Town of Halifax
Local Hazard Mitigation Plan

Draft January 21, 2016

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WINDHAM REGIONAL COMMISSION

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INTRODUCTION AND PURPOSE

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

The purpose of this plan is to assist the Town of Halifax in identifying all of the hazards facing the town and to identify new and continuing strategies to reduce risks from identified hazards.

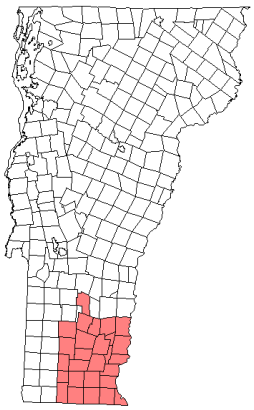
Hazard mitigation is any sustained action that reduces or eliminates risk to people and property from natural and human-caused hazards and their effects. Based on the results of previous Project Impact efforts, FEMA and state agencies have come to recognize that it is less expensive to prevent damage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

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

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

WINDHAM REGION GEOGRAPHY

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



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

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

HALIFAX GEOGRAPHY & TOWN PROFILE

Halifax lies in the foothills of the Green Mountains and is the second-oldest chartered town in Vermont. It consists of mostly northern hardwood forested lands with a few dispersed agricultural areas. The Green River and North River form two distinct valleys in town. The Green River flows southeast through the northern part of town and the East Branch of the North River drains most of the southern part of Halifax. The North River flows through a deep scenic gorge. In Halifax, the most important tributary to the North River is Branch Brook, which rises just north of town and flows south through West Halifax connecting to the North River south of the village. Both the Green River and North River ultimately flow into the Connecticut River via the Deerfield River.

The walls of these river valleys are rather rugged, but they give way to a moderate, rolling landscape once settled by farm families. Many of these former farms are now overgrown with second and third growth forest. They were once connected by a network of roads, many of which were abandoned when automobiles replaced horses as a means of transportation. Halifax currently has 68 miles of roadway, 13.89 miles of which are paved and 54 miles are unpaved. Jolly Mountain (elevation 2,020 ft.) is the highest peak in Halifax and is located in the central part of town. Several other hills, nearly as high, are scattered throughout the town including Ballou Mountain (elevation 2,001 ft.) which slopes rather steeply toward the Green River on the north. Halifax is a quite mountainous town with most roads either on slope sides, along waterways, or bounded by both. Though it's fairly close to other larger towns, driving into Halifax can give the outsider the sense of leaving much behind and venturing into a place set apart and secluded from the outside world. This is due in part because of the terrain and low population density.

Halifax is bounded to the north by Marlboro and Brattleboro, to the east by Guilford, to the west by Whitingham and Wilmington, and to the south by Heath and Colrain in Massachusetts. Municipal services are concentrated in the small village of West Halifax. The village holds the town office, the elementary school, the community hall, the historical society building, the fire station and the town garage. The town is also home to the Honora Winery and the Abbott's Glen Resort, which both bring in some tourism to Halifax. The town does not see much development, though, and in fact the town has been slowly losing population in recent decades.

This rural town has a very community-minded and established population. The town population is only 728, yet the resident volunteer base is larger percentage-wise than that of many other towns. One example of this was after the 2008 ice storm, the town had sixteen volunteers who pulled together enough resources and man hours to assist the town road crew in having all the town roads open within three days. This wouldn't have been possible without the assistance of town residents. Of note is that during the 2008 ice storm the town had no electricity, no cell phone or internet service, and no radio station. The community had to band together for themselves and their neighbors.

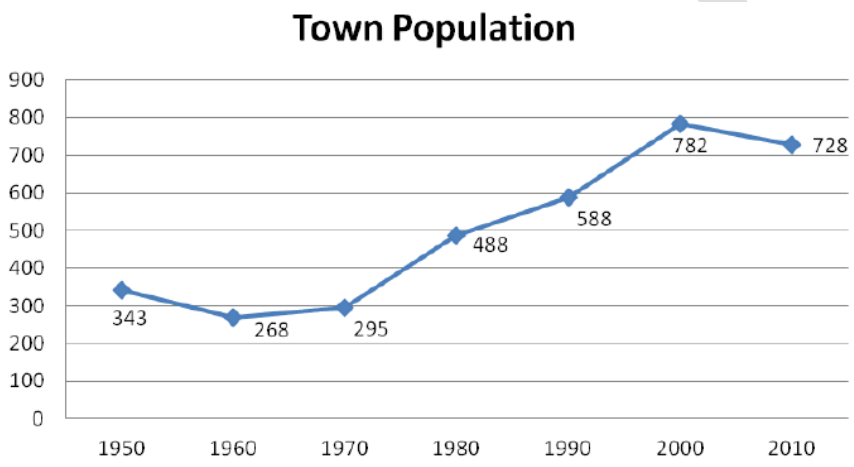
Emergency Services

Halifax lies within the 10-mile radius Emergency Planning Zone (EPZ) of Vermont Yankee Nuclear Power Plant. Radiological Emergency Response Planning (RERP) is currently still in place for these towns, though that is expected to end shortly as the Plant has shut down. This end will likely mean a cut in outside funding being decreased or cut off. The EMD is an active role in Halifax and it is advised that the town set aside some continued funding to aid in emergency management planning in the future. Evacuation plans and routing for an incident at Vermont Yankee Nuclear Power Plant are on file with the

Halifax Fire Department. Halifax Fire Company is an independent and volunteer company made up of about 25 volunteers, of whom 6-8 are also EMS certified. Halifax is a member of Tri-State Fire Mutual Aid Association and Deerfield Valley Mutual Aid Association, and Southwest New Hampshire Mutual Aid (primary). Local fundraising and private donations are the major source of funding supplemented by an annual appropriation by the Town. Rescue Inc, Deerfield Valley Rescue, Halifax EMS jointly provide rescue and EMS support for the town. The Town has a contract with Vermont State Police. They also hope to get a certified constable to have more law enforcement presence in town. The nearest hospitals are in Greenfield, Brattleboro, and Bennington – depending on the need of the victim. Halifax has one emergency shelter which is Halifax Elementary School. The elementary school serves 50-60 students and there is a crisis plan in place. Halifax recently signed up for VTAlert which is an emergency messaging system that can be used to alert residents, visitors or specific groups within a community, of various emergency messaging and directions.

The Town is also aware of its vulnerable population by having a inventory list of those people. In addition, Jacksonville, a neighboring Village, has Meals on Wheels which is another way of keeping track of people in need. The Whitingham/Halifax Lions Club and Nursing Care provide assistance for needy people and keep an eye on the community.

Population Demographics



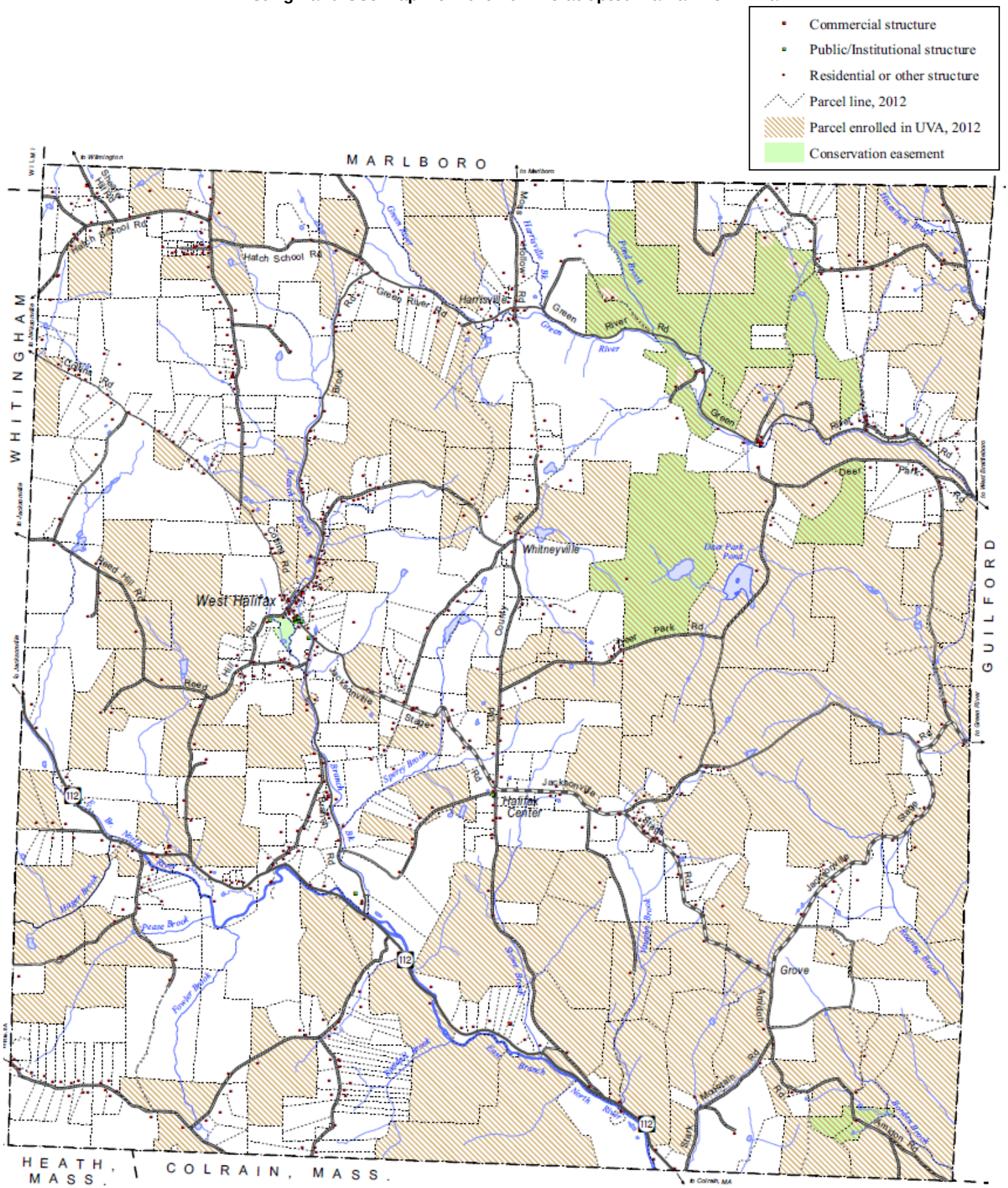
As the below graph and table show, population has dropped slightly since 2000. Halifax has a lower population than any of its neighbors. Compared with other adjacent towns, Halifax gained a larger number of residents between 1990-2000, but lost more residents percentage-wise than neighboring towns between 2000-2010. Locals attribute the population decrease primarily due to a shortage of jobs in the immediate area. The town has increasingly become a bedroom community for Brattleboro and Greenfield, Massachusetts, as well as nearby ski resort areas in Wilmington and Dover. Both growth and contraction in these neighboring communities are felt in Halifax, which will need to adapt. Halifax will need to prepare for and manage either economic contraction such as has been the case in the early part of the millennium, or possible growth such as what was seen in the 1980's and 1990's[1].

Population Trends in Surrounding Towns

Town	1990	2000	2010	% Change 1990-2000	% Change 2000-2010
Halifax	588	782	728	33%	-7%
Brattleboro	12,241	12,005	12,046	-2%	0.3%
Marlboro	924	978	1,078	6%	10%
Guilford	1,941	2,046	2,121	5%	4%
Wilmington	1,968	2,225	1,876	13%	-16%
Whitingham	1,177	1,298	1,357	10%	5%
Colrain, MA	1,757	1,813	1,671	3%	-8%

[1] Halifax 2010 Town Plan, re-adopted March 4, 2014.

Existing Land Use Map from the 2014 re-adopted Halifax Town Plan



PLANNING PROCESS

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

Documentation of the Planning Process

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

Past Process

On December 1, 2010, staff from the Windham Regional Commission met with a group of citizens in Halifax met to do a hazard vulnerability and risk assessment of hazards that could potentially affect Halifax. Further discussions took place between the group at later dates to talk about mitigation strategies. Mitigation projects were provided to the WRC planner by the Halifax Highway crew. Those projects and their progress will be reviewed in this updated plan.

The following hazard mitigation planning meetings were held:

- December 1, 2010 – Public meeting at Halifax Town Office
- December 8, 2011 – Phone conversations with EMD / Selectboard Chair and Road Foreman

A plan was drafted from the information collected at these meetings and a draft was submitted to FEMA in January of 2011. This draft was returned to the town with revisions. A draft was never revised or resubmitted to FEMA. Therefore a plan was never completed, approved by FEMA or adopted by the Town. The reason for the lapse in time between the previous plan process and the current process was primarily because of Tropical Storm Irene. Halifax suffered considerable damage from Tropical Storm Irene, and recovery was more on the town's mind than mitigation. The town now understands the importance of mitigation to prevent the significant damage they experienced in August 2011 from happening again. They approached the current planning process with enthusiasm.

Current Process

The Town commenced the planning process again in September 2015 when the draft that was worked on in 2010 through 2011 was picked back up for review and update. Alyssa Sabetto, Emergency Planner for the Windham Regional Commission, worked with the Town's EMD, John LaFlamme, to set up a meeting. The meeting was held on September 16, 2015 and was advertised and open to the public.[2] It lasted for

[2] See appendices 9 and 10 for sign in sheet and meeting agenda.

several hours over the scheduled time because there was so much enthusiasm and the town had a lot of concerns and projects to discuss. The meeting involved:

- a review of the old draft document with discussion of more recent hazard events,
- completion of hazard analysis and discussion of what hazards the town wants the plan to focus on
- progress made in mitigation efforts that were noted several years ago,
- development of new hazard mitigation projects, and
- review of mapping of the town to note where hazard events are causing repeated or large scale damage.

Alyssa used what she could of the old incomplete draft, but she mostly rewrote the plan to meet the more current standards and guidelines that FEMA has developed for hazard mitigation plans. She took the information from the September 16 meeting, along with follow-up information gathered in several conversations with the Road Foreman, EMD and Town Clerk, and assembled a new draft plan. John LaFlamme, the Town EMD and local plan champion, discussed the hazard mitigation plan process at several Selectboard meetings prior to September 16, 2015. The draft was presented for internal town review by the Committee, town personnel, Planning Commission and Selectboard on January 11, 2016. This internal town review period was from January 11-21. Members of the Selectboard, the Road Commissioner and members of the core planning team met and reviewed the plan during this time period at a Selectboard meeting on January 20. Comments, corrections and some additional information was received back from the Selectboard and the EMD. Alyssa made the revisions and corrections and finalized the draft for public comment.

The revised draft plan was then put out for public comment on January 21, 2016. This was done by posting an electronic copy on the town website and having a hard copy of the plan advertised and made available at the town office for public review and comment. Flyers were posted around town advertising its availability for review and comment. No comments were received from the public. It was simultaneously distributed to the adjacent towns of: Whitingham, Wilmington, Marlboro, Brattleboro, Guilford, in Vermont, and Colrain and Heath, Massachusetts, for comment via email.[3] There was one response received.[4] The plan was then finalized by Alyssa Sabetto for submittal to VT DEMHS and FEMA.

