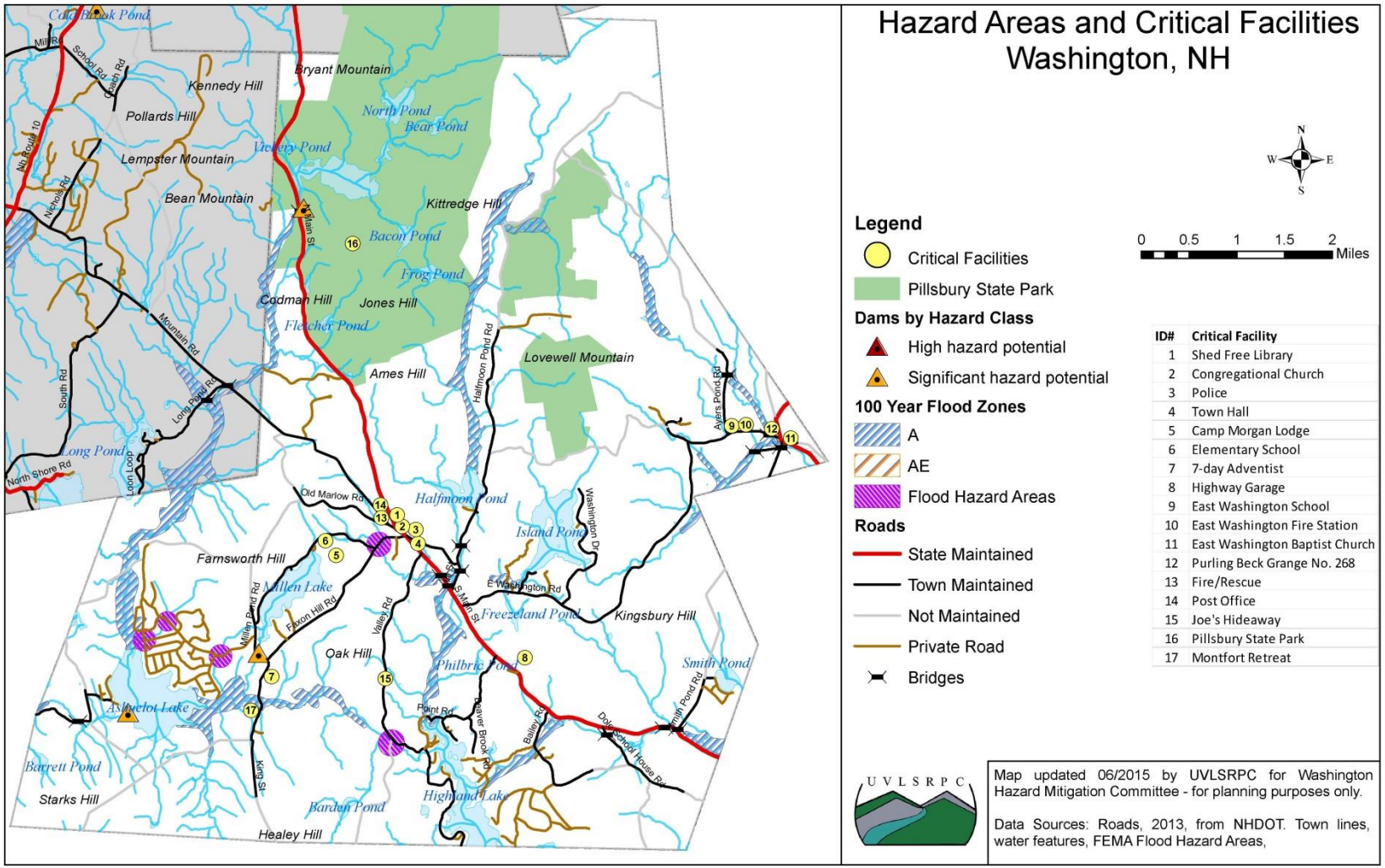
The Washington Hazard Mitigation Committee will be meeting on Wednesday, July 1 from 12:00 -4:30 to work on the update to the town's Hazard Mitigation Plan. All are welcome to join. The meeting will be at the Washington Fire Station.

