Town of Wardsboro
Local Hazard Mitigation Plan

Town Adopted 4/21/20
FEMA Final Approved 5/5/2020

Prepared for the Town of Wardsboro
by the Windham Regional Commission

WINDHAM REGIONAL COMMISSION

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INTRODUCTION AND PURPOSE

This Single Jurisdiction Hazard Mitigation Plan is an UPDATE to a Plan approved by the Federal Emergency Management Agency (FEMA) effective August 25, 2014.

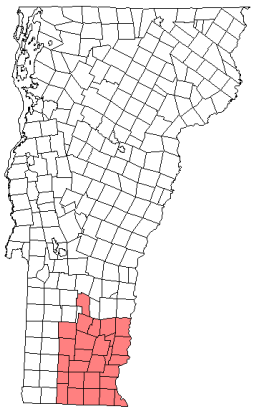
The purpose of this plan is to assist the Town of Wardsboro in identifying all of the hazards facing the town and to identify new and continuing strategies to reduce long term risks from identified hazards.

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



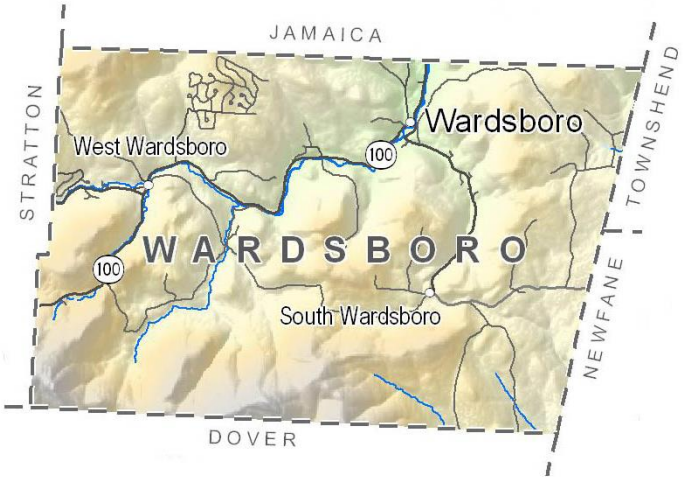
Situated in Vermont's southeastern corner, the Windham Region consists of 23 towns in Windham County, the neighboring towns of Readsboro, Searsburg, and Winhall in Bennington County, and Weston in Windsor County. The region is bordered by Massachusetts to the south and New Hampshire to the east. At over 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.

WARDSBORO GEOGRAPHY & TOWN PROFILE



The Green Mountains are the defining element of the physical geography of Wardsboro. As such, the landscape is rolling and mountainous, with the highest elevations being located in the southern portion of the Town. Historically, the development and primary travel corridors in Wardsboro have occurred in the valleys and along the stream and river corridors, which is typical in the region. As slopes increase, the buildability tends to become more difficult, especially historically, which along with access to water, is why development patterns tend to be in valleys and near streams. Much of the historical development patterns remains in southern Vermont, leading to vulnerabilities to flooding in some low lying village areas and along certain travel corridors. This is demonstrated in Wardsboro, where the most populous villages of Wardsboro and West Wardsboro both lie along Route 100, which follows Wardsboro Brook.

Wardsboro is 29.3 square miles in size, or 18,752 acres, and is primarily drained to the northeast by Wardsboro Brook, a tributary of the West River. Wardsboro is in south-central Vermont in Windham County and is located adjacent to the towns of Stratton, Jamaica, Townshend, Newfane and Dover. State highway Route 100, which is the main transportation route for the West River Valley, runs west and north through Wardsboro. Though located between Stratton and Mount Snow ski areas, Wardsboro remains a predominantly rural town with about 90% of the town in forest cover, about 4% wetland and water, and the only the remainder being open land, brush, or developed as roads or buildings. The U.S. Forest Service owns 3,044 acres, or 16 percent of Wardsboro, in one large tract in the southern part of town which is part of the Green Mountain National Forest (GMNF). The GMNF, the largest publicly owned parcel in Wardsboro, is under the federal government's jurisdiction. In addition, approximately two-thirds of the Town of Wardsboro is located within the GMNF Proclamation Boundary. With the consent of interested parties, lands located within the Proclamation Boundary can also be purchased if the federal government is interested and the town agrees to the sale. The Town owns the Wardsboro Town Forest which comprises 60 +/-acres managed under a forest management plan.

The three Town villages are West Wardsboro, South Wardsboro, and Wardsboro Village. In each of the villages lot sizes are varied and there is a diversity of housing and commercial

activities. Wardsboro Village functions as the center of civic and commercial activity in Wardsboro, such as the Town Office, Town Hall, Library, Church, Post Office, Fire/Rescue Station, Town Garage and Wardsboro Elementary School. A Post Office and Church are also found in West Wardsboro, and there is a third Church in South Wardsboro.

The majority of residential development has occurred as low-density single-family homes along Class 2 or 3 highways (there are many dirt roads in Wardsboro, and Vermont generally). While development has remained largely scattered throughout town, three larger housing developments have been built: Snow Mountain Farms, Snow Mountain Farms West, and Scandia Village. Snow Mountain Farms West is partially located in the Town of Stratton, but the housing development is solely accessed through Wardsboro. Tourist and second home owner traffic increases during the weekends, holidays and winter months as Route 100 is a major thoroughfare for the ski areas. The V.A.S.T snowmobile trail system traverses through the town between Dover and Stratton.

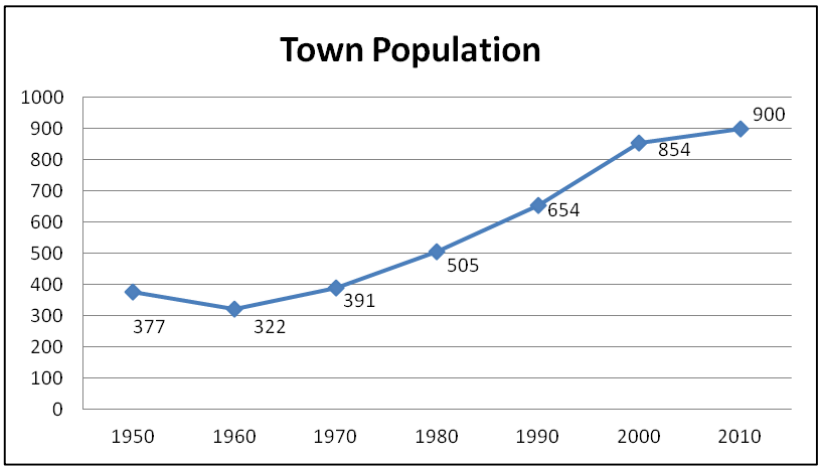
Because of its remote location, Wardsboro is a fairly close knit community and is very aware of vulnerable residents who may need help during hazardous conditions. While the Fire House does not maintain a list of vulnerable residents, they contact who they know of locally when necessary during periods of isolation or power outages. Wardsboro also has a 'Meals on Wheels' program, which keeps townspeople aware of potential needs of the vulnerable population. Wardsboro Elementary School is the Town's emergency shelter and has a standby generator. The Fire Station has a portable generator; however, being a critical facility, the town would like to have a standby generator installed at the Fire House, which could also serve the Town Office, which is the Local Emergency Operations Center.

The climate is generally temperate with moderately cool summers and cold winters, as in the rest of Vermont. The weather is unpredictable, and large variations in temperature, precipitation, and other conditions may occur both within and between seasons.

Fun Facts: Wardsboro is known as the first place the Gilfeather turnip was grown and harvested. The town now celebrates its heritage with an annual Gilfeather Turnip Festival. The Gilfeather Turnip was designated the Vermont state vegetable after a successful lobbying effort by Wardsboro Elementary School in 2016.

Development Trends

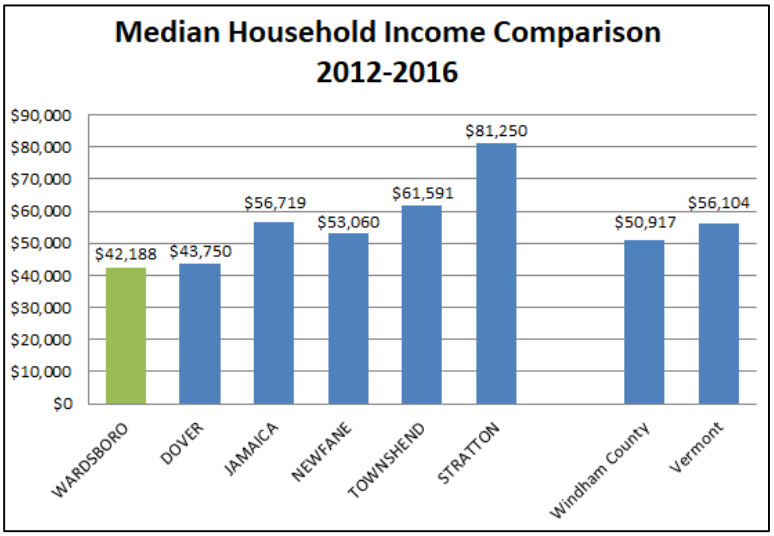
Wardsboro's population has been rising slightly over the years, more slowly in recent years with about a 5% increase between 2000 and 2010. There is very little new development on an annual basis in recent years in Wardsboro. Only about one new home is built per year in Town.



Population Trends in Surrounding Towns

Town	1990	2000	2010	% Change 1990-2000	% Change 2000-2010
Wardsboro	654	854	900	31%	5%
Jamaica	754	946	1035	26%	9%
Townshend	1019	1149	1232	12%	7%
Newfane	1555	1680	1726	8%	3%
Dover	994	1410	1124	42%	-20%
Stratton	121	136	216	12%	59%

Compared to surrounding towns, Wardsboro is relatively similar with a population bump between 1990 and 2000 followed by a slow growth pattern between 2000 and 2010, with the exception of Stratton which grew by 59%, and Dover which dropped by 20%. Wardsboro has many of the impacts of being a town located in a ski resort area, but hasn't seen the same amount of investment as towns like Stratton and Dover which actually have resorts located in their bounds. The difference in part can be seen in comparing the household incomes with surrounding towns. Wardsboro has the lowest household income of any of its neighbors. Wardsboro taxes are somewhat higher, however, because of the proximity to the resorts. They also have second home growth from the



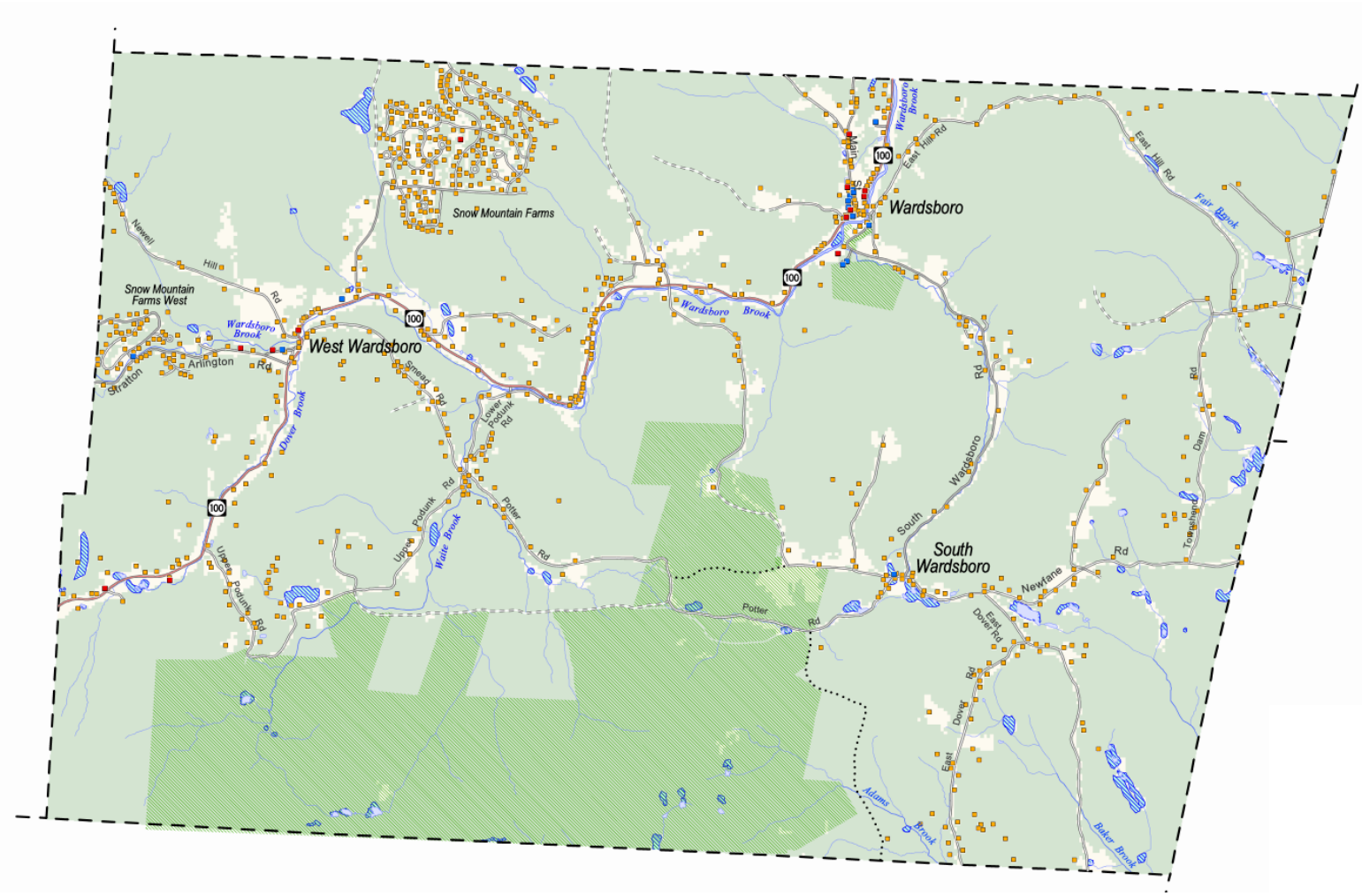
resorts, but not as much as Stratton or Dover. A higher percentage of Wardsboro residents are local, meaning they are not second home owners, than the neighboring towns. Population and income statistics are useful to consider in a mitigation plan because these factors give clues about a community's resiliency level and the ability of average residents to recover following a large scale event, or over the long term. Wardsboro benefits from the fact that there is a larger local based population, as this means there are more boots on the ground to assist when needed. They may be at some risk due to lower household income, as residents may have a more difficult time recovering following an event.

Emergency Services

The Emergency Management Director, who is appointed by the Selectboard, coordinates emergency preparedness and response for the Town. The Wardsboro Volunteer Fire Department serves the Town and is composed of 26 volunteer firefighters and the Chief. The Department serves the entire town and has mutual aid agreements with surrounding towns. There is a firehouse in Wardsboro Village. Keene Mutual Aid serves as dispatch for the Department. As with many small town fire departments in Vermont, getting volunteer firefighters is difficult. The Wardsboro Volunteer Fire Department makes all efforts to recruit volunteer fire-fighting personnel to protect Wardsboro residents and visitors. Members attend training courses sponsored by Vermont Fire Academy and the various mutual aid associations. The Fire Department, Town Garage, Town Office and the Road Crew all have interoperable radios as cell coverage is spotty.

Emergency medical services are provided primarily by Wardsboro First Response Squad and Rescue Inc. operating out of their West Townshend facility. Rescue Inc. is a non-profit organization funded in part through town assessments, which Wardsboro contributes to for the service. Rescue Inc. provides numerous towns in the region with ambulance service, medical care, transport to and from area hospitals and large regional hospitals. Wardsboro has police coverage provided by the Vermont State Police. The nearest hospital is Grace Cottage Hospital and then Brattleboro Memorial Hospital. Wardsboro's primary designated emergency shelter is Wardsboro Elementary School, which has a generator and is capable of sheltering up to 75 people overnight. Wardsboro Elementary is the only school in the Town and it serves about 40 students from grades Kindergarten through 6th. The Town Hall is the secondary shelter but it does not have a generator nor access to one. The Town Office is the Local Emergency Operations Center and has access to a portable generator, though it is not able to power the whole building.

Existing Land Use Map from the 2019 Wardsboro Town Plan



- Commercial structure
- Public/Institutional structure
- Residential structure
- Public or conservation land
- Wetlands
- Forest
- Non-forest
- State highway
- Paved town highway
- Unpaved town highway
- Class 4 town highway
- Legal trail
- Stream
- Pond or river

PLANNING PROCESS

Town residents who took part in the planning process for developing the Local Hazard Mitigation Plan for Wardsboro 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 Plan Update Process

This Single Jurisdiction Hazard Mitigation Plan is an UPDATE to a Plan approved by FEMA effective August 25, 2014.

The Town began the plan update process in May 2019. Alyssa Sabetto, Emergency Planner for the Windham Regional Commission met with Selectboard member Peter Sebastian and Town Clerk Jackie Bedard to kick off the update process and plan for the public meetings. Alyssa asked that the Selectboard review the mitigation actions table to update the progress of each action. The Selectboard did this work and discussed the update of the Hazard Mitigation Plan at three Selectboard public meetings held April 30th, May 14th and May 28th in Wardsboro. The Hazard Mitigation Planning participants convened three times on June 5th, June 26th and July 23rd for public meetings to provide input into the plan update. They met with Alyssa at the Wardsboro Town Office. Jackie directly invited town officials and the general public was informed through the normal means the town uses to advertise all public meetings, which included an advertisement in the Bucketville News.[1] Each meeting lasted for 2-3 hours. Over the course of the several meetings the group completed and discussed:

[1] See appendix for meeting flyer, sign-in sheets and meeting agendas.