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

Committee (2010-11)	Affiliations	Home
Patricia Dow	Town Treasurer Town Clerk	Halifax
Wayne Courser	Fire Chief	Halifax

[3] See appendix 6 for email.
[4] See appendix 7 for email.

Bradley Rafus	Road Commissioner Road Supervisor Tree Warden Planning / Zoning Commissioner	Halifax
Howard Alboum	Chairman of Planning Commission Zoning Board	Halifax
Andrew Rice	Trustee Fire Department Assistant Chief EMS	Halifax
John LaFlamme	Chair Selectboard Lieutenant, Fire Department	Halifax
Lewis Sumner	Emergency Management Director Selectman Fireman	Halifax
Dinah Reed	Windham Regional Commission, Assistant Planner	Brattleboro
Committee (2015)	**Affiliations**	**Home**
Robbin Gabriel	Selectboard Secretary	Halifax
Sirean LaFlamme	Halifax Planning Commission, ZBA Chair	Halifax
John LaFlamme	Town Emergency Management Director	Halifax
Bob Lecte	Resident	Halifax
Lewis Sumner	Selectboard	Halifax
Stephen Chaif	Planning Commission, ZBA	Halifax
Doug Grob	Selectboard	Halifax
Marilyn Allen	Resident	Halifax
Jesse Ferland	Resident	Halifax
Wayne Courser	Fire Chief	Halifax
Brad Rafus	Road Commissioner, Road Supervisor, Tree Warden	Halifax
Everett Wilson	Resident	Halifax
Alyssa Sabetto	Planner, Windham Regional Commission	Brattleboro

Public Involvement and Input from Neighboring Communities

Making the Halifax Hazard Mitigation Plan available for public comment included the following efforts:

- All of the meetings discussed in the above sections were advertised and open to the public.[5]
- Between 2010 and mid 2014, the Halifax Draft Plan was posted on the Windham Regional Commission website for public review and comment. No comments were received during this time.
- The draft hazard mitigation plan was brought to the January 12th joint planning commission/ selectboard meeting for review and comment by the selectboard, planning commission and the public.
- The draft plan was made available in hard copy for public review and comment at the town office from January 21 through February 8, 2016.
- A draft of the plan was posted from January 21 through February 8, 2016 on the town website for public comment.[6]
- Flyers were put up around town for public comment on the draft.[7]
- On January 21, 2016, an invitation was extended via email to the neighboring towns of: Whitingham, Wilmington, Marlboro, Brattleboro, and Guilford, in Vermont, and Colrain and Heath in Massachusetts, to provide a means and opportunity to review and comment on the draft

[5] See appendix 11 for town website advertisement for November 17, 2014 meeting.
[6] See appendix 2.
[7] See appendix 3.

Halifax Hazard Mitigation Plan.[8] One response was received back from the Planning Board for Bernardston, Massachusetts.[9] Inter-town communication will repeat for future revisions of this Plan.

- The Plan was put on the agenda for the January 26 Halifax Selectboard meeting to advertise its availability for public comment.

RISK ASSESSMENT

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

Climate change is causing more extremes for the climate and weather of Halifax, according to Town Emergency Management Director, John LaFlamme, "It goes from one extreme to the next. This summer was a lot of intense thunderstorms. Last winter was a lot of long heavy snowfalls and multiple below zero nights."

Methodology

A **vulnerability analysis** for each community begins with an inventory of possible hazards and an assessment of the risk that they pose. These are the questions to be answered. What hazards can affect your community? How bad can it get? What is the likelihood of future events occurring? What areas of your town are most vulnerable to these hazards? How do you climate change impacting your town currently and what are you worried about for future impacts? Information collected from the core planning team went into this vulnerability assessment to identify the hazards the town feels most vulnerable to.

The **Potential Impact** (percentage of the community affected) or magnitude of the impact of the hazard can be classed as follows:

1 = Negligible	Isolated occurrences of minor property damage, minor disruption of critical facilities and infrastructure, and potential for minor injuries
2 = Minor	Isolated occurrences of moderate to severe property damage, brief disruption of critical facilities and infrastructure, and potential for injuries
3 = Moderate	Severe property damage on a neighborhood scale, temporary shutdown of critical facilities, and/or injuries or fatalities
4 = Major	Severe property damage on a town-wide or regional scale, shutdown of critical facilities, and/or multiple injuries or fatalities

Probability of Future Events: This is the likelihood of future events occurring, taking into account how often events have occurred in the past as well as development trends the town is experiencing. This also takes into account the affects of climate change and the community's knowledge of those potential impacts.

1 = Unlikely	<1% probability of occurrence in the next 100 years (less than 1 occurrence in 100 years)
2 = Occasionally	1–10% probability of occurrence per year
3 = Likely	>10% but <100% probability per year (at least 1 chance in next 10 years)
4 = Highly Likely	100% probable in a year (an annual occurrence)

Warning Time: Amount of time generally given to alert people to hazard

1 = More than 12 hours
2 = 6–12 hours
3 = 3–6 hours
4 = None–Minimal

[8] See appendix 6 for email.
[9] See appendix 7 for response from Bernardston, MA.

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

The combination of the Potential Impact, Probability of Future Events, and Warning Time was used to determine the hazard ranking score for each hazard.

The **Potential Impact, Probability of Future Events and Warning Time** for each hazard was discussed at the September 20, 2015 Hazard Mitigation Plan meeting. There was also a review of what was developed in 2010-11; however, the below table, which the participants developed at the most recent meeting was more detailed in terms of areas of vulnerability and current in terms of what has happened in recent years. The participants discussed each potential hazard in detail and ranked each element for each hazard. The numbers were combined to give each hazard a hazard score. This score was used to determine which hazards the plan would address.

While all hazards were considered by the Hazard Mitigation Planning participants for inclusion in this plan, it is not feasible to study each in depth. For hazards that are not profiled in this plan, the reader is directed to the Vermont State Hazard Mitigation Plan. The rationale for not addressing all of the hazards is that they Halifax has a low level of risk associated with them and/or the town does not choose to mitigate for them at this time. This plan will only focus on the hazards that Halifax has decided are pertinent to their community and they have chosen to mitigate for, which are Flooding and Fluvial Erosion. Though fluvial erosion is caused by flooding events, the impacts are significantly different than the impacts of flooding, so the town wishes to address them separately. The below table shows the hazards in terms of their hazard ranking score as determined by the Hazard Mitigation Planning participants.

Possible Hazard	Probability of Future Events	Warning Time	Potential Impact	Score	Most vulnerable facilities and populations
Power Failure	4	4	2	10	This is an affect of other hazards. The town is most at risk of power failure during the winter months.
Highway Accidents	4	4	2	10	Route 112 is area of biggest concern
Structure Fire	3	4	2	9	Seasonal trend; woodstoves in winter, and lightning strikes in summer
Flood	3	2	4	9	Village is located in a low lying area and several structures are in the River Corridor; Fire Station has been flooded; $4.6 million in damages town-wide from Tropical Storm Irene in August 2011 and Halifax was cut off for a long time. Green River Road was closed for 4 months. Area of concern along Route 112.
Fluvial Erosion	3	2	4	9	Fluvial erosion happens all along the Green River, some areas of particular concern are discussed in this plan.
Tornado/Microburst	4	3	1	8	There has been structure damage in the past from microburst's
High Wind	3	3	2	8	Microburst's are the primary concern with winds in Halifax. High elevations are most vulnerable. Trees down in road is the biggest safety concern to the town.
Winter & Ice Storm	4	1	3	8	Town-wide
Wildfire	2	4	2	8	1951 was a bad wildfire that burned about 300 acres; The 2008 ice storm left huge amounts of wooded debris in its wake, and the Town is now

					more conscious of the possibility of wildfires.
School Safety Issues	1	4	2	7	The school has a crisis plan in place.
Air crash	1	4	2	7	Town-wide
Terrorism	1	4	2	7	
Earthquake	1	4	2	7	The region does lie on a fault line. Earthquakes are very rare. There was a small earthquake in 2009.
Invasive Species / Infestation	4	1	2	7	Wooly adelgid is present in Vermont but for Halifax it is not a big problem yet. The state is monitoring for it and has cages in the forest. Emerald Ash borer is close, but not yet in Vermont; Asian longhorned beetle is also close but not present in Vermont.
Hazardous material spill	1	4	1	6	
Hurricane	2	1	3	6	
Extreme Cold	4	1	1	6	
Radiological Incident	1	1	3	5	Halifax is within the EPZ, but VY recently shut down operations. Spent fuel is stored onsite.
Ice Jams	3	1	1	5	The whole Green River is susceptible; Branch Road; Route 112.
Landslide	1	1	2	4	no landslides, just fluvial erosion issues
Water Supply Contamination	1	2	1	4	No public water supply in Halifax
Hail Storm	2	1	1	4	Town-wide
Beaver dams	1	2	1	4	Sprague Road has a beaver dam present, but it's not causing an issue. Beaver fence was installed on Amadon Road. There aren't any other current issues, but they have had issues in the past.
Drought	1	1	1	3	Farms and gardens
Dam Failure	1	1	1	3	no dams in Halifax, or outside dams that would affect Halifax if they failed
Extreme Heat	1	1	1	3	
Railroad Accidents	N/A	N/A	N/A	N/A	There is no railroad in Halifax.
Tsunami	N/A	N/A	N/A	N/A	No coastline.
Volcano	N/A	N/A	N/A	N/A	No volcanoes in or near Halifax.

Though the above table shows the natural hazards of high winds, tornado/microburst, winter and ice storms and wildfires to all rank fairly high, Halifax—due to their small size and limited resources—at this point in time doesn't feel that the risk posed by these hazards is high enough to justify the cost it would take to mitigate for them. Earthquake, invasive species infestation, hurricane, extreme cold, ice jams, landslide, hail storm, beaver dams, drought, extreme heat, tsunami and volcano are all low-ranking natural hazards, that Halifax has low vulnerability for, or not applicable to Halifax, according to the Hazard Mitigation Planning participants. Halifax may choose to mitigate for hazards other than what this plan addresses if resources enable them to do so of it their level of vulnerability changes in the future. For hazards not covered in this plan, the reader is referred to the State All Hazards Mitigation Plan. Ice jams will be addressed within the flooding profile. Winter and ice storms are not being addressed in this plan because they are a way of life in Vermont and they are handled well by Halifax and VTrans. Halifax does not currently have the means to mitigate for high winds, winter weather events or extreme cold other than what is currently being done. Current methods are deemed adequate at this time, though the town may choose to address these hazards in the future.

Identifying and Profiling Hazards

The following sections include a narrative with a Description, Geographic Area of the Hazard, Impact, Extent, discussion of Past Occurrences, and the Probability of Future Events, of the natural hazards of most concern to Halifax to mitigate against.

Flooding[10]


Sumner Bridge, TS Irene 2011

Description

Flooding is the most widespread and destructive hazard in the United States. Flooding has also been the most common and costly hazard to affect Halifax. The effects of flooding are also considered in the fluvial erosion section of this plan, because much of the flood related damage is caused by fluvial erosion. Flooding can occur anytime of the year as a result of heavy rains, thunderstorms, tropical storms, hurricanes or Nor'easters. It can result from the overflow of major rivers and their smaller tributaries, or inadequate local drainage. Historically, floods have been a factor in over 80 percent of all federally declared disasters. People living in close proximity to bodies of water such as rivers, lakes, and streams are at greater risk from flooding than those not living in the floodplain. There is a 26 percent chance of experiencing a flood during the life of a 30-year mortgage compared to a 4 percent chance of a fire. Halifax has an NFIP compliant floodplain ordinance, which gives residents access to discount flood insurance and enables the Town to regulate development within the Special Flood Hazard Area (SFHA). SFHAs are subject to inundation by the 1% annual chance flood (100-year flood). Maps of these areas can be found at the Town Office or online at the FEMA Map Service Center.[11]

TS Irene flooding at Fire Station in the village of West Halifax

Impact

Halifax has a very hilly/mountainous topography and is quite beautiful and remote. Because of its topography, nearly all the roads in Halifax lie along waterways as these are the lower flatter areas of land in the town. Therefore, there are a lot of structures that also lie close to waterways. Despite the damage that flooding has caused in Halifax, there is not a lot of FEMA defined Special Flood Hazard Area (SFHA) in Halifax. This is due to the town's terrain. SFHA delineates areas of floodwater inundation. The terrain of Halifax leads to fast moving flood waters that don't have much opportunity to spread out into floodplains and slow their speeds. An example of this is shown in the photo above (Sumner Bridge), where one can see the moving floodwaters near the stream corridor and the still inundation floodwaters in the floodplain along and outside the corridor (this area is not in the FEMA defined SFHA. The *River Corridor Plan for the Green River in Guilford and Halifax, VT*[12] mentions this in reference to the

[10] All flooding photos were provided courtesy of Halifax EMD John LaFla
[11] https://msc.fema.gov/portal
[12] River Corridor Plan for the Green River in Guilford and Halifax, VT, prepared by Fitzgerald Environmental Associates, LLC, November 1, 2014

Green River by saying “The Green River watershed is an extremely flashy watershed due to its steep headwaters and soils with poor infiltration. The National Flood Insurance Program (NFIP) study for the Green River does not cover the entire river corridor and is not a detailed study; therefore inundation hazards appear to be underestimated in many locations.” There is not a lot of wide open flat floodplain in Halifax. Flooding therefore comes at high speeds and causes much erosive destruction in River Corridor. This is evidenced by the fact that there were $4.6 million in damages town-wide from Tropical Storm Irene in August 2011. Photos taken during and after TS Irene are shown throughout this report. The town was cut off for several days after that storm, and several weeks in the hardest hit remote areas. More about the erosive flood impacts will be discussed in the fluvial erosion section of this plan.

This photo shows sheet flow flooding throughout the entire village area of West Halifax. TS Irene.

The photo the right shows the TS Irene moving floodwaters in the village area, with the Fire Station shown in the photo. There is no FEMA defined SFHA in the village area. The River Corridor, along Branch Brook, does run through the village, though even the area shown in this photo is not in the mapped River Corridor. This is important to note because it shows that the maps are not absolute and therefore regulations are not perfect to restrict development in areas that can experience flooding hazards. As waterways shift, and development impacts waterways and floodwater movement, so to do the areas of flood hazard shift and change over time. The village area is susceptible to flooding, as shown by the below photo, and Halifax should keep that in mind when they are permitting any new development. The below pictured area is in neither the Special Flood Hazard or the River Corridor, which goes to show that there are hazard areas that the town should be aware of without relying upon mapping.

Flash floods typically occur in high elevation drainage areas as a result of summer thunderstorm activity. Drainage ditches and culverts are the biggest concern for local flash flooding events. Drainage ditches and culverts are the biggest concern for local flash flooding events. Some of the highest hazard areas associated with flash floods are the Green River corridor and areas adjacent to the east branch of the North River, including route 112. These areas have all seen damage in recent years with flooding and severe thunderstorms that have been a part of declared disasters. Green River Road is an important through route for the region, including Halifax, when Route 9 is cut off for through traffic, as it was during and after TS Irene. Other areas of concern during flooding events are homes located along small brooks throughout town that are subject to rise during quick flash flooding events such as along Branch Brook, Fowler Brook and Randall Brook.

