

Town of Woodbury, VT

Local Hazard Mitigation Plan Update

Adopted February 4th, 2019
Prepared by the Town of Woodbury

Table of Contents

1. Introduction	2
2. Purpose	2
3. Community Profile	3
4. Planning Process and Maintenance	6
4.1 Planning Process	6
4.2 Planning Update Process	10
4.3 Plan Maintenance Process	17
5. Risk Assessment	18
5.1 Hazard Identification and Analysis	18
5.2 Worst Threat	21
Severe Winter Weather (Ice/Snow/Cold combined)	21
High Winds	28
Flooding (Fluvial Erosion/Inundation combined)	31
5.3 Vulnerabilities of Concern	37
Long Term Power Outages	37
Lack of Cell Phone Service in Times of Emergency	41
6. Mitigation	43
6.1 Town Plan Goals that Support Local Hazard Mitigation	43
6.2 Proposed Hazard Mitigation Programs, Projects & Activities	43
Attachments	
Town of Woodbury 2018 Local Hazard Mitigation Survey	48
Woodbury Hazard Mitigation Plan Timeline	68
Local Areas of Concern Map	70
5- Year Plan Review/Maintenance	71
Certificate of Adoption	72

In accordance with the Stafford Act, municipalities may perform mitigation planning and be eligible to receive increased federal funding for hazard mitigation measures. (42 U.S.C. 5165).

1. Introduction

The impact of expected, but unpredictable natural and human-caused events can be reduced through community planning. The goal of this Plan is to provide an all-hazards local mitigation strategy that makes the community of Woodbury more disaster resistant.

Hazard mitigation is any sustained action that reduces or eliminates long-term 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 disasters than to repeatedly repair damage after a disaster has struck. This Plan recognizes that communities 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 local actions that can be taken to reduce the severity of the hazard.

Hazard mitigation strategies and measures alter the hazard by eliminating or reducing the frequency of occurrence, avert the hazard by redirecting the impact by means of a structure or land treatment, adapt to the hazard by modifying structures or standards, or avoid the hazard by preventing or limiting development, improving public education, or ensuring development is disaster resistant.

2. Purpose

The 2019 Woodbury Local Hazard Mitigation Plan is an update of the Town’s adopted 2013 Local Hazard Mitigation Plan which was approved by FEMA on March 11, 2013. The purpose of this Plan is to assist the Town of Woodbury in:

- recognizing hazards facing the community,
- ranking them according to local vulnerabilities, and
- identify strategies to reduce risks from acknowledged hazards of highest concern based on current information.

The Town reviewed, evaluated, and revised the 2013 plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities. New information has been incorporated in the Plan making it up to date, stronger, and more useful to the Town of Woodbury officials and residents who will implement the actions and measures going forward.

Implementation of this plan will make Woodbury more resistant to harm and damages in the future, and will help to reduce public costs.

Woodbury strives to be in accordance with the strategies, goals and objectives of the State Hazard Mitigation Plan, including an emphasis on proactive pre-disaster flood mitigation for public infrastructure, good floodplain and river management practices, and fluvial erosion risk assessment initiatives.

The 2019 Woodbury Local Hazard Mitigation Plan is an update of the 2013 adopted plan updates to the plan include:

- Information in the 2013 Plan was updated to reflect current information.
- The Town updated the hazards reflecting the community's priorities.
- The Plan Update Process was updated.
- The Plan Maintenance section was updated.
- Flood and Severe Storm Hazards was updated.
- The Local Areas of Concern Map was updated to reflect current information
- The status of 2013 mitigation strategies was included.
- New mitigation strategies were identified that reflect the current priorities and intended actions of the community over the next five years

3. Community Profile

The Town of Woodbury is located on the northern edge of Washington County and is bounded by the Towns of Walden and Cabot to the east, Marshfield and Calais to the south, Worcester and Elmore to the west, and Wolcott, Hardwick, and Walden to the north. The Town of Woodbury is a small, rural, residential and tourism-based community located on the northern edge of Washington County.

According to the 2010 Census, Woodbury has a total population of 906 people living in 713 housing units. Of these units, 284 are classified as seasonal ("vacation"). The abundant water bodies and forests draw visitors from within and outside of the State, most of whom contribute to the local economy through the purchase of goods and services. The Town's population increased by 11% from the 2000 Census, while the number of occupied housing units grew a rapid 20%. Seasonal units are being converted for year-round use. Woodbury may be transitioning into a bedroom community for Montpelier, Barre, Hardwick, and Morrisville. Approximately 16% of Woodbury's workforce is employed within the town, while the remaining 84% work outside of the community.

With about 1,560 feet of topographical relief inside its boundaries and over 85% of the land forested, Woodbury is rugged and picturesque. It has more lakes and ponds than any other town in Vermont. It is at the headwaters for both the Lamoille and Winooski River Basins. The Town is bisected by Route 14 which traverses a valley formed by Cooper Brook to the north and Kingsbury Brook from Greenwood Lake south to South Woodbury. Low hills lie to the east while the ridgeline of the Woodbury Range is the dominant topographical feature west of Route 14.

The majority of the Town's commercial and dense residential development is located within the villages of Woodbury and South Woodbury. The largest number of private residences, however, are widely dispersed throughout the Town's rural lands. This pattern of rural development surrounding dense villages is reinforced by the Town Plan. Woodbury has had limited new development. Development continues to be scattered rural residential and renovations 2 to 3 a year along hill tops away from any known hazards. One residential house was removed in the Village to make a town green. There are no major residential or commercial developments currently in the planning or permitting stages and none since the previous plan. Based on this development, vulnerability in Woodbury has stayed roughly the same since the previous plan.

In Woodbury, the Hardwick Electric Department provides electric to the majority of residents. Residents in the southwestern portion and the western corner of the town are supplied by Washington Electric Cooperative and Green Mountain Power. The majority of Woodbury is dependent upon groundwater for its domestic water supply and on individual on-site septic systems for wastewater treatment.

The Town's fire coverage is provided by the Woodbury Volunteer Fire Department (WVFD), which is a member of Capital Fire Mutual Aid System. Woodbury provides mutual aid to the neighboring town of Calais. According to Woodbury's 2017 Town Report, the WVFD responded to 113 calls for emergency assistance, 79 of which were in Woodbury. Hardwick Rescue provides ambulance service, and Woodbury First Response (part of the Woodbury Fire Department) provides additional medical care to Woodbury residents. The Ambulance Service responded to 561 calls for assistance in its service area in 2017. Hardwick Rescue continues to provide CPR/AED and first aid classes for the community.

The Vermont State Police and Washington County Sheriff's Department provides law enforcement for the Town of Woodbury.

Woodbury has a recently established a municipal website www.woodburyvt.org and as an active Front Porch Forum (community listserv).

The Town of Woodbury has an approved Local Emergency Operations Plan (LEOP) that is updated and adopted annually after Town Meeting Day and before May 1st. The current LEOP was adopted on June 25, 2018 and is due for renewal by May 1, 2019. The Town coordinates with the Central Vermont Regional Planning Commission, which provides technical support and guidance with the LEOP update. The Town requires the certifying officer to be trained in ICS 402 or ICS 100 at minimum. All Select Board members were trained in ICS 402 as of 2018. In conjunction with the LEOP, the Town adopted the use of the National Incident Management System (NIMS) on May 11, 2015 as the standard for management and systematic approach involving all threats and hazards, regardless of cause, size, location, or complexity, to reduce loss of life, property, and harm to the environment.

Woodbury has participated in the National Flood Insurance Program for over forty years since 06/21/1976. This has been the task of the Zoning Administrator to monitor where things are being built/ renovated and making sure nothing is built in the flood plan. In 2013, official Digital Flood Insurance Rate Maps (FIRM) became available. The Woodbury FIRM, (Community Panel #50023C0209E, effective 3/19/2013) can be found as digital data with aerial photography at tinyurl.com/floodreadyatlas and at www.msc.fema.gov. Special Flood Hazard Areas have only been identified near Sabin Pond, Forest Lake, Little Mud Pond and a short reach of Cooper Brook. There are 112 parcels that include floodplains. Using 2017 e-911 site data, there are at least five structures in the Special Flood Hazard Area; all are residential. As of 12/10/2018 the FEMA Community Information System (CIS) reports that three structures in the high risk SFHA carry flood insurance. There are seven flood insurance policies total, in force, insuring \$1,526,400. There are no repetitive loss properties in Woodbury.

After a federally-declared disaster, municipalities can apply for financial support from the FEMA Public Assistance program for eligible public losses. Additionally, in Vermont, the Vermont Emergency Relief and Assistance Fund (ERAF) tinyurl.com/erafvt provides States funding toward the required 25% non-federal matching funds. Communities that take specific steps to reduce flood damage can benefit from a higher percentage of State funding. All communities are eligible for 7.5%, communities taking four basic steps can receive 12.5%. The four basic steps to reduce flood damage are 1) participate in the National Flood Insurance Program, 2) adopt standards that meet or exceed the Vermont Roads and Bridge Standards 2016, 3) adopt a Local Emergency Operations Plan (renewed and adopted annually), and 4) adopt a Local Hazard Mitigation Plan as approved by FEMA. Communities that additionally protect River Corridors benefit from the maximum support at 17.5%. Woodbury has an ERAF rating of 12.5 %

Woodbury can qualify for the maximum 17.5% rate if it adopts River Corridor protections that

meets or exceeds the Vermont Agency of Natural Resources (ANR) model criteria. River Corridor maps are available online at tinyurl.com/floodreadyatlas. The corridors identify the area needed to allow the stream to establish and maintain its least erosive path in the valley. Streams with watersheds over a half square mile are considered protected with a setback of fifty feet from the top of the bank. More at: www.floodready.vt.gov. Protection of river corridors slows the speed and power of high flows. This reduces the rate of damage to roads, culverts, bridges and structures, as well as reducing lake pollution. Damage to public infrastructure from high flows is the single most expensive source of damage to town budgets in Vermont.

ANR has published model bylaw language to support community work for protection at bit.ly/model-regulations. The ANR models use a “no adverse impact” approach to avoid damage to other properties, by avoiding impairment of floodplain and river corridor functions. The CVRPC is available to assist the community in adopting river corridor protections.

4. Planning Process and Maintenance

4.1 Planning Process

In June 2018, the Select Board created a survey to solicit town resident input for concerns of potential hazards and emergencies. The survey was available online and via hard copy at the Town Office and local public events. The Town received 63 responses. (See attachment)

On September 24, 2018, the Woodbury Select Board sent out a Request for Proposals for contractor services to assist with the Local Hazard Mitigation Plan update. The Central Vermont Regional Planning Commission (CVRPC) was selected as the contractor. Thomas Lindsay, Town of Woodbury Select Board Chair, contacted people to join the Planning Team.

Beginning in late October 2018, Select Board members and CVRPC updated the 2013 LHMP during regularly scheduled, warned meetings (11/8 and 11/29) and through email correspondence. The Planning meetings were open to the public but no public attended.

Topics covered during the 11/8 meeting:

- Review plan updated process
- Review example plan and discuss Town vision for Woodbury LHMP
- Develop list of stakeholders and confirm planning team
- Set planning team meeting dates and public engagement event dates
- Develop list of available plan resources
- Review state hazard list to identify preliminary list of 5 priority hazards
- Review draft maps and identify changes and new maps
- Discuss next steps and priority tasks

Topics covered during the 11/29 meeting:

- Progress check in
- Discuss vulnerability assessment
- Review status of 2013 mitigation actions
- Identify programs, projects and activities for 2018 LHMP
- Finalized plan update process
- Finalize plan maintenance process
- Review text development to date

(See attachments for meeting topics)

The LHMP was also on the agenda at multiple Select Board meetings (10/22, 11/12, 11/26). Town residents were present at the Select Board meetings but made no comment on the LHMP.