- a review of the 2014 Hazard Mitigation Plan and discussion of progress made on identified actions, and progress made that was not a mitigation action in the 2014 Plan;
- review of hazard events and discussion of events that have occurred since 2014;
- Review of the 2014 hazard analysis and an update on what hazards the town would like this Plan to focus on. This involved completing the updated hazard analysis table as a group;
- Review of the mitigation goals of the Town set out in the 2014 Plan, and a discussion about update of those goals and any change in mitigation priorities in the Town;
- review of mapping of the town to note where hazard events are causing repeated or large scale damage;
- update of development changes in the Town since 2014, and how those changes impact vulnerability in the Town; and
- development of updated mitigation actions table, which includes maintaining of some of the incomplete mitigation actions from the 2014 Plan

Alyssa updated the plan to meet the current standards and guidelines of FEMA for hazard mitigation plans. She took the information from the public meetings, along with follow-up information gathered in conversations with the Road Foreman and the Town Clerk. Alyssa also reviewed and utilized the data sources noted and cited throughout this plan to gather further information. The draft was presented for internal town review by the Committee, town personnel, Planning Commission and Selectboard on December 16, 2019. This internal town review period was from December 16-February 18. Comments and corrections were received back from the Planning Commission and the Selectboard. Alyssa made the revisions and corrections to finalize the draft for public comment.

The revised draft plan was put out for public comment on February 20, 2020. This was done by 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 during the two-week comment period. It was simultaneously distributed to the adjacent towns of: Stratton, Jamaica, Townshend, Newfane, and Dover, for comment via email.[2] No comments received back. The plan was finalized by Alyssa Sabetto for submittal to Vermont Emergency Management (VEM). This submittal allows VEM to make suggested revisions on the draft, and allows for any revisions to be made before the final draft is submitted to the Federal Emergency Management Agency Region 1 (FEMA) for review.

The following people were involved in the hazard mitigation planning process in one or more meetings:

Contributors	Affiliations	Home
Peter Sebastian	Selectboard	Wardsboro

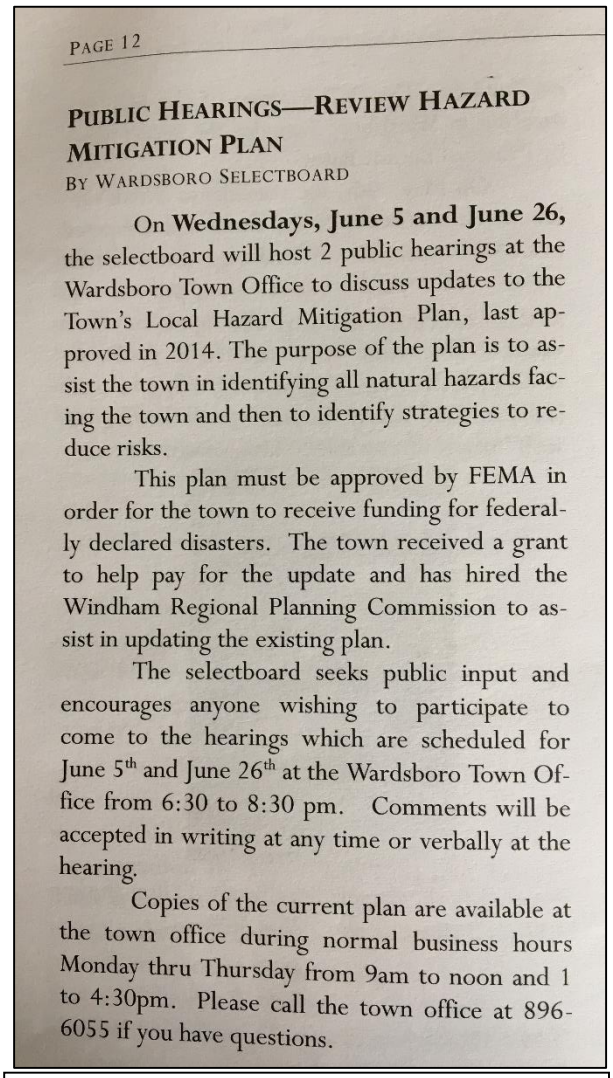
[2] See appendix 3 for reach-out and response.

Jack Cunningham	Wardsboro Commissioner for the Windham Regional Commission	Wardsboro
Greg Donna	Wardsboro Road Foreman	Jamaica
Michelle Hull	Wardsboro Assistant Town Clerk	Wardsboro
Jackie Bedard	Wardsboro Town Clerk / Treasurer	Wardsboro
Kathy Anderson	Wardsboro Selectboard	Wardsboro
James Knapp	Wardsboro Selectboard	Wardsboro
Alyssa Sabetto	Windham Regional Commission, Plan Developer	Brattleboro

Public Involvement and Input from Neighboring Communities

Making the Wardsboro 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.[3]
- The Selectboard did this work and discussed the update of the Hazard Mitigation Plan at three Selectboard public meetings held April 30th, May 14th and May 28th in Wardsboro.
- The Hazard Mitigation Planning participants convened three times on June 5th, June 26th and July 23rd for public meetings to provide input into the plan update.
- Alyssa and Selectboard member, Peter Sebastian, did a road tour on May 1st to visit an area of Wardsboro that has extreme fluvial erosion issues.
- The draft plan was made available in hard copy for public review and comment at the town office from February 20-March 12, 2020.
- Flyers were put up around town for public comment on the draft.[4]
- Advertisements were placed in the Deerfield Valley News and the Brattleboro Reformer advertising the public comment opportunity.[5]
- On February 19, 2020, an invitation was extended via email to neighboring towns to provide a means and opportunity to review and comment on the draft Wardsboro Hazard Mitigation Plan.[6] No comments were received. Inter-town communication will repeat for future revisions of this Plan.



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PUBLIC HEARINGS—REVIEW HAZARD MITIGATION PLAN

BY WARDSBORO SELECTBOARD

On **Wednesdays, June 5 and June 26,** the selectboard will host 2 public hearings at the Wardsboro Town Office to discuss updates to the Town's Local Hazard Mitigation Plan, last approved in 2014. The purpose of the plan is to assist the town in identifying all natural hazards facing the town and then to identify strategies to reduce risks.

This plan must be approved by FEMA in order for the town to receive funding for federally declared disasters. The town received a grant to help pay for the update and has hired the Windham Regional Planning Commission to assist in updating the existing plan.

The selectboard seeks public input and encourages anyone wishing to participate to come to the hearings which are scheduled for June 5th and June 26th at the Wardsboro Town Office from 6:30 to 8:30 pm. Comments will be accepted in writing at any time or verbally at the hearing.

Copies of the current plan are available at the town office during normal business hours Monday thru Thursday from 9am to noon and 1 to 4:30pm. Please call the town office at 896-6055 if you have questions.

Advertisement for public meetings posted in the Bucketville News June 2019 edition.

[3] See appendix 14.
[4] See appendix 4.
[5] See appendix 5.
[6] See appendix 3.

RISK ASSESSMENT

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

Methodology

A **vulnerability analysis** for each community begins with an inventory of possible hazards and an assessment of the risk that they pose. These are the questions to be answered. What hazards can affect your community? How bad can it get? What is the likelihood of future events occurring? What areas of your town are most vulnerable to these hazards? How does climate change impact 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 following table is the scale used to rank each hazard that is analyzed:

Hazard Assessment Ranking Criteria		
	Frequency of Occurrence: Probability of a plausibly significant event	**Potential Impact:** Severity and extent of damage and disruption to population, property, environment and the economy
1	Unlikely : <1% probability of occurrence in the next 100 years	Negligible: Isolated occurrences of minor property damage and environmental damage, potential for minor injuries, no to minimal economic impact
2	Occasionally: 1–10% probability of occurrence per year, or at least 1 chance in next 100 years	Minor: Isolated occurrences of moderate to severe property and environmental damage, potential for injuries, minor economic disruption
3	Likely: >10% but <75% probability per year, or at least 1 chance in next 10 years	Moderate: Severe property damage on a community scale, injuries or fatalities, short-term economic impact
4	Highly Likely: 100% probability in a year	Major: Severe property damage on a community or regional scale, multiple injuries or fatalities, significant economic impact

Potential impact is considered and scored separately for impacts to infrastructure, life, economy and the environment. Additionally, seasonal patterns that may exist are considered, what areas are likely to be affected most, the probable duration of the hazard, the speed of onset (amount of warning time, considered with existing warning systems).

The combination of the impact scores for infrastructure, life, economy and environment, along with the probability (frequency of occurrence) score are used to determine the hazard ranking score for each hazard. 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 Wardsboro 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 Wardsboro has decided are pertinent to their community and they have chosen to mitigate for at this time which are Fluvial Erosion, Inundation Flooding and Ice. The below table shows the hazards in terms of their hazard ranking score as determined by the Hazard Mitigation Planning participants.

HAZARD ASSESSMENT								
		Potential Impact						
Possible Hazard	**Probability**	Infrastructure	Life	Economy	Environment	**Average:**	**Score:**	**Most vulnerable facilities and populations**
Fluvial Erosion	3	3	3	2	3	3	8	Lots of homes near Wardsboro Brook and Route 100. Sedimentation in the stream occurs routinely.
Inundation Flooding	3	3	3	2	2	3	8	Less common than fluvial erosion but still a concern.
Ice	3	2	2	3	2	2	7	Large event: Dec 11, 2008 was a big ice storm. Vegetation along roadways and downed trees getting in roadways and right of ways are the town concerns.
Wind	3	2	2	2	1	2	5	Power outages can be lengthy depending on the location in town. Most power lines come through the woods which makes restoration difficult.
Wildfire	2	2	2	2	3	2	5	Lots of dead wood in the forests.
Drought	2	1	2	2	2	2	4	Private wells sometimes do go dry.
Landslides	2	2	2	1	2	2	4	House on South Wardsboro Road is at risk.

Possible Hazard	**Probability**	Infrastructure	Life	Economy	Environment	**Average:**	**Score:**	**Most vulnerable facilities and populations**
Invasive Species	4	1	1	1	1	1	4	EAB is a concern and is present in VT. Less of a town concern for public land and more of an individual property owner concern. HWA is present; Wild parsnip and Japanese knotweed are two biggest concerns.
Snow	4	1	1	1	1	1	4	Snow means money making, so it's actually an economic boom not a concern for most locals.
Cold	4	1	1	1	1	1	4	Power outages during cold is the concern, but more residents have generators. The Elementary School has a generator and Fire Department has portable generator.
Heat	2	1	1	1	1	1	2	
Infectious Disease Outbreak	2	1	1	1	1	1	2	
Hail	2	1	1	1	1	1	2	
Earthquake	1	1	1	1	1	1	1	

The above table shows vulnerability to some natural hazards that Wardsboro—due to their small population and limited resources—at this point in time doesn't feel the risk posed by these hazards is high enough to justify the cost to further mitigate for them. The Town has chosen to focus this Plan on Flooding, Fluvial Erosion and Ice. In the prior Wardsboro Local Hazard Mitigation Plan, adopted in 2014, the Town focused on flooding, severe winter storms, high winds, landslides (which was considered only in terms of fluvial erosion) and wildfires. These hazards were all considered as part of the hazard assessment for this current Plan. Though the Town feels somewhat vulnerable to Wind and Wildfire, they felt that they have done what's possible within their own power and jurisdiction to mitigate for these hazards. Drought, landslides, and invasive species do pose some risk to Wardsboro, but not enough that they feel the need to mitigate for these hazards at the current time. Fluvial erosion will address what the prior plan addressed under landslides. The town feels that they deal adequately and comfortably with snow. Cold is something they feel their population is accustomed to dealing

with, along with the fact that their emergency shelter equips them to handle anyone who might lose power and need a warm place to get shelter. Heat, infectious disease outbreak, hail and earthquake are not hazards that Wardsboro feels pose enough risk to consider mitigation. Current methods of handling most hazards 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, Probability, and discussion of Past Occurrences of two natural hazards affecting Wardsboro.

Flooding and Fluvial Erosion

Flooding 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 Wardsboro. 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. Wardsboro 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.[7]

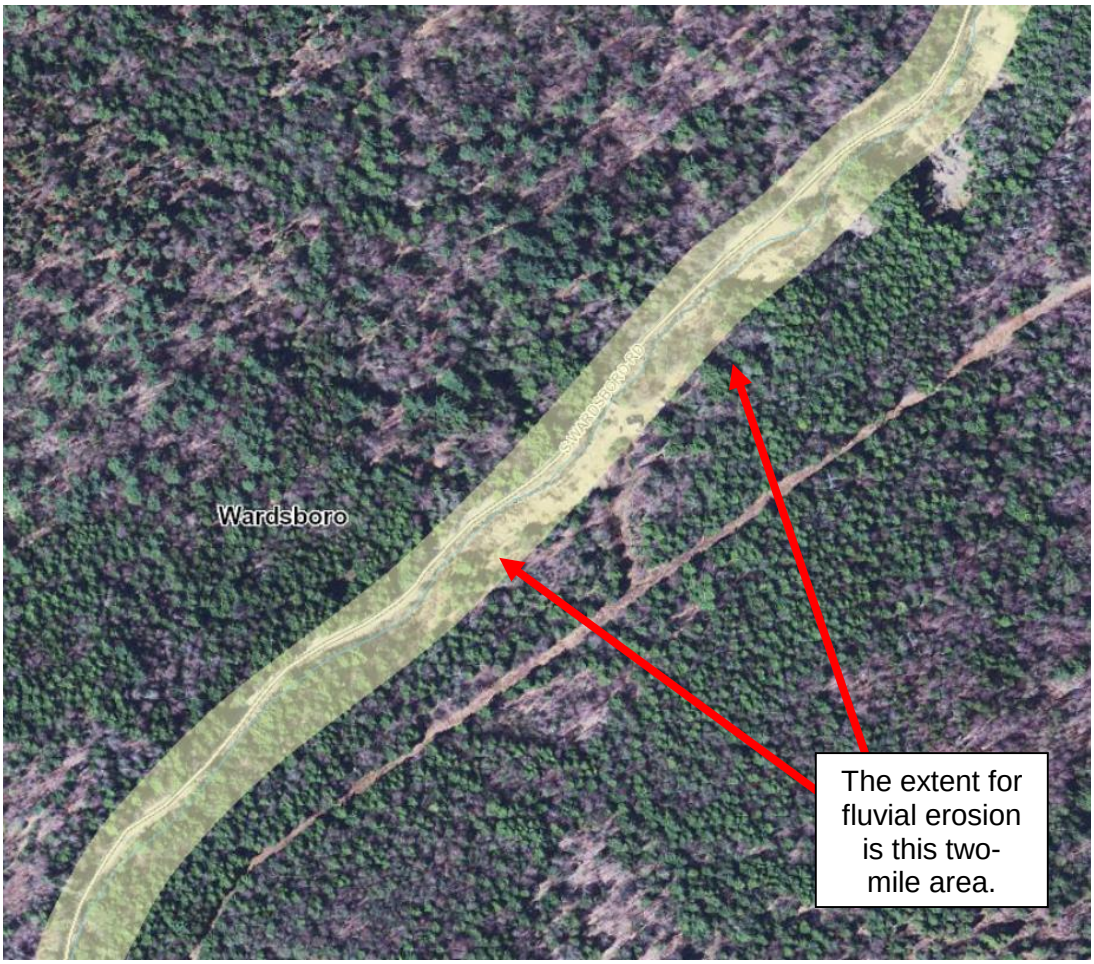
Fluvial Erosion Description
Outside of the FEMA mapped SFHA, which runs along Route 100 between West Wardsboro and the Jamaica town line, most of the damage caused by flooding events in Wardsboro is caused by fluvial erosion. Fluvial erosion is the destruction of river banks caused by the movement of 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. Areas of concern in Wardsboro are South Wardsboro Road, Lower Podunk Road, Stratton-Arlington Road, and at the intersection of Smead Road and VT Route 100. All areas of concern, except for South Wardsboro Road, are small seasonal streambank issues that pose no serious danger but are ongoing maintenance issues.

The South Wardsboro Road area was viewed by FEMA personnel after TS Irene and no specific corrective measure has been identified or pursued, beyond continuing to monitor the slide. The area of slumping bank is large, is not on town property, and has been a fluvial erosion problem for several years, and identifying a feasible resolution remains a Town objective.

[7] https://msc.fema.gov/portal

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 accompany these events. Associated issues in Wardsboro 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.

The historic road network of many Vermont towns and villages typically follows waterways. This historic settlement pattern creates vulnerability for the road network, infrastructure and development within and along what are called River Corridors. River Corridor mapping was released by the Vermont Agency of Natural Resources in early December 2014; small stream mapping was released in January 2016. This mapping delineates fluvial erosion hazard areas and includes a 50-foot buffer beyond those designated areas. For small streams, a 50-foot buffer from top-of-bank on either side of the waterway constitutes the River Corridor. This mapping can assist municipalities in developing bylaws and effective mitigation strategies to regulate development within fluvial erosion hazard zones. Wardsboro does not currently have a fluvial erosion bylaw, but is considering adding this to their floodplain regulations.
South Wardsboro Road is pictured here.



Pictured here is South Wardsboro Road and the adjacent waterway. Note the location of the road, entirely within the River Corridor, which is the cream colored shaded area. Note the proximity of the road to the waterway, especially close to some of the meander bends. These bends in the river are prone to movement as part of natural river processes, and their movements can be even more dramatic when manmade impacts and development upstream impinges on these natural stabilizing forces. The interaction of the natural and unnaturally dramatic forces of river movement, combined with the stationary location of the closely located roads is what leads to road damages during heavy weather events. The area pictured here is the area that sees the most damages from this type of event within Wardsboro, though it is outside of FEMA designated SFHA. Property owners outside of the FEMA floodplain can purchase flood insurance at a lesser expense, and it still covers damages resulting from fluvial erosion in events that damage multiple properties.

Impact of Flooding and Fluvial Erosion

Due to the mountainous and upland terrain of much of Wardsboro, there is limited FEMA designated floodplain. It is localized to Wardsboro Brook. Due to the historic development patterns in Wardsboro, with the main transportation route following the waterway, much of the built environment is also located in this hazardous area or along tributaries to Wardsboro Brook. The tributaries are generally in mapped River Corridors, and because of the terrain, are more subject to fluvial erosion than rising and standing flooding such as is more common in wide lowlands. Wardsboro was heavily impacted by most recent large storm in memory, Tropical

Storm Irene in 2011. There was flooding throughout the villages of West Wardsboro and Wardsboro. Numerous buildings were damaged, resulting in 4 buyouts, and there were damages to public infrastructure, including to the bridge over Gilfeather Road. The roads are the most expensive infrastructure maintenance cost in Wardsboro. Over-road runoff causing ruts and eating away edges of dirt roads is a big problem in Wardsboro according to Selectboard Co-Chair, Peter Sebastian. Wash outs on rural roads cause forest debris to enter streams and this can clog culverts. This is a routine issue for culverts at the base of Sheldon Hill Road and Fitts Road.