Ice jam on the Green River along Green River Road. 2013.

Ice jam flooding is fairly common in the early springtime, generally around March. The heavy rainfall, combined with runoff from snowmelt due to the mild temperatures, results in flooding of rivers, streams and creeks,

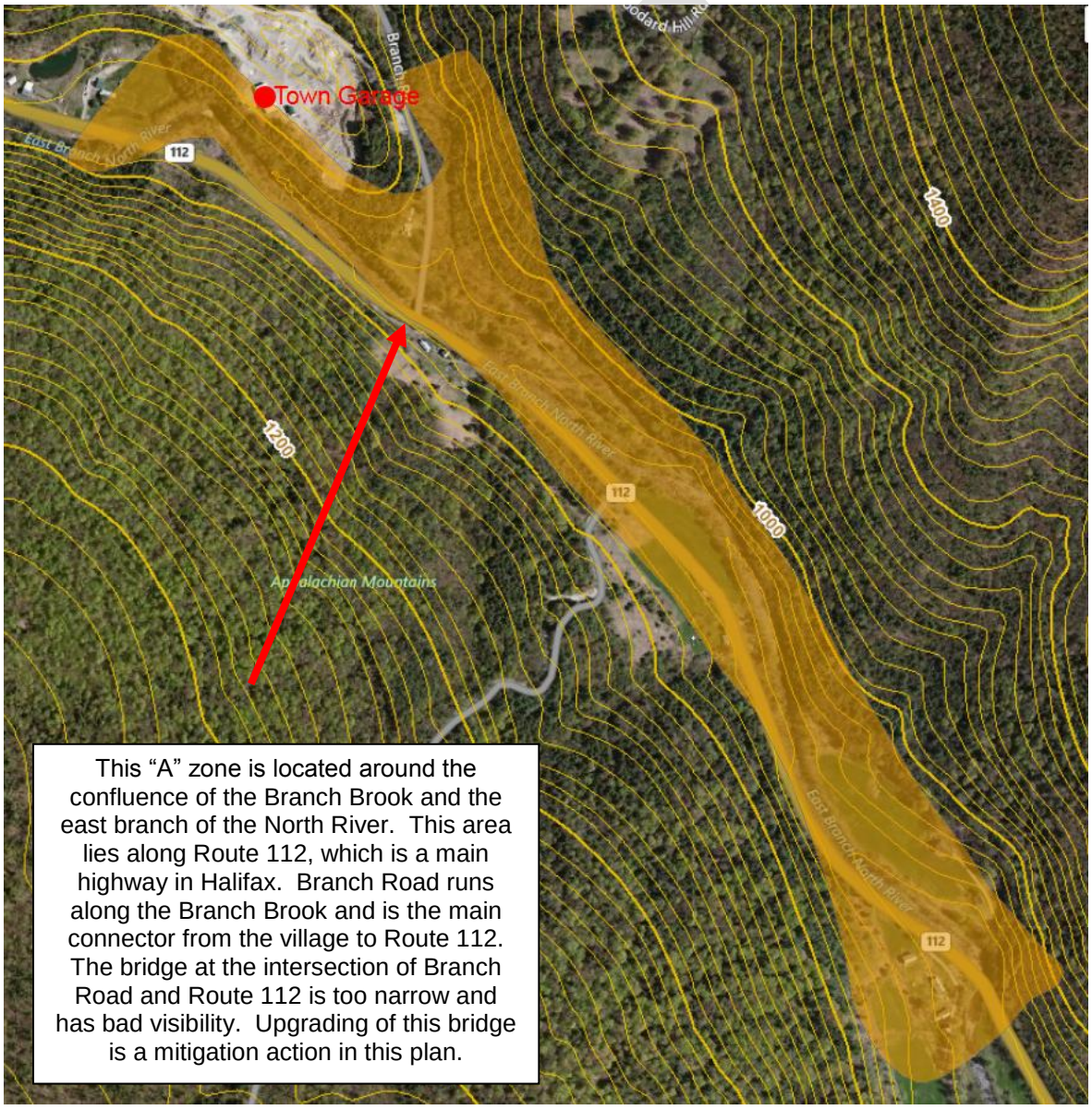
mainly from the formation of ice jams. Halifax doesn't have mapped current or historic ice jams.[13] However, sometimes jams will form on the west branch of the North River north of the village. These jams are monitored, but there has not been ice jam flooding that caused any damage to structures or infrastructure to date. There has been flooding on Green River Road, where jams routinely form due to log buildups, and there would be damage if not for the town road crew monitoring and breaking up the jams when needed. Halifax is primarily concerned about the log jams that exist in some of the rivers and streams and pose a risk for flooding. Some of these jams remain in place for several years, and pose a risk if they break and let loose a lot of water and debris. The Road Foreman has gotten permission from Vermont Agency of Natural Resources to cut some of the logs but leave them in the river. This will allow the water to not get backed up, while also preserving the ecological value of woody natural debris in the waterways. Being able to cut these logs in warmer times, prevents problem ice jams from forming in the winter months.

[13] CRELL Ice jam database/map http://rsgisias.crrel.usace.army.mil/apex/f?p=524:9:13745795700578

Location / Special Flood Hazard Area and River Corridor Mapping

FEMA has mapped two "A" zones in Halifax, which are shown below. "A" zones are the lowest level of risk that FEMA maps. These zones are the Special Flood Hazard Area (SFHA) that FEMA has defined in Halifax. Properties within the SFHA, that have a mortgage, are required to purchase flood insurance. Parcels outside of the mapped area can still purchase insurance if they would like. Halifax's participation in the National Flood Insurance Program (NFIP) gives residents access to discount flood insurance through the NFIP. The Flood Hazard Summary Sheets on FloodReady, Vermont's website, says there are 5 structures in the Special Flood Hazard Area and only 20% of these structures have flood insurance.[14] As the below map shows, the Town Garage is partially located in the SFHA. The building is actually quite high up and has not been flooded to date.

The below map was created using the Vermont Agency of Natural Resources 'Natural Resources Atlas' which is an online mapping tool. This map is a snip showing all of the special flood hazard areas (SFHAs) that FEMA has designated in Halifax. The area is shown in orange. The floodplains shown in



This "A" zone is located around the confluence of the Branch Brook and the east branch of the North River. This area lies along Route 112, which is a main highway in Halifax. Branch Road runs along the Branch Brook and is the main connector from the village to Route 112. The bridge at the intersection of Branch Road and Route 112 is too narrow and has bad visibility. Upgrading of this bridge is a mitigation action in this plan.

[14] Flood Hazard Summary Report for Halifax, accessed 10/16/15
https://anrweb.vt.gov/DEC/FoFReports/DisplayFloodHazardReport.aspx

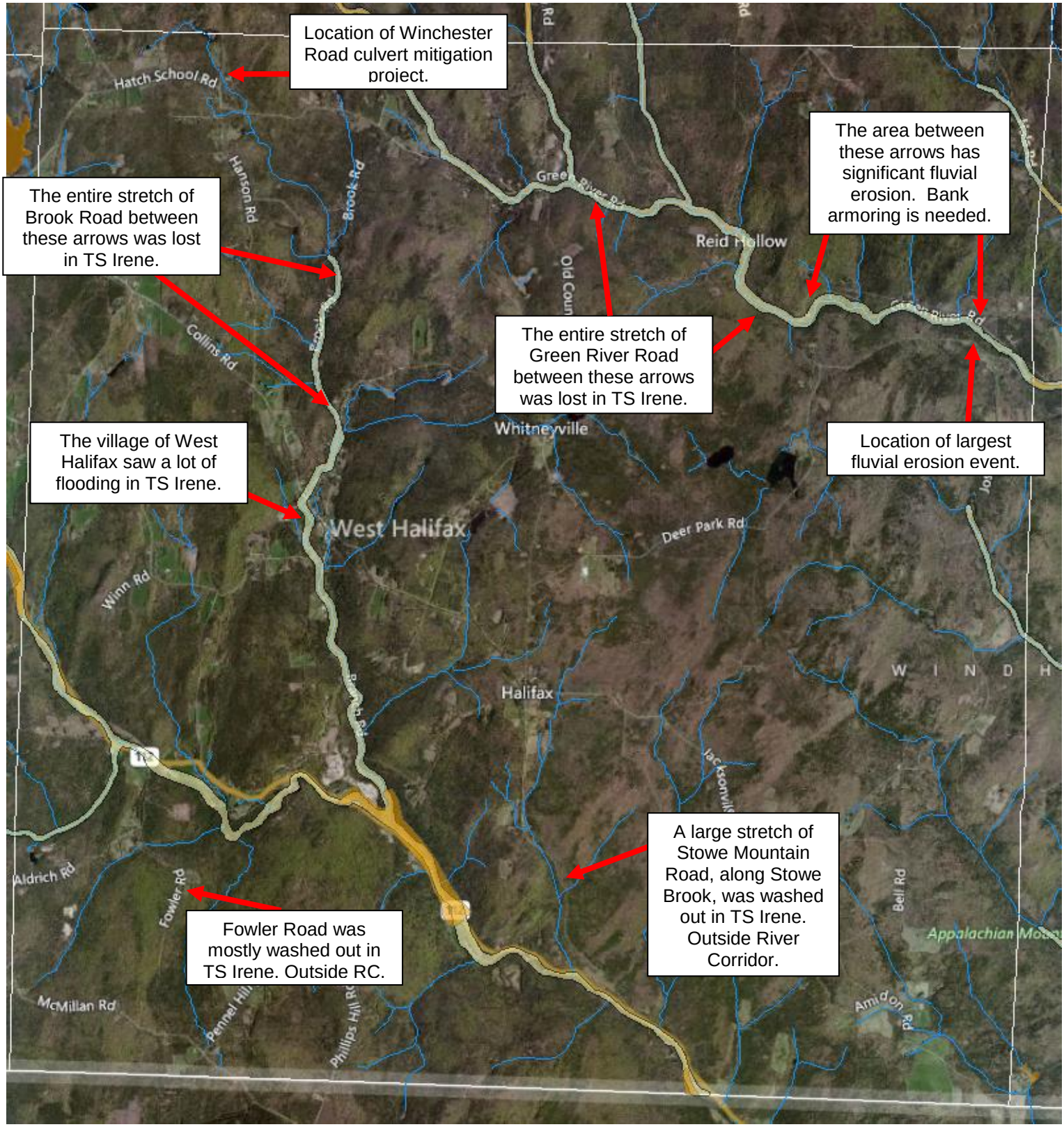
these maps are based on the FEMA Flood Insurance Rate Maps (FIRMs) available through the FEMA Map Service Center.[15] The map effective date for the latest FIRMs for Windham County is 9/28/2007.

This is other "A" zone SFHA in Halifax. It lies on the southern border of the Town along Route 112.

The map on the following page shows the River Corridors that Vermont Agency of Natural Resources (ANR) has mapped, as well as the SFHAs for the entire Town. River Corridors encompass an area around the present channel where fluvial erosion, channel evolution and down-valley meander migration are most likely to occur. The mapped river corridor includes this area and a 50-foot buffer on either side to allow for the recommended setback and zone of avoidance to protect the riparian/fluvial erosion hazard corridor. The ANR defined River Corridor also includes a 50 foot buffer on all streams shown on the Vermont Hydrologic dataset. The only mapped River Corridors are for streams with a watershed of two square miles or greater, so for unmapped streams one must assume the buffer.

[15] FEMA Map Service Center https://msc.fema.gov/portal

The below map shows the Special Flood Hazard Areas (SFHAs) in orange and the River Corridors in white, for the entire Town of Halifax. Of note is that there is not much SFHA but a lot of River Corridor. There is mapped River Corridor extending along the along the Green River, Branch Brook and the North River. These are also the main transportation throughways in Halifax. This can lead to road washouts



and culvert issues during storm events.

Extent
The highest recorded measurement at the nearest stream gauge to Halifax on the Green River was 13.98 feet, which was measured during TS Irene on August 28, 2011.[16] Average height for this reach is about 5.62 feet.

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

Maximum 1-Day Total Precipitation[17] for BALL MTN LAKE		
Rank	Value (inches)	EndingDate
1	5.6	1973-06-30
2	4.9	2011-08-29
3	4.36	1999-09-17
4	3.97	2005-10-09
5	3.32	1987-06-23
6	3.3	1975-08-08
7	3.21	2003-08-02
8	3.14	1988-04-29
9	3.07	2010-10-01
10	3.02	2000-12-18
Period of record: 1969-05-01 to 2015-04-02		

[16] USGS Stream gauge 01170100 GREEN RIVER AT COLRAIN, MA <http://waterwatch.usgs.gov/?id=wwchart_ftc&site_no=01170100>
[17] Data provided by the NOAA, Northeast Regional Climate Center at Cornell University. http://www.nrcc.cornell.edu/. Courtesy of Jessica Spaccio, Climatologist. 4/3/2015.

Past Occurrences

Since 1996, when National Climatic Data Center detailed records start, there have been 35 flood events in Windham County, Vermont. Halifax experiences routine spring flooding, but this is not always documented. There have been 15 Presidential Disaster Declarations in Windham County since 1953. Of these, 6 were severe storms, 5 were floods, 2 hurricanes, 1 snow event and 1 severe ice storm.[18]

Disaster Declarations for Windham County, VT

Disaster Number	Incident Begin Date	Incident End Date	Declaration Date	Incident Type	Title	Disaster Close Out Date
4043	5/20/2011	5/20/2011	11/8/2011	Severe Storm(s)	SEVERE STORMS AND FLOODING	
4022	8/27/2011	9/2/2011	9/1/2011	Hurricane	TROPICAL STORM IRENE	
3338	8/26/2011	9/2/2011	8/29/2011	Hurricane	HURRICANE IRENE	3/10/2014
1816	12/11/2008	12/18/2008	1/14/2009	Severe Ice Storm	SEVERE WINTER STORM	10/15/2014
1698	4/15/2007	4/21/2007	5/4/2007	Severe Storm(s)	SEVERE STORMS AND FLOODING	3/13/2013
1559	8/12/2004	9/12/2004	9/23/2004	Severe Storm(s)	SEVERE STORMS AND FLOODING	1/4/2011
1488	7/21/2003	8/18/2003	9/12/2003	Severe Storm(s)	SEVERE STORMS AND FLOODING	1/4/2011
3167	3/5/2001	3/7/2001	4/10/2001	Snow	SNOW	2/28/2005
1336	7/14/2000	7/18/2000	7/27/2000	Severe Storm(s)	SEVERE STORMS AND FLOODING	6/30/2008
1307	9/16/1999	9/21/1999	11/10/1999	Severe Storm(s)	TROPICAL STORM FLOYD	6/30/2008
1124	6/12/1996	6/14/1996	6/27/1996	Flood	EXTREME RAINFALL AND FLOODING	2/23/2005
1101	1/19/1996	2/2/1996	2/13/1996	Flood	ICE JAMS AND FLOODING	2/17/2005
518	8/5/1976	8/5/1976	8/5/1976	Flood	SEVERE STORMS, HIGH WINDS & FLOODING	4/16/1981
397	7/6/1973	7/6/1973	7/6/1973	Flood	SEVERE STORMS, FLOODING, & LANDSLIDES	11/12/1976
277	8/30/1969	8/30/1969	8/30/1969	Flood	SEVERE STORMS & FLOODING	5/26/1972

Detail on Specific Flooding Events that have Affected Halifax:

July 10, 2013 - Warm moist air over the northeast provided the ingredients for heavy rainfall, and saturated ground from record May and June rainfall made the region vulnerable to flooding. Showers and thunderstorms developed during the afternoon and evening of July 2 2013, producing heavy rainfall moved repeatedly across southeast Vermont, with isolated flash flooding.