The following town residents participated in the committee planning process (ie planning meetings):

Select Board:

Thomas Lindsay, Town of Woodbury Select Board Chair; E911 Coordinator

wdbyselctbdtlinsday@comcast.net

Michael Gray, Town of Woodbury Select Board, Town Highway Administrative Assistant, Planning Commission Chair

Grhayes1956@comcast.net

Brian Shatney, Town of Woodbury Select Board, Planning Commission Member

bshatney@aol.com

Auditor:

Susan Martin, Town of Woodbury Auditor

Ssm9950@yahoo.com

Health Officer/Emergency Management Director:

Brian Shatney

bshatney@aol.com

Fire Chief and Woodbury Fire Warden:

Paul Cerutti

pcwoodbury@gmail.com

The Town remains most vulnerable to long-term power outages/severe winter weather, windstorms, flooding and lack of cell phone service. This is a slight change from the previous plan, which included flooding/flash flooding/fluvial erosion, dams/beaver dams, extreme cold wildfires, Extreme Cold/Winter or Ice Storm in conjunction with power shortage/failure, high

winds, and structure fire. While the Town is still concerned about these hazards, the changing environment has made them choose the new priorities.

The methodology used to perform the assessment and prioritization is described later in this Plan. The Town will focus on long-term power outages as these occurrences are the most common and severe. Continued investments by Hardwick Electric Department and Washington Electric Coop, Inc. (WEC) in ongoing line clearing maintenance, upgrades to the grid, and using a mix of power sources would reduce the impact of power outages.

On December 7 2018, a copy of the draft plan was sent electronically to the following people for review and comment. The electronic correspondence included instructions to return comments to Ashley Andrews and Thomas Lindsay by email at andrews@cvregion.com and WDBYselctBdTlindsay@comcast.net by December 12 2018.

<i>Organization</i>	<i>Name, Position</i>	<i>Email</i>
Vermont Emergency Management (VEM)	Stephanie Smith, Hazard Mitigation Planner	stephanie.a.smith@vermont.gov
Central Vermont Regional Planning Commission	Ashley Andrews, Planner	andrews@cvregion.org
Woodbury Fire Department	Paul Cerutti, Fire Chief	pcwoodbury@gmail.com
Vermont Department of Environmental Conservation	Ned Swanberg, Regional Floodplain Manager	ned.swanberg@vermont.gov
Vermont Department of Environmental Conservation	Gretchen Alexander, Regional Rivers Scientist	gretchen.alexander@vermont.gov
Vermont Department of Environmental Conservation Dam Safety Program	Eric Blatt	Eric.Blatt@vermont.gov
Vermont Department of Environmental Conservation	Rob Evans, River Corridor and Floodplain Manager	rob.evan@vermont.gov
Vermont Department of Forests, Parks & Recreation	Dan Singleton, Washington County Forester	dan.singleton@vermont.gov

<i>Organization</i>	<i>Name, Position</i>	<i>Email</i>
VT ANR Dam Program	Benjamin Green	Benjamin.Green@vermont.gov
Town of Woodbury	Brian Shatney, Emergency Management Director	bshatney@aol.com
Town of Woodbury	Thomas Lindsay, Select Board Chair	WDBYSelctBdTlindsay@comcast.net
Orleans Southwest Supervisory Union	Joanne LeBlanc	jleblanc@ossu.org
	Laura Gutette, School Nutrition Specialist and Meal Planner	lguyette@ossu.org
Woodbury Elementary School	Amy Masse, Principal	amasse@ossu.org
Green Mountain Power	Brenda Spafford	Brenda.Spafford@greenmountainpower.com
Washington Electric Coop, Inc.	Dan Weston	dan.weston@wec.coop
Village of Hardwick Electric Department	Mike Sullivan, General Manager	
Village of Morrisville Water & Light Dept.	Craig Myotte, Manager	
Washington County Sheriff's Department	W. Samuel Hill	
Vermont State Police, Middlesex Barracks	Lieutenant David White	david.white@vermont.gov
Vermont Emergency Management	Josh Cox, Regional Floodplain Manager	josh.cox@vermont.gov
Local Emergency Planning Committee 5	Katina Johnson, Chair	Kjohnson_398@comcast.net

The Draft Plan was also sent to neighboring Towns:

<i>Town of</i>	<i>Person</i>	<i>Role</i>	<i>Email</i>
Cabot	Betty Ritter	Town Clerk	tcocabot@fairpoint.net
Marshfield	Bobbi Brimblecombe	Town Clerk	clerk@Town.marshfield.vt.us
Calais	Judy Fitch	Town Clerk	Calais.Townclerk@gmail.com
Worcester	Katie Winkeljohn	Town Clerk	worcestertclerk@comcast.net

Elmore	Sharon Draper	Town Clerk	sdraper@elmorevt.org
Wolcott	Belinda Clegg	Town Clerk	Wolcott@pshift.com
Hardwick	Alberta Miller	Town Clerk	alberta.miller@hardwickvt.org
Walden	Lina Smith	Town Clerk	waldentc@pivot.net

Additionally, a notice for public review and comment on the draft was posted on Front Porch Forum. The draft plan was available in hard copy in the Town Office and digitally on the Town's Emergency Management webpage. The deadline for public comment was December 12, 2018. Additional opportunities for the public to comment on the Plan's content and the planning process have been made available at Select Board meetings. The planning meetings focused on:

- 1) assessing past mitigation projects and compiling information on its current and future hazard mitigation programs, projects and activities,
- 2) identifying and ranking the hazards significant to Woodbury,
- 3) discussion of vulnerabilities,
- 4) plan maintenance, and
- 5) public engagement.

(See Attachment for More Information)

All meetings were open to the public. No public attended the planning meetings between the Emergency Management Team and the Planning Commission (also known as the planning meetings), and no public comments were received at any of these meetings.

The draft Plan and a completed Plan Review Tool was sent to Stephanie Smith, Hazard Mitigation Planner, at Vermont Emergency Management (VEM) for review and comment at the same time as being sent out for public comment, and to adjoining towns and organizations. Comments were received from ANR and WEC, based on their comments a new draft of the LHMP was reviewed by the members of the planning team on [December 13th 2018](#) and the back to VEM. That started the review and approval process with VEM and FEMA.

After VEM review, the final plan was submitted to FEMA for review and approval. Once FEMA approves the plan, it will notify VEM of "Approval Pending Adoption" status. After Approval Pending Adoption, the plan will be considered by the Select Board for adoption. The Select Board will hold a warned public hearing. After the hearing and at a regular Select Board meeting, the Select Board will approve and adopt the Woodbury 2019 Local Hazard Mitigation Plan and execute the Certificate of Adoption. A copy of the executed Certificate of Adoption will be attached to this Plan. The adopted Plan and signed certificate was sent to VEM for submittal to FEMA on [December 19, 2018](#). The Plan will expire five years from the FEMA approval effective

date. During the review and adoption process, CVRPC will be providing support and technical assistance.

Public comments submitted in the future will be reviewed by the Select Board and attached as an appendix.

During and after the update process, the Town used the Town website, and Front Porch Forum to post notices and informational pieces about the updated Local Hazard Mitigation Plan.

4.2 Plan Update Process

The 2019 LHMP update will be submitted as a single jurisdiction local mitigation plan. This Plan will guide the Town into the next five years and maintain the Town's eligibility as an applicant for mitigation grants.

The current Plan is not a significant departure from the 2013 plan; however, new analysis was done to determine where the Town should put resources in the future. The Planning Team and Town's contractor updated the significant weather events history, considered changes to risk based off on past events and the likelihood of future events and their impact to infrastructure and lives, and reviewed the historical and expected locations of future events to make determinations on how best to apply resources.

Analysis showed that the worst threats and areas of concern have changed some from the 2013 plan and that continued effort needs to be applied to these threats and areas to mitigate risk. Available resources will be applied to mitigate top priority threats.

The implementation of several mitigation actions over the past five years, some not listed because the Town considers them to be regular maintenance and program implementation measures, have reduced the Town's vulnerability to specific hazards. Despite the fact that solid strides have reduced the risk of identified worst threats and areas, additional work needs to be done. Woodbury has benefitted from the collaborative approach to achieving mitigation on the local level, by partnering with Agency of Natural Resources (ANR), Vermont Agency of Transportation (VTrans), Agency of Commerce and Community Development (ACCD), Vermont Emergency Management (VEM), Central Vermont Regional Planning Commission (CVRPC), Federal Emergency Management Administration (FEMA) Region 1 and other agencies working together to provide assistance and resources to pursuing mitigation projects and planning initiatives in Woodbury.

General Updates

- Update of all data and statistics using available information (Section 3 and Section 5)
- Revaluation, identification and analysis of all significant hazards (Section 5)
- Acknowledgment of implemented mitigation strategies since 2013 – see matrix below (Section 4.2)
- Identification of on-going mitigation projects and strategies – see Existing Mitigation Programs, Projects and Activities section (Section 4.2)
- Identification of new mitigation strategies (Section 6)

Hazard Analysis Updates (Sections 5 and 6)

- Added location/vulnerability/extent/impact/likelihood table for each hazard to summarize hazard description (Section 5.1-5.3 – after each hazard)
- Review of Vermont Hazard Mitigation Plan, October 2018 (Section 5 – hazard analysis table)
- Review of Federally declared disasters, weather data, ANR resources, VT Flood Ready site, and NOAA/NCDC site.
- Flood/Flash Flood/Fluvial Erosion and Extreme Cold/ Winter Storms remain on the list of worst threat, reflecting the community's belief that these hazards are the most significant and the Town is still vulnerable to these hazards. Although the Town cannot predict with certainty that these events will be the norm in the future, the Town continues to keep these in its analysis of hazards that it may be vulnerable to in the next five years.
- High Winds are now considered highly likely.

Maps

- Review of 2016 Areas of Concern map – updated with flood hazard areas, river corridors and conserved land.
- Review of 2016 Culvert and Bridge Survey

Updates to the 2019 LHMP included a review of all of Woodbury's planning documents:

- Woodbury Zoning Ordinance
- 2018 Proposed Land Use Development regulations
- Flood Hazard District Overlay
- 2015 Road and Culvert Inventory survey
- Capital Improvement Budget
- 2018 Local Emergency Operations Plan
- 2013 Local Hazard Mitigation Plan
- Kingsbury Branch Stormwater Master Plan 2018

- Flood Resiliency Checklist
- Woodbury Annual Town Reports
- 2013 Woodbury Plan Review Tool FEMA approved- reference to Section 2 recommendations for next plan update and plan strengths
- Municipal General Roads Permit (Act 64) – (in process of development)

The following chart provides an overview of Woodbury's 2013 local hazard mitigation actions along with their current status. Additionally, since the 2013 plan, the Town has begun updating its flood regulations to maintain NFIP compliance.