> "The next event—it's going to take South Wardsboro Road out. It's going to be gone."
> – Wardsboro Road Foreman, Greg Donna

The Route 100 corridor and the South Wardsboro Road are the areas in town most prone to fluvial erosion, and were hard hit by Tropical Storm Irene. Damage to Route 100 could limit access to town, as it is the major transportation corridor. There is visibly active fluvial erosion occurring on several stretches of riverbank along South Wardsboro Road on a daily basis according to the Wardsboro Road Foreman, Greg Donna. Residences and buildings on Route 100 and South Wardsboro Road are most at risk for flooding and fluvial erosion. Stratton Arlington Road is also vulnerable, as that road lies along the Wardsboro Brook, as well. Planning participants feel that the mapping of the FEMA floodplain and the River Corridor accurately locate the hazards in Wardsboro.

South Wardsboro Road fluvial erosion seen from car driven on South Wardsboro Road, which is directly on the other side of the stream and in the River Corridor.

Roadways in floodplains and undersized bridges and culverts are a big cause of stream instability generally, not just in Wardsboro. A waterway that is constrained is unable to reach geomorphic equilibrium which increases flooding in that area and puts increased pressure and larger flood loads on upstream and downstream sections, as well as causing more flooding damage. A river is in geomorphic equilibrium when its water, energy, sediment, and debris are in balance. In this condition a river is neither building up sediment in the channel nor losing sediment from its bed. Importantly, a river in equilibrium has not become overly deep and can continue to overflow onto its floodplains. The water that spills onto the floodplain slows down,

and the velocity of the water still in the channel does not become excessively powerful. Mitigation actions are intended to assist with achieving greater equilibrium which will also lessen or even eliminate flooding levels and damages to buildings and infrastructure. Historic development patterns limit or complicate mitigation in some areas.

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. 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.

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. Wardsboro doesn't have mapped current or historic ice jams.[8]

Extent

The extent of a flood event can vary from a minor event due to a typical rain event or could be a major event as a result of rapid snow melt in spring, rain on frozen ground, or as a result of a tropical depression or storm. Town historians claim that the extent of flooding is such that brooks may breach their banks and flow onto land and down roads. It's important to note that this report is looking at flooding data for this section in the light that flooding is the cause of fluvial erosion. TS Irene was the worst flooding damage to private homes (5 homes destroyed) in the town's history, according to recollection of longtime residents.

The highest recorded measurement on the West River at the nearest stream gauge to Wardsboro (in Jamaica, VT) was 14.87 feet, which was measured on December 31, 1948.[9]

Extent for thunderstorms/heavy rain events: The tables below shows the top 10 rain events at a former USGS weather monitoring station in West Wardsboro. This table shows that TS Irene in 2011 was the highest 1-day precipitation value between 1978 and 2012. 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.

Maximum 1-Day Total Precipitation[10]		
for West Wardsboro, VT		
Rank	Value (inches)	Ending Date
1	6.22	8/29/2011
2	4.75	9/17/1999
3	4.55	7/16/2000
4	4.42	10/9/2005
5	4.22	7/14/1996
6	4	3/14/1993
7	3.86	9/28/1985

[8] CRELL Ice jam database/map http://icejams.crrel.usace.army.mil/apex/f?p=524:5:0::NO
[9] USGS Stream gauge 01155500 West River at Jamaica, VT (66 years of record) http://waterwatch.usgs.gov/index.php.
[10] Data provided by the NOAA, Northeast Regional Climate Center at Cornell University. http://www.nrcc.cornell.edu/. 10/10/18.

8	3.85	10/1/2010
9	3.7	4/16/2007
10	3.69	8/7/1990
Period of record: 1978-09-01 to 2012-03-31		

To give context to this data, the "Precipitation Frequency Estimates" table below allows one to determine the event frequency based on the rainfall amount. This table puts Irene (24-hour value) at between a 25 and 50-year event for Wardsboro. It is important to remember that precipitation levels vary throughout the region.

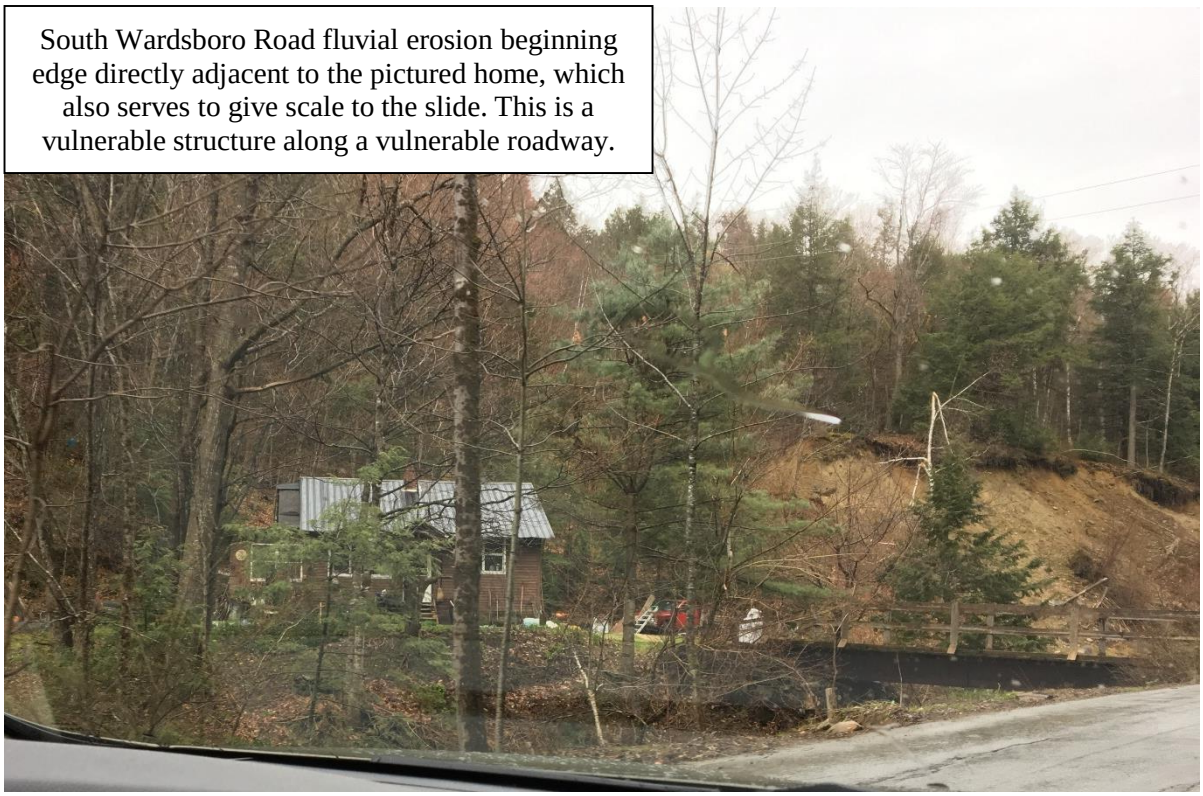
The table below is specific for Wardsboro, and has the values associated with the size of an event in order to determine the storm frequency[11]. This is for reference. Wardsboro should consider what size event is reasonable to set standards to build to, for both infrastructure and buildings. Some experts advise that towns should be using the 10 year one hour or two-hour frequency estimates to reflect the monsoon type storms that are seen in the region. Infrastructure built for 24 hour events often can't keep up with high intensity storms leading to erosion and street flooding. This should be a consideration in the future.

PRECIPITATION FREQUENCY ESTIMATES (in inches)										
by duration for ARI (years):	1	2	5	10	25	50	100	200	500	1000
5-min:	0.297	0.347	0.428	0.495	0.587	0.657	0.729	0.806	0.911	0.995
10-min:	0.421	0.491	0.605	0.7	0.831	0.931	1.03	1.14	1.29	1.41
15-min:	0.496	0.578	0.712	0.824	0.978	1.1	1.22	1.34	1.52	1.66
30-min:	0.702	0.819	1.01	1.17	1.39	1.55	1.72	1.9	2.15	2.34
60-min:	0.909	1.06	1.31	1.51	1.8	2.01	2.23	2.46	2.78	3.02
2-hr:	1.19	1.38	1.7	1.97	2.33	2.61	2.89	3.19	3.6	3.93
3-hr:	1.38	1.61	1.98	2.28	2.71	3.03	3.36	3.72	4.21	4.61
6-hr:	1.75	2.05	2.54	2.94	3.5	3.92	4.36	4.85	5.56	6.13
12-hr:	2.18	2.57	3.22	3.76	4.5	5.05	5.64	6.32	7.31	8.13
24-hr:	2.62	3.13	3.96	4.65	5.59	6.3	7.05	7.94	9.26	10.4
2-day:	3.08	3.69	4.7	5.53	6.68	7.54	8.45	9.55	11.2	12.6
3-day:	3.38	4.06	5.17	6.08	7.35	8.29	9.3	10.5	12.3	13.9
4-day:	3.64	4.36	5.53	6.51	7.85	8.84	9.91	11.2	13.1	14.8
7-day:	4.36	5.15	6.43	7.49	8.95	10	11.2	12.6	14.7	16.4
10-day:	5.07	5.89	7.23	8.34	9.87	11	12.2	13.6	15.7	17.4
20-day:	7.29	8.18	9.63	10.8	12.5	13.8	15	16.4	18.3	19.8
30-day:	9.15	10.1	11.6	12.9	14.7	16	17.4	18.7	20.4	21.7
45-day:	11.4	12.5	14.1	15.5	17.4	18.9	20.3	21.7	23.3	24.5
60-day:	13.3	14.4	16.2	17.7	19.8	21.4	22.9	24.3	25.9	27

Extent of Fluvial Erosion

South Wardsboro Road is area with the largest extent of fluvial erosion in Wardsboro. There is an active erosion zone that is 2500' long in the River Corridor of the stream along the Road.

[11] NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: Wardsboro, VT <https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=vt> accessed 10/10/18.



South Wardsboro Road fluvial erosion beginning edge directly adjacent to the pictured home, which also serves to give scale to the slide. This is a vulnerable structure along a vulnerable roadway.

Probability of Flooding and Fluvial Erosion

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. Flash flooding is a locally probable event, with flash floods typically occurring in summer months. Higher-elevation drainage areas and streams are particularly susceptible to flash floods, which plan participants noted are more common.

Fluvial erosion is highly likely and exists in Wardsboro, 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. Fluvial erosion is directly associated with flooding and large scale rain events and spring snow melt. Inundation flooding events are less of a hazard in Wardsboro, but fluvial erosion caused by moving flood waters does present a hazard. With areas of high elevation drainage, Wardsboro is subject to flash flood events that erode stream banks and adjacent areas. There are events every year, especially during spring snow melt and late summer season rains.

Past Occurrences

Since 1996, when National Climatic Data Center detailed records start, there have been 41 flood events in Windham County, Vermont. Wardsboro experiences routine spring flooding, but this is not always documented. There have been 16 Presidential Disaster Declarations in

Windham County since 1953. Of these, 7 were severe storms, 5 were floods, 2 hurricanes, 1 snow event and 1 severe ice storm.[12]

Disaster Declarations for Windham County, VT

Disaster Number	Incident Begin Date	Incident End Date	Declaration Date	Incident Type	Title	Disaster Close Out Date
4356	10/29/2017	10/30/2017	01/02/2018	Severe Storm and Flooding	SEVERE STORMS AND FLOODING	
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 Wardsboro and Windham County:

August 3, 2018 - A slow-moving cold front brought several rounds of heavy rainfall and thunderstorms to eastern New York and western New England. After passing through eastern New York, a severe thunderstorm knocked down trees and caused localized flash flooding in the towns of Putney and West Wardsboro, Vermont.

January 12, 2018 - After a frigid end of December and beginning of January, an unseasonably warm air-mass was pumped into western New England on January 12th on southerly winds. The temperatures reached the 50s and 60s during the day. Showers also developed in the warm air-mass ahead of a cold front and were heavy at times, with some locations receiving one to two inches of rainfall. The combination of warm temperatures and heavy rainfall caused river ice to dislodge and resulted in ice jams in spots. Flooding occurred due to a combination of ice jam movement and heavy rainfall. Several roads were closed or damaged and a trailer park experienced flooding.

October 29-30, 2017 rain storm – South Wardsboro Road slide undermined a large portion of South Wardsboro Road. The road was washed out. Lots of trees came down and so the brook needed to be cleared out and the bank and road needed to be stabilized. Gilfeather Road and Potter Road had portions of washout too.

[12] 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 5/14/18.

June 9, 2015 - A moist and unstable air mass ahead of an advancing cold front led to the developing of thunderstorms during the early afternoon hours on Tuesday, June 9th across eastern New York. As the thunderstorms organized into small lines, some of the thunderstorms produced wind damage, mainly to trees and power lines. These thunderstorms reached southern Vermont by the midafternoon hours and produced a report of wind damage near Halifax. Trees and wires were reported down during a thunderstorm on McMillan Road in Halifax. Thunderstorms ended over the region by the late afternoon, as the cold front crossed the region from west to east.

July 14, 2014 - As a strong area of low pressure moved across upstate New York on Monday, July 28th, repeated rounds of thunderstorms occurred during the afternoon and evening hours. This led to flash flooding across northern Windham County, as small streams and creeks rapidly overspread their banks. In addition, the Williams River reached flood stage due to the rapid surge in water. Although the worst of the flooding remained north of Windham County in Windsor County, many residents reported this flooding to be the worst seen in the area since Tropical Storm Irene in 2011. Heavy rain from thunderstorms led to flash flooding in Windham. The access road to the Tater Hill Golf Course was washed out as a result of the flooding.

July 7, 2014 - A warm and humid air mass was in place across southern Vermont on the afternoon of Monday, July 7th. A cluster of showers and thunderstorms moved from upstate New York into southern Vermont during the mid-afternoon hours. These thunderstorms had previously weakened, but were still associated with very strong winds aloft. As these thunderstorms interacted with the high terrain of the southern Green Mountains, they produced gusty winds. These winds caused damage to trees and power lines near Readsboro. The thunderstorm continued eastward towards the Connecticut River Valley, but did not produce any additional severe weather before exiting the state to the east.

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

September 1, 2013 - A moist and humid air mass was in place across the region on Sunday, September 1st. A surface frontal boundary was situated across eastern New York into southern New England during the morning hours. During the day, the frontal boundary slowly lifted northward. With enough instability in place due to daytime heating, some showers and thunderstorms developed along this frontal boundary. The showers and thunderstorms tracked over the same locations during the afternoon hours across southern Vermont. As a result of the persistent heavy rain, flash flooding occurred in downtown Wilmington. A mudslide also occurred due to the heavy rainfall. By the evening hours, the showers and thunderstorms were located north of the region and beginning to weaken, and the threat for flash flooding ended.

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.

Tropical Storm Irene – August 28, 2011 - 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, fluvial erosion, and damaging winds across the region, including Wardsboro. 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. ||This heavy to extreme rainfall resulted in widespread flash flooding and river flooding across southern Vermont.

Route 100 in Windham County was closed due to flooding and wash outs. Portions of Route 100 remained closed after the flood waters receded due to significant damage. The North Branch Deerfield River runs along a portion of Route 100 from the Mount Snow area to Wilmington. Along Dover Road, one house was destroyed and floated down the North Branch Deerfield River and other houses were destroyed or significantly damage. Much of the road was reported washed away. A woman drowned when the car she was in became trapped by flood waters from the North Branch Deerfield River in Wilmington. Strong winds also occurred across southern Vermont, with frequent wind gusts of 35 to 55 mph, along with locally stronger wind gusts exceeding 60 mph. The strongest winds occurred from the north to northeast during the morning hours, then from the west to northwest during Sunday evening. The combination of strong winds, and extremely saturated soil led to numerous downed trees and power lines across the region. This also resulted in widespread long duration power outages. In particular, the approximate number of customers affected by power outages included: Windham County, 18000. President Obama raised the federal match share to 90% from 75% for TS Irene relief, therefore lowering the state and local shares by 7.5% each. Total cost of public damages in Wardsboro was $2,530,000, of which FEMA paid $2,277,131. Rains from TS Irene caused an extreme flash flooding and fluvial erosion hazard event for the region. This event was Presidential Disaster Declaration DR 4022. Several roads were washed out and closed for several weeks. Access to the Town of Wardsboro from the north on Rt. 100 was shut down because of major road wash outs.

May 20, 2011 - Showers and thunderstorms developed in a moist and unstable air mass across the region. Storms across a portion of Windham County resulted in flash flooding in the Saxtons River area. A wash out was reported on Bemis Hill Road at Westminster Road south of Saxtons River.

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. Across the state, nearly $3.6 million was obligated as part of the FEMA Public

Assistance Program. Initially, the precipitation fell as a mixture of wet snow, sleet and rain, with snow and sleet more prevalent across the higher elevations. The precipitation then changed to plain rain by late Monday morning. Liquid equivalent precipitation totals from this storm ranged from 3 to 6 inches. Rain and snow caused damage to roads and utility lines across Windham County and Wardsboro. Across the State, nearly 3.6 million dollars were obligated as part of the FEMA Public Assistance Program under DR1698. Wardsboro received $507,552.54 from the state and FEMA for their damages.

June 29, 2006 - After being nearly stationary while deepening for several days, an upper-level trough from the Great Lakes to the lower Ohio Valley was accelerating eastward at daybreak on June 29. An associated weak low pressure over Lake Erie trailed a cold front through the Ohio Valley. During the day, this system moved rapidly eastward and touched off thunderstorms in the warm, humid air mass over western New England in the early evening. Torrential rainfall produced flash flooding in Windham County.

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. Route 100 was closed in portions.