Aug. 28, 2011 – Tropical Storm Irene – The Federally Declared Disaster DR-4022, Tropical Storm Irene, tracked northeast across eastern New York and western New England during Sunday, August 28th, producing widespread flooding, and damaging winds across the region, including Halifax. The greatest impact from Irene across southern Vermont was due to heavy to extreme rainfall, which resulted in catastrophic flooding. Rainfall amounts generally averaged 4 to 8 inches. Much of the rain which fell occurred within a 12 hour period, beginning early Sunday morning, and ending Sunday evening. Route 9, the main route across southern Vermont was closed. Numerous evacuations were reported. Rains caused extreme flash flooding and fluvial erosion and road damage/washouts in Halifax. About 20 Halifax residents were stranded for 1-2 and some even 3 weeks after TS Irene; they were along the Green River and roads that offshoot from Green River, such as Perry Road, Fowler Road, and Deer Park. The Halifax fire station was surrounded by flooding, but the trucks could still get in and out. The village was flooded but suffered only minor road damage. Reed Hill Bridge, Weir Road bridge, Deer Park bridge, and Hale Road bridge were all washed out. In total Halifax received $4.3 million from FEMA (90% of total damages).

[18] FEMA tool: Data Visualization: Disaster Declarations for States and Counties: Windham County, VT http://www.fema.gov/data-visualization-disaster-declarations-states-and-counties Accessed 10/16/15

August 5, 2008 - The passage of a strong upper level disturbance, combined with a moist and unstable air mass in place, led to the development of numerous thunderstorms across southern Vermont during Thursday afternoon on August 7th, some of which contained large hail. In addition, locally very heavy rainfall led to flash flooding in some areas.

April 15-21, 2007 - Flash floods and inundation flooding over a period of several days - The Town of Halifax got 8 inches of snow in the morning of April 15, followed by 6-8 inches of rain. The snow caused a berm at the Town Offices holding in the rainwater which caused a lot of inundation flooding. Rain and snow caused damage to roads and utility lines across Windham County and Halifax. Across the state, nearly $3.6 million was obligated as part of the FEMA Public Assistance Program. Halifax received approximately $235,000 from FEMA for this event. While it is not normal for the town to receive this type of damage from severe flooding and thunderstorms on an annual basis, road washouts and culvert repairs from these associated events have ranged in the ballpark of $200,000 to $400,000.

Weir Road Bridge during TS Irene, 2011. This bridge was completely washed out.

October 8, 2005 - On October 8 at daybreak, a nearly stationary cold front was over southwestern New England. The air over the northeastern United States was very moist. Low pressure in the vicinity of the eastern Carolina states moved slowly north northeast along the cold front. Heavy rain fell over southern Vermont through the early morning hours of October 9. During this period, there was over 6 inches of rainfall in southern Vermont, triggering widespread flooding. Several evacuations of people from their homes occurred. Flooding from a beaver dam break on Perry Road caused 14 feet of erosion. Major added complications came from debris that washed with the water, plugging culverts and wreaking havoc near bridges. Halifax received $225,000 as part of Vermont state assistance for non-declared disasters.

August 30, 2004 - Flash flooding resulted in washouts of small bridges at Ames Hill, Hescock and Cook Roads. Canoe Brook Road in Dummerston impassable, with a culvert washed away, and a 20-foot wide by 20-foot deep hole in the road. Presidential Disaster Declaration DR – 1559.

October 29, 2003 – Areas of low pressure moved northeast along a frontal boundary across New York and western New England from Sunday night, October 26th into Monday night, October 27th. Rainfall ranged from 1 1/2 to 2 1/2 inches with the greatest amounts in and east of the Green Mountains.

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

September 28, 2002 - The remnants of Tropical Storm Isidore moved northeast from the Ohio Valley on Friday, September 27th into New York state during the afternoon of the 27th and across central Vermont during Friday night, September 27th. Heavy rain accompanied this system with generally between 1 1/2 and 2 inches of rainfall reported. Amounts were locally higher in the mountains. Earlier in the month, September 14-15, the remnants of Tropical Storm Hannah resulted in rainfall of around an inch across the same area. No flooding was reported with either event.

September 17, 1999 - The remnants of Hurricane Floyd moved up the eastern seaboard on September 16 and during the early hours on September 17. The storm brought both high winds and heavy rainfall to Southern Vermont , which included a large swath of 3 to 6 inch amounts. Specific rainfall amounts included 2.91 inches in Bennington, 3.89 inches in Sunderland, 4.54 inches at Peru and 5.70 inches at Brattleboro. The rain produced significant flooding across the region, which proved destructive. Many smaller tributaries reached or exceeded bank full. Water from the Millbrook in Weathersfield washed away a portion of State Route 5. The World's Fair in Tunbridge was cancelled for the first time in many years. Winds from the passage of Floyd were estimated to have gusted to over 60 mph, especially over hill towns. The combination of the wind and very saturated ground, produce widespread downing of trees and power lines across much of Southern Vermont. A woman was injured on Tavern Hill in Putney, Windham County when a tree came crashing down on her Volvo, destroying the vehicle. Some trees fell on vehicles and houses. The rain and wind produced power outages across the region. As many as 2,000 people lost power in Southern Vermont.

June 19, 1998 - Thunderstorms with torrential downpours produced flash floods across parts of Windham County. Shoulders of routes 100 and 112 were washed out near Jacksonville and Halifax. Flooding also occurred in the Putney area and at Rawsonville. Several mountain roads were washed out throughout the County.

In 1996, Between Saturday morning July 13 and Sunday morning July 14 rainfall from three to five inches was common across southern Vermont resulting in significant damage and a Presidential Declaration of Emergency. Flooding occurred throughout New England causing millions of dollars in damage. The remnants of Hurricane Bertha tracked from the Mid-Atlantic region northeast to Quebec, Canada. Several roads and streams were flooded throughout the region, including low-land flooding along the Hoosic River in Bennington County. Scattered power outages also occurred over the area, when strong winds downed water-laden tree branches onto wires.

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

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

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

Probability

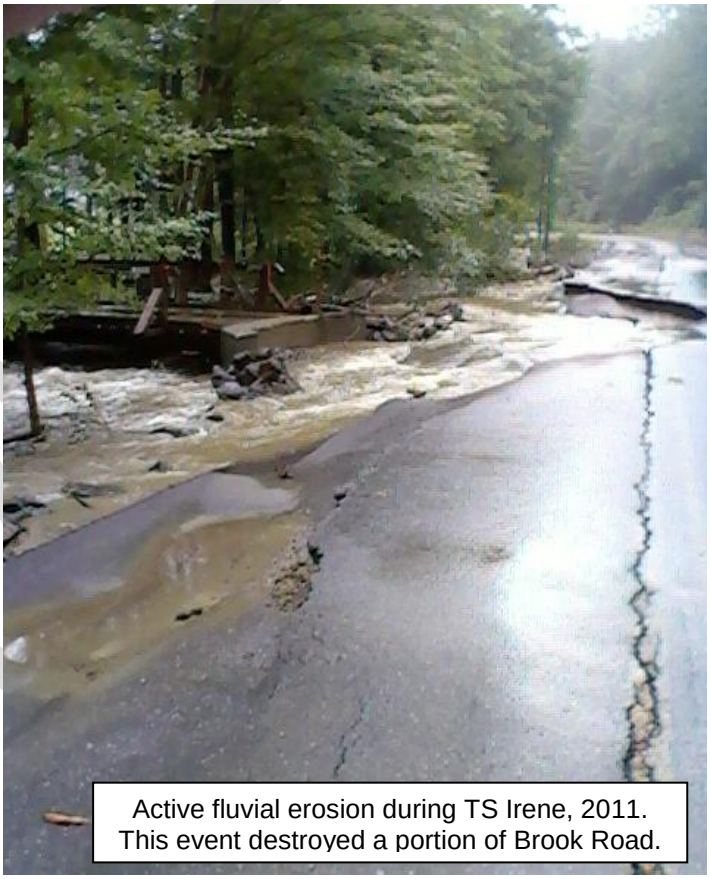
[19] USGS "Vermont Floods and Droughts" information page http://md.water.usgs.gov/publications/wsp-2375/vt/. Accessed 4/3/15.

Flooding is highly likely, as determined by the number of past events and the local knowledge of the Hazard Mitigation Planning Committee. There are events every year, especially during spring snow melt and late summer season rains.

Sources used
Local town knowledge and records, VT ANR online mapping, FEMA FIRM maps, US ACE's CRELL Ice Jam mapping tool, USGS stream gauge data, Northeast Regional Climate Center data, FEMA.gov data visualization tool for declared disasters, National Climatic Data Center storm event database data for Windham County.[20]

Fluvial Erosion[21]
Description and Impact

Most flooding damage is caused by fluvial erosion. Halifax is particularly susceptible because most of the road network, infrastructure and development is within the River Corridor.


Active fluvial erosion during TS Irene, 2011. This event destroyed a portion of Brook Road.

Most of the destruction from flooding in Halifax is due to fluvial erosion rather than inundation, which is the type of flooding targeted through the NFIP. Fluvial erosion is the destruction of river banks caused by the movement of rivers and streams, when stream power overcomes resistance of bed and bank material. This can range from gradual bank erosion to catastrophic changes in river channel location and dimension during flood events. This occurs when the stream has more energy than is needed to transport its sediment load, due to channel alterations or runoff events that increase water speed in the channel, leading to erosion. Fluvial erosion hazard mapping was released by the VT Agency of Natural Resources in early December 2014. This mapping can assist municipalities in developing bylaws and effective mitigation strategies to regulate development within fluvial erosion hazard zones. Halifax does not currently have a fluvial erosion bylaw, but is in the process of adding this to their floodplain regulations.

Gravity and water power are the forces driving fluvial erosion. Factors that allow the force of gravity to overcome the resistance of earth material to erosion include: saturation by water, steepening of slopes by erosion or construction, alternate freezing or thawing, removal of trees and other vegetation and earthquake shaking. Major erosion events are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. Associated issues in Halifax are related to road cutting and bank erosion for the most part, areas where roads have been built between steep slopes on one side of the road, and slopes to a river or brook on the opposite side. Existing homes are dotted on the landscape along these roads which have existed for 200 years or more, so cannot be easily closed or relocated.

[20] < http://www.ncdc.noaa.gov/stormevents/> accessed September 1, 2015
[21] All fluvial erosion photos were provided courtesy of Halifax EMD John LaFlamme.

Geographic Area of Hazard/Location/Occurrence

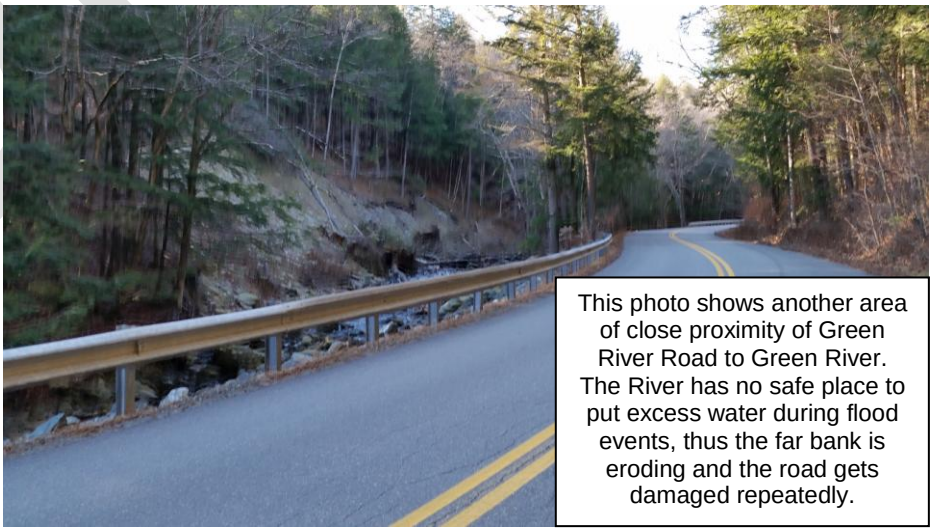
This photo shows the close proximity of Green River Road to Green River. There is extensive bank armoring in this section put in after TS Irene.

In some instances stabilization/mitigation projects in Halifax have helped. In other areas throughout Halifax, issues remain. Many of the fluvial erosion issues are on private land, and thus require the consent of the land owner to mitigate the hazard. In the words of EMD John LaFlamme, 'A lot of the Halifax's vulnerability is not under their control to mitigate.' The river Corridor mapping (included in this plan) shows the ANR defined River Corridors, which are likely to have fluvial erosion. The map also points out some of the issues discussed in the text of particular problem spots. There are numerous areas in Halifax with fluvial erosion risks to both infrastructure and buildings. Many of the road risks have cut off residences during past events, such as TS Irene. About 20 Halifax residents were stranded for 1-2 and some even 3 weeks after TS Irene; they were along the Green River and roads that offshoot from Green River, such as Perry Road, Fowler Road, and Deer Park.

The *River Corridor Plan for the Green River in Guilford and Halifax, VT*[22] describes the River this way "…The Green River channel is still adjusting its width, depth, and planform to the following historical and ongoing impacts: 1) aggradation of sediment in the valleys due to European settlement and deforestation that occurred during the 1700's and 1800's; 2) channel straightening, dredging, and corridor encroachment associated with adjacent roads, agriculture, and other land uses; 3) significant floods in recent years such as those in October of 2005 and Tropical Storm Irene in August of 2011" (pg 71).

The Green River extent in Halifax has "extensive armoring and encroachment along Green River Road. The steeper and more confined reaches in Halifax transport large volumes of sediment and have little opportunity to spill on to floodplains and dissipate energy. As a result, these reaches convey large volumes of water and sediment downstream. These high energy reaches caused catastrophic damage to roads and bridges during Tropical Storm Irene in locations where embankment armoring failed or at bridges that were undersized or obstructed by debris."

The *River Corridor Plan* describes the overall recommendations for the Green River extent in Halifax this way:



This photo shows another area of close proximity of Green River Road to Green River. The River has no safe place to put excess water during flood events, thus the far bank is eroding and the road gets damaged repeatedly.