2013 Mitigation Action	2018 Status
Replacement and upgrade of culverts on County Rd, W. Woodbury Rd, Cranberry Meadow Rd, Buck Lake Road/TH 2, Cabot Rd, Rt 14, Old Quarry Road and Nichols Pond Road (1-3 years)	Completed
Generator education and training (2-3 years)	Completed
Relocate fire station out of flood plain (2 years)	Not completed but still interested; planning ongoing Included in the 2019 LHMP table
Develop priority culvert/bridge replacement list (3 Year)	Done every 3 years
Installation of generator transfer switch from Fire Department annex to Town Hall (3-4 years)	Changed plan - transfer switch to main fire department station instead of town hall
Purchase generator for Town Hall (3-4 years)	No longer interested
Install communications system in Town Hall (4 years)	No longer interested
Connect Woodbury Store to generator to allow for store to stay open and provide supplies during events (3 years)	No longer interested – store closed
Issue a Town-wide survey to determine vulnerable populations and resident needs/available reserve equipment & supplies (2 years)	Currently underway, survey to town residents sent December 2018
Work with elected officials, the State and FEMA to correct existing compliance issues and prevent any future NFIP compliance issues through continuous communications, training and education (1-2 years)	This is an ongoing project

Town Capabilities for Implementing Mitigation Strategy

Services provided by the Town of Woodbury are overseen by a three-member volunteer Select

Board.

The Town employs a handful of staff members to carry out services to its residents on a daily basis. The following are the paid positions which are involved in hazard mitigation:

- Town Clerk (Part Time) and Assistant Clerk (Part Time): Diana Peduzzi and Laura Dailey
- Treasurer (Part Time): Brandy Smith
- Town Highway Department (Road Foreman and 1 full time and 2 part-time crew): Greg Parkhurst-Foreman, Greg Adams-Full Time, and Timothy Neil (also captain with Woodbury Fire Department) and Peter Dailey-Part-Time

Volunteer municipal officials also play a crucial role in carrying out hazard mitigation. The Emergency Management Team consisting of the Director, EOC Chief, Planning Commission, Health Officer, Zoning Administrator, Fire and Tree Wardens, Animal Control Officer and the Woodbury Fire Department help plan, oversee and implement municipal and mitigation activities.

The municipal budgeting process occurs on an annual basis and plans for a fiscal year from July to June. The budget is usually developed between early November and early January. Voters consider it for approval on the first Tuesday in March at Annual Town Meeting Day. The Select Board is charged with developing and proposing the budget to the voters, including the budget for Highway Equipment. After the budget has been adopted by vote of town residents, the Select Board has the authority to modify it in cases of extraordinary circumstances; i.e. natural disaster, unexpected equipment/infrastructure failure (i.e., water well, power failure, major bridge/culvert failure). The budget is monitored several times a month by the Select Board and Town Treasurer. The Select Board also has the authority, established annually at Town Meeting, to borrow money on behalf of the Town.

Municipal revenues are generated primarily through levy of taxes on property value. Other major sources are Federal and State payments to support the town school, aid (including grants) from the Vermont Agency of Transportation and the Agency of Natural Resources for highways, and payments in lieu of taxes for land owned by the State of Vermont. Woodbury also receives reimbursement, based on a percentage of extraction, from the Swenson Quarry for highway maintenance. The municipality also has the authority to incur debt through bonding.

Existing Mitigation, Maintenance, and Preparedness Programs, Projects & Activities

The ongoing or recently completed programs, projects and activities are listed by strategy and have occurred since the development of the previous plan and were reviewed by the planning

team. They share and incorporate the overall goals of the local hazard mitigation plan. Woodbury has the capacity to maintain these programs and initiatives using Town staff and community volunteers described in the Community Capacities above. Unless otherwise noted, there is no need to expand or improve on these programs, projects and activities.

It is important to note that the job of the Woodbury Highway Foreman continues to evolve. There is an increasing need to spend more time with administrative duties of the job over the equipment operator/supervisor responsibilities. This is in part due to new requirements and regulations the Town is subject to from Act 64 (the Clean Water Act) and the need of the Town to secure funding from both non-emergency and emergency grants which help to increase its capacity for implementation of mitigation strategies and actions. The Town Road Foreman, Greg Parkhurst, has the experience and ability to perform all roles, however, the time spent away from performing the duties as equipment operator is a challenge the Town recognizes. To alleviate this situation, the Town has added a new part time position of Town Highway Administrative Assistant to the Highway Department. Some of the projects completed or awarded to protect roads and increase flood resiliency are listed below:

- VTrans grant for cement box culvert replacement at the bottom of Cabot Road in Woodbury village for Buck Lake Brook
- VTrans Better Roads grant for cement box culvert replacement on Nelson Pond Road
- VTrans Better Roads grant for major ditching and drainage control at the bottom of East Hill Rd, a FEMA grant for cement box culvert replacement at the bottom of Cabot Road in Woodbury Village for Buck Lake Hill Road at the conjunction of state Route 14
- MRGP Grants-in-Aid FY18 Pilot Project for ditching, grading, berm removal and culvert replacement on Tebbetts Road and Valley Lake Road
- MRGP Grants-in Aid FY19 for ditching, grading, berm removal and culvert replacement on Foster Hill Road
- Ditching, graveling, berm removal, grading and/or culvert replacements were completed on West Woodbury Road, Tebbets Road, Cabot Road, Valley Lake Road, County Road, Dog Pond Road, Buck Lake Road...all work on town highways done to developed standards of the state's Act 64 MRGP
- Nichols Ledge Road Class 4 restoration project done to MRGP standards that included culvert replacement, ditching, turnouts and 3" stone gravel road bed replacement to prevent chronic erosion
- Ditching, berm removal, turn out, run off collection basin and lowering of road surface to reduce flooding potential of the Woodbury Fire Department's Annex Building in Woodbury village

- Part time position created for mitigation of beaver intrusions to town highways in collaboration with the town highway department; position now entails monitoring all beaver dams in town

Community Preparedness Activities

- Capital Equipment Plan and increases of revenue into Woodbury's Heavy Equipment Reserve Fund for its highway department
- Homebound Persons Phone Tree/E911 CARE form
- Establishment of a Red Cross Shelter at Woodbury Elementary School. Other emergency shelter sites are being explored.
- Local Emergency Operations Plan 2018 and renewed annually
- Trained and certified Select Board members in ICS 402
- Appointment of a Town Fire Warden to serve a five-year term. Paul Cerutti, Woodbury's Fire Department chief, currently serves as Fire Warden.

Hazard Control & Protective Works

- Maintenance Programs- (Culvert Survey & Replacement (290 culverts, done by CVRPC 2015, due to be revised); MRGP Town Highway Inventory (42 miles of Town Highway) – CVRPC Survey 2017-2018.
- Stone line ditch initiative to meet changes in the VT Codes and Standards for all ditches with slopes >5%
- Adoption of the 2016 VTrans bridge and culvert standards.
- Purchase of Hydro Seeder for seeding ditching work.
- Mutual Aid, Mutual Aid response agreement with surrounding communities
- Town Road and Bridge Standards. Woodbury adopted the VT 2016 Road and Bridge Standards.
- Local Hazard Mitigation Plan 2013 and subsequent updates every 5 years. Plan is reviewed annually and after every disaster event with a full review and update by the Town at least every five years. Current 2013 Plan expires 12/06/2018. Plan Update is in process. Town will need to receive VEM and FEMA approval prior to adoption of this Plan.
- Primary Emergency Shelter and Town Highway Garage have backup generators.

Insurance Programs

- Participation in the National Flood Insurance Program –Town is currently updating zoning regulations and Flood District Overlay map. Regulations need to be adopted by the Select Board.

Land use Planning/Management

- The Town of Woodbury Flood Hazard Area Regulations (12/24/2011) regulate development in the mapped Special Flood Hazard Areas to “minimize and prevent the loss of life and property, the disruption of commerce, the impairment of the tax base, and the extraordinary public expenditures and demands on public services that result from flooding and other flood related hazards.
- Woodbury’s Town Plan (04/01.2003) has expired and is being updated.
- Woodbury’s Zoning Ordinance is being updated.
- Woodbury will consider adopting River Corridor protections as part of the update process. River Corridor protections reduce damage to the road network and private property and will allow the community to qualify for additional support after federally-declared disasters. River Corridors also reduce pollution/eutrophication into lakes and ponds and are substantially similar to the existing stream setbacks in Woodbury.
- Woodbury’s Conservation Commission (WCC) has completed the Woodbury Town Forest Education and Recreation Plan through a grant with the Vermont Forest, Parks and Recreation Department overseen by its Urban Forestry Program. The WCC now seeks funds to implement the plan.

Protection/Retrofit of Infrastructure and Critical Facilities

- Dry hydrants – 9
- Spare batteries for the repeaters were purchased so that repeater coverage will be available during power outages.
- The Woodbury Fire Department is well equipped with radio equipment and can supplement radio equipment for other public officials. Capital Reserve Fund maintained to fund projects
- Public Awareness, Training & Education
- Radio checks are done weekly by the fire department. A mailing will be sent to residents to reinforce the Town’s system.
- Use of Town website for educational outreach and information dissemination

4.3 Plan Maintenance Process

The Woodbury Local Hazard Mitigation Plan will be updated and evaluated annually by a LHMP Committee to be created at the 2019 Town Meeting. The Select Board will be responsible for creating the committee. At future February Select Board meetings the LHMP Committee will present recommend updates to the board based on their evaluation of wither the plan is meeting the stated goals and to give an update on action status. A review of the Local Emergency Operations Plan will also occur at this meeting. Updates and evaluation by the Select Board will

also occur within three months after every federal disaster declaration and as updates to Town plan/zoning and river corridor plans come into effect. The plan will be reviewed by the Select Board, Planning Commission and public at the abovementioned February Select Board meeting. CVRPC will help with updates or if no funding is available, the Select Board Chair will update the plan with the support of the LHMP Committee.

The process of evaluating and updating the plan will include continued public participation through public notices posted on the municipal website, notice in the municipal building, Front Porch Forum, and CVRPC newsletter inviting the public to the scheduled Select Board (or specially scheduled) meeting. These efforts will be coordinated by the Select Board.

Monitoring of plan progress, implementation, and the 5-year update process will be undertaken by the Select Board Chair and the LHMP Committee. Monitoring updates may include changes in community mitigation strategies; new Town bylaws, zoning and planning strategies; progress of implementation of initiatives and projects; effectiveness of implemented projects or initiatives; and evaluation of challenges and opportunities. If new actions are identified in the five-year interim period, the plan can be amended without formal re-adoption during regularly scheduled Select Board meetings. After a five-year period, the plan will be submitted for re-adoption following the process outlined in the schematic found in the Attachments section.

Woodbury shall also consider incorporation of mitigation planning into its long term land use and development planning documents. It is recommended the Town review and incorporate elements of the Local Hazard Mitigation Plan when updating the municipal plan, zoning regulations, and flood hazard/FEH bylaws. The incorporation of the Local Hazard Mitigation Plan into the municipal plan, zoning regulations and flood hazard/FEH bylaws will also be considered after declared or local disasters. The Town shall also consider reviewing current and future Winooski River and Mad River planning documents and studies for ideas on future mitigation projects and hazard areas.

Town plans reflect the community's shared vision and goals. If a community adopts a plan that additionally meets statutory requirements, then the community may request approval of their Municipal Plan by the Regional Commission. Such approval enables the community to access municipal planning grants and other funds.

Since 2014, approved town plans incorporate a flood resiliency element.

The Woodbury Town plan has expired, and the community is seeking input to update it. In the next plan, Woodbury will identify flood hazard and fluvial erosion hazards, strategies, and

recommendations to mitigate risks to public safety, critical infrastructure, historic structures, and public investments.

5. Risk Assessment

5.1 Hazard Identification and Analysis

The following natural disasters were discussed and the worst threat hazards were identified based upon the likelihood of the event and the community's vulnerability to the event. Hazards not identified as a "worst threat" may still occur. Refer to section 4.2 for a description of the hazard mitigation rubric. Greater explanations and mitigation strategies of moderate hazards can be found in the State of Vermont's Hazard Mitigation Plan.