Another severe period of flooding and thunderstorms, which lasted from the period of August 12- September 12, 2004 engendered Presidential Disaster Declaration DR – 1559. These two events triggered funding from the FEMA Public Assistance Program which helped to pay for debris removal and overtime hours for emergency response workers. Flash flooding resulted in washouts of small bridges at Ames Hill, Hescock and Cook Roads. Canoe Brook Road in Dummerston was impassable, with a culvert washed away, and a 20-foot wide by 20-foot deep hole in the road.

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. The torrential rains took a toll, washing out roads in Londonderry. State Highway 121 was washed out in the Town of Windham. Massive flooding occurred in the Town 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. Nearly constant rain and thunderstorms from the period of July 21 through August 18, 2003 led to FEMA Declaration 1488. Many roads were washed out and culverts needed replacing throughout town.

July 2000 - A stalled frontal boundary across extreme southern Vermont interacted with a strong upper level disturbance from July 15 into early July 16. Two to four inches of widespread rain fell, with locally higher amounts across the higher terrain of Windham County. Specific amounts included 3.00 inches at Bennington and 5.17 inches at West Wardsboro, in Windham County. This rain produced enough runoff to cause the Deerfield River rose 6 feet above unofficial flood stage in Wilmington. Several roads were reported under water. The widespread heavy rain event set the stage for more widespread flooding later Sunday. The air remained very moist and unstable in wake of the rainstorm. More thunderstorms erupted late in the day across southern Vermont. These storms moved very slowly, trained over the same region, and were further enhanced by the steep terrain. The thunderstorm rainfall, as well as the earlier rainstorm, dumped in excess of 8 inches locally at Newfane. Since the ground was already saturated, the heavy rains from the thunderstorms produced flooding and flash flooding across the region. In Windham County, a five-mile stretch of State Route 30 was closed due to flooding and residents were evacuated. Street flooding was reported at Brattleboro. Severe damage took place on South Wardsboro and Steep Way Roads. A home suffered mud damage as mud - laden water had flowed through the house.

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. The 1999/2000 Town Report said that $22,149 was received from FEMA for "several washed out roads" resulting from this event.

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.

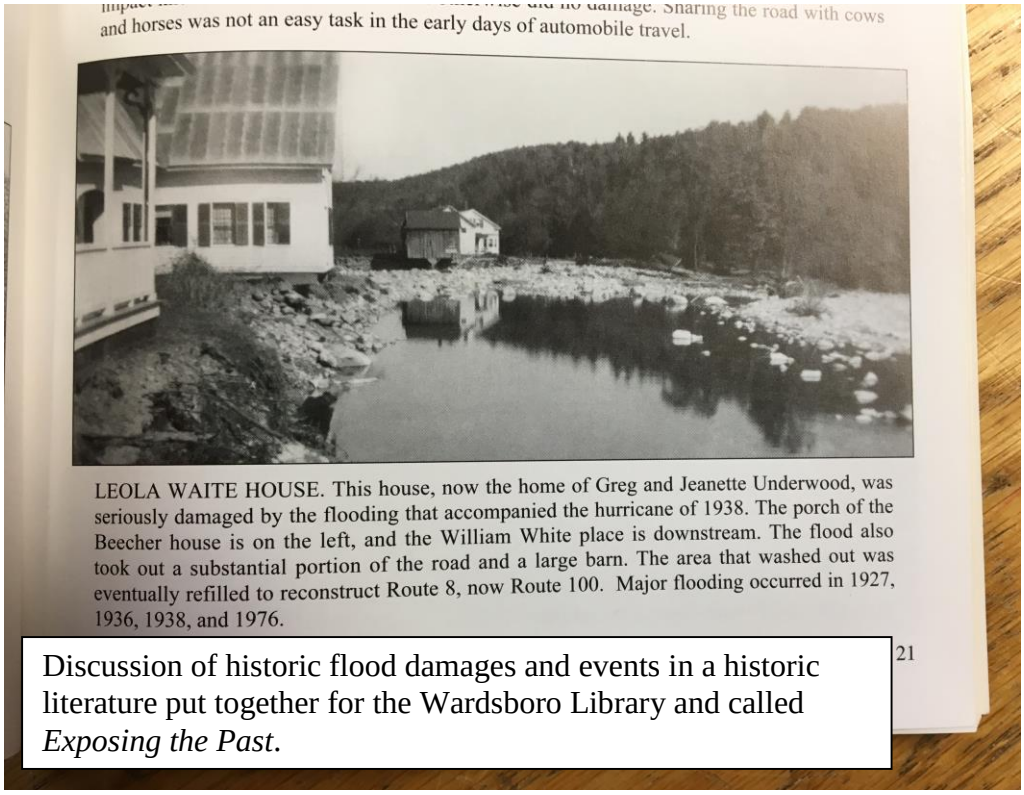
In 1996, Between Saturday morning July 13 and Sunday morning July 14 rainfall from three to five inches was common across southern Vermont resulting in significant damage and a Presidential Declaration of Emergency. Flooding occurred throughout New England causing millions of dollars in damage. The remnants 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. Damage to South Wardsboro Road and Kent Road cost Wardsboro some money to repair, but the amount is not known.

January 19, 1996 - An intense area of low pressure which was located over the Mid-Atlantic region on Friday morning January 19th produced unseasonably warm temperatures, high

dewpoints and strong winds. This resulted in rapid melting of one to three feet of snow. In addition to the rapid snowmelt one to three inches of rain fell as the system moved northeast along the coast. Many small streams across the county flooded, including Whetstone Brook, resulting in several road washouts.

During 1976, flooding occurred throughout New England, as result of Hurricane Belle, causing millions of dollars in damage. Bridge #9, which crosses Wardsboro Brook from the Village of Wardsboro to get to South Wardsboro Road, was washed out and completely destroyed. Wales Read Bridge at the intersection of Route 100 and Lower Podunk Road was destroyed in this event, as well.

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. 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.[13] After this event, there was extensive dredging, berming and windrowing in an attempt to control channel location and reduce future flood impacts. Some of the smaller brooks in Wardsboro flooded and there was damage to higher elevation roads, but there was not damage to Route 100.


and horses was not an easy task in the early days of automobile travel.

LEOLA WAITE HOUSE. This house, now the home of Greg and Jeanette Underwood, was seriously damaged by the flooding that accompanied the hurricane of 1938. The porch of the Beecher house is on the left, and the William White place is downstream. The flood also took out a substantial portion of the road and a large barn. The area that washed out was eventually refilled to reconstruct Route 8, now Route 100. Major flooding occurred in 1927, 1936, 1938, and 1976.

21

Discussion of historic flood damages and events in a historic literature put together for the Wardsboro Library and called *Exposing the Past*.

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. All of Route 100 (Route 8) from the Village of Wardsboro to the elementary school was washed out.

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

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.

Sources used
Local knowledge of areas of concern and impacts, Discussions and emails with Wardsboro Road Foreman and Town Clerk between October and December 2019

Geographic Area of Hazard/Location/Occurrence of Fluvial Erosion and Flooding/Special Flood Hazard Area and River Corridor Mapping

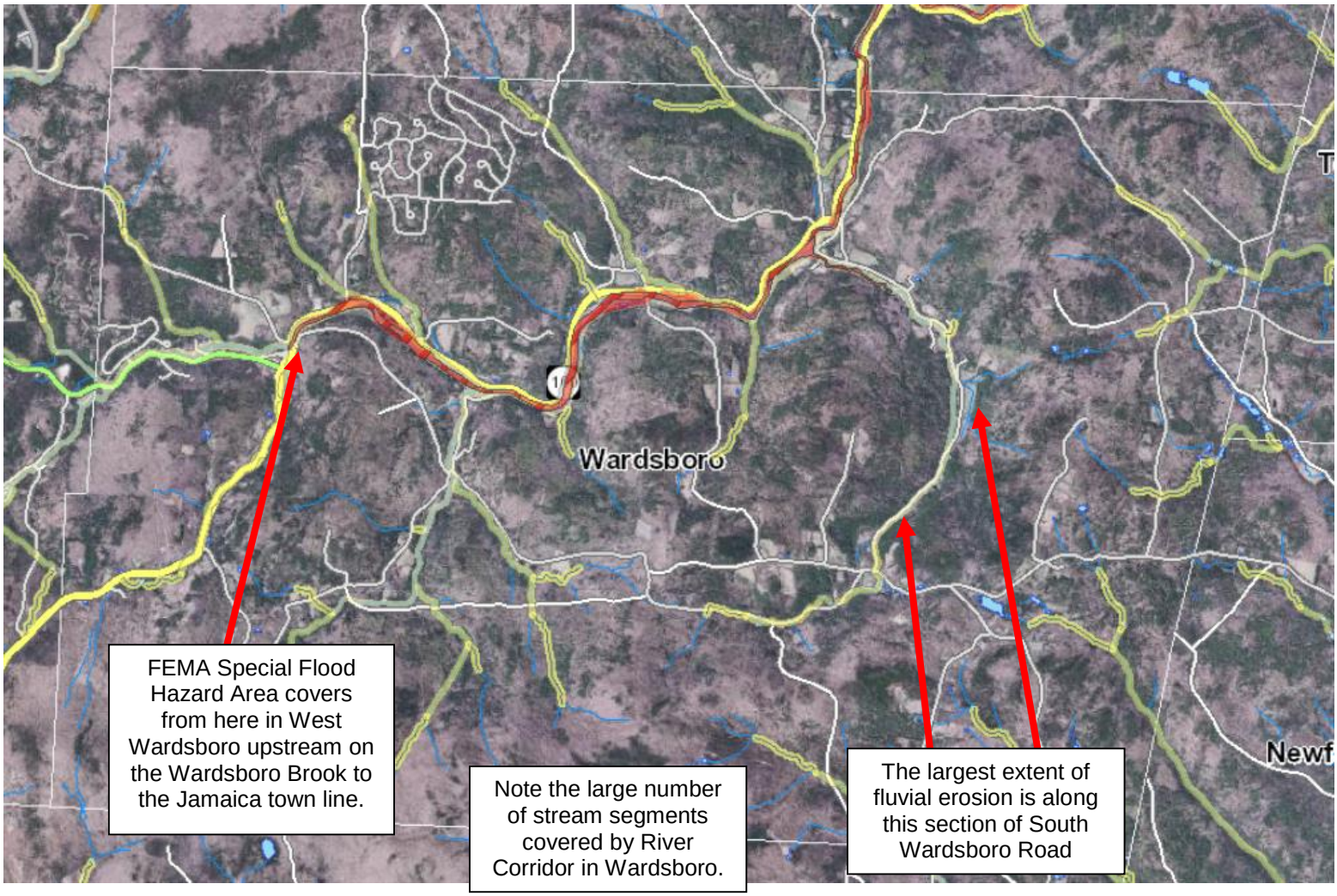
The river Corridor mapping (included in this plan) shows the ANR defined River Corridors, which are likely to have fluvial erosion. The map also points out some of the issues discussed in the text of particular problem spots. Mitigation projects on private land require the consent of the land owner to complete.

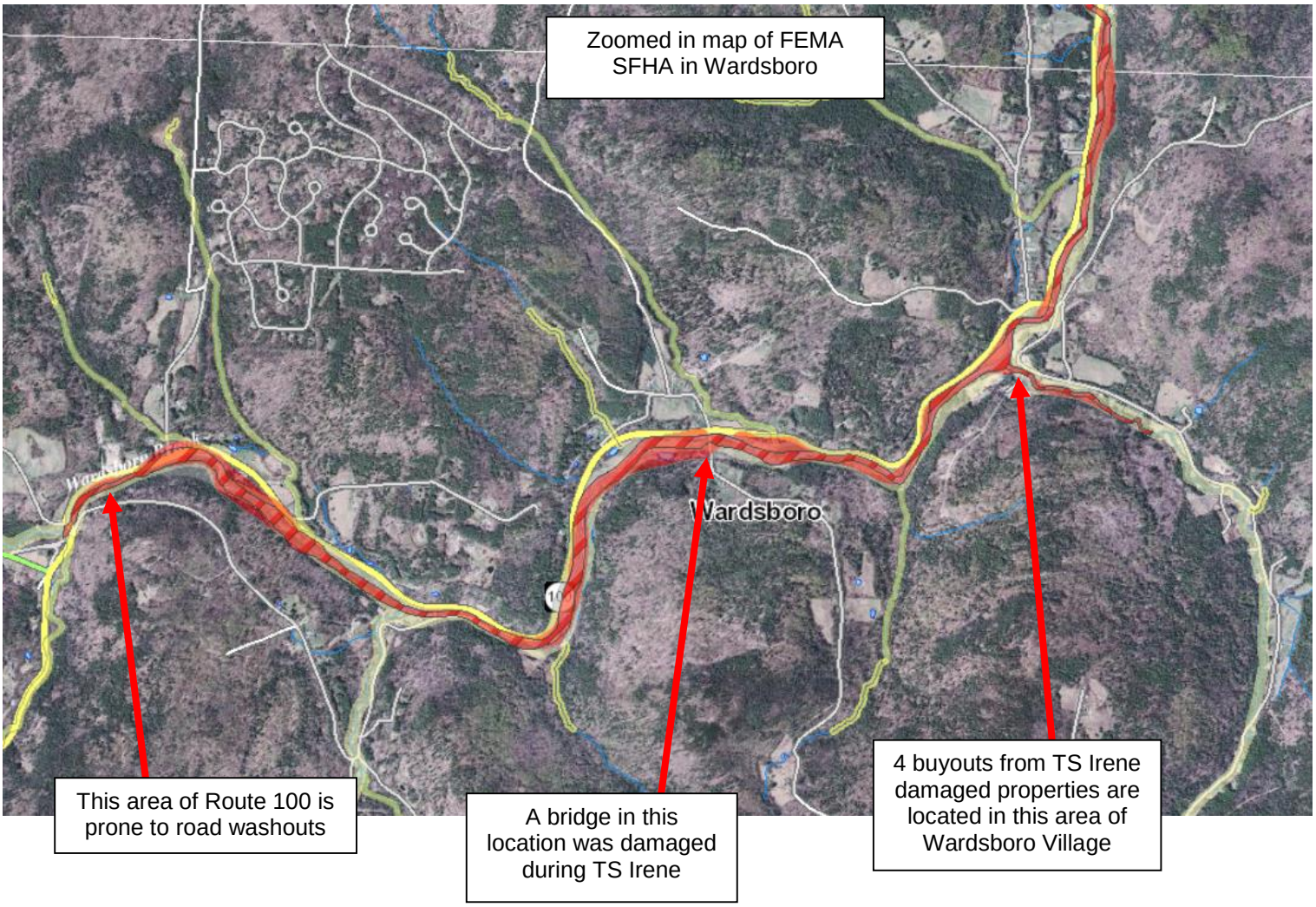
FEMA has mapped "AE" zones, including "AE with Floodway" in Wardsboro. "AE" zones have Base Flood Elevations determined. Floodways are considered areas with moving flood waters and are the highest regulated flood hazard areas according to FEMA. FEMA does not map fluvial erosion. Properties within the SFHA, that have a mortgage, are required to carry flood insurance, and properties without a mortgage are advised to. Wardsboro's participation in the NFIP gives residents access to discount flood insurance through the National Flood Insurance Program (NFIP). The Flood Hazard Summary Sheets on FloodReady Vermont's website says there are 34 structures in the Special Flood Hazard Area.

The maps on the following pages were created using the Vermont Agency of Natural Resources 'Natural Resources Atlas. The legend pertains to the accompanying maps. FEMA SFHA is shown in red. The floodplains shown in these maps are based on the FEMA Flood Insurance Rate Maps (FIRMs) available through the FEMA Map Service Center.[14] This map shows the River Corridors that Vermont Agency of Natural Resources (ANR) has mapped. The ANR defined River Corridor also includes a 50-foot setback requirement on all streams with a watershed between .5 and 2 square miles. Together the mapped area and the small stream buffers constitute the River Corridor. 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 below map shows the Special Flood Hazard Areas (SFHAs) in red (AE zone) and the River Corridors in cream color. Within Wardsboro, FEMA SFHA lies only along the Wardsboro Brook from approximately the village of West Wardsboro north to the town line. River Corridor is scattered along many smaller streams throughout the Town.

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


Wardsboro
FEMA Special Flood Hazard Area covers from here in West Wardsboro upstream on the Wardsboro Brook to the Jamaica town line.
Note the large number of stream segments covered by River Corridor in Wardsboro.
The largest extent of fluvial erosion is along this section of South Wardsboro Road



Ice Storm

Description and Impact

The Region has a long history of severe winter storms and blizzards and usually experiences at least one or two Nor'easters each year with varying degrees of severity. There have been 118 winter/ice storm or extreme cold events in Windham County since 1996.[15] A typical event begins as a low-pressure system that moves up the Atlantic Coast, into the Canadian Maritimes, dumping heavy snow across parts of Vermont. Snowfall accumulations are generally three to six inches in the valleys and 6 to 12 inches in the mountains. Winter storms and ice storms can cause power lines to fail, damage trees and impede access to homes and businesses. Wardsboro is at risk as an entire town, though higher elevation areas usually experience the most severity with winter weather.

Heavy wet snows of early fall and late spring, as well as ice storms, often result in loss of electric power, leaving people without adequate heating capability. The other threat from winter

[15] National Climatic Data Center, 1996-2019 storm events database < http://www.ncdc.noaa.gov/stormevents/>

storms is downed trees, resulting in power failures and impassable roads or driveways. An ice storm crossed the region in December of 2008 causing widespread downed trees and power outages in Windham County. The total cost of damages across the region surpassed the one-million-dollar threshold triggering a Presidential Disaster Declaration DR-1816. Wardsboro received $15,465.26 from the state and FEMA for damages resulting from this ice storm. Damage across the region consisted of roads being blocked for short periods of time due to downed trees and utility lines. Thousands lost power for varying lengths of time and several shelters were opened in Windham County. Compared to neighboring southern New Hampshire communities, Wardsboro and Windham County fared relatively well from the damage inflicted by the ice storm.

The primary concerns with winter weather events is power failure, damage to roofs, trees and power lines, and dangerous or impossible travel conditions.