[22] River Corridor Plan for the Green River in Guilford and Halifax, VT, prepared by Fitzgerald Environmental Associates, LLC, November 1, 2014

- Limited floodplain protection opportunities exist in Halifax, and therefore those few opportunities identified in this plan are very important for the protection of nearby infrastructure and downstream areas.
- Extensive roadway reconstruction following Tropical Storm Irene left the river prone to bed erosion and bank instability on the opposite bank. While there may not be a feasible way to address these issues, there are opportunities to further "naturalize" the banks along the road through the redevelopment of vegetated slopes overlying the riprap armor.
- The ongoing bed and bank erosion along the heavily armored stretches of Green River Road should be monitoring closely in the near term, and especially following subsequent floods. If the river bed continues to incise (i.e., cut down), the embankments could be at risk of failure. Channel bed armoring may be required in some areas to prevent these failures.

Extent
The largest area of fluvial erosion in Halifax is pictured to the left. It lies off of Green River Road on private land. It is about 200 feet long and 300 feet high.

Probability
Fluvial erosion is highly likely and exists in Halifax, especially due to the damage caused by TS Irene in 2011, where fluvial erosion hazard flooding de-stabilized many steep-sloped areas and washed out riparian zones next to roads and streams.

Largest area of fluvial erosion in Halifax is along the Green River. Photo was taken after TS Irene in 2011.

Sources used
Local knowledge of areas of concern and impacts, Discussions and emails with the EMD and Road Foreman during Fall/Winter 2015

Power Outages
Power failure is a common condition associated with high winds, ice storms, flooding, downed trees, and other hazards. It can occur anywhere in town. Power failures are typically the result of power lines damaged by high winds or heavy snow/ice storms. Power failures may also result from disruptions in the New England or National Power grid, as indicated by the widespread power outages in 2003. Dead or dying trees in close proximity to power lines pose a particular threat for power failure. Green Mountain Power serves Halifax. Power outages can be viewed on their website.[23]

Residents that don't have access to a generator are of concern in winter months if there is no alternate heat source other than electric. The need to educate residents about the proper installation and use of generators to prevent accidents was acknowledged during public participation in this plan development.

TS Irene in 2011 and the December 2008 ice storm were major weather events that caused extended power loss. Some areas were out of power for 10 days. There was another long power outage during

[23] https://wss.greenmountainpower.com/customers/outages/

the summertime in the late 1990's when the power was out for two days due to equipment failure at a substation.

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

ASSESSING VULNERABILITY

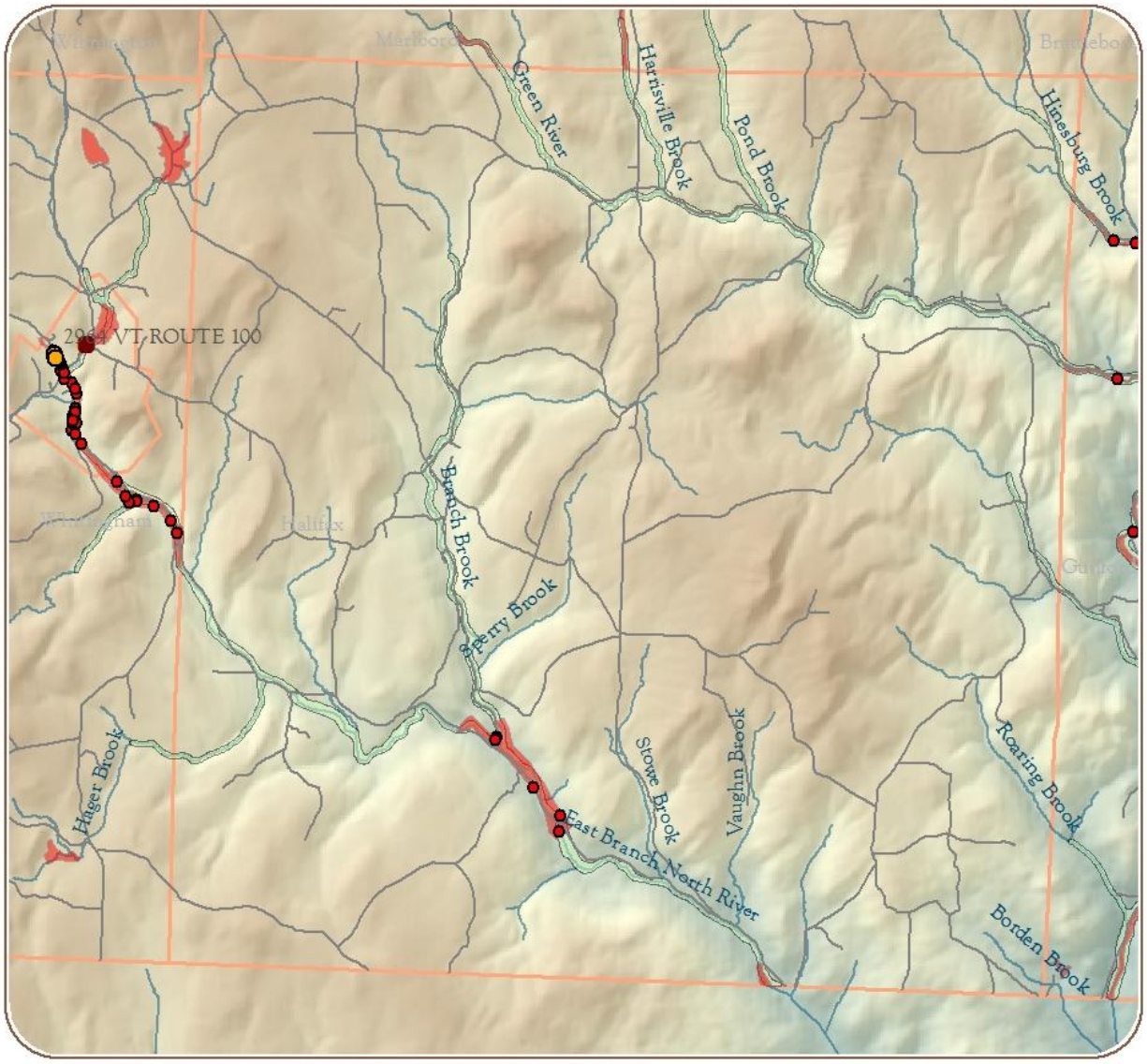
Structures in the SFHA and River Corridor

There are approximately 5 buildings within FEMA-designated Special Flood Hazard Areas (SFHAs).[24] The map on the following page shows structures (red and orange dots on map) that are located in the SFHA. The 5 are all in the larger SFHA, near the intersection of Route 112 and Branch Road. These structures are particularly vulnerable to flooding and fluvial erosion hazards described in this plan.

Properties within SFHAs, that have a mortgage, are required to purchase flood insurance. Halifax's participation in the National Flood Insurance Program (NFIP) gives residents access to discount flood insurance through the National Flood Insurance Program. Flood insurance can still be purchased privately, however it is more expensive. Development in SFHAs must meet additional construction standards as outlined in Halifax's floodplain regulations, which is part of their zoning ordinance and was adopted in March 2012. Halifax joined the NFIP in 2012. There is only one active flood insurance policy through the NFIP in affect in Halifax.

There are thirty-six (36) structures in the River Corridor in Halifax. This is about 6% of the total number of structures in Halifax.[25] Adding River Corridor regulations to the floodplain bylaw in the town zoning would impact substantial improvements/replacements of these structures, as well as any new development in the River Corridor.

[24] 2015 Flood Hazard Summary Sheet for Halifax
[25] There is currently 594 structures in Halifax.



Town of Halifax
Critical Structures and Buildings in Hazard Areas

- Critical or Public Structures in Hazard Areas
- Buildings in Special Flood Hazard Areas
- Flood Hazard Areas
- River Corridors
- Dam - High Hazard Potential

8.21.15 VT DEC

Special Flood Hazard Areas are mapped by FEMA for the National Flood Insurance Program (NFIP).
www.msc.fema.gov

River Corridors and Flood Hazard Areas can be viewed on the Vermont Flood Ready Atlas - tinyurl.com/floodreadyatlas

Building locations from e911 site locations 12/12

For current data on flood risks and mitigation actions in the community please see please see Community Reports on www.floodready.vt.gov

0 0.5 1 2 3 Miles

Repetitive Loss Structures

According to FloodReady.Vermont.gov, Halifax has no repetitive loss claims.[26] A Repetitive loss structure is an NFIP-insured structure that has had at least 2 paid flood losses of more than $1,000 each in any 10-year period since 1978.[27] Severe repetitive loss (SRL) structures are NFIP-insured buildings that, on the basis of paid flood losses since 1978, meet either of the loss criteria described in the SRL section. SRL properties with policy effective dates of January 1, 2007 and later will be afforded coverage (new business or renewal) only through the NFIP Servicing Agent's Special Direct Facility (SDF) so that they can be considered for possible mitigation activities. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- That has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.
- For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.

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

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

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

In return for adopting floodplain management regulations, the federal government makes flood insurance available to the citizens of the community. In 1973, the NFIP was amended to mandate the purchase of flood insurance as a condition of any federally regulated, supervised or insured loan on any construction or building within the 100-year floodplain. In 2012, Congress passed the Biggert-Waters Flood Insurance Reform Act to reduce subsidies for structures built before the NFIP was instituted (called pre-FIRM structures). Over 50 percent of Vermont's NFIP policies are pre-FIRM, which means that flood insurance premiums for many will increase over the ensuing years.

While the NFIP floodplain management criteria are administered by states and communities through their floodplain management regulations, FEMA's role is to provide technical assistance and to monitor communities for compliance with the minimum NFIP criteria. Halifax joined the NFIP on November 1, 2012 and is a member in good standing (CID 500281). The latest floodplain ordinance was adopted March 6, 2012 and is in the zoning ordinance. The latest Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) referred to in the development of this plan have an effective date of September 28, 2007.

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[26] Report listing repetitive losses is available here: <http://floodready.vermont.gov/sites/floodready/files/documents/VT%20RL%20Report%201.26.15.pdf>
[27] https://www.fema.gov/national-flood-insurance-program/definitions

The latest record indicates that there is one (1) active NFIP policy in Halifax. This policy has a total value of $86,400. There have been no NFIP claims paid in Halifax since they joined the NFIP.[28]

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

Vulnerable Community Assets in Halifax

As noted in prior sections, the village of West Halifax is susceptible to flooding. All of the below assets noted by the town are in the village of West Halifax, with the exception of the Town Garage.

- Halifax Town Office
- Halifax Elementary School (Red Cross Emergency Shelter) – The school serves 50-60 students and has a school crisis plan in place. The school is a Red Cross shelter for the town. It is the only shelter in Halifax.
    - Shelter capacity is not more than school. This could be an issue, though EMD says that there are only 20-30 individuals who may need sheltering in the event of short term natural disaster, like ice storm. This is because many residents have wood heat or generators and would most likely choose to remain in their homes.
    - Has a generator
- West Halifax Community Hall
- Historical Society Building
- Fire Station (has generator)
- Town Garage (has generator)

Market Values of Structures in Halifax[29]

The total Grand List in the Town of Halifax:	$142,112,300.00**
Common Level of Appraisal:	104.16 (Jan 2015)

** $1,267,108.00 = Grand List Adjusted for Exemptions (voted and legal)
These counts do not include non-taxable structures. There are 17 (non taxable) locally exempt properties.

Development Trends

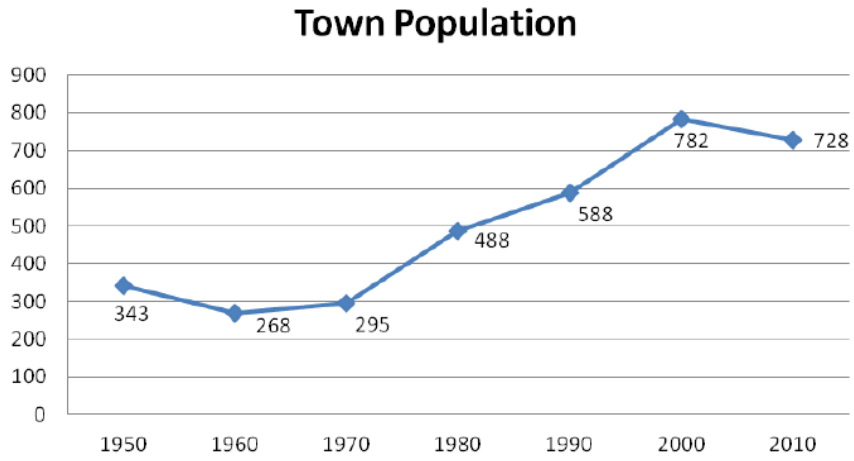
Halifax is a stand out community for the fact that they discuss mitigation in their town plan. They recognize the importance of mitigation as part of a complete emergency management policy.

"…Preparedness also requires preparing for emergencies, recovering from emergencies and finding ways to successfully mitigate against the impact of future emergencies and disasters not just responding to situations as they happen."
- Halifax Town Plan

To reiterate what was stated in the introduction of this report, population has dropped slightly since 2000. Halifax has a lower population than any of its neighbors. Locals attribute the population decrease primarily due to a shortage of jobs in the immediate area. In addition, property taxes are higher in Halifax than some surrounding areas. The town has increasingly become a bedroom community for Brattleboro and Greenfield, Massachusetts, as well as nearby ski resort areas in Wilmington and Dover. Household income is comparable to surrounding towns. There

[28] FEMA NFIP Insurance Report, January 2015, accessed November 23, 2015 http://floodready.vermont.gov/sites/floodready/files/documents/NFIP%20Insurance%20Report%20VT%201.26.15.pdf
[29] Town of Halifax 2015 Grand List

are no trends that stand out as causing particular vulnerability for Halifax.[30] Population loss is somewhat of a concern, but that is a trend seen in the Windham region and the many areas in the State of Vermont generally and relates to larger economic forces at play, such as a shortage of well paying jobs. This leaves economic vulnerabilities for rural areas, such as Halifax, but not specific to Halifax alone. The fact that Halifax's economy is not based on tourism serves to lessen vulnerability for the town because a disaster or tourism decline would not impact them as much as town that relies heavily on tourism for its economy.