Hazard Impact	Probability	Potential Impact					Score
		Infrastructure	Life	Economy	Environment	Average:	
Fluvial Erosion	4	4	2	4	4	3.60	14.4
Inundation Flooding	2	2	1	1	1	1.40	2.8
Ice	3	3	3	2	2	2.60	7.8
Snow	4	3	3	3	1	2.80	11.2
High Wind	4	4	2	3	2	3	12
Heat	4	1	3	2	2	2.40	9.6
Cold	4	4	3	3	1	3	12
Drought	2	2	1	1	1	1.40	2.8
Landslides	1	1	1	1	1	1	1
Wildfire	2	2	2	2	2	2	4
Earthquake	1	1	1	1	1	1	4
Invasive Species	4	3	1	3	3	2.80	11.2
Infectious Disease Outbreak	2	1	2	2	2	1.80	3.6
Hail	2	1	1	1	1	1.20	2.4

Score = Probability x Average Potential Impact

	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 per year	Negligible: isolated occurrences of minor property and environmental damage, potential for minor injuries, no to minimal economic disruption
2	Occasionally: 1–10% probability of occurrence per year, or at least one 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, at least 1 chance in next 10 years	Moderate: severe property and environmental damage on a community scale, injuries or fatalities, short-term economic impact
4	Highly Likely: >75% probability in a year	Major: severe property and environmental damage on a community or regional scale, multiple injuries or fatalities, significant economic impact

Flood/Flash Flood/Fluvial Erosion, (which is now called Flooding (Fluvial Erosion/ Inundation combined) based on history, has a High Likelihood of happening. At least one flood event each year over the past five years has occurred in Woodbury. Therefore, the likelihood of Flooding changed from likely to highly likely for Fluvial Erosion, and occasionally for Inundation.

Those hazards not found to pose the greatest threat to Woodbury such as ice, heat, landslides, wildfire, earthquake, infectious disease outbreak and invasive species are not addressed in this Plan and were not included (except for invasive species) in the risk and vulnerability assessment due to the low occurrence, low probability of impact or negligible potential impact and scarce community resources (time and money). A review of the Vermont State Hazard Mitigation Plan of November 2018 provides a greater explanation of these hazards and possible mitigation strategies to address them. Like the State of Vermont Hazard Mitigation Plan, Woodbury did not include the following hazards in the risk and vulnerability assessment due to the low occurrence, low vulnerability, and or geographic proximity: civil disturbance, coastal erosion, expansive soils, karst topography, sinkholes, tsunamis, and volcano.

The following hazards were found to be most significant in the Town of Woodbury:

- Severe winter weather (Ice/Snow/Cold combined)
- High Winds

- Flooding(Fluvial Erosion/Inundation combined)

Vulnerabilities of Concern

- Long term power outages
- Lack of cell phone service in times of emergency

A discussion of each significant hazard is included in the preceding subsections and a map identifying the location of each hazard is attached (See map titled *Areas of Local Concern*.) Each subsection includes a list of past occurrences based upon County-wide FEMA Disaster Declarations (DR-#) plus information from local records and the National Oceanic and Atmospheric Administration (NOAA), National Center for Environmental Information (NCEI), formally the National Climate Data Center, a narrative description of the hazard and a hazard matrix containing the following overview information:

Hazard	Location	Vulnerability	Extent	Impact
Type of hazard	General areas within municipality which are vulnerable to the Identified hazard.	Types of structures impacted	Magnitude of hazard: Scale dependent on hazard	Dollar value or percentage of damages

5.2 Worst Threat Hazards

Severe Winter Weather (Ice/Snow/Cold combined)

Hazard Impact	Probability	Potential Impact					Score
		Infrastructure	Life	Economy	Environment	Average:	
Ice	3	3	3	2	2	2.6	7.8
Snow	4	3	3	3	1	2.80	11.2
Cold	4	4	3	3	1	3	12

Score = Probability x Average Potential Impact (2018 Vermont State Hazard Mitigation Plan Draft)

Vermont is known for its cold snowy winters and Vermont towns and its residents are generally equipped to handle this weather. It is when the winter weather becomes extreme that a hazard is created. Severe winter storms bring heavy snow loads, ice, damaging winds, dangerous wind

chills, below zero temperatures, power outages, downed trees and power lines, collapsed roofs and buildings, stranded motorists and vehicles, road closings, restricted transportation, and school and business closings.

The physical impacts of severe winter weather are town wide due to the expansive nature of the weather. A winter storm is defined as a storm that generates sufficient quantities of snow, ice or sleet to result in hazardous conditions and/or property damage. Ice storms are sometimes incorrectly referred to as sleet storms. Sleet is similar to hail only smaller and can be easily identified as frozen rain drops (ice pellets) that bounce when hitting the ground or other objects. Sleet does not stick to wires or trees, but in sufficient depth, can cause hazardous driving conditions. Ice storms are the result of cold rain that freezes on contact with the surfaces coating the ground, trees, buildings, overhead wires and other exposed objects with ice, sometimes causing extensive damage. Periods of extreme cold tend to occur with these events.

One of the major problems associated with ice storms is the loss of electrical power. Major electric utility companies have active, ongoing programs to improve system reliability and protect facilities from damage by ice, severe winds and other hazards. Typically, these programs focus on trimming trees to prevent encroachment of overhead lines, strengthening vulnerable system components, protecting equipment from lightning strikes and placing new distribution lines underground.

NOAA defines Heavy Snow as generally snowfall accumulating to 4" or more in depth in 12 hours or less; or snowfall accumulating to 6" or more in depth in 24 hours or less. In forecasts, snowfall amounts are expressed as a range of values, e.g., "8 to 12 inches." However, in heavy snow situations where there is considerable uncertainty concerning the range of values, more appropriate phrases are used, such as "...up to 12 inches..." or alternatively "...8 inches or more..." A Blizzard is defined as conditions that are expected to prevail for a period of 3 hours or longer that involve sustained wind or frequent gusts to 35 miles an hour or greater; and considerable falling and/or blowing snow (i.e., reducing visibility frequently to less than a ¼ mile).

Vermont is known for cold winter temperatures. Extreme cold is arctic air, together with brisk winds, that can lead to dangerously cold wind chill values. People exposed to extreme cold are susceptible to frostbite in a matter of minutes. Areas most prone to frostbite are uncovered skin and the extremities, such as hands and feet. Hypothermia is another threat during extreme cold. Hypothermia occurs when the body loses heat faster than it can produce. Wind chills can be life threatening. The wind chill temperature is how cold a person or animal feels when outside. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As wind increases, it draws the heat from the body through exposed skin and reduces the

body's skin temperature and eventually the body's core temperature. Often times exposed skin can freeze within minutes of exposure.

History of Occurrences (state/county wide)

Date	Event	Location	Extent
02/04/2018-02/05/2018	Winter Weather	Statewide	A widespread snowfall of 3 to 5 inches occurred.
1/13/2018	Winter Weather	Statewide	Rain changed to a prolonged period of sleet early Saturday morning before ending as snow by mid-morning. Freezing rain and sleet accumulated around ½ inch with snowfall over several inches. A flash freeze made for some hazardous road conditions.
1/4/2018-1/6/2018	Winter Weather	Statewide	A widespread 3 to 6 inches of snow was observed but isolated 9 inches along a few communities along the slopes of the Green Mountains.
12/25/2017	Winter Weather	Statewide	A widespread 4 to 8 inches of snow fell across Vermont.
12/22/2017	Winter Storm	Washington County	A widespread 5 to 10 inches of snow fell across central VT. The timing and intensity of the snowfall lead to hundreds of vehicle accidents and blocked highways for several hours.
12/12/2017	Winter Storm	Washington County	A widespread 6 to 12 inches of snow fell across Washington county
02/16/2016	Winter Weather	Statewide	2-4" of snowfall with 1/10 th " of ice accretion across Washington County.
12/29/2015	Winter Weather	Washington County	A Combination of snow and sleet accumulated 4-6 inches across Washington county along with some light freezing rain at times.

Date	Event	Location	Extent
2/1/2015- 2/28/2015	Extreme Cold	Statewide	In February many sites recorded 15 to 20+ below zero with wind chills of 30 below zero or colder. Many communities witnessing the coldest month since December 1989 or January 1994. Damage to infrastructure.
1/27/2015- 1/28/2015	Winter Weather	Statewide	Snowfall across Washington county was 3 to 7 inches
1/7/2015- 1/8/2015	Extreme Cold	Statewide	15-25 below with winds 15-30 mph, created wind chills colder than 20-30 below. School opening delays
1/3/2015- 1/4/2018	Winter Weather	Washington County	Widespread snowfall was 3 to 7 inches with up to one-quarter of an inch of ice. Property damage \$5000.
12/9/2014- 12/13/2014	Winter storm	Washington County	6-24" of snow, widespread power outages DR4207VT. FEMA totals of \$3949028.50 in state damages.
11/26/2014- 11/27/2014	Winter Storm	Washington County	8-14" of snow, with 9 inches in Worcester
3/12/2014	Winter storm	Washington County	12-24" of snow
2/13/2014	Winter Storm	Washington County	10-24 inches of snow, with 1-2inches an hour.
3/19/2013	Winter storm	Washington County	6-14" of snow
12/26/2012	Winter storm	Washington County	9-18" of snow
2/24/2012	Winter storm	Washington County	3-36" of snow
11/23/2011	Winter storm	Washington County	5-12" of wet snow
3/6/2011	Winter storm	Washington County	12-18" of snow, 10,000 customers lost power statewide
2/23/2010	Winter Storm	Washington County	20" of snow and 50,000 customers lost power statewide
Date	Event	Location	Extent
2/22/2009	Winter Storm	Washington County	16" of snow, 30 mph wind gusts

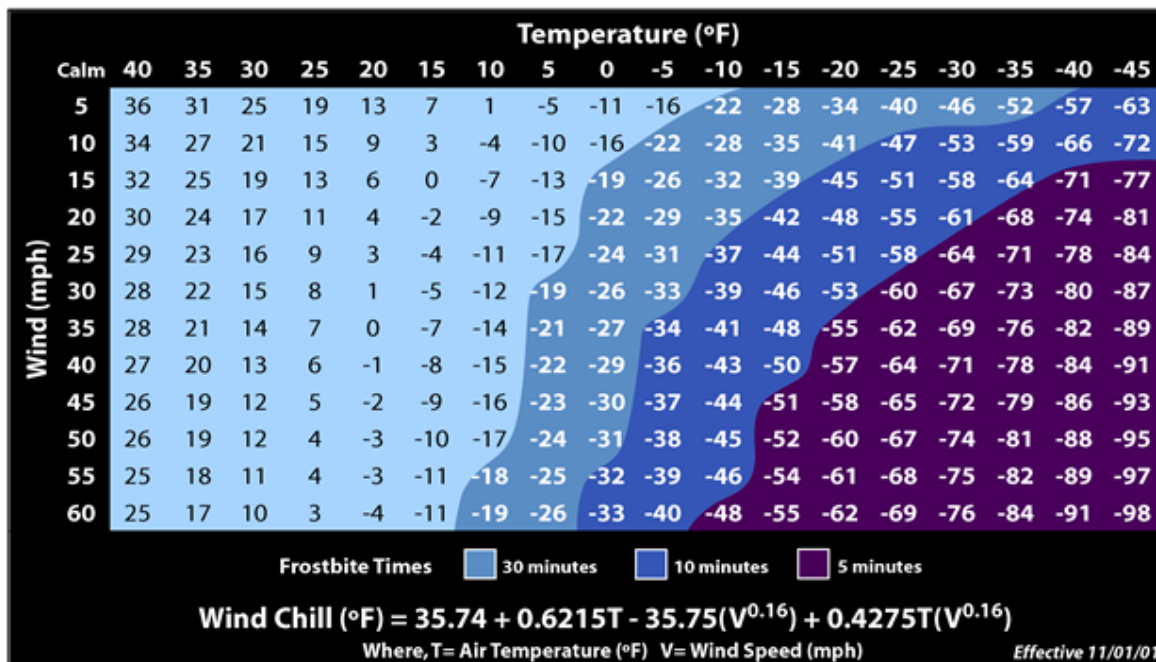
Date	Event	Location	Extent
2/1/2008	Winter storm	Washington County	3-7" of snow and ice ¼-1/2" thick, 50 mph wind gusts
2/14/2007	Winter storm	Washington County	22" of snow
2/14/2006	Winter storm	Washington County	30" of snow
1/4/2003	Winter storm	Washington County	19" of snow
3/5/2001	Winter storm	Washington County	15-30" of snow
12/31/2000	Winter storm	Washington County	10" of snow
1/15/1998	Winter storm	Washington County	10-12" snow (not a DR in Washington County)
12/29/1997	Winter storm	Washington County	21" of snow
12/7/1996	Winter Storm	Washington County	12" of snow
3/21/1994	Winter storm	Washington County	5-11" of snow
11/1/1993	Winter storm	Washington County	15" of snow
1/3/1993	Freezing Rain	Statewide	1/4-1/2" freezing rain