Power failure is a common event in areas of Wardsboro and a condition as a result of high winds and/or heavy snow or ice that can occur anywhere in town. Power failures are typically the result of power lines damaged by storm events. During ice storms the higher elevation locations in town as well as areas of concentrated development are most susceptible to power failures. West Wardsboro Village, Upper Podunk Road and South Wardsboro Road are areas of town where it would be likely for power line failures to occur and cause power disruptions to residential dwellings. Power failures may also result from disruptions in the New England or national power grid, as indicated by the widespread power outages in 2003. Dead or dying trees in close proximity to power lines pose a particular threat to power lines when ice loads are added.

Extent

The severity or magnitude of winter storm to occur in southeast Vermont can range from moderate to very severe. The southeastern region of VT typically receives over 60 inches of snowfall per year, and most Vermonters are prepared to handle large amounts of snowfall. Wardsboro experiences significant snow storms every year but according to the town they are manageable. During the major snowfall of winter 2010-2011, where the region received well over 100 inches of snow, the biggest problem was that snow never melted off during the season, only accumulated, making it difficult to find space to store the mounds of snow. But in the season of 2010-2011, the problem arose with finding locations to deposit huge quantities of snow during the season because there wasn't the typical mid-season melt off. Snow amounts are not necessarily a problem for Vermonters, but heavy, wet snow, or the event of rain on snow or frozen ground, are usually very problematic. The winter of 2010-2011 had record snowfall of 124.3 inches. Wardsboro has been known to get 3 feet of snow in one storm, easily.

Seasonal Snowfall records per the Burlington, VT Weather Service:

Seasonal
(Jul 1st – Jun 30th)

Maximum			Minimum		
Rank	Snowfall	Year(s)	Rank	Snowfall	Year(s)
1	145.4"	1970-71	1	31.8"	1912-13
2	132.0"	1886-87	2	32.0"	1904-05
3	128.4"	2010-11	3	37.7"	2011-12
4	122.4"	2000-01	4	38.3"	1928-29
5	120.2"	2007-08	5	38.7"	1926-27
6	116.9"	1992-93	6	39.6"	1979-80
7	113.5"	1887-88	7	40.4"	1988-89
8	111.6"	1965-66	8	40.7"	1948-49
9	108.9"	1971-72	9	42.5"	1990-91
10	107.2"	1993-94	10	43.0"	1903-04

Probability
The Hazard Mitigation Planning Committee in Wardsboro deems ice storms to be likely in any given year. Every winter there is at least one weather related incident where people in town will lose power for a few days.

Past Occurrences
The Region has a long history of severe winter storms and blizzards and usually experiences at least one or two Nor'easters each year with varying degrees of severity. The planning participants, and climate data, noted no significant ice events between 2008 and 2019. There have been three winter storms in recent history in Windham County that were Disaster Declarations:

- Ice Storm (DR-1201) – January 6-16, 1998
- Snowstorm (EM-1358) – December 16-18, 2001
- Winter Storm (DR-1816) – December 11-18, 2008

The following detail events listed in the National Climatic Data Center for all ice storms on record for Western Windham County for records dating back to 1996:

December 11-12, 2008 - A cold front moved across eastern New York and western New England on Wednesday, December 10th, ushering a cold air-mass into the region. A low pressure system developed over the southeast states Wednesday and Wednesday night. This storm then headed northeast Thursday and Thursday night, December 11th, with precipitation spreading northward well in advance of the low. The low continued to track northeast, passing over the mid-Atlantic region late Thursday night, and over the New York City Metropolitan area and southern New England Friday morning, December 12th. The low then moved to the Canadian Maritimes Friday night. As the storm approached, warmer air moved in aloft, and with a cold air-mass remaining in place at the surface. This set the stage for a significant mixed precipitation event. The precipitation came down heavy at times, especially Thursday night. Hourly precipitation rates of one quarter to one third of an inch were reported for several hours in the form of freezing rain across much of the region. The precipitation changed back to snow before ending early Friday afternoon. Total ice accretion from freezing rain ranged from one half to three quarters of an inch, with the greatest amounts occurring across higher elevations of eastern Bennington and western Windham Counties. Some sleet and snow also were mixed in, with as much as 7 inches reported at Woodford. The ice storm resulted in widespread damage to trees and resultant power outages across southern Vermont, where an estimated 15,000 utility customers lost power. Many schools and businesses were shut down for several days due to the loss of power, and impassable roads from extensive fallen debris, resulting in significant economic and societal impacts. States of emergency were also declared across portions of southern Vermont. The hardest hit areas were across Bennington and much of Windham Counties. Bitterly cold temperatures followed in the wake of the storm Saturday and Sunday, compounding the power outages across the region. Numerous warming shelters were setup to assist those who were without power and heat.

This storm resulted in widespread downed trees and power outages in the region. The total cost of damages across the region crossed the one-million-dollar threshold which allowed for a Presidential Disaster Declaration DR-1816. Wardsboro received $15,465.26 from the state and FEMA for damages resulting from this ice storm. Damage across the region mostly consisted of roads being blocked for short periods of time due to downed trees and utility lines. Thousands lost power for varying lengths of time and several shelters were opened in Windham County.

Compared to neighboring southern New Hampshire communities, Wardsboro and Windham County fared relatively well from the damage inflicted by the ice storm.

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

March 4-5, 2008 - A strengthening low pressure system over the lower Ohio Valley on Tuesday March 4th tracked northeast into west central New York State by Wednesday morning on March 5th. The low then tracked northeast into the Canadian Maritimes by Thursday morning on March 6th. This storm system spread a swath of freezing rain and sleet across higher elevations of east central New York and portions of southern Vermont. The freezing rain and sleet developed late Tuesday evening, and continued through early Wednesday afternoon before tapering off. In southern Vermont, significant ice accumulations of one half, to locally up to one inch occurred in the higher elevations of western Windham county. Elsewhere, ice accumulations ranged from one quarter to less than one half of an inch, with the least occurring in lower elevations. The heavy ice accumulations across the higher elevations led to widespread downed tree limbs and wires, as well as power outages. Wilmington in southwest Windham county was particularly hard hit.

January 15-16, 2007 - A low pressure system over the mid-west moved east, reaching south central New York State around midday on Monday, January 15th, and then moved off the southern New England coast by Monday evening. Cold low level air remained in place as precipitation overspread the region early Monday morning, producing a mix of freezing rain and some sleet. Significant icing occurred from the freezing rain during Monday, leading to widespread power outages from downed trees and tree limbs, and from power transformers which shorted out. Although the freezing rain tapered off Monday evening, strengthening winds in the wake of the storm continued to down tree limbs and exacerbate power outages across the region into Monday night. |This ice storm had a significant impact on travel and economy across the region.

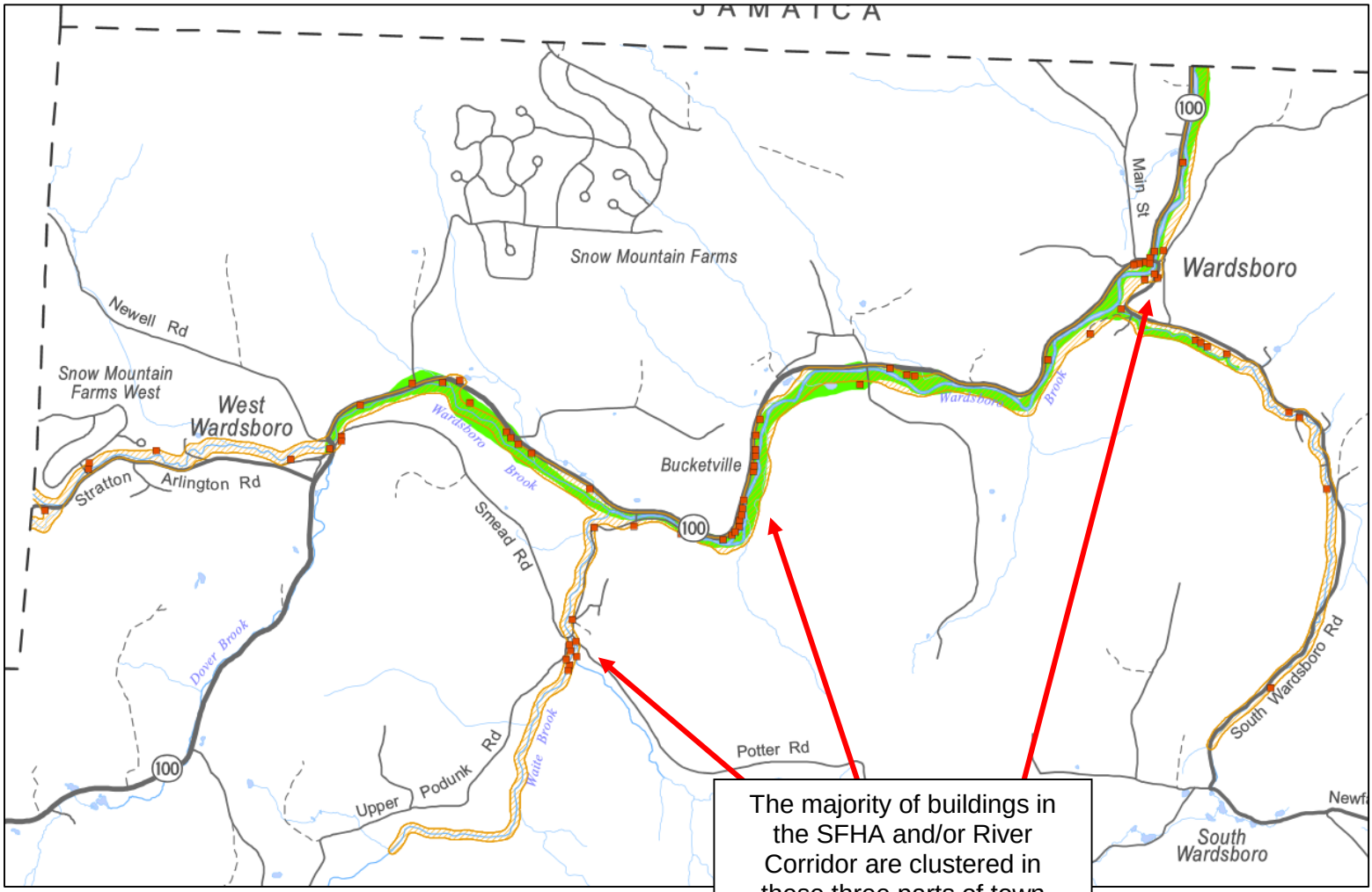
ASSESSING VULNERABILITY

Structures in the SFHA or River Corridor

There are 34 buildings within FEMA-designated Special Flood Hazard Areas (SFHAs).[16] There are 66 structures that lie in the River Corridor. The map below shows the location of these structures. The affected structures are primarily along Route 100, with some also on Stratton Arlington Road, South Wardsboro Road, and at the intersection of Smead, Upper Podunk and Potter Roads. Public infrastructure vulnerabilities in Wardsboro are primarily to roads and other associated infrastructure. There are no Tier II facilities located in either the SFHA or the River Corridor.

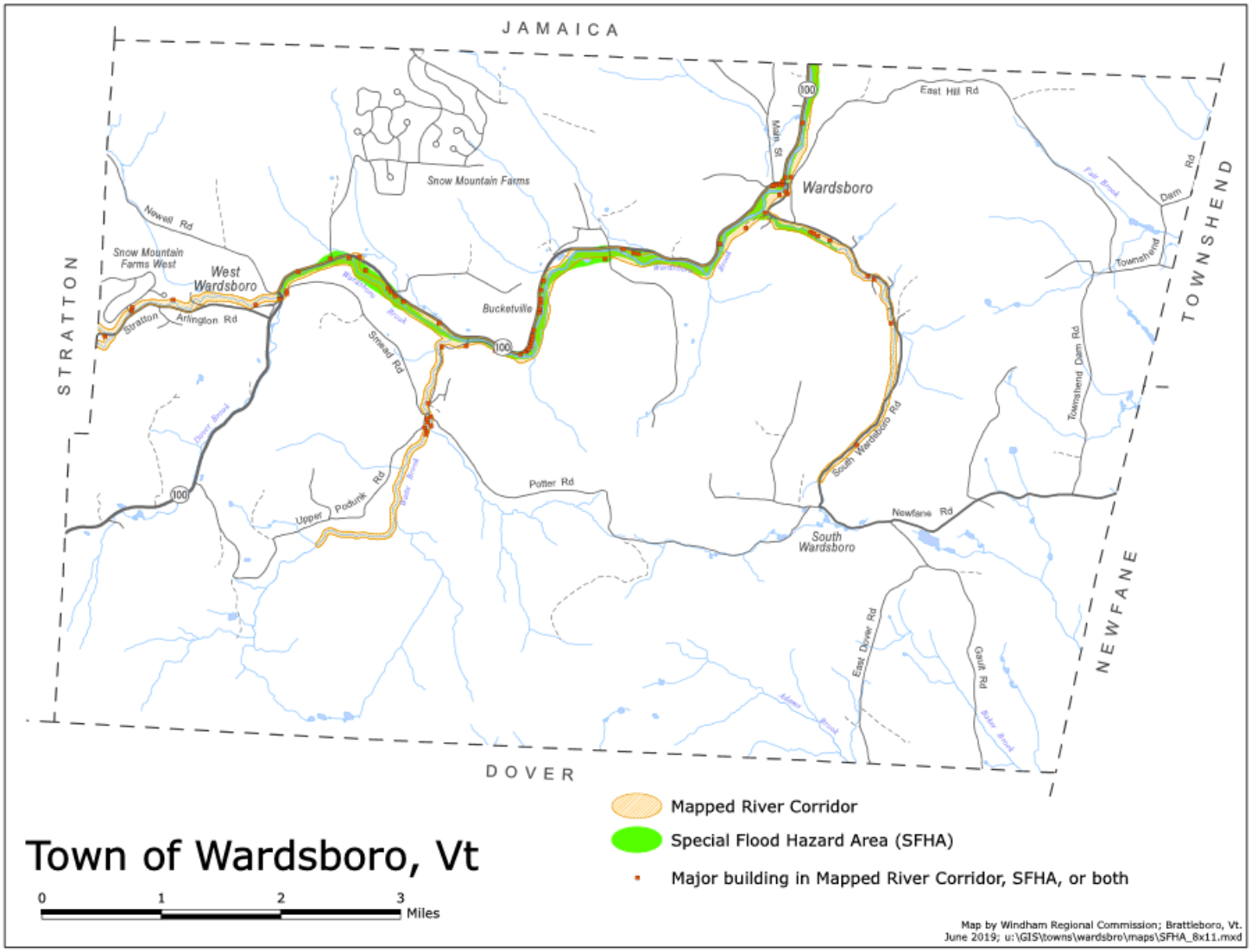
All structures in the mapped SFHA and River Corridor in Wardsboro are shown on this map.

Mapped River Corridor
Special Flood Hazard Area (SFHA)
Major building in Mapped River Corridor, SFHA, or both



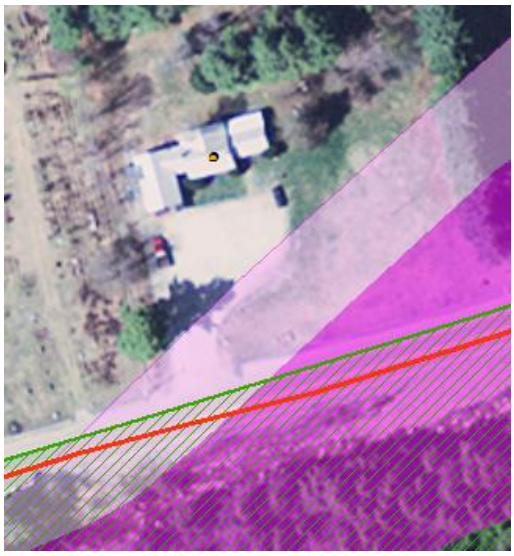
[16] 2019 Flood Hazard Summary Sheet for Wardsboro

Structures within SFHAs, that are under a mortgage, are required to purchase flood insurance. Wardsboro'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 Wardboro's floodplain regulations, which is part of their zoning ordinance and was most recently adopted in 2008.

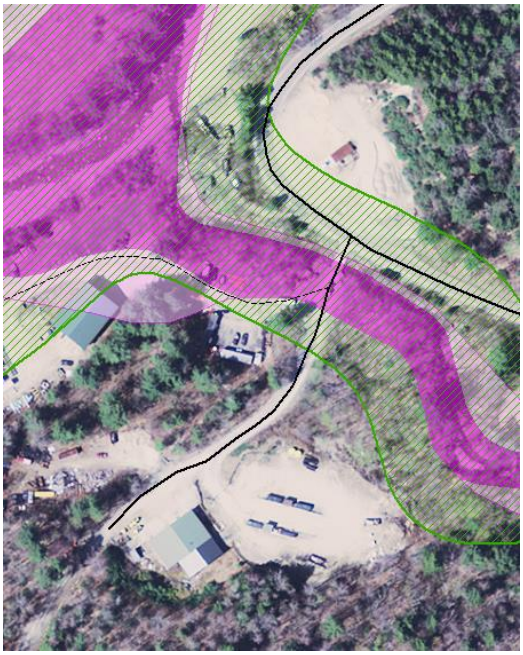


There are several community facilities in Wardsboro that have particularized flood risk. They are as follows:

- The driveway and parking lot of the West Wardsboro post office is in the floodplain. Shown to the right.



- The access road to the Town Highway Garage, 77 Dump Road, Wardsboro, VT (has generator) (access bridge which crosses South Wardsboro Brook could washout or flood over). Shown to the right.



- The Wardsboro post office and the historical society, which the arrows point to, are both in the river corridor. Shown to the left.

Repetitive Loss Structures

According to FloodReady.Vermont.gov, Wardsboro has no repetitive loss claims.[17] 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.[18] 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

[17] Report listing repetitive losses is available here: <http://floodready.vermont.gov/sites/floodready/files/documents/cisrpt_RL%206.26.18.PDF>
[18] https://www.fema.gov/national-flood-insurance-program/definitions

policies are pre-FIRM, which means that flood insurance premiums for many will increase over the ensuing years.