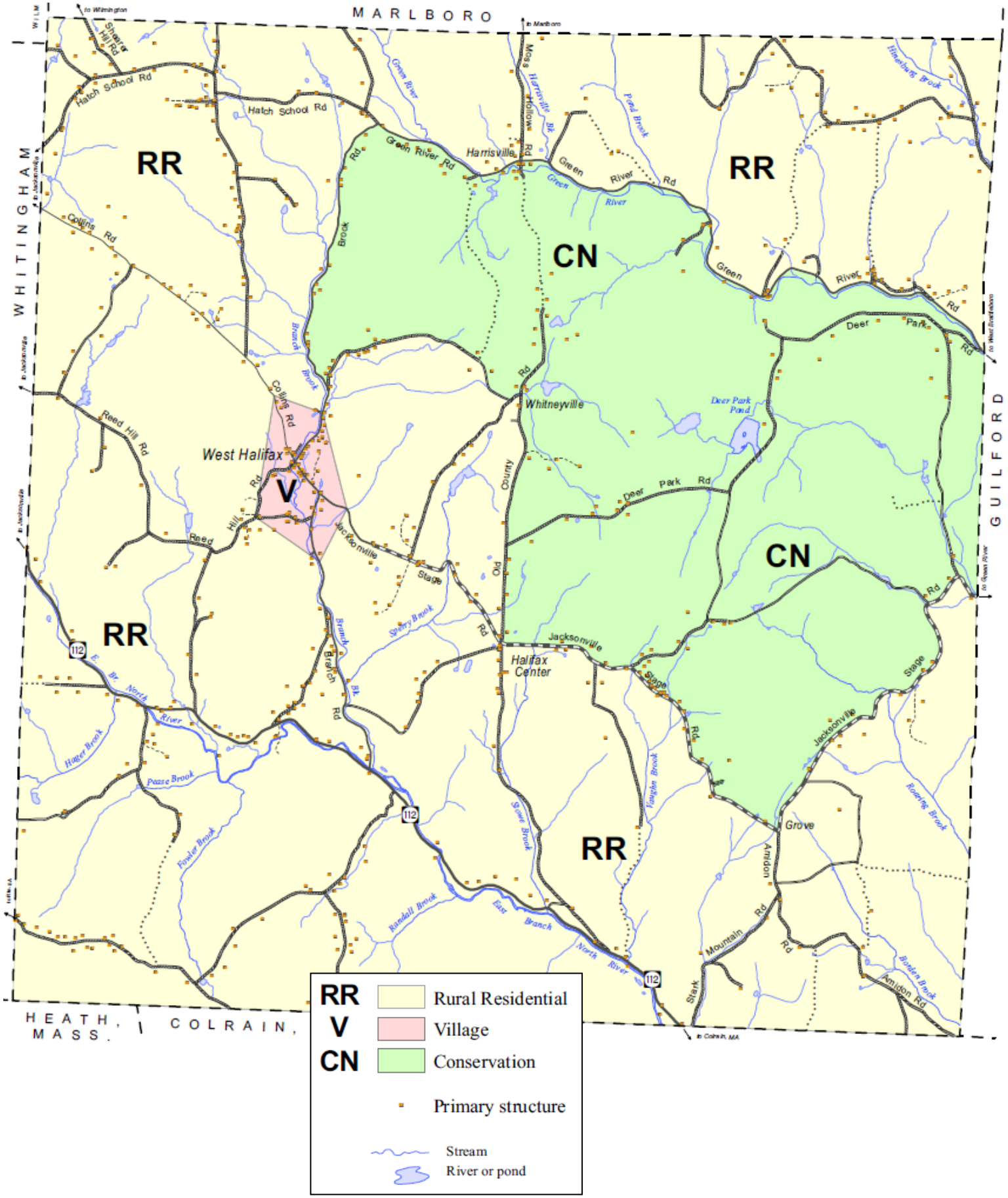


There is not much development in Halifax. Locals have a mix of desire for development and desire for things to stay the same. The latter usually wins out, with some exceptions. There is a new winery that has become a draw for tourism and event hosting. On average, Halifax issues 30-35 building permits a year. There are some new houses, but most of these permits are for alterations to existing properties or accessory structures. The town is not aware of any development in particularly vulnerable areas.[31] The existing built environment of Halifax is vulnerable because a lot of structures are in areas of fluvial erosion susceptibility. Development in remote areas is vulnerable to being cut off during a disaster. When granting permits for new development, Halifax should consider the vulnerability of the new development and the means that the town has to get to the area where the development will be located if a disaster happens and roads are out.

With the shutdown of Vermont Yankee at the end of 2014, the town will be losing emergency management funding from VY in the year 2016. The town has not had any specific discussion about funding for emergency management after the loss of VY funds.

[30] 2010 re-adopted Halifax Town Plan
[31] Feedback gathered from discussion at meeting and with several Halifax residents, September and December 2015.

Proposed Land Use Map from 2010 Re-adopted Halifax Town Plan



MITIGATION STRATEGY

Local Hazard Mitigation Goals for this Plan

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

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

2010 Re-adopted Town Plan Policies that Support Mitigation

Land Use - Flood Hazard Area Policies

1. Reserve flood hazard areas for agriculture, recreation, or other purposes, which do not significantly impair the land's ability to handle floodwaters.
2. Deny any development within a flood hazard area that restricts or diverts the flow of floodwaters.
3. Ensure the health, safety and welfare of the public during flooding by discouraging all construction within flood hazard areas.

Surface Water Policies

1. Ensure that the natural course, condition, and function of watercourses and stream banks not be changed permanently except for necessary crossings by adequate bridges or culverts engineered and designed to minimize the impact on streams.
2. Require that undisturbed vegetation buffers be maintained along the banks of surface waters.
5. Require that Significant Wetlands as identified on the National Wetlands Inventory Maps be protected from development by maintaining an undisturbed, naturally vegetated buffer strip around the wetland edge sufficient to ensure the integrity of the wetland.
7. Require that every effort be made to utilize natural drainages. Deny the rerouting or enclosure of small upland streams and swales in culverts.

Natural Area Policies

2. Prevent any development that dredges, fills, drains, floods or otherwise alters any wetland.

Emergency Management Policies

1. Require that all new public and private roads and driveways are properly constructed so that they do not contribute to the damage of Town roads from run-off. Driveway permits are required.
2. Encourage the improving of existing roads, and design culverts and bridges to carry a 25-year flood event without damage.
3. Encourage the updating and improvement of emergency evacuation plans.

Fire and Police Protection Policies

1. Provide the facilities and effective equipment for police and fire protection that is within the financial capabilities of the Town.

2. Require that all development be designed and sited so as to minimize the risks of fire and to maximize the fire department's ability to combat fires. Necessary common fire protection features, such as fire ponds and/or dry or charged hydrants, should be installed where practicable by developers and subdividers to ensure public safety.
3. Encourage that smoke detectors be installed in all residential units and commercial establishments.
4. Require that proposals for development include a statement of immediate and long-term impact on police and fire protection services and identify measures to be taken to minimize any additional burden.

Communication Tower Policies

6. Facilitate the provision of telecommunications services to the residences and businesses of the Town.

Energy Resources Policies

1. Encourage the use of on-site or locally obtainable renewable energy resources such as hydroelectric, solar, wood, biomass, and wind as long as such use is consistent with policies of the Town Plan.

Progress between 2010-11 and 2015

Though there was not a complete and adopted hazard mitigation plan in place, Halifax had drafted hazard mitigation action goals during the plan process in 2010-11. The below table has those actions and their current status. Actions that have not been completed, and the town still wishes to pursue, are included in the Mitigation Action Table of this plan.

2010-11 Mitigation Action	Responsible Party	Expected Completion Timeframe/Year	Current Status
Inventory of trees potentially interfering with power lines	Road Foreman, Tree Warden	Annually	Trees in town right of way are monitored. Private land is not touched. Green Mountain Power inspects and removes trouble trees every couple years.
Adopt Building codes that comply with high wind standards	Selectboard	2 years (2012-13)	This is not action that the town wants to pursue.
Stark Mountain Road culvert upgrade	Road Foreman	1 year (2012)	This did not happen. Better Back Roads grant was not approved and the town didn't have budget for it. This is still an action the town wants to pursue
Hubbard Hill Road culvert upgrade	Road Foreman	1 year (2012)	Half of this project is complete now; expected completion Fall 2016
Winchester Road Culvert replacement	Road Foreman	1 year (2012)	This was not completed; Hydrology study was completed and that recommended a concrete box culvert, which is an upgrade. The town plans to pursue this action.
Keeping Culverts and bridges free from natural woody debris and ice jams	Road Foreman	Checking continuously during winter months	Annual process that the ditches are cleaned. There are a large number of trees across Green River. ANR has given permission for the trees to be cut, but not removed.
Education programs to local citizens on emergency preparedness	Emergency Personnel	Ongoing	The school provides some education to students.
Continued ICS training	Emergency Personnel	Ongoing	Everybody is currently trained that needs to be.

Additional Mitigation:

Halifax has set up and been trained on using VTAlert. VTAlert is an emergency notification system that delegated individuals can use to send emergency messaging to the public or specific groups within the town. This is a highly important tool in emergency response and prevention.

Halifax has reworked their permit applications so that they align with revised zoning and so they are more self explanatory and give applicants a more detailed understanding of permit process. This is important because residents seeking permits need to be made aware of all permit requirements, including special requirements for proposed development in hazard areas such as the Special Flood Hazard Area and the River Corridor.

Ongoing Efforts

1. Leaf removal and ditch cleaning are maintenance activities done every Spring by the road crew. The road crew stone lines all ditches with greater than a 5% grade to prevent them from eroding.

2. Halifax updates their culvert inventory every three years. The next update is in process and is expected to be completed in December 2015. This update is going to include detailed condition information for every culvert and will take into account all changes from the last update.

3. The road crew goes around twice per year and inspects trees and brush that could cause hazards along roadways. Green Mountain Power hires a tree service to prune trees around lines every several years.

4. The town maintains their one emergency shelter equipment and inventory.

5. Halifax is a member in good standing of the National Flood Insurance Program. The floodplain ordinance is kept compliant and the town maintains SFHA maps at the town office.

6. When culverts are replaced, they are upgraded to meet current Town Road and Bridge Standards, which usually means upgrading the culvert size.

7. For the time being, until funding is cut in 2016, Radiological Emergency Response Program (RERP) is still in place. As an EPZ town, the means that Halifax attends all required trainings, participates in drills, and maintains equipment to deal with a radiological emergency.

Identification of Mitigation Actions

The Halifax Hazard Mitigation Planning participants identified the following hazard mitigation activities based on an evaluation of hazard event vulnerability not addressed by existing hazard mitigation initiatives and the feasibility of new activities. As a part of the ongoing plan process, these were updated in 2015 by the Hazard Mitigation Planning participants to reflect progress and new ideas.

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

- Does the action reduce damage?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?

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

Cost-Benefit Analysis

As part of public involvement discussions, there was a rough cost/benefit analysis done for each action listed in the table and those results are shown in the table. The below cost and benefits tables address the priorities for the mitigation strategies that are stated in the Mitigation Actions Table. This was how the mitigation actions were assessed by the Hazard Mitigation Planning participants. Priority was assessed somewhat independently of cost/benefit and was based more on the perceived need of each action and availability of funding, versus what the action costs and benefits.

At the time of applying for FEMA's PDM-C, FMA or HMGP grant programs, each project listed below will undergo full benefit-cost analysis (BCA) methodology, version 5.1 or higher to maximize savings. Whenever possible, Guilford will utilize 406 mitigation funding.

Cost Estimates

High	= >$100,000
Medium	= $25,000 – 100,000
Low	= < $25,000

Benefit Estimates

High	Public Safety
Medium	Infrastructure/ Functionality
Low	Aesthetics/ General Maintenance

Mitigation Actions Identified by the Hazard Mitigation Planning participants

HAZARD	ACTION	RESPONSIBLE PARTY	TIME-FRAME	FUNDING SOURCE	MITIGATION OR PREPAREDNESS	COST / BENEFIT	PRIORITY	STATUS
All hazards	Promote VTAlert sign-up amongst residents and second home owners	EMD	Start Summer 2015 / Complete mid-2016	State funded; town budget	Mitigation and Preparedness	Low/High	High	VTAlert has been set up for the town and personnel were trained.
All Hazards	Formalize mutual aid/shared services/ equipment sharing agreements with adjacent towns. Having these agreements would save time and effort following disasters when support is needed.	Selectboard / Road Foreman	Started Summer 2015 / Complete by the end of 2016	Town budget	Preparedness	Low/High	High	Halifax is participating in Municipal Shared Services meeting that WRC has hosted.
Flooding / Ice jams	Cut trees that obstruct water flow in the Green River and have potential to cause jams.	Road Crew	Start and finish Fall 2015	Town budget	Mitigation and Preparedness	Low/High	High	Permission was just granted from VT ANR to do this. Trees can be cut, but must be left in place.
Flooding / Fluvial erosion	New bridge at Sumner Road and Branch Road	Road Foreman	Start and finish Summer 2017	Vtrans Structures grant	Mitigation	High/High	High	Road Class was upgraded to allow for grants for this project. In discussions in town now.
Flooding / Fluvial erosion	Winchester Road Culvert upgrade	Road Foreman	Start and finish 2017 or 2018	Vtrans grant	Mitigation	High/Low	Medium	Hydraulic study completed; This upgrade will be a 4'x8' box culvert.
Flooding / Fluvial erosion	Culvert upgrade on Hatch School Road	Road Foreman	Start and finish Summer 2019	VTrans Structures grant / Town budget	Mitigation and Preparedness	Medium / High	Medium	Hydraulic study needed to be scheduled with VTrans
Flooding / Fluvial erosion	Stark Mountain Road culvert upgrade	Road Foreman	Start and complete 2017 - Summer to Fall	Town budget, unless grant can be found	Mitigation	Medium/ High	Low	Planning to put a portion in 2016 town budget, and the rest in 2017 budget. Issue is under-sized culvert and ditches that need stone lined. This culvert was badly damaged in TS Irene.

HAZARD	ACTION	RESPONSIBLE PARTY	TIME-FRAME	FUNDING SOURCE	MITIGATION OR PREPAREDNESS	COST / BENEFIT	PRIORITY	STATUS
Flooding / Fluvial erosion	Hubbard Hill Road culvert upgrade	Road Foreman	Start and finish 2016	Town budget	Mitigation	Low/ Medium	Low	The east side of Hubbard Hill Rd was completed in 2014, now culverts on west side need to be completed. These culverts always have problems when there are heavy rains.
Flooding / Fluvial erosion	New bridge at Branch Road and Route 112	Road Foreman	Hydraulic study by 2017; Start and finish construction Summer 2018	VTrans Structures grant / Town budget	Preparedness	High/ Low	Low	VTrans has visited the site; hydraulic study not yet completed. The bridge is too narrow and the sight lines are limited in both directions. This is the main road from VT 112 to the village. This upgrade is more for safety than hazard mitigation.
Fluvial erosion	Green River Bank armoring	Road Foreman	Start and Finish Summer 2016	Town budget or grant funding	Mitigation	High/High	High	Stone armor the bank of the Green River from Clark Road to Metcalfe Road. This section didn't get done after TS Irene. After every storm, they are losing a bit more ledge. The road is in danger and it needs to be fixed yearly-which is costly.
Fluvial erosion	Add fluvial erosion regulations to floodplain bylaw in zoning ordinance	WRC and Planning Commission	Began Summer 2015 / complete March 2016	Town budget / WRC dues	Mitigation	Low/ High	High	Draft is being worked on currently. It will be voted on at TMD 2016.
Flooding	Training of Zoning Administrator in floodplain administration	Zoning / Floodplain Administrator / WRC / VT ANR	Ongoing; First training held Fall 2015	Town budget	Mitigation and Preparedness	Low / High	High	Having a ZA with a proper understanding of the regulations will ensure permits are sought when needed and prevent structures from being built in vulnerable locations or in improper ways. Classes currently being scheduled.

The Green River Corridor Plan, which was recently completed, is a detailed study of the entire river corridor. Part of the report outlines specific projects and ranks them for mitigation priority.