Hazard	Location	Vulnerability	Extent	Impact
Severe Winter Weather	Town Wide. All roads, utility poles and lines, Town Forest, Private woodlots/ timber stands, private residences and businesses, public infrastructure	Elderly & handicapped populations, remote structures, old/under insulated structures, public infrastructure and utilities, trees, telecommunications, school system	Depending on severity; 18+" snowfall in March 2011 event Jan/Feb 2015 15-20 days below zero with wind chills of negative -30 degrees below zero. 12/9/2014 – 12/13/2014 6 to 24 inches wet heavy snow in county. No	Depends on severity – additional sheltering/ plowing/ emergency services costs for town. School closing and vehicular accidents. Downed trees and power lines. Prolonged power outages for 175,000 customers statewide.

Hazard	Location	Vulnerability	Extent	Impact
			specific extent data for Woodbury is available.	12/2014 FEMA Total PA obligated statewide \$3,949,028 A gap in the data exists for Woodbury.



Wind Chill Chart



The NOAA website at http://www.nws.noaa.gov/om/cold/wind_chill.shtml provides a wind chill chart (above) and states, “the National Weather Service (NWS) Wind Chill Temperature (WCT) index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The index does the following:

- Calculates wind speed at an average height of 5 feet, the typical height of an adult human face, based on readings from the national standard height of 33 feet, typical height of an anemometer
- Is based on a human face model

- Incorporates heat transfer theory based on heat loss from the body to its surroundings, during cold and breezy/windy days
- Lowers the calm wind threshold to 3 mph
- Uses a consistent standard for skin tissue resistance
- Assumes no impact from the sun, i.e., clear night sky.”

Woodbury experiences frequent occurrences of severe winter storms, extreme cold temperatures, heavy snows, and ice storms.

During the many winter storms, ice storms, and extreme cold, Woodbury has experienced school closings, increased road maintenance, pressure on the town highway budget, power outages (from downed lines and extreme cold), downed trees and tree limbs, increase medical needs due to overexertion with clean up and snow removal, falls often with broken bones due to icy surfaces, vehicular accidents, collapsed structures from heavy snow and ice loads, frozen culverts and more.

Many of the impacts from these hazards can be reduced by using common sense and practicing preparedness measures such as staying off the snow and ice covered roads until they are cleared, having vehicles equipped with proper winter gear and snow tires, using moderation and resting when removing snow and cleaning up from a storm, keeping heating pipes cleared and well ventilated, keeping roofs clean of heavy snow/ice loads, checking on and helping the elderly and disabled residents of the community, and listening to the local weather forecast for storm updates. Participating in the free VTAlert system is highly encouraged and an important resource in emergency preparedness.

For the next plan update, Woodbury will more closely monitor winter storms and collect data to determine the worst extent possible on the Town. Extent data can be based on volumes of snow; winter weather alerts issued, or wind chill factor. See tables below for descriptions and scales.

Based on past occurrences, the worst anticipated winter weather Woodbury could experience would be 2-3’ of snow with more at higher elevations and several days of power outages. Past worst storms-were in March 2011 and before that the Ice Storm of 1998. More recently in the past five years, the worst winter storm occurred December 9 to December 13, 2014 with Vermont receiving a federal declaration (DR4207-VT) for the storm damages. Heavy wet snow with a snow to water ratio of 8:1 caused over 175,000 power outages, the second most power outages due to weather in the state of Vermont at that time. FEMA’s total Public assistance grant funds obligated to the state was \$3,949,028.57. An extended period of extreme cold occurred in January and February of 2015. Dangerously cold wind chills of 30 degrees below zero and colder occurred. Overall, in the past five years the extreme cold, winter storms, ice storms, and heavy

snows have spared the state of Vermont compared to the historical records of the past when heavy snowstorms and winter storms were more frequent and common. Power outages caused by broken tree limbs or downed trees from wet heavy snow loads or ice storms continue to create a challenge to the town.

Extent Scale - Winter Weather Alerts

Winter Weather advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter storm watch	Severe winter weather conditions may affect your area (freezing rain, sleet or Heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.
Freezing rain or freezing drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice Glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard Warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/freeze warning	Below freezing temperatures are expected and may cause significant damage to plants, crops and fruit trees.
Wind Chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

High Winds

Hazard Impact	Probability	Potential Impact					Score
		Infrastructure	Life	Economy	Environment	Average:	
High Winds	4	4	2	3	2	3	12

High wind can be the result of any of the following:

- Wind Storm: high wind event without precipitation.

- Hurricanes/Tropical Storms: the most significant impacts from hurricanes/tropical storms in Vermont are flood inundation and fluvial erosion. Wind implications of hurricanes/tropical storms are addressed below.
- Thunderstorm: high wind event with the potential for compounding impacts due to precipitation, lightning, and/or hail.
- Tornado: a violently rotating column of air extending from a thunderstorm, not common in Vermont.

Date	Event	Location	Extent
1/11/2017	High Wind	County Wide	Numerous measured wind gusts of 40-45 mph with some isolated 50 mph gusts. Isolated to scattered power outages due to downed tree limbs and small trees on utility lines.
2/29/2016	High Wind	County Wide	Wind gust of 35- 45 mph impacted the region with an isolated report of 59 mph. Isolated to scattered tree limbs and power lines downed by these winds
7/10/2013	High Wind	Statewide/ County Wide	Scattered wind gust of 50 mph or greater with several reports of trees branches on utility lines in several communities in Washington County, 15K in property damage
1/20/2013	High Wind	County Wide	Scattered reports of tree limbs, tree branches down and power outages across the region. A few measured gusts reached 50 mph.
10/29/2012	Hurricane Sandy	Statewide	Winds of 15 to 30 mph sustained with frequent gusts in excess of 40 mph caused scattered damage to tree limbs, branches and a few small trees.

Date	Event	Location	Extent
7/4/2012	Thunderstorm, High Wind, Hail	Statewide	50 knot winds. Dime size hail reported. 0.75" total.
1/18/2012	High Wind	County Wide	Strong winds with frequent gusts in excess of 40 mph and a few gusts of 50 mph knocked down some tree limbs and caused some scattered power outages
7/06/2011	Thunderstorm	County Wide	50 knot winds; 15,000 people in VT lost power
5/26/2011	Hail/Thunderstorms/Flash Flooding	County Wide	1" hail, 50 knot winds, 25,000 customers lost power in VT, 3-5" of rain
8/9/2010	Thunderstorm/High Wind/Hail	Worcester(adj town)	50 knot winds
7/18/2008	High Wind	County Wide	1" Hail, 30 knot winds
6/19/2006	High Wind	County Wide	50 knot winds
6/9/2005	High Wind	Calais (adj town)	Downed power lines, 60 knot winds
9/16/1999	Tropical Storm Floyd	Statewide	Tropical storm winds and flooding
5/19/1982	High Wind	County Wide	56 knot winds
9/22/1938	Hurricane	Statewide	Category 1 force winds

Hazard	Location	Vulnerability	Extent	Impact
High Wind	Town Wide: All roads, utility poles and lines, Town Forest, Private woodlots/timber stands, private	Potentially all population in Woodbury. Most susceptible are the elderly and handicapped. All structures,	Depending on the wind speed. May 5, 2017 wind gusts of 74 mph caused extensive	Downed trees and power lines. Prolonged power outages

Hazard	Location	Vulnerability	Extent	Impact
	residences and businesses, public infrastructure	public infrastructure and utilities, trees, cellular and wired communications and broadband networks affected	<p>damage state-wide. The hardest hit location was Rutland VT with 15,000 customers without power. October 31, 2017 a massive windstorm causes power outages in 111,750+ Vermont homes.</p> <p>May 5, 2018 damaging winds associated with strong thunderstorms knocked out power to countless Hardwick Electric customers in Woodbury.</p>	<p>for 35,000 customers statewide.</p> <p>A gap in the data from Hardwick Electric exists for Woodbury.</p> <p>A gap in the data from Hardwick Electric exists for Woodbury.</p>

Flooding (Fluvial Erosion/Inundation combined)

Hazard Impact	Probability	Potential Impact					Score
		Infrastructure	Life	Economy	Environment	Average:	
Fluvial Erosion	4	4	2	4	4	3.60	14.4
Inundation Flooding	2	2	1	1	1	1.4	2.8

Score = Probability x Average Potential Impact (2018 Vermont State Hazard Mitigation Plan Draft)

History of Occurrences: Local and County Wide Data – nearest flood gauges are Winooski Gauge, (From NCDC website and FEMA DR List), NOAA NEEI storm events database.

Together, flooding/flash flooding/fluvial erosion is one of Woodbury's most commonly recurring hazards. Flooding is the overflowing of rivers, streams, ponds and lakes due to excessive rain, rapid snow melt or ice. Flash flooding is a rapidly occurring flood event usually from excessive rain. Fluvial erosion is a natural process of stream channel adjustments. Fluvial erosion causes erosion of sediment in some areas, while causing aggradation of sediment in others. Fluvial erosion processes may occur more quickly and severely during flood events. Where buildings are placed too close to streams, and the channel becomes straightened and armored, the stream flow becomes faster and more powerful, often directing subsequent damage to nearby roads, culverts and property.

Woodbury is a headwater area for both the Lamoille and Winooski River Basins and has more lake and ponds than any other town in Vermont. The major water bodies within the Town of Woodbury are: Buck Lake, East Long Pond, Nichols Pond, Greenwood Lake, Nelson Pond, and Sabin Pond. In addition to these larger ponds and lakes, there are approximately 20 smaller ponds. Due to the location, high in the watershed basin the Town does not have extensive flood prone inundation areas. However, it is prone to flash flooding and erosion.