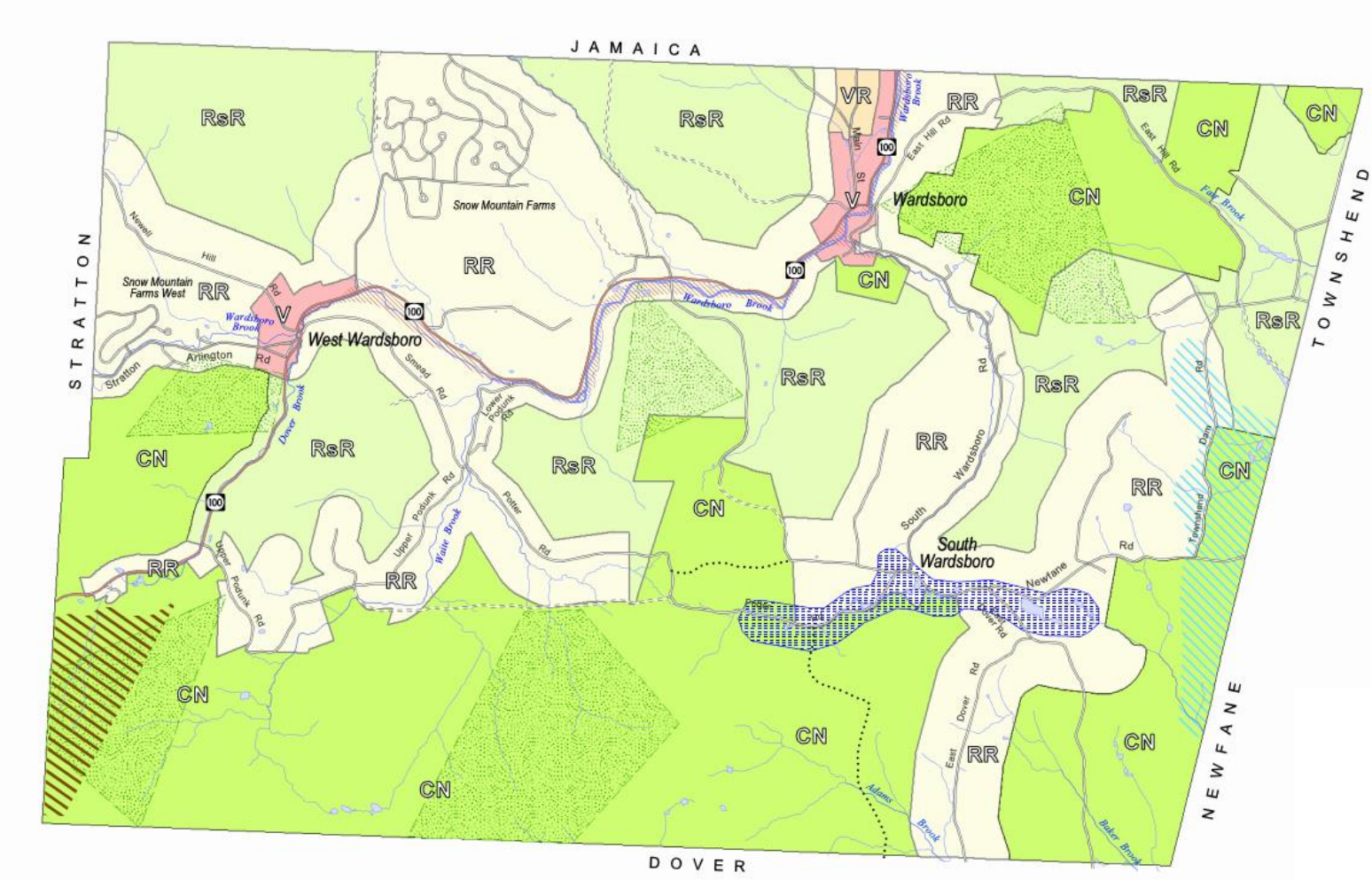
While the NFIP floodplain management criteria are administered by states and communities through their floodplain management regulations, FEMA's role is to provide technical assistance and to monitor communities for compliance with the minimum NFIP criteria. Wardsboro joined the NFIP on July 16, 1980 and is a member in good standing (CID 500138). The latest floodplain ordinance was adopted in September 2008 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.

The latest record indicates that there are twelve (12) active NFIP policies in Wardsboro, with five (5) of those policies being for buildings in the SFHA and seven (7) for buildings outside the SFHA. These policies have a total value of $2,103,200. There have been twelve (12) NFIP claims filed in Wardsboro since they joined the NFIP with a total payout of $482,740.[19] Wardsboro may want to do public outreach to encourage the purchase of flood insurance for people in the River Corridor and the FEMA 500-year floodplain (Zone X on the FIRMs). Flood insurance is reasonably priced in these areas, and covers damage from fluvial erosion, as well as inundation flooding. Nearly 20% of flood insurance claims nationally are for flood damage to buildings located outside the SFHA.

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. The NFIP is administered locally by the Zoning Administrator, who also fulfills the role of Floodplain Administrator.

[19] FEMA NFIP Insurance Report, June 2018, accessed June 12, 2019. http://floodready.vermont.gov/sites/floodready/files/documents/cisrpt_NFIP%206.26.18.PDF

Proposed Land Use Map from 2019 Wardsboro Town Plan



Proposed Land Use areas:		Areas of Special Concern:
CN	Conservation	Flood Hazard Area
RsR	Resource Residential	Bear Corridor
RR	Rural Residential	Surface Water Resource Area
V	Village Commercial	Riparian Corridor
VR	Village Residential	Scenic Viewshed

Development Trends

The Town population has been steadily increasing over the years. The population of Wardsboro rose between 2000 and 2010 from 854 to 900 people, an increase of 5%. Most of

the population increase is second home owners moving here full time. The population is aging. There is not a lot of commercial development in Wardsboro. There is a public school. School enrollment has dropped, but most of that change is due to students being homeschooled or attending nearby schools. In 2010, of the 849 housing units in Wardsboro, 453 units or approximately 53%, were seasonal second homes[20]. This shows how much Wardsboro's population can vary between ski season and non-ski season. Wardsboro is a Vermont mountain town with two nearby ski areas. Most of the newly built homes, and there is only about one new home built a year, are for second home owners and typically built on higher elevations and outside of flood hazard areas. There are two main subdivisions, Snow Mountain Farms and Snow Mountain Farms West. Second home owners are attracted to the choice of either Mount Snow or Stratton Resort for skiing. It is considered a bedroom community to the resorts. The resorts provide employment opportunities, both at the resorts or being self-employed.

Since the prior approved Local Hazard Mitigation Plan, there have been no significant changes in development, other than about five new homes. The town discontinued one road and bridge, and gave it to property owner. The town is considering discontinuing several other roads that lead to single homes, which would eliminate the need to maintain and service ½ to ¾ mile of road town-wide, a couple culverts, and a bridge.

Wardsboro does have zoning. The development pattern has not changed appreciably over the years, so the historic settlement pattern remains predominant, and unfortunately much of the built environment in Wardsboro is located along Route 100 and within land vulnerable to flooding and fluvial erosion. New development has merely extended along the road frontages in all sections of town. There is only about one new building permit issued per year. Taxes are considered high so building or owning a home in Wardsboro is expensive. Property values are high, due to the proximity to the resorts, which affects everyone's ability to buy a home or maintain living in Wardsboro.

[20] Windham Regional Commission Town Profile 2018: Wardsboro

MITIGATION STRATEGY

Local Hazard Mitigation Goals

The below Hazard Mitigation Goals, which were contained in the prior Wardsboro Local Hazard Mitigation Plan, were reviewed by the planning participants as part of the Plan update process. The participants unanimously felt that the overall goals outlined here remain the town's overall hazard mitigation goals.

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

In addition to the above goals, there were two specific problem statements and goals listed in the 2014 Wardsboro Local Hazard Mitigation Plan. Here again are the problem statements and goals, along with the current status for each:

Problem Statement 1: In the event of natural or man-made hazards in the Town of Wardsboro, there is inadequate documentation of incidents on infrastructure and homes as they are adversely impacted in any given year.

Goal 1: Train town personnel including; road crews and office staff to formulate a standardized method of collecting and retrieving data of work accomplished. Train staff of the importance of establishing an administrative procedure to document maintenance, repairs, and improvements to infrastructure so that funding can be identified for mitigation to avoid future losses. The town has a database to track road and culvert maintenance, but staff needs training.

Current Status: This has been happening and continues to be an important goal of the town to keep good records. The Town is currently working with the Windham Regional Commission to do a culvert inventory update and a road erosion inventory. The Road Foreman does document damages and he understands the importance of doing that.

Problem Statement 2: The Town of Wardsboro has many vulnerable parcels of land along the Wardsboro Brook, a major tributary of the West River.

Goal 2: Review NFIP Flood regulations and current zoning bylaws with an eye to preventing future development in or near the floodplain and write new language that goes beyond the minimum NFIP model regulations.

Current Status: Included in the mitigation actions of this plan update is the development of an updated flood hazard bylaw to include river corridors. The update should include enhanced FEMA regulations for the SFHA and regulation of the river corridor.

Town Plan Policies and Recommendations that Support Mitigation

The 2019 Wardsboro Town Plan presents an indirect focus on mitigation, which is highlighted by the number of policies and action items that relate to mitigation. I will highlight them here, but not include the entire section that they are a part of:

Natural Resource Policies:

Watercourses, Shorelines, and Riparian Areas

1. Maintain undisturbed, naturally vegetated buffer strips along riparian corridors to minimize soil erosion, stream siltation and damage to water quality.

2. Require that construction, road maintenance, forestry and agricultural practices follow state approved guidelines for protecting water quality, e.g. logging and road salt application. Follow and apply approved Management Plans and Accepted or Best Management Practices.

3. Protect Wardsboro's surface and ground water by restricting development in the following areas:
    a. Watersheds of upland streams;
    b. Watersheds characterized by steep slopes and shallow soils;
    c. Areas supplying large amounts of recharge waters to aquifers;
    d. Watersheds of public supplies.
    e. Riparian Areas

4. Maintain or enhance the chemical, physical and biological quality of Wardsboro's surface waters.

Wetlands

1. Naturally vegetated buffer strips around significant wetlands shall be left undisturbed.

Flood Hazard Areas

1. Devote lands within the flood hazard areas, both NFIP and FEH, to agricultural and open space uses whenever possible. Structures and fill shall not be allowed in the floodway and should be avoided in the floodplain and FEH zones.

Flood Resilience Policies:

1. Foster the protection and restoration of river corridors, floodplains, wetlands, and upland forested areas that attenuate and moderate flooding and fluvial erosion.

2. Protect floodplains, river corridors, land adjacent to streams, wetlands, and upland forests through adoption and administration of flood hazard area regulations governing development in designated Special Flood Hazard Areas and River Corridors, in order to reduce the risk of flood damage to infrastructure, improved property, people, and the environment.

3. Avoid new development in identified flood hazard, fluvial erosion, and river corridor protection. If new development is to be built in such areas, it should not exacerbate flooding and fluvial erosion.

4. Encourage the protection and restoration of floodplains and upland forested areas that attenuate and moderate flooding and fluvial erosion.

5. Encourage flood emergency preparedness and response planning.

Riparian areas provide for channel stability in the following ways:

- *Flood attenuation - riparian areas allow floodwaters to spread out horizontally over the land, thereby reducing the force with which the floodwaters move downstream.*
- *Reduced effects of storm events - riparian vegetation and soil obstruct surface runoff, slowing it down and allowing it to infiltrate into the ground, reducing the volume and rate at which surface runoff enters stream channels*
- *Bank and shoreline stabilization - soils and vegetation in riparian areas obstruct and slow down floodwaters, and reduce floodwater volume through absorption, thus reducing the energy applied to stream bed and banks, reducing the scouring ability of high flow events, and*
- *Ice damage control - forested riparian corridors trap ice slabs and other floating debris, reducing the potential for ice jamming, which can result in backwater and flooding upstream, and can lead to channel instability and property damage.*

- 2019 Wardsboro Town Plan

Flood Resilience Recommendations for Action:

1. Be familiar with up-to-date ANR river corridor maps that delineate the land area adjacent to streams and rivers that are required to accommodate a stable channel. (Selectboard, Planning Commission, Zoning Administrator)

2. Be familiar with Flood Insurance Rate Maps (FIRMs) that delineate areas that could be covered or inundated by water during flooding. (Selectboard, Planning Commission, Zoning Administrator)

3. Regulate any new development in identified flood hazard areas, fluvial erosion hazard areas, and/or river corridors to ensure that development does not exacerbate flooding and fluvial erosion, and extend these provisions to development activities that might increase the amount and/or rate of runoff and soil erosion from upland areas. (Planning Commission, Zoning Administrator)

4. Update the Flood Hazard Area Regulations to include regulation of river corridors, and include provisions for advance notification of and specific limits on new development activities in identified flood hazard areas, fluvial erosion areas, River Corridors and/or upland forested areas based on regulatory templates developed by the ANR Department of Environmental Conservation Rivers Program. (Planning Commission)

5. Pursue a flood resilience management approach whose essential components are to identify and map flood hazard areas, fluvial erosion hazard areas, and river corridor protection areas based on stream geomorphic assessment studies and maps provided by the Vermont ANR Rivers Program, and designate those areas for protection to reduce the risk of flood damage to infrastructure and private property. (Planning Commission, Selectboard)

6. Provide information to citizens regarding individual and community preparedness for emergencies. (e.g. flooding and power outages) (Selectboard, Planning Commission)

Past and Ongoing Mitigation and Maintenance Efforts

Below is an update on prior identified hazard mitigation projects that were listed in the 2014 Wardsboro LHMP. The Town Selectboard and Road Foreman reviewed these actions at two meetings in summer 2019 and provided the current status on each item[21]. While annual reviews are ideal, Wardsboro did not do them. Current status is listed here in the last column, and prioritization changes are called out where applicable. Monitoring of current status was done for all actions listed in the prior plan.

HAZARD	MITIGATION ACTION	RESPONSIBLE PARTY	TIMEFRAME	FUNDING SOURCE	PROJECT PRIORITY	CURRENT STATUS AS OF OCT 2019
Flood	Upgrade at-risk culverts, install additional culverts and stone line ditches as necessary	Selectboard	Annually	Local, State, FEMA funding and unspecified grants	high	Ongoing
Flood	Armor stream banks near roads and bridges	Selectboard	1 -2 Years	Local, State, FEMA funding	high	Ongoing; complete on South Wardsboro Road
Flood	Replace three culverts in Boardman Loop to meet ANR standards	Selectboard	1-2 Years	Local, State, FEMA funding	high	Complete; There used to be three side by side culverts. They got plugged up in Irene and the culverts were taken out by the storm. This was a temporary bridge for 3 years before this new bridge was constructed on December 30, 2014. Done by contractors. $564,669. Funded through FEMA with Irene dollars.
Flood	Replace Culvert #9A and retaining walls on Townshend Dam Rd at Bobcat Rd	Selectboard	1-2 Years	Local, State, FEMA funding	high	Completed October 2, 2018. Replaced a round corrugated steel pipe with a box culvert. There were problems with this culvert before during and after Irene. This was always undersized and the road and adjacent land would get flooded with any significant amount of time. Caused erosion in the area and the road would have to be closed to avoid cars driving in flooded area. $106,100 and done by contractors. Funded through VTrans Structures grant.
Flood	Townshend Dam Rd between East Hill Rd and Bobcat Rd, upgrade culvert #10	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local funding	low	Not complete and 3-5 years away likely; The plan is to replace this metal culvert with a concrete box culvert.
Flood	Replace and upgrade to ANR Standards Bills Rd. culvert#10	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	~~Medium~~ low	This is no longer a priority and was not completed.
Flood	Replace and upgrade to ANR Standards East Hill Rd. culverts#40,41	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	medium	Unknown status; not a priority

[21] See appendix 7 for the marked up mitigation action tracker tool used in this review.

HAZARD	MITIGATION ACTION	RESPONSIBLE PARTY	TIMEFRAME	FUNDING SOURCE	PROJECT PRIORITY	CURRENT STATUS AS OF OCT 2019
Flood	Replace and upgrade to ANR Standards Fitts Rd. culvert#1	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	~~Medium~~ high	Not complete; Now a high priority item
Flood	Replace and upgrade to ANR Standards Potter Rd. culvert#3	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	~~Medium~~ high	Not complete; Now a high priority item; this is TH #39 bridge #22
Flood	Replace and upgrade culvert #13 on Townshend Dam Rd at Fair Brook	Selectboard	3-5 Years	HMGP,V-Trans structures grant with local funding	medium	Complete; FEMA funded $78,597. Completed 9/20/16-12/15/16. Replaced undersized round steel culvert that was taken out in Irene with a box culvert.
Flood	Armor Banks near South Wardsboro Rd. home buyouts creating flood bench	Selectboard	2-5 Years	HMGP, unspecified grants, local funding	high	Complete
Flood	Home Buyouts	Selectboard	1-2 Years	HMGP and Local Funding	high	4 home buyouts completed; These were all the homes sought for buyout. Complete.
Wildfire / Structure Fire	Identify additional firefighting water supply sources for Snow Mountain Farms development	Wardsboro Fire & Rescue	Private Development Undetermined Lack authority to develop and no large private water supply available	Dry Hydrant program grants from VT Rural Fire & Protection Task Force, local funding	low	Complete; Jamaica Fire pond dry hydrant installed.
High Winds	Potentially Hazardous Tree Assessment – Remove dead or dangerous tree limbs near power lines	Road Foreman, Green Mountain Power	Continual Basis - Annually	Local Funding Utility Maintenance	low	GMP does tree removal; Town does not have Tree Warden, so the Road Crew cannot cut anything larger than 6" in diameter.
Winter Storm / Ice Storm	Potentially Hazardous Tree Assessment – Remove dead or dangerous tree limbs near power lines	Road Foreman, Green Mountain Power	Continual Basis - Annually	Local Funding	low	GMP does tree removal; Town does not have Tree Warden, so the Road Crew cannot cut anything larger than 6" in diameter.
Landslide/Mudslide	Annual road and bank maintenance for most; South Wardsboro Rd situation requires research	Selectboard	Current and on-going	Unknown	low	The site has been inspected by the State of Vermont, but no formal plan has been put in place or actions taken.
All Hazards	Standby Generator at Wardsboro Fire & Rescue	Wardsboro Fire & Rescue	When opportunity permits	HMGP, local funds	Med	There is a portable generator there now. The Town wishes to have a permanent generator put in place.