Best,
Adam Ricker

Adam Ricker, Assistant Planner
Upper Valley Lake Sunapee Regional Planning Commission
10 Water Street, Suite 225, Lebanon, NH 03766
Phone: 603-448-1680

APPENDIX D:

Map of Hazard Areas and Critical Facilities


Hazard Areas and Critical Facilities
Washington, NH
Legend
Critical Facilities
Pillsbury State Park
Dams by Hazard Class
High hazard potential
Significant hazard potential
100 Year Flood Zones
A
AE
Flood Hazard Areas
Roads
State Maintained
Town Maintained
Not Maintained
Private Road
Bridges
N
W
E
S
0 0.5 1 1.5 2 Miles
ID# Critical Facility
1 Shed Free Library
2 Congregational Church
3 Police
4 Town Hall
5 Camp Morgan Lodge
6 Elementary School
7 7-day Adventist
8 Highway Garage
9 East Washington School
10 East Washington Fire Station
11 East Washington Baptist Church
12 Purling Beck Grange No. 268
13 Fire/Rescue
14 Post Office
15 Joe's Hideaway
16 Pillsbury State Park
17 Montfort Retreat
UVLSRPC
Map updated 06/2015 by UVLSRPC for Washington Hazard Mitigation Committee - for planning purposes only.
Data Sources: Roads, 2013, from NHDOT. Town lines, water features, FEMA Flood Hazard Areas,
Cold Brook Pond
Bryant Mountain
Kennedy Hill
Pollards Hill
Lempster Mountain
Bean Mountain
North Pond
Bear Pond
Victory Pond
Kittredge Hill
Bacon Pond
Frog Pond
Codman Hill
Jones Hill
Fletcher Pond
Ames Hill
Lovewell Mountain
Halfmoon Pond Rd
Ayers Pond Rd
Long Pond
Halfmoon Pond
Island Pond
Washington Dr
Farnsworth Hill
Millen Lake
Freezeland Pond
Kingsbury Hill
Oak Hill
Philbrick Pond
Smith Pond
Ashuelot Lake
Barrett Pond
Starks Hill
Barden Pond
Highland Lake
Healey Hill
Old Marlow Rd
E Washington Rd
Valley Rd
Millen Pond Rd
Faxon Hill Rd
Point Rd
Beaver Brook Rd
Baldwin Rd
Dodge School House Rd
South Pond Rd
King St
Mountain Rd
Long Pond Rd
South Rd
North Shore Rd
Loon Loop
Nichols Rd
Mill Rd
School Rd
Depot Rd
Main St

APPENDIX E:

FEMA Approvals and Town Adoption of Hazard Mitigation Plan

Town of Washington, New Hampshire
Board of Selectmen
A Resolution Adopting the Washington Hazard Mitigation Plan Update 2016

WHEREAS, the Town of Washington received assistance from the Upper Valley Lake Sunapee Regional Planning Commission through funding from the NH Homeland Security and Emergency Management to prepare a hazard mitigation updated plan; and WHEREAS, several planning meetings to develop the hazard mitigation plan update were held in September through October 2013 and then presented to the Board of Selectmen for review and discussion on _____, 2016; and WHEREAS, the Washington Hazard Mitigation Plan Update 2016 contains several potential future projects to mitigate the hazard damage in the Town of Washington; and WHEREAS, the Board of Selectmen held a public meeting on _____, 2016 to formally approve and adopt the Washington Hazard Mitigation Plan Update 2016.

RESOLVED by the Town of Washington Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Washington;
2. The respective officials identified in the mitigation strategy 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.
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.

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town this ___ day of _____, 2016: Town of Washington Board of Selectmen

_____ _____
Thomas Marshall

_____ Attest
Al Krygeris

_____
Bob Williams