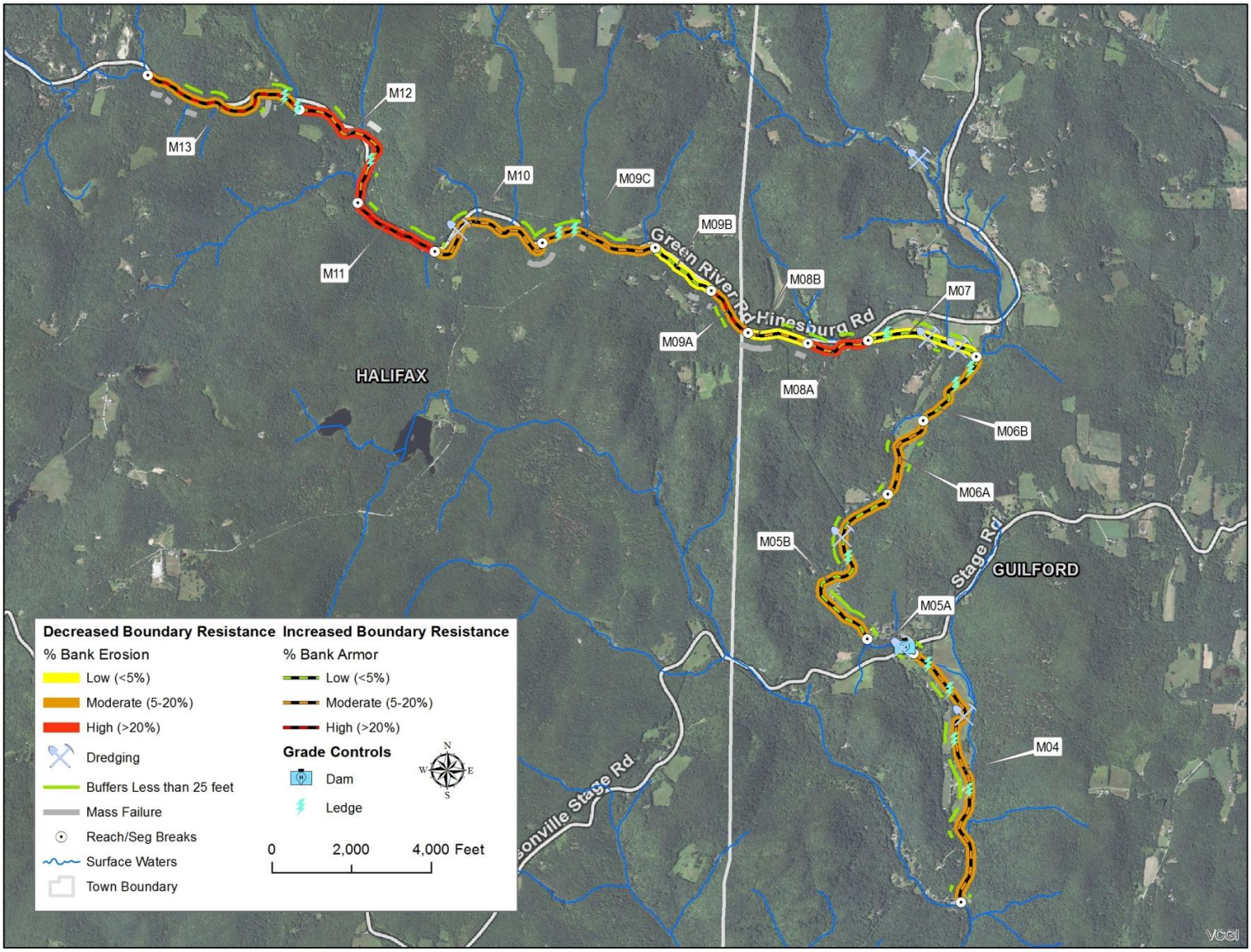
Green River Corridor Plan Identified Mitigation Projects for the Town of Halifax

Project #, Location, Reach, Lat/Long	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Hazard Mitigation Priority	Ecological Benefits Priority	Project Benefits	Costs	Potential Partners & Funding
#15 Green River Rd Reach M09C Multiple Sites	**Passive Restoration** Buffer Planting	Two bank armoring sites from T.S. Irene lack vegetation on upper slope.	Add topsoil/grubbings to upper slope and seed with conservation mix. Plant smaller stock saplings to encourage long term woody vegetation along banks and shading of channel.	Low	Moderate	Increase shading and woody debris inputs to stream.	Low costs for materials and labor for buffer plantings.	Town of Halifax; WCNRCD Trees for Streams
#16 Green River Rd Reach M10 Multiple Sites	**Passive Restoration** Buffer Planting	A low floodplain bench was constructed during post-Irene removal of a major debris jam in the upper reach. Seeded with grass, no woody vegetation. An additional bank armor sites from T.S. Irene in lower reach lacks vegetation on upper slope.	Plant woody vegetation on floodplain bench. Add topsoil/grubbings to upper slope and seed with conservation mix. Plant smaller stock saplings to encourage long term woody vegetation along banks and shading of channel.	Low	Moderate	Increase shading and woody debris inputs to stream.	Low costs for materials and labor for buffer plantings.	Town of Halifax; WCNRCD Trees for Streams
# 17 Dawn till Dusk Farm Reach M10 42.8029 N 72.7099 W	**Passive Restoration** Buffer Planting	Landowner is concerned with bank erosion on property. Channel incised considerably during T. S. Irene and is causing some erosion on left bank. No structures are at risk.	Work with landowner to plant woody buffer vegetation and advise on bank stabilization options.	Low	Low	Reduce erosion and sediment inputs, increase shading and woody debris inputs to channel.	Low costs for materials and labor for buffer plantings.	WCNRCD Trees for Streams
#18 Private Footbridge Reach M11 42.8044 N 72.7159 W	**Active Restoration** Bridge Abutment Configuration	Existing private footbridge has a 60' span, but sloping rock abutments create a significant channel constriction to 32'. Armor slope and structure vulnerable to failure in future floods.	Work with landowner to reconfigure rock abutments to increase bankfull width and reduce vulnerability at structure.	Moderate	Low	Improve flow and sediment/debris transport through bridge, reduce risk of debris plugging during storm events.	Moderate costs to reconfigure lower armor slopes.	Landowner

Project #, Location, Reach, Lat/Long	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Hazard Mitigation Priority	Ecological Benefits Priority	Project Benefits	Costs	Potential Partners & Funding
#19 Green River Rd Reach M11 Multiple Sites	**Passive Restoration** Buffer Planting	Two bank armoring sites from T.S. Irene lack vegetation on upper slope.	Add topsoil/grubbings to upper slope and seed with conservation mix. Plant smaller stock saplings to encourage long term woody vegetation along banks and shading of channel.	Low	Moderate	Increase shading and woody debris inputs to stream.	Low costs for materials and labor for buffer plantings.	Town of Halifax; WCNRCD Trees for Streams
#20 Green River Rd Reach M12 Multiple Sites	**Passive Restoration** Buffer Planting	Two bank armoring sites from T.S. Irene lack vegetation on upper slope.	Add topsoil/grubbings to upper slope and seed with conservation mix. Plant smaller stock saplings to encourage long term woody vegetation along banks and shading of channel.	Low	Moderate	Increase shading and woody debris inputs to stream.	Low costs for materials and labor for buffer plantings.	Town of Halifax; WCNRCD Trees for Streams
#21 Green River Rd Reach M12 42.8113 N 72.7204 W	**Active Restoration** Berm Removal and Road Embankment Armoring	A tall historic berm blocks access to the left floodplain (approx. 1 acre). The channel cut through the berm on the upstream end during T.S. Irene, but road repairs filled in this access point with rip-rap. Floodplain storage is low throughout reach.	Alternatives analysis to remove berm, or restore access to floodplain at the upstream access point, and move rock rip-rap along road to protect embankment.	**High**	Low	Provide valuable floodplain storage for attenuation of sediment and stormflow before stream enters long stretch with minimal storage. Reduce risk of debris catching on downstream bridge which experienced major damage and overbanks flows during T.S. Irene.	Limited costs to remove portion of recently placed rip-rap at upstream end. High costs and impacts to remove historic berm.	Town of Halifax; Landowner
#22 Floodplain along Green River Rd Reach M12 42.8126 N 72.7230 W	**Passive Restoration** Corridor Protection	A short stretch (500 ft) of intact and accessible floodplain on the left bank in between the river and road was accessed during T.S. Irene. Floodplain stores significant sediment and floodwaters during floods.	Prevent stream corridor from future development.	Moderate	Low	Provide valuable floodplain storage for attenuation of sediment and stormflow along Green River Road where minimal storage is available. Reduce risk of debris catching on downstream structures which experienced major damage during T.S. Irene.	Low to Moderate costs depending on conservation or easement approach and size of parcel.	VTANR; VLT; Landowner

Project #, Location, Reach, Lat/Long	Type of Project	Site Description Including Stressors and Constraints	Project or Strategy Description	Hazard Mitigation Priority	Ecological Benefits Priority	Project Benefits	Costs	Potential Partners & Funding
#23 Green River Rd Reach M13 Multiple Sites	**Passive Restoration** Buffer Planting	Two bank armoring sites from T.S. Irene lack vegetation on upper slope. Total length of armor slope approx 600 feet.	Add topsoil/grubbings to upper slope and seed with conservation mix. Plant smaller stock saplings to encourage long term woody vegetation along banks and shading of channel.	Low	Moderate	Increase shading and woody debris inputs to stream.	Low to Moderate costs for materials and labor for buffer plantings.	Town of Halifax; WCNRCD Trees for Streams

Green River Stream Segment Map



Riparian and boundary condition modifiers for the Green River watershed[32]

Implementation of Mitigation Actions / Capabilities

Barriers to Implementation:

1. Financial constraints of town budget
2. Limited staff at town level
3. Halifax will soon be losing emergency planning funding from VY. The town would have to allocate budget to emergency planning after this point in 2016. The town should consider doing this.
4. Small population means limited tax base
5. Large number of second homes
6. Village of West Halifax is susceptible to flooding

[32] Map taken from the River Corridor Plan for the Green River in Guilford and Halifax, VT, prepared by Fitzgerald Environmental Associates, LLC, November 1, 2014

7. Green River Road, one of the main roads in town, is entirely within the River Corridor. Many other roads in Halifax are also in the River Corridor. Many of the roads in Halifax are also steep.
8. Floodplain Administrator needs training

Capabilities to build upon for implementation:

1. Town cohesion and social capital
2. Active Selectboard
3. Active Planning Commission
4. Five part-time town employee positions, engaged employees
5. Five full-time Road Crew employees
6. Dedicated EMD to carry out projects. This funded position may no longer be funded as RERP funding is lost, but town should consider funding EMD. Reliance on volunteer base is more risky.
7. Windham Regional Commission assistance when needed
8. Floodplain ordinance in place and being updated
9. Tourism base which brings financial capital into town

Recognizing that there is no place that doesn't have barriers to overcome in project implementation, Halifax is in a decent position overall. There are committed volunteers and staff who make this town function well. They are invested and plan to remain in the area. Halifax does not have a lot of businesses, but they do have some tourist attractions and more potential ones on the horizon. Halifax is not struggling financially, though they have a limited real estate tax base because they have a small population. Halifax is a distance from major towns and amenities. This lends to a "do it yourself" mentality that serves Halifax positively. Their remote location could increase vulnerability during a major event, or conversely it could protect Halifax.

The town looks to and works closely with the Windham Regional Commission. They look to the Regional Plan policies for guidance on land use decisions which influence their town plan policies and goals. The town works closely with VT Department of Environmental Conservation Agency of Natural Resources and the Army Corps of Engineers when mitigating any work in streams or rivers. Additionally the town adopts the latest VTrans Road Standards for road/culvert/bridge improvement projects.

With the support of these Agencies and the Commission, Halifax is capable of carrying out all of the mitigation actions outlined in this plan.

Existing Planning Mechanisms / Integration

The following policies, programs and activities related to hazard mitigation are currently in place and/or being implemented in the Town of Halifax. The Hazard Mitigation Planning participants analyzed these programs for their effectiveness and noted improvements needed. Halifax uses all of the tools listed below to help plan for current and future activities with the town. For example: the Local Emergency Operation Plan has a contact list that is used for response purposes in the case of a hazard event, and is updated every year after Town Meeting. Town Road and Bridge Standards are followed by the town and Halifax is in the midst of updating their culvert inventory in late 2015. In the development of this plan, the latest readopted 2010 Town Plan was used.

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

emergency preparedness and mitigation planning efforts are included in the Town Plan, with particular attention to including the projects in the Mitigation Actions Table. This will assist with ensuring that this plan is utilized and project follow-through occurs.

Halifax will soon be updating the Town Plan to address flood resiliency and the village designation. The hazard mitigation plan will be considered and incorporated as appropriate. The floodplain ordinance is being updated now to include a Fluvial Erosion Hazard bylaw. The LEOP is updated yearly and was updated last in 2015. Other mitigation/emergency planning related documents and their status are outlined in the below table:

Type of Existing Authority / Policy / Program / Action	Description	Effectiveness/Enforcement/ Hazard that is addressed	Gaps in Existing Protection/Improvements Needed
Town Plan	Plan for coordinated town-wide planning for land use, municipal facilities, etc.	Flood Resilience not addressed	Town Plan re-adopted in 2014; Next plan should incorporate flood resiliency
Town Local Emergency Operation Plan	Municipal procedures for emergency response	Incident Command; Hazard Annexes included	LEOP and adopted by Town Select board in 2015; next LEOP should include all of the appendices
School Emergency Response Protocol	School procedures for emergency response	School Crisis Plan in place	Town should review the plan with the school administration; plan should be routinely exercised with town staff participation.
LEPC 6 Hazardous Materials Plan	Procedures for hazmat emergency response at regional level	LEPC 6 has the plan	Continued involvement with the LEPC; LEPC should update their plan.
Mutual Aid – Emergency Services	Agreement for regional coordinated emergency services	Keene (NH) Mutual Aid – written agreement/contract for Fire/Ambulance and HazMat	None identified
Mutual Aid – Public Works / Road Crew	This would address sharing of equipment or services between towns.	There are no formal agreements in place at this time. As needs arise towns help each other.	It would be beneficial for all towns to have formalized agreements in place before needs arise. Not having this creates unnecessary legwork during and following events. Halifax is participating in the Municipal Shared Services meetings that WRC has hosted.
Road Standards	Design and construction standards for roads and drainage systems	Adopted new VTrans Road Standards in 2013.	Road standard issues that could be addressed to protect bridges.
Zoning regulations	Regulates the division of land, standards for site access and utilities	Zoning in place, currently being updated	Zoning update occurring now and will be voted on Town Meeting Day 2016.
Sewage Regulations	Regulates on-site sewage systems	State Regulations apply	None Identified
Flood Hazard Area Regulations	Regulates development in FEMA identified SFHAs	In zoning bylaw	Revised in 2007 to include new FEMA DFIRM's. Being updated to include River Corridors.
National Flood Insurance Program (NFIP)	Provides ability for residents to acquire flood insurance	NFIP member since 1992	Further training for Floodplain Administrator recommended

Maintenance Programs	Bridge & Culvert Inventory	Updated in 2015 Completed Annually	None Identified
Building Code	Regulates building construction standards	No building codes in place	NA
Wetland protection – VT Wetland Rules	Protected by 1990 Vermont Wetland Rules	Protection of environment, water resources, wildlife, biota	None Identified

PLAN MAINTENANCE PROCESS

Monitoring and Updating the Plan – Yearly Review

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

Plan Maintenance – 5 Year Update and Evaluation Process

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

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

2. The WRC Emergency Planner will guide the Committee through the update process. This update process will include several advertised public meetings. At these meetings the Committee will use the existing plan and update as appropriately guided by the WRC Emergency Planner to address:
   - Update of hazard events and data gathered since the last plan update.
   - Changes in community and government processes, which are hazard-related and have occurred since the last review.
   - Changes in community growth and development trends and there affect on vulnerability.
   - Progress in implementation of plan initiatives and projects.