There are certain ongoing efforts in the town that serve to either mitigate for hazards, assist with readiness of town to deal with a hazard, or both. Those efforts are listed here:

1. Leaf removal, tree trimming and ditch cleaning are maintenance activities done every spring by the road crew. If ditches are being eroded, the crew may also stone line them.

2. The town manages a local emergency operations center (EOC) during disasters.

3. The town maintains one emergency shelter at the Wardsboro Elementary School, and it is capable of being an overnight shelter.

4. Wardsboro 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.

Additional Actions Completed

Wardsboro completed a number of mitigation projects that were not identified in their previous plan. These include:

1. Removed two undersized culverts (15 and 16) on Newell Hill Road and replaced them with box culverts. This was done by Contractors on November 3, 2014. The Brook winds under the road twice in a small distance and both culverts were overtaken and damaged in TS Irene. Each culvert conversion cost $47,125 and this project was funded by FEMA.

2. Box culvert put in on East Hill Road on December 16, 2014. Round steel undersized culvert was taken out by TS Irene. Culvert had been replaced with headers on both ends for temporary fix until 2014 when it was replaced with upsized box culvert. $69,000. Funded through FEMA.

3. Block wall on South Wardsboro Road. The previous protruding rock wall was removed, and a gabion wall and rip rap were installed behind it to stabilize the bank. This is an area with a steep wall adjacent that was slowly falling into the road. Any rain storm would cause a little more bank erosion in this area. The road is very narrow in this area with the brook on the other side of the road with no room for guard rails. There was a lot of water coming through this area in the winter that would cause thick ice on the roadway underneath it. Project completed between Aug 8, 2018 and May 14, 2019. $44,510 funded through a VTrans Better Roads grant.

4. Silver Mine culvert #4 installed adjacent to and Gault Road culvert #1 that was overfilling constantly. During any heavy rain storm there were washouts in this area. The town funded this and it cost $1,940. Completed July 23, 2019.

5. Slope restoration on South Wardsboro Road. Rip-rap was placed in 17 areas over the course of a mile only on town-owned land. This work was only done areas between South Wardsboro Brook and the road, with the goal of protecting the road. There was a small area in one spot where trees that were taken down by the landslide and taken out of the brook and put at the base of slide with the permission of that landowner and that cost the town $1,400. Completed between December 11, 2018 and May 28, 2019. Contractor did the work. FEMA payout was $41,335.

Mitigation in Action

Image of a buyout property located at 743 Route 100 N, in the Village of Wardsboro, pre-demolition. This structure was on a small sliver of land between Route 100 and the Wardsboro Brook.

Image of 743 Route 100 N site after the buyout, demolition and site stabilization. This hazardous structure is no longer in the floodway.

Identification of Mitigation Actions

The Wardsboro 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.

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. Actions relating to future development were considered, but the plan participants did not find them to be feasible at this time due to lack of political will/community support.

- 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, Wardsboro 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	ISSUE AND ACTION	RESPONSIBLE PARTY	TIME-FRAME	FUNDING SOURCE	MITIGATION OR PREPAREDNESS	COST / BENEFIT	PRIORITY	STATUS
Fluvial Erosion	Sheldon Hill Road culvert #2 is 5' concrete pipe and should be replaced with a concrete box culvert.	Selectboard will bid out the work; Road Foreman will oversee it.	Top priority – complete Spring/Summer 2021	VTrans or FEMA grant	Mitigation	Med / Med	high	Hydraulic study is underway with Vtrans now.
Fluvial Erosion	Replace and upgrade to ANR standards Fitts Road culvert #1. There is no other road out if this culvert fails and 15 homes would be trapped.	Selectboard will bid out the work; Road Foreman will oversee it.	Planned for 2022 (after Sheldon Hill culvert is done)	VTrans or FEMA grant	Mitigation	Med / High	high	This action was listed in the prior Plan, but the priority is changed from medium to high.
Fluvial Erosion	Stone line ditches in the entire town, where needed and identified by a plan put together by the WRC.	Road crew with potential use of contractors.	Ongoing. Complete within five years and to meet state requirements.	town funds and state grants	Mitigation	Med / Med	high	This is to meet state requirements under Act 64.
Fluvial Erosion	Potter road culvert #4 - upgrade to possibly be a bridge with I beams that are set in the surrounding ledge. This is currently undersized at 6'. Cost estimate is $130,000.	Selectboard will bid out the work; Road Foreman will oversee it.	2024 or 2025; can be completed in a month or so	VTrans Structures Grant, or FEMA grant, with local capital fund match	Mitigation	High / High	medium	The fluvial erosion was intense in this area because this culvert was undersized. TS Irene caused damage. The SB would like the Road Crew to put a swale in the road to act as a temporary flood chute to divert the water away from South Wardsboro.

HAZARD	ISSUE AND ACTION	RESPONSIBLE PARTY	TIME-FRAME	FUNDING SOURCE	MITIGATION OR PREPAREDNESS	COST / BENEFIT	PRIORITY	STATUS
Fluvial erosion / flooding	Implement new review of all tax sale properties to see if they are buyout candidates before they are put up for auction.	Town Clerk	Ongoing new practice	Town funds	Mitigation	Low / High	Medium	The Town recently had to buy back a property that was then bought out under a FEMA grant. Going forward, review of tax sale properties to see if they are within the FEMA SFHA would avoid having to buyback properties for buyout.
Fluvial Erosion	Have a plan for removal and where to take material when the South Wardsboro slide occurs. This includes having a predesignated spot to put the material.	Selectboard and the Road Foreman to finalize the plan; Road Crew to implement when needed	Summer 2020 develop the plan with Selectboard	Town funds	Preparedness / Mitigation	Low / Medium	medium	The Road Foreman has ideas about this, as this issue has been on his mind for some time. The material will likely go to a private property owner who wants it.
Fluvial Erosion	Replace and upgrade to ANR standards the Bills Road culvert #10.	Selectboard will bid out the work; Road Foreman will oversee it.	2026 is the goal for this project. The work will take one month.	VTrans or FEMA grant	Mitigation	Med / High	low	A hydraulic study request needs to be sent to VTrans. This culvert is undersized and overflows with heavy rains, and debris gets caught in the culvert. This then takes out a nearby driveway just above it. It's currently a 4' culvert.
Fluvial erosion	Update the flood hazard bylaw to include River Corridor regulations.	Selectboard and the Planning Commission	2024	Town funds	Mitigation	Low / High	Low	ANR or the Windham Regional Commission can assist the Town in completing this.

HAZARD	ISSUE AND ACTION	RESPONSIBLE PARTY	TIME-FRAME	FUNDING SOURCE	MITIGATION OR PREPAREDNESS	COST / BENEFIT	PRIORITY	STATUS
Fluvial erosion	Mitigate undersized culvert #10 which is sandwiched between 2 box culverts on Townshend Dam Road. This didn't get moved during TS Irene and remains in place.	Selectboard will bid out the work; Road Foreman will oversee it.	Start and complete in or by 2030	VTrans grants likely or FEMA grant	Mitigation	Medium / Medium	low	This project is a low priority, but something that the Road Foreman knows needs to be addressed.
Ice	Complete new salt/sand shed. This new shed will hold more than 3x the amount as the current shed.	Selectboard will bid the work out to contractor	Complete Spring/summer 2020	Town funds	Mitigation / preparedness	High / High	High	Selectboard is currently bidding out for the engineering for this project.
All Hazard / Power outage / Ice	Backup generators to serve the Town Office and Fire Department (this would replace small portable generator that only serves Fire Department). EOC is in the Fire Department. Generator is also needed to serve the town hall, which is the secondary shelter.	Selectboard	2021, while looking for grants and building local matching funds.	FEMA grant with local match funding; the town has been budgeting for match funds.	Mitigation	Med / High	High	Selectboard has put out quote requests to see what the expected costs are, and whether the preferred solution is for one generator to serve both buildings or if two generators are needed. There are frequent power outages in town.
Ice	Appoint a tree warden so that the Town has the authority to cut trees larger than 6" in diameter.	Selectboard	Appoint in 2020	This will be a volunteer position.	Mitigation / Preparedness	Low / High	medium	Selectboard has been considering possible people to fill this role. Without a tree warden the Road Crew is limited to a tree of 6” in diameter that they can cut themselves.
Ice	Identify trees overhanging lines and contact GMP for removal or trimming	Fire Department	ongoing	Town funds	Mitigation	Low / Med	Medium	Currently the Road Crew can only cut anything smaller than 6" in the right of way and not overhanging a power line.

HAZARD	ISSUE AND ACTION	RESPONSIBLE PARTY	TIME-FRAME	FUNDING SOURCE	MITIGATION OR PREPAREDNESS	COST / BENEFIT	PRIORITY	STATUS
Ice	Develop a standing contract relationship for emergency tree removal and debris clearing	Selectboard	2020	Town funds	Preparedness	Low / Med	Medium	Selectboard will look into this and contact tree services that they've worked with before.
Ice / Power outages	Support Green Mountain Power by giving them local permissions to bury lines and move lines to the road.	Selectboard and Road Foreman	Ongoing	No funds needed	Mitigation	Low / High	Medium	Projects can only proceed as fast as Green Mountain Power (GMP) is able to do them. Town should also encourage phone and internet providers to go underground with GMP.
All Hazard / Power outage	Create a self-reporting mechanism for vulnerable populations to let the town know they may need assistance. Selectboard will put together a postcard for self-identification and include that in the tax bill.	Fire Department with Selectboard	To be sent with 2020 tax bills	Town funds	Mitigation	Low / High	Medium	The Selectboard is planning to talk this over with the Fire Department before this is created. They will be invited to an upcoming Selectboard meeting.
All Hazards / Ice / Invasive Species	Update the management plan for 60-acre town owned public Town Forest.	Selectboard	Start spring 2021 / complete fall 2021	Grant support, if possible	Mitigation	Low / Low	low	Selectboard will work with ANR and contract with professional forester to develop updated management plan.
All hazards	Educate and encourage homeowners to install carbon monoxide monitors and alarms. This information will be included with an annual fund request from the Fire Dept.	Fire Department	To be sent with 2020 funding request	Town funds	Preparedness	Low / High	Medium	The Selectboard is planning to talk this over with the Fire Department before this is created. They will be invited to an upcoming Selectboard meeting.
All hazards	Renew mutual aid agreements with surrounding towns for road equipment	Road Foreman with Selectboard	2020	Town funds	Preparedness	Low / Med	Medium	Having agreements already in place and up-to-date eliminates questions during times of need and stress. This is a best practice.

Implementation of Mitigation Actions / Capabilities

Barriers to Implementation:

1. Aging population with little in-migration of younger residents
2. Limited population base, though this also lowers risk
3. Emergency planning director (EMD) is a volunteer –reliance upon volunteers can be risky in terms of turnover and availability
4. Not a lot of industry or commercial entities in Wardsboro
5. Wardsboro does not currently regulate development in the River Corridor through its zoning, which limits control of this hazardous area.
6. Limited emergency response training for town staff and volunteers.
7. No designated assistance organization for the town elders.
8. There is no Conservation Commission in town
9. It takes so long to get hydraulic study which lengthens time to decrease vulnerability.
10. Transportation projects can get drawn out for 2-3 years between getting an engineering study, getting engineering design work completed, and getting funded.
11. Boards are the same all the time and finding replacements or new members is difficult.
12. Wardsboro Fire Department is small and volunteer.
13. Limited tax base to draw funds from for major projects. Raising funds is a hardship. No mitigation fund set up currently.

Capabilities to build upon for implementation:

1. 3 full-time road crew staff
2. 2 full-time town staff; town clerk and assistant town clerk
3. Grant writing capacity among town staff is limited, but effective.
4. Two different populations in town. The local population is good about looking out for each other. The second homeowners rely on locals to watch their homes. Road Crew knows the property maintenance entities in the area and gets in touch with them if they notice an issue at a second home. Neighborly attitude amongst locals.
5. Selectboard with lots of local knowledge
6. Well-functioning EOC
7. Small set-aside fund for bridge repairs
8. Windham Regional Commission assistance when needed
9. Floodplain ordinance in place. Town could update floodplain ordinance to include River Corridors and/or more restrictive standards.
10. Zoning Board of Adjustment
11. Residents are generally the hearty and self-sufficient type

Recognizing that there is no place that doesn't have barriers to overcome in project implementation, Wardsboro should focus on engaging around emergency management at the town level. There are a limited number of committed volunteers and staff who make this town function well. They are invested and plan to remain in the area. The Town has a hard time recruiting new volunteers. Wardsboro is not struggling financially, but there is a rise in home foreclosures in town in recent years. They are located along Route 100, which is a semi-major travel corridor of the region, yet many residents live on back dirt roads that can be difficult to access during certain times of the year. This lends to a "do it yourself" mentality that serves Wardsboro positively.

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, Wardsboro 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 Wardsboro. The Hazard Mitigation Planning participants analyzed these programs for their effectiveness and noted improvements needed. Wardsboro uses all of the tools listed below to help plan for current and future activities with the town. For example: the Local Emergency Management 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 Wardsboro completed their last culvert inventory in 2014, and is in the midst of one currently. In the development of this plan, the latest 2019 Town Plan was used.

As Wardsboro 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. The Local Emergency Management 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 responsible party identified. 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.

This updated hazard mitigation plan will be considered and incorporated in the next Town Plan update, as appropriate. The LEMP is updated yearly and was updated last in 2019. 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.	Current Town Plan incorporates flood resiliency. The Town Plan was last updated by the Planning Commission with assistance from the Windham Regional Commission in 2019.	None identified. The next plan update should incorporate information from the latest hazard mitigation plan.
Town Local Emergency Management Plan	Municipal procedures for emergency response	Incident Command; Hazard Annexes included	LEMP and adopted by Town Select board in 2019; next LEMP should include all of the appendices. LEMP is completed by Town Clerk and Selectboard.
School Emergency Response Protocol	School procedures for emergency response	They do have a crisis plan in place. They do a lock down practice 6x a year.	Ensure that the school works with Vermont Emergency Management, State Police and local emergency management director to continue to keep the plan relevant.
Mutual Aid – Emergency Services	Agreement for regional coordinated emergency services	Keene (NH) Dispatch; EMS – Rescue Inc. contract with Wardsboro, out of West Townshend facility; Mutual Aid agreements with Jamaica, Winhall, Dover and Stratton for fire support; No contract for police in place, so covered by the state police	None identified
Mutual Aid – Public Works / Road Crew	This would address sharing of equipment or services between towns.	The Selectboard signed an agreement in 2005.	Update agreements as needed. 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.
Road Standards	Design and construction standards for roads and drainage systems	Adopted new VTrans Road Standards in 2013.	No gaps identified. Wardsboro Road Crew will continue to comply with the most recent Town Road and Bridge standards set by VTrans.
Zoning regulations	Regulates the division of land, standards for site access and utilities	Zoning in place, updated fairly often	Zoning was last updated in 2008. Next zoning update should include River Corridors.
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; regulates only to BFE, no freeboard	Revised in 2008 to include new FEMA DFIRM's. Will be updated to include River Corridors.
Maintenance Programs	Bridge & Culvert Inventory	Updated in 2014, and currently doing update	NA

Type of Existing Authority / Policy / Program / Action	Description	Effectiveness/Enforcement/ Hazard that is addressed	Gaps in Existing Protection/Improvements Needed
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 Town Clerk, 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 Management Plan (LEMP). 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 Town Clerk in Wardsboro 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 Wardsboro Selectboard will appoint a team to convene a meeting of the hazard mitigation planning committee. The town's Town Clerk will chair the committee, and other members should include local officials such as Selectboard members, fire chief, zoning administrator, constable, road commissioner, Planning Commission members, health officer, interested stakeholders, etc. The Town Clerk 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 their effect 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 their effect 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.
- Impacts of climate change and how the local environment is changing due to climate impacts

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 to 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 Town Clerk, 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 VEM 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 Town Clerk, 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 Management/ 911 Coordinator
- Post the hazard mitigation plan at the town office
- Selectboard will review current 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, Bucketville News, etc.

APPENDIX

1. Adoption Certificate
2. Bucketville News advertisement for Draft Hazard Mitigation Plan (June 2019 edition)
3. Email sent to adjacent towns for public comment on the draft plan
4. Flyer advertising availability of Draft Hazard Mitigation Plan for public comment
5. Newspaper advertisements in both the Deerfield Valley News (2/27/20) and the Brattleboro Reformer (2/27/20) advertising public comment opportunity on the Draft Hazard Mitigation Plan
6. Email sent 12/16/19 to town staff and Hazard Mitigation Planning Committee for review of the draft
7. Marked up mitigation action tracker tool that the Selectboard used in reviewing the status of prior identified actions
8. June 5, 2019 Hazard Mitigation Committee meeting sign-in sheet
9. June 26, 2019 Hazard Mitigation Committee meeting sign-in sheet
10. July 23, 2019 Hazard Mitigation Committee meeting sign-in sheet
11. June 5, 2019 Meeting agenda
12. June 26, 2019 Meeting agenda
13. July 23, 2019 Meeting agenda
14. June 5 and 26, 2019 Meeting flyer that was posted around town

Certificate of Adoption
Town of Wardsboro, VT
Selectboard

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

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

WHEREAS, the Town of Wardsboro, 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 Wardsboro, 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 Wardsboro, 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 Wardsboro, VT adopts the *Town of Wardsboro 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 21st (*date*) day of April 2020 (*month, year*).