In Vermont, there are significant flash flood dangers near small streams and in alluvial fans. Alluvial fans are areas where streams transition between a steep mountain grade and gentler, flatter valleys below. Flash floods are likely to occur after a severe thunderstorm that produces a large amount of precipitation over a short amount of time. The precipitation falls so quickly that the soil is unable to absorb the water which results in surface runoff that collects in small, upstream tributaries, that then moves quickly downstream at a high velocity. Encroachments along streams additionally speed and exacerbate the effects of flash flooding. Mountainous areas such as Vermont are particularly prone to flash flooding due to the steep terrain. High flow events can damage roads, destroy culverts, interrupt transportation and emergency response, damage buildings and create public safety hazards.

As described above, most of the Special Flood Hazard Areas on the Town's National Flood Insurance Rate Map are located on the north and south parts of town. There are approximately five buildings in the areas shown as Zone A flood hazard areas with 112 properties in the Town that are vulnerable to potential flooding. As stated earlier there are no repetitive loss structures

in Woodbury.

As of 2018, Woodbury has access to topographic data with one-foot contours from lidar. This is a tremendous improvement over the previous standard of twenty-foot contours. With the use of established flood information (Base Flood Elevations) it may be possible to refine the mapping of flood hazards on some of the ponds. Such data could supplement the FEMA maps and improve the implementation of the Woodbury flood hazard regulations.

Woodbury has lessened the impacts and the town's vulnerability to the hazard of flooding/flash flooding/fluvial erosion with mitigation activities and repairs done to its infrastructure over the past five years (and as previously noted in the 2013 Plan). One example is the removal of the Woodbury Country Store, (with a FEMA flood hazard mitigation grant buyout project) which was built over Buck Lake Brook. The store is located at a juncture in the river that is prone to water back up. The brook is currently channelized into a stone and concrete culvert under the building and property. The stream banks of Buck Lake Brook will also be restored and may have to the potential to provide floodplain functions.

The Town Capital Reserve Fund, Town Highway Fund budget, AOT grants, Federal and State assistance fund, and the recent completed Culvert Inventory and Highway Survey are tools and resources that help the town prioritize and implement its strategies. With the Culvert Inventory and Highway Survey completed, the Town is, "well positioned to apply for grants for assistance in fixing some of our bigger infrastructure challenges." (year ending 2016 Annual Town Report, Select Board Report).

It is important to note that Vermont has experienced a majority of its flooding in areas along upland streams and in road drainage systems that do not adequately convey the amount of water they are receiving. Flooding in these areas should be expected and planned for. The National Weather Service has seen a trend in recent years of more intense, locally severe storms with high intensity rain and flooding associated with them.

The topography and extent of several streams and tributaries make Woodbury susceptible to the danger of flash flooding. As noted in the Vermont State Hazard Mitigation Plan, these areas are not shown on the FEMA FIRMs. The Vermont Department of Environmental Conservation River Program is working to provide statewide coverage of fluvial erosion hazard (FEH) areas along the streams and river corridors. The river corridor is in the process of being delineated for the larger streams and rivers and setbacks have been established for the smaller upland streams. This data is due to be released within the next year and will be a valuable tool for Woodbury in its efforts to help mitigate the risk of flash flooding. Once the statewide river

corridor digital map layer is finalized it will facilitate mitigation and river corridor protection planning and prioritization. If funding is available and the political will exists, CVRPC can assist Woodbury in the development of river corridor regulations that incorporate the Vermont mapped Fluvial Erosion Areas once these maps are released.

Date	Event	Location	Extent
10/29/2017- 10/30/2017	Flood	Washington County	DR- 4356- The VT Governor requested a major disaster declaration due to damaging winds, power outages, heavy rainfall and flooding. A storm dumped 2-3 inches of rain across much of the state with some locations reporting more than 5 inches of rain. Extent unknown for Woodbury.
6/29/2017 – 7/1/2017	Flood/Flash Flood, Severe Storm	Washington County	Heavy rains approx... 1-1.5 inches of rainfall on top of 3-4 inches of rain over a period of four days. DR 4330-VT
8/16/2016 – 8/17/2016	Flash Flood	Washington County	3 – 5 inches of rain in a few hours.
7/19/2015 7/20/2015	Flash Flood, severe storm	Washington County	Excess of 2” torrential rainfall with training thunderstorms. Road damage ~\$70k
6/11/2014	Flooding	Washington County	Montpelier flood gauge at N.A.
4/15/2014 – 4/18/2014	Severe Storms and Flooding	State-wide	Heavy rains & melting snow pack created widespread flooding & release of 4-6 inches of water from

Date	Event	Location	Extent
			snowpack causing many waterways to reach near bankfull conditions across Central Vermont. Damage to roads and bridges occurred. DR-4178 VT
8/2/2013	Flooding	Washington County	Montpelier flood gauge at 4.23 feet
11/8/2011	Flooding	Washington County	Montpelier flood gauge at 4.05 feet DR 4043
8/28/2011	Flood/Tropical Storm	Statewide	Winooski Flood gauge knocked out – above 423.3 feet (flood stage is 419 feet) Woodbury received 5.21 inches of rain– DR 4022
5/27/2011	Flood	Washington County	Winooski flood gauge at 423.3 feet DR 4001
4/11/2011	Flood	Washington County	2-4” of rain and heavy snowmelt, Winooski flood gauge at 421.0 feet DR 1995
8/2/2008	Flash Flood	Washington County	3-5” of rain, not a historical crest in Montpelier
7/11/2007	Flash Flood	Washington County	3-6” of rain in 2 hrs – DR 1715, not a historical crest in Montpelier
6/26/2006	Flood	Washington County	3-4” of rain, not a historical crest in Montpelier

Date	Event	Location	Extent
7/21-8/18/2003	Flood	State Wide	steady rain during the morning hours, with locally heavy rain associated with thunderstorms later in the day. Scattered showers and thunderstorms erupted during the afternoon hours on August 3. Around \$1 million in estimated damages. Extent unknown for Woodbury. DR 1488
7/14-7-18/2000	Flood	State Wide	2-4" of widespread rain fell, with locally higher amounts across higher terrain. Extent unknown DR 1336
9/16/1999	Tropical Storm Floyd	Washington County	Montpelier flood gauge at 9.30 feet, 5-7" rain county wide DR 1307
6/27/1998	Flash Flood	Washington County	6.66 ft, 3-6" rain countywide, DR 1228
7/15/1997	Flash Flood	Washington County	2-4" of rain DR 1184
1/19/1996	Flood; ice jam	Washington County	7.41 ft DR 1101
6/17/1998	Flash Flood	Washington County	3-6" of rain over 2 day period - DR 1228, not a historical crest in Montpelier
8/5/1976	Flood	Washington County	Montpelier flood gauge at 12.31 feet – DR 518

Date	Event	Location	Extent
6/30/1973	Flood	Washington County	Montpelier gauge at 17.55 ft DR 397
9/22/1938	Flood/Hurricane	Washington County	Montpelier flood gauge at 14.11 feet
11/03/1927	Flood	Washington County	Montpelier flood gauge at 27.10 feet

Hazard	Location	Vulnerability	Extent	Impact
Flooding	State Wide	Roads, bridges, culverts, properties in floodplain and areas along steep terrain	Winooski River gauge highest recorded historical crest at 423 feet on 5/28/11: gauge was damaged during TS Irene event, but water was higher. Woodbury received about 5.21 inches of rain. The extent for fluvial erosion is unknown in Woodbury	15 million in damages state wide.

5.3 Vulnerabilities of Concern

Long Term Power Outages

The North American Electric Reliability Corporation (NERC) requires electric utilities to report events which cause disturbances that interrupt service (i.e., power outages) of more than 300 MegaWatts (MW) or affect 50,000 customers or more. A University of Vermont analysis of NERC data describes 933 events causing outages from the years 1984 to 2006, and is presented in

According to the Vermont study, almost 44% of the events in the period were weather-related (i.e., caused by tornado, hurricane/tropical storm, ice storm, lightning, wind/rain, or other cold weather). The study noted that the data include many events smaller than the NERC reporting threshold. It also noted that some of the reported events have “multiple initiating” causes, since some events (such as lightning) can trigger other outages or operator errors.

One of the major problems associated with storms is the loss of electrical power. Major electric utility companies have active, ongoing programs to improve system reliability and protect facilities from damage by ice, severe winds and other hazards. Typically, these programs focus on trimming trees to prevent encroachment of overhead lines, strengthening vulnerable system components, protecting equipment from lightning strikes and placing new distribution lines underground.

Electric service in Woodbury is provided by Hardwick Electric Company and a small section by Washington Electric Cooperative Inc. (WEC) because the lines serve much of the remote and higher elevation areas in Woodbury they are more prone to damage from falling trees especially during heavy wet snows, ice storms and violent electrical storms. As a result, homes located in these areas may experience a higher frequency and duration of outages than homes located in the low lying areas and valleys such as those along the Route 14 corridor.

Both Hardwick Electric and WEC have online real time outage tracking tools.

Vulnerable populations, such as the elderly and handicapped are of greatest risk to this hazard. If this type of multiple hazard event takes place for an extended period of time, back-up power would be necessary for critical facilities Town Offices, and Town Highway Garage. Woodbury Elementary School and the Woodbury Fire Department both have generators giving them back up capacity and the ability to be used as shelters if needed.

History of Occurrences: Local and County Wide Data

Date	Event	Location	Extent
12/9/2014- 12/13/2014	Winter storm	Washington County	6-24” of snow, widespread power outages DR4207VT. FEMA totals of \$3949028.50 in state damages.

Date	Event	Location	Extent
1/20/2013	Strong Wind	County Wide, State Wide	Winds in excess of 50 MPG. Numerous reports of tree or power line failures statewide. Estimated 10,000 without power statewide
7/06/2011	Thunderstorm	County Wide	50 knot winds; 15,000 people in VT lost power
5/26/2011	Hail/Thunderstorms/Flash Flooding	County Wide	1" hail, 50 knot winds, 25,000 customers lost power in VT, 3-5" of rain
3/6/2011	Winter storm	Washington County	12-18" of snow, 10,000 customers lost power statewide

Blackout and Power Outage Data for the State of Vermont 2009-2016

Year	# of people affected by outages	Duration of Outages	# of outage s	State Ranking (number of outages)	Average # of people affect per outage	Average duration of outage
2009	22377	345 minutes (5.75 hours)	9	*	3197	86 minutes
2010	123800	360 minutes (6 hours)	13	*	13756	120 minutes (2 hours)
2011	74030	138 minutes (over 2	14	*	6169	69 minutes

Year	# of people affected by outages	Duration of Outages	# of outages	State Ranking (number of outages)	Average # of people affect per outage	Average duration of outage
		hours)				
2012*	*	*		*	*	*
2013	54522	450 minutes (7 1/2 hours)	14	*	4957	150 minutes (2 1/2 hours)
2014	45126	480 minutes (8 hours)	13	38	3761	40 minutes
2015	30977	1260 minutes (21 hours)	15	42	2065	84 minutes
2016	69542	1490 minutes (24 hours)	16	39	4346	9 minutes
* no data	Data compiled from Eaton Blackout and Power Outage Tracker					

Vulnerability	Location	Most Vulnerable	Extent	Impact
Prolonged Power Outages	Town Wide. All roads, utility poles and lines, Town Forest, Private woodlots/ timber stands, private residences and businesses, public infrastructure	Elderly & handicapped populations, remote structures, old/under insulated structures, public infrastructure and utilities, trees, telecommunications, school system	Minimal to Moderate depending on severity; 18+” snowfall in March 2011 event Jan/Feb 2015 15-20 days below zero with wind chills of negative -30 degrees below zero. 12/9/2014 – 12/13/2014 6 to 24 inches wet heavy snow in county. No specific extent data for Woodbury is available.	Depends on severity – additional sheltering/ plowing/ emergency services costs for town. School closing and vehicular accidents. Downed trees and power lines. Prolonged power outages for 175,000 customers statewide. 12/2014 FEMA Total PA obligated statewide \$3,949,028 A gap in the data exists for Woodbury.