- Incorporation of new mitigation initiatives and projects.
- Effectiveness of previously implemented initiatives and projects.
- Evaluation of the plan for its effectiveness at achieving its stated purpose and goals.
- Evaluation of unanticipated challenges or opportunities that may have occurred between the date of adoption and the date of the report, and there affect on capabilities of the town.
- Evaluation of hazard-related public policies, initiatives and projects.
- How mitigation strategy has been incorporated into other planning mechanisms
- Review and discussion of the effectiveness of public and private sector coordination and cooperation.

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

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

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

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

7. Public and adjacent town comments will be incorporated by the WRC Emergency Planner. The final draft will be provided to the Emergency Management Director, and interested individuals that participated in the update, for final review and comment, with review comments provided to the Committee and incorporated into the plan.

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

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

10. SHMO and FEMA comments will be addressed in the plan by the WRC Emergency Planner.

11. The plan will be resubmitted as needed until the plan is approved pending adoption. Once the plan is approved by FEMA, it will be ready for adoption.

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

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

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

Post-Disaster Review/Update Procedure

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

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

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

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

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

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

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

Continued Public Participation

Maintenance of this plan and implementation of the mitigation strategy will require the continued participation of local citizens, agencies, and other organizations. To keep the public aware of and involved in local hazard mitigation efforts, the town will take the following measures:

- Provide hazard mitigation information at Town Meeting
- Schedule and advertise a planning meeting each year, soon after Town Meeting
- Seeking participation from key players in addition to general public interest:
    - Select board
    - Planning Commission
    - Public Works
    - School
    - Fire & Rescue
    - Emergency Mgt/ 911 Coordinator
    - Town Administrator
- Post the hazard mitigation plan on the town website
- Selectboard will review past hazard mitigation committee members and consider whether new members should be added. Representatives of local businesses, nonprofits, academia, etc. should especially be considered.
- Notify the public of committee meetings through town bulletin board, website, newspaper, Facebook, Community Hall newsletter, etc.

APPENDIX

1. Adoption Sheet
2. Website advertisement for Draft Hazard Mitigation Plan (posted 1/13/15 – 1/28/15)
3. Flyer advertising availability of Draft Hazard Mitigation Plan for comment
4. Email sent 12/23/14 to Town Staff and Hazard Mitigation Committee for comment on draft
5. Committee email comments received back on draft
6. Email to adjacent towns for comment on draft
7. Adjacent town comments received back on draft
8. Website advertisement for November 17, 2014 Hazard Mitigation Committee meeting at Guilford Town office
9. November 17, 2014 Hazard Mitigation Committee meeting agenda
10. November 17, 2014 Hazard Mitigation Committee meeting sign-in sheet
11. September 10, 2013 Hazard Mitigation Committee meeting sign-in sheet
12. January 28, 2011 Hazard Mitigation Committee meeting sign-in sheet
13. Road Foreman Meeting of October 21, 2010 sign-in sheet
14. October 19, 2010 LEPC 6 meeting with program about Pre-Disaster Hazard Mitigation Plans (Guildford had a representative)
15. Flyer advertising October 19, 2010 LEPC 6 meeting
16. October 19, 2010 LEPC 6 meeting - overview and photographs showing public interaction
17. September 21, 2010 LEPC 6 meeting with program about Pre-Disaster Hazard Mitigation Plans (Guildford had a representative)

1. PREREQUISITE

Adoption by the Local Governing Body

Certificate of Adoption
Town of Halifax, VT
Selectboard

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

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

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

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

WHEREAS, the Town of Halifax, VT authorizes responsible agencies to execute their responsibilities to implement this plan for the purposes of long term risk reduction and increased community resiliency and;

WHEREAS, the Town of Halifax, VT will follow the Plan Maintenance Process outlined in this plan to assure that the plan stays up to date and compliant; and

NOW, THEREFORE BE IT RESOLVED that the Town of Halifax, VT adopts the *Town of Halifax Local Hazard Mitigation Plan* as well as future revisions and maintenance required by 44 CFR 201.6 and FEMA for a period of five (5) years from the date of this resolution.

Duly adopted this _____ day of _____.
date *month, year*

Selectboard

_____
Lewis Sumner, Chair

_____
Douglas Grobe, Vice Chair

_____
Bradley Rafus

ATTEST

_____
Robbin Gabriel, Selectboard Assistant

Website advertisement for draft plan review

Email sent to adjacent towns for public comment on the draft plan

Flyer advertising availability of Draft Hazard Mitigation Plan for public comment

Halifax Hazard Mitigation Plan

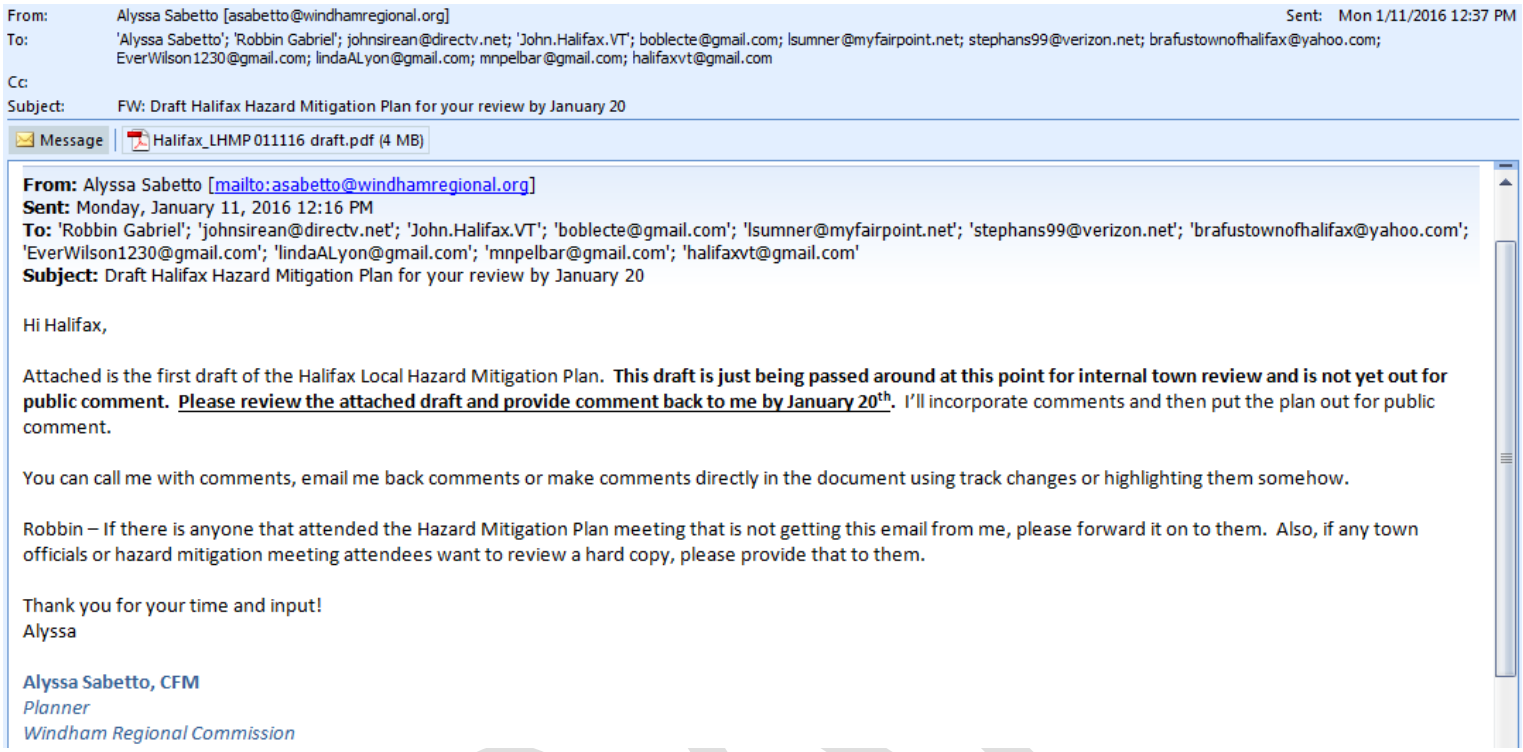
PUBLIC COMMENT PERIOD

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

The Plan will be available for comment until the end of the public comment period on February 8, 2016.

Anyone who would like to comment on the plan should contact Alyssa Sabetto at the Windham Regional Commission. She can be reached via phone at 802-257-4547 x109 or email at asabetto@windhamregional.org. We encourage your review and participation!

Email sent 1/11/16 to town staff and Hazard Mitigation Planning Committee for review of the draft



From: Alyssa Sabetto [asabetto@windhamregional.org] Sent: Mon 1/11/2016 12:37 PM
To: 'Alyssa Sabetto'; 'Robbin Gabriel'; johnsirean@directv.net; 'John.Halifax.VT'; boblecte@gmail.com; lsumner@myfairpoint.net; stephans99@verizon.net; brafustownofhalifax@yahoo.com; EverWilson1230@gmail.com; lindaALyon@gmail.com; mnpelbar@gmail.com; halifaxvt@gmail.com
Cc:
Subject: FW: Draft Halifax Hazard Mitigation Plan for your review by January 20

Message | Halifax_LHMP 011116 draft.pdf (4 MB)

From: Alyssa Sabetto [mailto:asabetto@windhamregional.org]
Sent: Monday, January 11, 2016 12:16 PM
To: 'Robbin Gabriel'; 'johnsirean@directv.net'; 'John.Halifax.VT'; 'boblecte@gmail.com'; 'lsumner@myfairpoint.net'; 'stephans99@verizon.net'; 'brafustownofhalifax@yahoo.com'; 'EverWilson1230@gmail.com'; 'lindaALyon@gmail.com'; 'mnpelbar@gmail.com'; 'halifaxvt@gmail.com'
Subject: Draft Halifax Hazard Mitigation Plan for your review by January 20

Hi Halifax,

Attached is the first draft of the Halifax Local Hazard Mitigation Plan. **This draft is just being passed around at this point for internal town review and is not yet out for public comment. Please review the attached draft and provide comment back to me by January 20th.** I'll incorporate comments and then put the plan out for public comment.

You can call me with comments, email me back comments or make comments directly in the document using track changes or highlighting them somehow.

Robbin – If there is anyone that attended the Hazard Mitigation Plan meeting that is not getting this email from me, please forward it on to them. Also, if any town officials or hazard mitigation meeting attendees want to review a hard copy, please provide that to them.

Thank you for your time and input!
Alyssa

Alyssa Sabetto, CFM
Planner
Windham Regional Commission

Responses received from 1/11/16 comment solicitation from town and Hazard Mitigation Planning Committee on the draft plan

All comments were received via telephone conversation with Robbin Gabriel.

Website advertisement for September 16, 2015 Hazard Mitigation Committee meeting at Halifax Town office

Website advertisement seeking volunteers for Hazard Mitigation Planning Committee

September 16, 2015 Hazard Mitigation Committee meeting sign-in sheet

Halifax, VT - HAZARD MITIGATION PLAN UPDATE MEETING
September 16, 2015
Location: Halifax Town Office

SIGN IN SHEET

Name and email address	Affiliations – Please list all	Town where you live
Robbin Gabriel Halifaxsecretary@gmail.com	Selectboard Secretary	Halifax
Sirean M LaFlamme johnsirean@directv.net	P.Com & ZBA Chair.	Halifax
John haFlamme john.halifax.vt	EMD	Halifax
Bob Leete bobleete@6-dot.com	Live in town	Halifax
Lewis Sumner LSumner@Myfairpoint.net		Halifax
Stephen Chait stephens99@verizon.net	Planning Commission. Zoning Board.	Halifax
Doug Grob	selectboard	Halifax
Marilyn A Iler		
Jesse Ferland	—	Halifax
Wayne Courser	Fire chief	Halifax
Brad Rafus BraFus Town of Halifax @ yahoo.com.	Road commissioner	Halifax
Everett Wilson		

September 16, 2015 Meeting agenda

Halifax Hazard Mitigation Plan Update & Community Resiliency Meeting

Halifax Town Office – September 16, 2015

Agenda

1. Introduce the Hazard Mitigation Plan

a) Purpose
b) Process
c) Review of past involvement

2. Hazards

a) Complete Hazard Ranking Table
b) Discuss events that have happened that should be included in the plan
c) Mapping of vulnerable areas – mark up map as a group

3. Mitigation Actions

a) Review and update Mitigation Goals
b) Review Mitigation Actions table developed by Halifax in 2011
c) Discuss progress made since the plan was last worked on
d) Discuss Existing Hazard Mitigation Projects, Programs & Activities
e) Update Mitigation Actions Table
f) Gaps and capabilities with Implementation

4. Other Updates

a) Development trends – new developments, upcoming developments
b) Review of other elements of the draft plan and questions that weren't discussed

5. Next Steps

September 16, 2015 Meeting flyer that was posted around town

Halifax Hazard Mitigation / Resiliency Plan Public Meeting Announcement

Date: Wednesday, September 16, 2015

Time: 6:00-8:00 PM

Location: Halifax Town Office
246 Branch Road, Halifax, VT 05358

Come help create Halifax's Local Hazard Mitigation Plan! What hazards does the town face? What actions can the town take now to lower vulnerability before the next natural hazard strikes?

For more information contact
Alyssa Sabetto at 802-257-4547 x109

WINDHAM REGIONAL COMMISSION

December 1, 2010 Hazard Mitigation Committee meeting sign-in sheet

HALIFAX – PRE-DISASTER HAZARD MITIGATION PLANNING MEETING

December 1, 2010
Location: Halifax Town Offices

SIGN IN SHEET

Name	Affiliations – Please list all	Town where you live	Phone	email
Patricia Daw	Treasurer Town Clerk	Halifax	368-7390	townclerk@halifaxvermont.com
Wayne Courser	Fire Chief	Halifax	368-7733	NONE
Bradley Rafus	Road commissioner, Road Supervisor, Treewarden, Planning, Zoning commission	Halifax	368-7378	BradRafus@earthlink.net
HOWARD ALBOOM	Chairman of PLANning Commission Zoning Board.			
Andrew Rice	Halifax Constable Trustee Firedept Asst chief/ EMS	Halifax	257-7982	Halifaxconstable@Gmail.com

Damage photos from Tropical Storm Irene (these photos do not show the entire extent of damage in Halifax). These photos were provided by Town EMD John LaFlamme.

Green River Road

Green River Road