Selectboard

Peter Sebastian, Co-Chair

James Knapp, Co-Chair

Kathy Anderson, Co-Chair

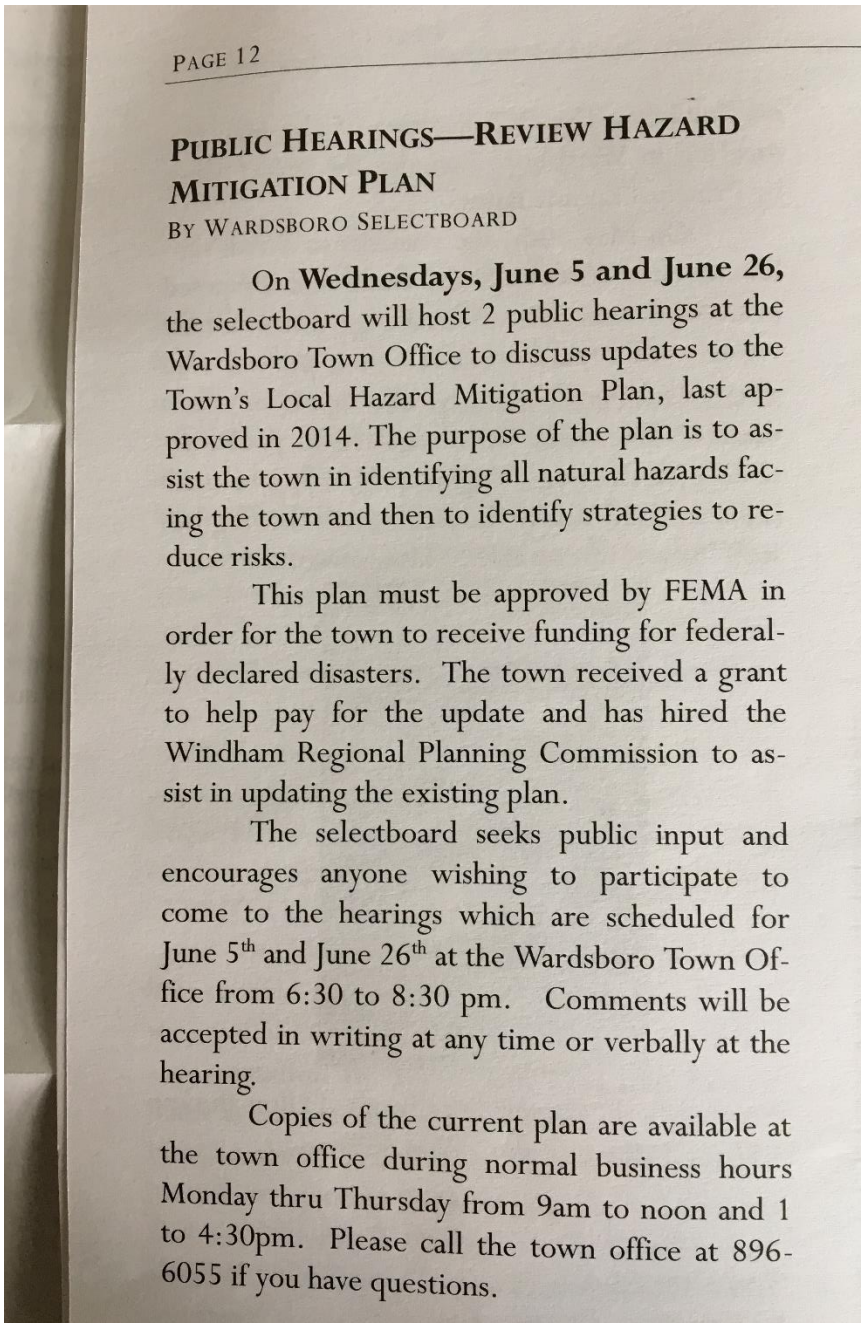
Michael Fitzpatrick

~~Mitchell Plimpton~~ Karen Davis

ATTEST

Jackie Bedard, Town Clerk

2. Bucketville News advertisement for Draft Hazard Mitigation Plan public meetings (June 2019 edition)



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PUBLIC HEARINGS—REVIEW HAZARD MITIGATION PLAN

BY WARDSBORO SELECTBOARD

On **Wednesdays, June 5 and June 26,** the selectboard will host 2 public hearings at the Wardsboro Town Office to discuss updates to the Town's Local Hazard Mitigation Plan, last approved in 2014. The purpose of the plan is to assist the town in identifying all natural hazards facing the town and then to identify strategies to reduce risks.

This plan must be approved by FEMA in order for the town to receive funding for federally declared disasters. The town received a grant to help pay for the update and has hired the Windham Regional Planning Commission to assist in updating the existing plan.

The selectboard seeks public input and encourages anyone wishing to participate to come to the hearings which are scheduled for June 5th and June 26th at the Wardsboro Town Office from 6:30 to 8:30 pm. Comments will be accepted in writing at any time or verbally at the hearing.

Copies of the current plan are available at the town office during normal business hours Monday thru Thursday from 9am to noon and 1 to 4:30pm. Please call the town office at 896-6055 if you have questions.

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

Wed 2/19/2020 1:16 PM

Alyssa Sabetto <asabetto@windhamregional.org>

Wardsboro Local Hazard Mitigation Plan - for your review and comment

To 'townclerk@townofstrattonvt.com'; 'jamaicatownclerk@svcable.net'; 'Paul Fraser'; 'Rebecca Ohm'; 'townshendtownclerk@gmail.com'; 'karla@townshendvt.net'; 'plan@townshendvt.net'; 'tnewfane@svcable.net'; 'lynn.forrest@sbcglobal.net'; 'dvradmin@sover.net'; 'dvrclerk@sover.net'; 'nico231973@aol.com'

Cc 'wardsborotownoffice@myfairpoint.net'; 'Alyssa Sabetto'

Wardsboro_ 2019 Haz...
6 MB

Hello towns adjacent to Wardsboro,

Attached please find a draft of the updated Wardsboro Hazard Mitigation Plan. I have recently worked on finalizing and updating this draft plan with the help of the town. It is now being sent to you for your review and comment, per FEMA requirements. Please share with your planning commission and selectboard. **Please review and provide comment back to me by March 12, 2020.** My contact information is shown below.

I would appreciate you letting me know that you have reviewed the draft, even if you do not have comment.

I appreciate your time and assistance in this matter. If you have any questions, please let me know.

Thank you,
Alyssa

Alyssa Sabetto, CFM
Senior Planner
Windham Regional Commission

4. Flyer advertising availability of Draft Hazard Mitigation Plan for public comment

Wardsboro Hazard Mitigation Plan

PUBLIC COMMENT PERIOD

The draft Wardsboro Hazard Mitigation Plan is now available for public review at the Wardsboro Town Office.

The Plan will be available for comment until the end of the public comment period on March 12, 2020.

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 x113 or email at asabetto@windhamregional.org. We encourage your review and participation!

5. Newspaper advertisements in both the Deerfield Valley News (2/27/20) and the Brattleboro Reformer (2/27/20) advertising public comment opportunity on the Draft Hazard Mitigation Plan

2/27

Wardsboro
Hazard Mitigation Plan
PUBLIC COMMENT PERIOD

The draft Wardsboro Hazard Mitigation Plan is now available for public review at the Wardsboro Town Office.

The Plan will be available for comment until the end of the public comment period on March 12, 2020.

Comment on the plan may be made to Alyssa Sabetto at the Windham Regional Commission via phone at (802) 257-4547 x113 or email at asabetto@windhamregional.org. The Wardsboro selectboard will also receive comments at the Wardsboro Town Office (at 802) 896-6055 or by email at Wardsborotownoffice@myfairpeint.net.

We encourage your review and participation!

Jackie Bedard,
Clerk for the Wardsboro Selectboard
20 February 2020
2/27

DEVELOPMENT REVIEW

Public Notices

Wardsboro
Hazard Mitigation Plan
PUBLIC COMMENT PERIOD

The draft Wardsboro Hazard Mitigation Plan is now available for public review at the Wardsboro Town Office.

The Plan will be available for comment until the end of the public comment period on March 12, 2020.

Comment on the plan may be made to Alyssa Sabetto at the Windham Regional Commission via phone at 802-257-4547 x113 or email at asabetto@windhamregional.org
The Wardsboro selectboard will also receive comments at the Wardsboro Town Office at 802-896-6055 or by email at Wardsborotownoffice @myfairpoint.net

We encourage your review and participation!

Jackie Bedard,
Clerk for the
Wardsboro Selectboard
20 February 2020

AD#46869
02/27/2020

Make those connections! Use our classieds.

2/26/2020
BRATTLEBORO REFORMER

6. Email sent 12/16/19 to town staff and Hazard Mitigation Planning Committee for review of the draft

Mon 12/16/2019 3:20 PM

Alyssa Sabetto <asabetto@windhamregional.org>

Wardsboro Local Hazard Mitigation Plan for internal town comment until Jan 10

To wardsborotownoffice@myfairpoint.net; wardsborohighway@myfairpoint.net; 'Donna Sebastian'; 'jack cunningham'; kanderson1031@gmail.com; onekkranch@yahoo.com

Cc mkmma@hotmail.com; mjplimpton@myfairpoint.net

This message was sent with High importance.

Wardsboro_ 2019 Haz...
6 MB

Hello Wardsboro,

Attached is the first draft of the Wardsboro 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 10TH.** I'll incorporate comments and then put the plan out for public comment. You can mark up the attached document and scan it back to me, call me with comments or email me back a list of comments. I wasn't able to send in a word version, as the file was too large for email.

Please note that the yellow highlighted sections of the plan are not yet completed for Wardsboro and are awaiting further information.

Jackie – If there is anyone that is not getting this email that should, please forward it on to them. (EMD?)

Thank you,
Alyssa

Alyssa Sabetto, CFM
Senior Planner
Windham Regional Commission

7. Marked up mitigation action tracker tool that the Selectboard used in reviewing the status of prior identified actions

	MITIGATION ACTION TRACKER								
		Information in Hazard Mitigation Plan				Current Status			
	Action	Responsible Party	Timeframe for Completion	Funding Source	Project Priority	Current Status	Completion Timeframe	Completion Goal	Other notes; Difficulties encountered
1	Upgrade at-risk culverts, install additional culverts and stone line ditches as necessary	Selectboard	Annually	Local, State, FEMA funding and unspecified grants	high	ON GOING			
2	Armor stream banks near roads and bridges	Selectboard	1 -2 Years	Local, State, FEMA funding	high	ON GOING.	PARTIAL/COMPLETE	COMPLETE SOUTH WARDSBORO ROAD	DONE
3	Replace three culverts in Boardman Loop to meet ANR standards	Selectboard	1-2 Years	Local, State, FEMA funding	high	DONE			
4	Replace Culvert #9A and retaining walls on Townshend Dam Rd at Bobcat Rd	Selectboard	1-2 Years	Local, State, FEMA funding	high	DONE			
5	Townshend Dam Rd between East Hill Rd and Bobcat Rd, upgrade culvert #10 5'	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local funding	low	? *	3 to 5 yrs	Replace w/ Box culvert	this is a 5' METAL culvert
6	Replace and upgrade to ANR Standards Bills Rd. culvert#10	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	~~medium~~	NOT DONE	⇒ no longer a priority		4' culvert
7	Replace and upgrade to ANR Standards East Hill Rd. culverts#40,41	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	medium	? *	culvert #40 = 18"x30' on		one bad one is a 33.36" EAST Hill
8	Replace and upgrade to ANR Standards Fitts Rd. culvert#1	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	medium	NOT DONE			
9	Replace and upgrade to ANR Standards Potter Rd. culvert#3	Selectboard	3-5 Years	HMGP, VTrans Structures Grants and Local Funding	medium	NOT DONE			POTTER ROAD TH#39 BR#22
10	Replace and upgrade culvert #13 on Townshend Dam Rd at Fair Brook	Selectboard	3-5 Years	HMGP,V-Trans structures grant with local funding	medium	DONE.			
11	Armor Banks near South Wardsboro Rd. home buyouts creating flood bench	Selectboard	2-5 Years	HMGP, unspecified grants, local funding	high	DONE			
12	Home Buyouts	Selectboard	1-2 Years	HMGP and Local Funding	high	DONE			
13	Identify additional firefighting water supply sources for Snow Mountain Farms development	Wardsboro Fire & Rescue	Private Development Undetermined Lack authority to develop and no large private water supply available	Dry Hydrant program grants from VT Rural Fire & Protection Task Force, local funding	low	Done ? ~~Not Done~~			Jamaica Fire Pond ~~Saves~~ dry hydrant installed
14	Potentially Hazardous Tree Assessment – Remove dead or dangerous tree limbs near power lines	Road Foreman, Green Mountain Power	Continual Basis - Annually	Local Funding / Utility maintenance	low	GMP does this			Town can't cut on utility over branches
15	Potentially Hazardous Tree Assessment – Remove dead or dangerous tree limbs near power lines	Road Foreman, Green Mountain Power	Continual Basis - Annually	Local Funding	low	GMP does this			
16	Annual road and bank maintenance for most; South Wardsboro Rd situation requires research	Selectboard	Current and on-going	Unknown	low	Site has been inspected by the state			
17	Standby Generator at Wardsboro Fire & Rescue	Wardsboro Fire & Rescue	When opportunity permits	HMGP, local funds	Med	portable generator, but not permanent one yet			

Sheldon Hill Rd culvert & Dennis Hescock look for hydraulic study

8. June 5, 2019 Hazard Mitigation Committee meeting sign-in sheet

Wardsboro, VT Local Hazard Mitigation Plan Development Meeting
June 5, 2019
Location: Wardsboro Town Office

SIGN IN SHEET

Name and email address	Affiliations – Please list all	Town where you live
PETER SEBASTIAN Pds e myfairpoint.NET	SELECTBOARD	WARDSBORO
JACK CUNNINGHAM	WARDSBORO - WRC COMISM.	Wardsboro
Greg Donna wardsborohighway@MY fairpoint.Net	Road Foreman	JAMAICA
Michelle Hull wardsboro town office @myfairpoint.net	Assistant Town Clerk	Wardsboro
JACKIE BEDARD WARDSBORO TOWNOFFICE@MYFAIRPOINT.NET	TOWN CLERK/TREASURER	WARDSBORO
Kathy Andersen	Select board	Wardsboro

9. June 26, 2019 Hazard Mitigation Committee meeting sign-in sheet

Wardsboro, VT Local Hazard Mitigation Plan Development Meeting
June 26, 2019
Location: Wardsboro Town Office

SIGN IN SHEET

Name and email address	Affiliations – Please list all	Town where you live
pds e myfairpoint.NET	SELECTBOARD	WARDSBORO
Michelle Hull	Assistant Town Clerk	Wardsboro
Greg Donna	Road Foreman	JAMAICA
James Knapp	Select Board	Wardsboro
JACKIE BEDARD	TOWN CLERK	WARDSBORO
Kathy Andersen kandersen1031@gmail	Select Board	WARDSBORO

10. July 23, 2019 Hazard Mitigation Committee meeting sign-in sheet

Wardsboro, VT Local Hazard Mitigation Plan Development Meeting
July 23, 2019
Location: Wardsboro Town Office

SIGN IN SHEET

Name and email address	Affiliations – Please list all	Town where you live
PETER SIEBOSTYN Pds@myfairpoint.NET	SELECTBOARD	WARDSBORO
Greg Donna WardsboroHighway@MyFairpoint.NET	Road Foreman	Jamaica
Kathy Andersen kandersen1031@gmail.com	Selectboard	Wardsboro
James Knapp onekkranch@yahoo.com	Selectboard	Wardsboro
Michelle Hull	Assistant Town Clerk	Wardsboro
JACKIE BEDARD	TOWN CLERK	WARDSBORO

11. June 5, 2019 Meeting agenda

Wardsboro Hazard Mitigation Plan Update & Community Resiliency Meeting

Wardsboro Town Office – June 5, 2019

Agenda

1. Update of the current Wardsboro Local Hazard Mitigation Plan

a) Purpose
b) Process

2. Hazards

a) Review and update the Hazard Ranking Table / Worksheet
b) Discuss hazard events that have occurred since the last Plan
c) Mark up the town vulnerability/hazard location map as a group

3. Mitigation Actions

a) Review/edit Mitigation Goals
b) Review the current Mitigation Actions Table that the Selectboard updated
c) Create an updated Mitigation Actions Table for the updated Plan
d) Identify gaps and capabilities with implementation

4. Other Updates

a) Discuss recent mitigation work completed by the town
b) Discuss development trends – new developments, upcoming developments
c) Overall resiliency concerns or ideas
d) Review of other elements and address questions that weren't discussed

5. Next Steps

12. June 26, 2019 Meeting agenda

Wardsboro Hazard Mitigation Plan Update & Community Resiliency Meeting

Wardsboro Town Office – June 26, 2019

Agenda

1. Review of Previous meeting outcomes

a) Hazards decided upon for addressing in the Plan

2. Let's look at a map together

a) Mark up the town vulnerability/hazard location map as a group

3. Mitigation Actions

a) Review/edit Mitigation Goals
b) Review the current Mitigation Actions Table that the Selectboard updated
c) Create an updated Mitigation Actions Table for the updated Plan
d) Identify gaps and capabilities with implementation

4. Other Updates

a) Discuss recent mitigation work completed by the town
b) Discuss development trends – new developments, upcoming developments
c) Overall resiliency concerns or ideas
d) Review of other elements and address questions that weren't discussed

5. Next Steps

13. July 23, 2019 Meeting agenda

Wardsboro Hazard Mitigation Plan Update & Community Resiliency Meeting

Wardsboro Town Office – July 23, 2019

Agenda

1. Let's look at a map together

a) Mark up the town vulnerability/hazard location map as a group

2. Mitigation Goals and Actions

a) Review/edit Mitigation Goals
b) Create an updated Mitigation Actions Table for the updated Plan
c) Identify gaps and capabilities with implementation

3. Other Updates

a) Discuss recent mitigation work completed by the town
b) Discuss development trends – new developments, upcoming developments
c) Overall resiliency concerns or ideas
d) Review of other elements and address questions that weren't discussed

4. Next Steps

14. June 5 and 26, 2019 Meeting flyer that was posted around town

Update of the Wardsboro Local Hazard Mitigation Plan Public Meeting Announcement

2 Meeting Dates: June 5th and June 26th, 2019

Time: 6:30-8:30 PM

Location: Wardsboro Town Office
71 Main Street, Wardsboro, VT

Come learn about and help to update Wardsboro'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 x113

WINDHAM REGIONAL COMMISSION