Lack of Cell Phone Service in Times of Emergency

Woodbury like many rural towns in Vermont has a diverse topography and a sparse population which makes it hard to get access to cell service. The Town has many roads that can only be accessed from the adjoining towns, so when there is a town wide emergency the phrase “ You can’t get there from here.” very much applies, not only for driving but calling as cell phones are becoming universal, less and less people are opting for landlines. The big issue right now is 911 service. Paul Cerutti, Woodbury Fire Chief/ Rescue has cited numerous occasions when the fire department has gone to a call and once on site they aren’t able to either call in backup or to the nearest hospital. The Town has radio communication between the fire department and town offices but that is it. During a survey conducted in spring of 2018 it is the biggest issue for the townsfolk.

Extent of problem.

1. The majority of the community does not have cell coverage.
2. Many have discontinued the use of landlines and use Wi-Fi calling, or home based micro cells.

3. The phone carriers have removed all pay phones.
4. We have a large influx of summer residents who depend solely on its cell phones, and have addressed this at its homes with the items noted in 2, but are not able to use its phones anywhere else in town.

Impact.

1. Emergencies cannot be reported until someone finds a house with a landline or a person with access to wifi or micro cell. This results in long delays in 911 calls, adversely affecting outcomes for sick or injured people, or in reporting a fire where the fire doubles in size every 2 minutes. There are long stretches of roads with no cell coverage and no houses. Almost impossible to report emergencies.
2. When emergency services are on an emergency scene, we do not have the ability to contact medical control, for treatment requirements. We must use the radio for communications that should be private. We have to pass requests, and instructions between multiple dispatchers before we get the information.
3. In incidents like our recent double homicide on October 30, the command post had to be set up in Hardwick, and there was no communications between the workers on the scene and the leadership.
4. It would be difficult to calculate the loss of life or financial impact of these problems. I can just say that in the areas of medical treatment, the golden hour, or in the case of fires which double in size every 20 minutes, delays in calling 911 that run 10 to 20 minutes will be substantial. This is coupled with long response times and long transport times that we have due to the remoteness and road quality in our community.

Just one new tower can make a world of difference in towns that have sketchy service, but there's no way to force service providers to invest in those areas. And the cost of one new tower is very expensive.

Vulnerability	Location	Most Vulnerable	Extent	Impact
Lack of Cell Phone Service	Town Wide:	Town Wide. All Woodbury residents, residences, businesses, public infrastructure.	Magnitude of hazard: Loss of Life, structures	Dollar value or percentage of damages

6. Mitigation

The goal of this Plan is to update the local mitigation strategy that makes Woodbury more disaster resistant and reduces its risk from natural hazards. Further, it is the goal of this Plan to take actions to reduce or eliminate the long-term risk to human life and property from:

- The natural hazard of severe winter weather (Ice/Snow/Cold combined).
- The natural hazard of high winds.
- The natural hazard of flooding (Fluvial Erosion/inundation combined).
- The vulnerability of long term power outage.
- The vulnerability of cell phone service in times of emergency.

6.1 Town Plan Goals and Objectives that Support Local Hazard Mitigation

The Town of Woodbury doesn't have an adopted Town Plan at this time, it is under development. When the plan is completed it will be used to integrate with the next Local Hazard Mitigation plan update. The most recent town plan expired in 2008 and was not incorporated into the plan because the data was significantly outdated.

6.2 Proposed Hazard Mitigation Programs, Projects & Activities

Woodbury considered many actions related to limiting future development, but not finding them feasible due to having almost zero growth, limited funds, and needing to prioritize other actions, has not addressed them at this time. Hazard mitigation programs, projects and activities that were identified for implementation at the Woodbury Local Hazard Mitigation meeting:

Hazards Mitigated	Mitigation Action	Local Leadership	Prioritization	Funding Resources	Time Frame
Flooding, Severe storms	Remove the Woodbury Store to reduce flooding backup (MA)	SB, Town Clerk	High	HMGP, AOT funds, ERP funds, town funds	1-2 years 2019 -2020
Flooding, Severe Storms	Monitor Beaver Dams (PA)	Town Highway Administrative Assistant	Medium	town budget	2019-2020, annually thereafter.

Hazards Mitigated	Mitigation Action	Local Leadership	Prioritization	Funding Resources	Time Frame
Power Outages, Wind, Cold Weather	Maintain the power lines in town ROW (PA)	Hardwick Electric Depart.	High		2019-2020, annually thereafter.
All Hazards	Establish more emergency shelters in West Woodbury and at the South Woodbury Church (PA)	SB	Medium	town funds	2-3 years 2020- 2021
All Hazards	Purchase a generator for generator for one new shelter or town building (PA or MA)	SB	Medium	HMGP, town funds	1-2 years 2019- 2020
Flooding	Relocate Fire Station to a location away from flooding	SB, Fire Dept, Calais SB	Medium	Town funds, donations	2-3 years 2020-2021
Flooding	Upsizing Culvert in Cranberry Meadow Rd (MA)	Road Crew	Medium-Low	Local funds and AOT	1-2 Years, 2019-2020
Emerald Ash Borer (EAB)	Go to EAB identification/ and inventory training and hold public talks on EAB (PA)	SB, Road Commissioner	Low	FPR, CVRPC, Local	1 year January to December 2019
Lyme Disease	Hold public talks about Lyme Disease and other tick related illnesses (PA)	SB	Low	state agency rep	1 year January to December 2019
Flooding	Communicate with adjoining towns to purchase a Vactor Truck to keep the culverts and ditches free of debris (PA)	Road Crew	Low	Mutual Aid	2-3 years 2020-2021

Hazards Mitigated	Mitigation Action	Local Leadership	Prioritization	Funding Resources	Time Frame
Cell Service	Petition the Public Utilities Commission to request them to put up a cell tower either in the Quarry or on a church steeple. (MA)	SB	Low		1 year January to December 2019
All hazards	Culvert upgrade and replacement for the hydrologically connected sections of class 4 roads (MA)	Road Crew	Low	ANR, DEC	annually
All hazards	Finalize designs and implement high priority projects that come out of the Storm Water Master Plan for Woodbury.	SB	Low	VTrans, DEC, Lake Champlain Basin Program	5 years 2023

VEM also emphasizes a collaborative approach to achieving mitigation on the local level, by partnering with ANR, VTrans, ACCD, Regional Planning Commissions, FEMA Region 1 and other agencies, all working together to provide assistance and resources to towns interested in pursuing mitigation projects and planning initiatives.

The mitigation activities are listed in regards to local leadership, possible resources, implementation tools, and prioritization. The method used for prioritization of the actions was qualitative and based upon: 1) the Community's need to address the issue, 2) the action's cost, 3) the action's benefit, and 4) the availability of potential funding. Emphasis was placed on a review of the benefits (pros) and costs (cons) when prioritizing the mitigation actions with the expectation that the benefits would outweigh the costs.

In performing the benefit cost review, the team reviewed a wide range of questions concerning the mitigation actions. How immediate and critical is the need to the community? How costly is the action? Is it a low-cost strategy? Is the action cost effective and seem reasonable for the nature of the project? Are funds already secured or readily available? Does the action use outside funding sources? Is there a time restriction on expending funds? Can the action be budgeted in

the current or upcoming budget cycle or does it require long term debt? What is the level of risk to community assets (people, economy, structures, critical facilities & infrastructure, and the natural environment)? Does the action provide for the protection of life and property and reduce the risk for loss, injury, or damage? How critical are the community assets that benefit from the action? How fast will the action take to implement? How many people and or area will benefit from the action; whole community, neighborhood, individual? What benefits will the action provide? Does the action support the community goals, policies and plans?

The following categories are used to define the priority of each mitigation action/strategy:

HIGH - A High prioritization denotes that the action is either critical or potential funding is readily available or in hand, and should have a timeframe of implementation of less than two years. These projects also use grants and other outside funding sources; provide the greatest protection from loss of life and property damage; are cost effective; have a larger benefit; and provide a higher degree of risk reduction for community assets. Generally, the community assets that benefit from these actions are critical and of high priority.

MEDIUM - A Medium prioritization is warranted where the action is less critical or the potential funding is not readily available and has a timeframe for implementation of more than two years but less than four. These projects are somewhat cost effective at reducing damage to property and people, have some benefit, and provide some degree of risk reduction for community assets.

LOW - A Low prioritization indicates that the timeframe for implementation of the action, given the action's cost, availability of funding, and the community's need to address the issue, is more than four years. These actions may have limited benefit or the cost effectiveness is low. The community assets that benefit from the action are not in immediate need or are a low priority.

Woodbury understands that in order to apply for FEMA funding for mitigation projects that a project must meet FEMA benefit cost criteria. The Town must also have a FEMA approved Hazard Mitigation Plan as well.

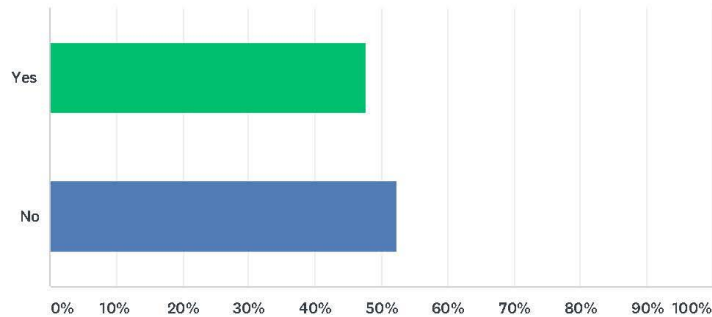
Attachments

- Town of Woodbury Hazard Mitigation Survey
- Woodbury Hazard Mitigation Plan Timeline/ Meeting Agenda
- Woodbury Hazard Analysis Map

- 5-year plan maintenance and review process
- Town Resolution Adopting the Plan

Q1 Have you ever been personally impacted, physically or financially, by a natural disaster in Woodbury?

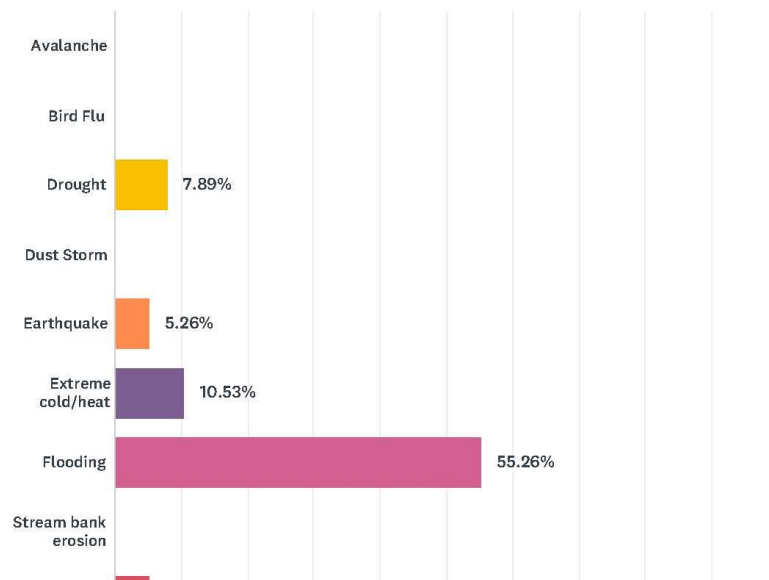
Answered: 63 Skipped: 0



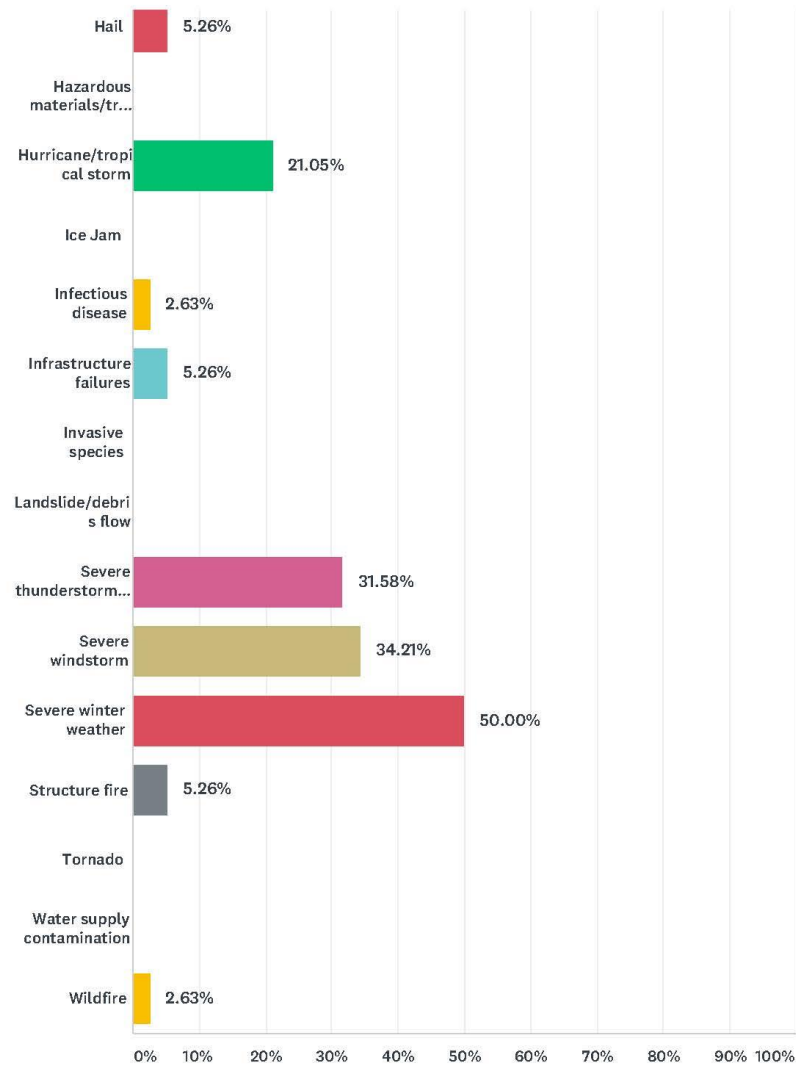
ANSWER CHOICES	RESPONSES	
Yes	47.62%	30
No	52.38%	33
Total Respondents: 63		

Q2 Which of the following hazards was the cause of the disaster you experienced in Woodbury?

Answered: 38 Skipped: 25



1 / 20

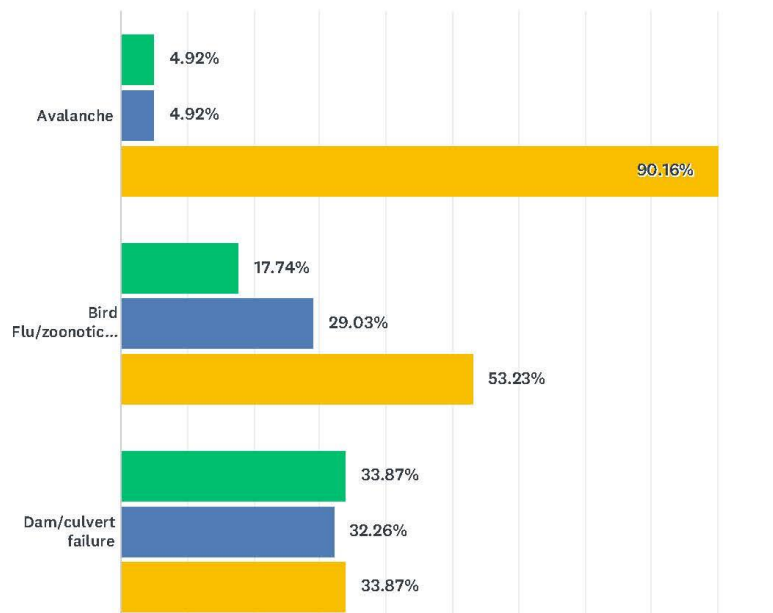


ANSWER CHOICES	RESPONSES	
Avalanche	0.00%	0
Bird Flu	0.00%	0
Drought	7.89%	3
Dust Storm	0.00%	0
Earthquake	5.26%	2
Extreme cold/heat	10.53%	4
Flooding	55.26%	21

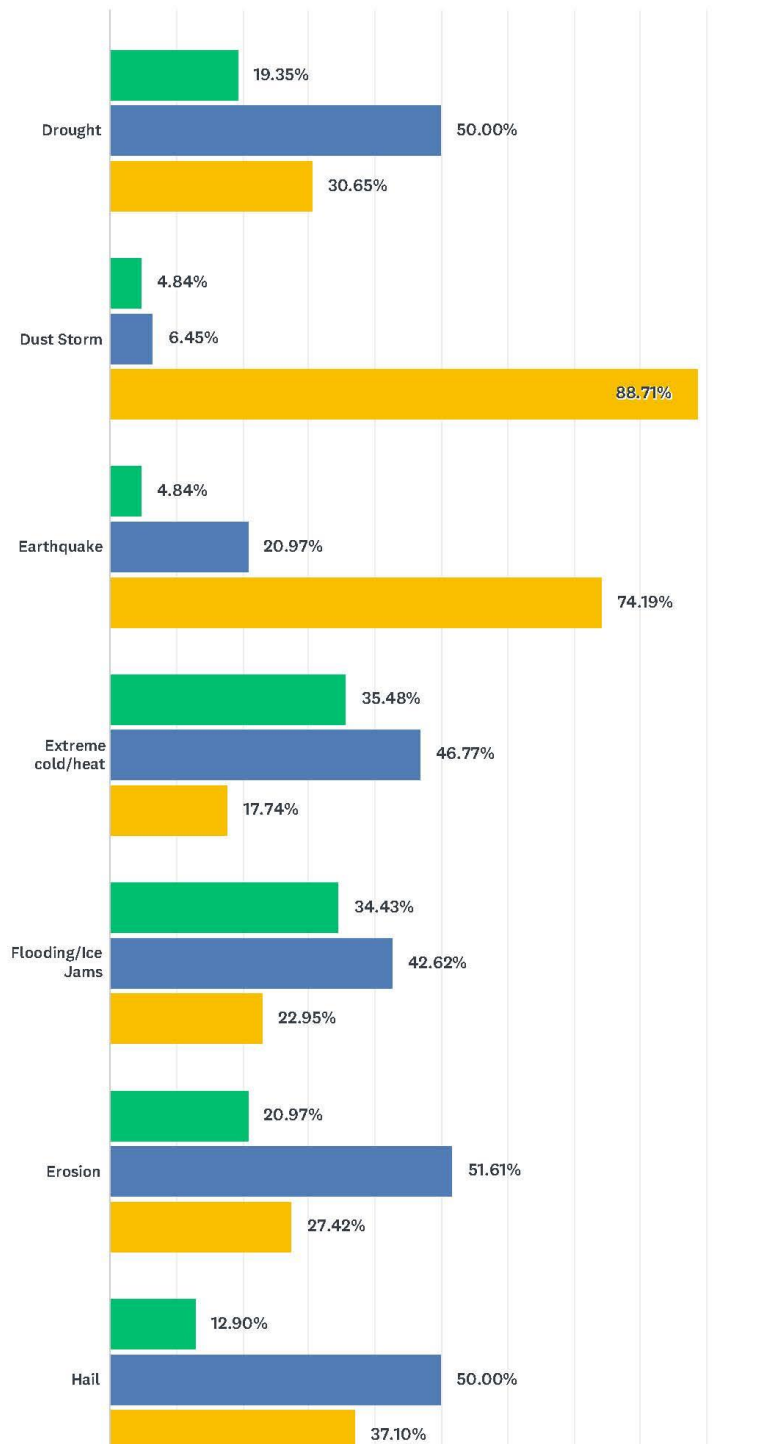
Stream bank erosion	0.00%	0
Hail	5.26%	2
Hazardous materials/transportation spills	0.00%	0
Hurricane/tropical storm	21.05%	8
Ice Jam	0.00%	0
Infectious disease	2.63%	1
Infrastructure failures	5.26%	2
Invasive species	0.00%	0
Landslide/debris flow	0.00%	0
Severe thunderstorms/lightning	31.58%	12
Severe windstorm	34.21%	13
Severe winter weather	50.00%	19
Structure fire	5.26%	2
Tornado	0.00%	0
Water supply contamination	0.00%	0
Wildfire	2.63%	1
Total Respondents: 38		

Q3 How concerned are you about the following hazards?

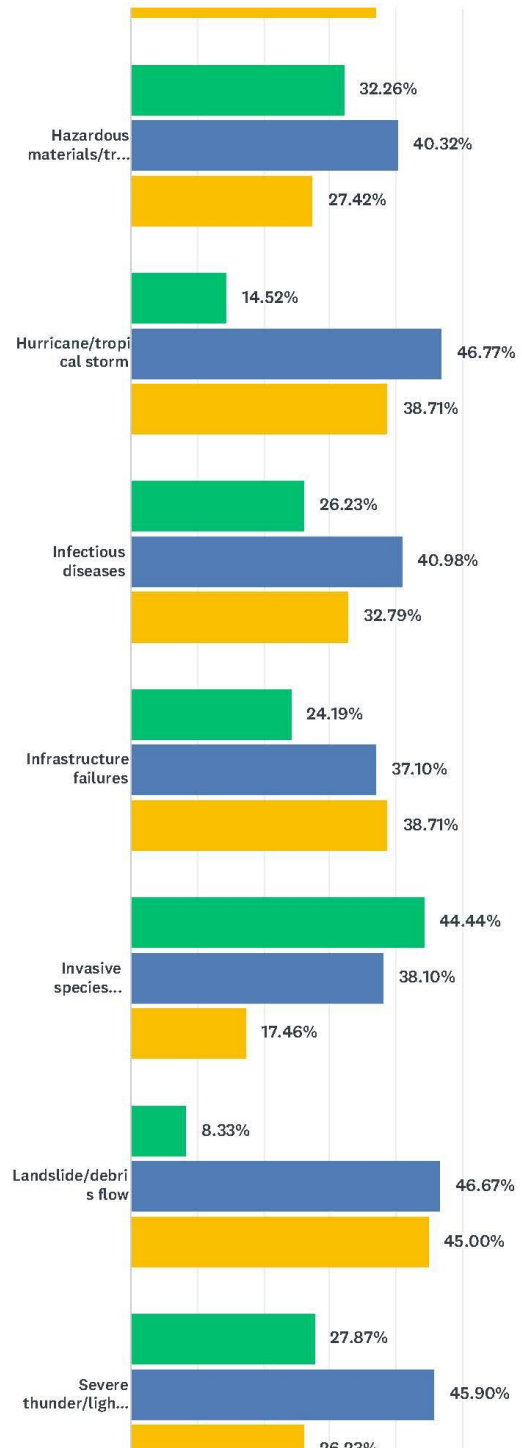
Answered: 63 Skipped: 0



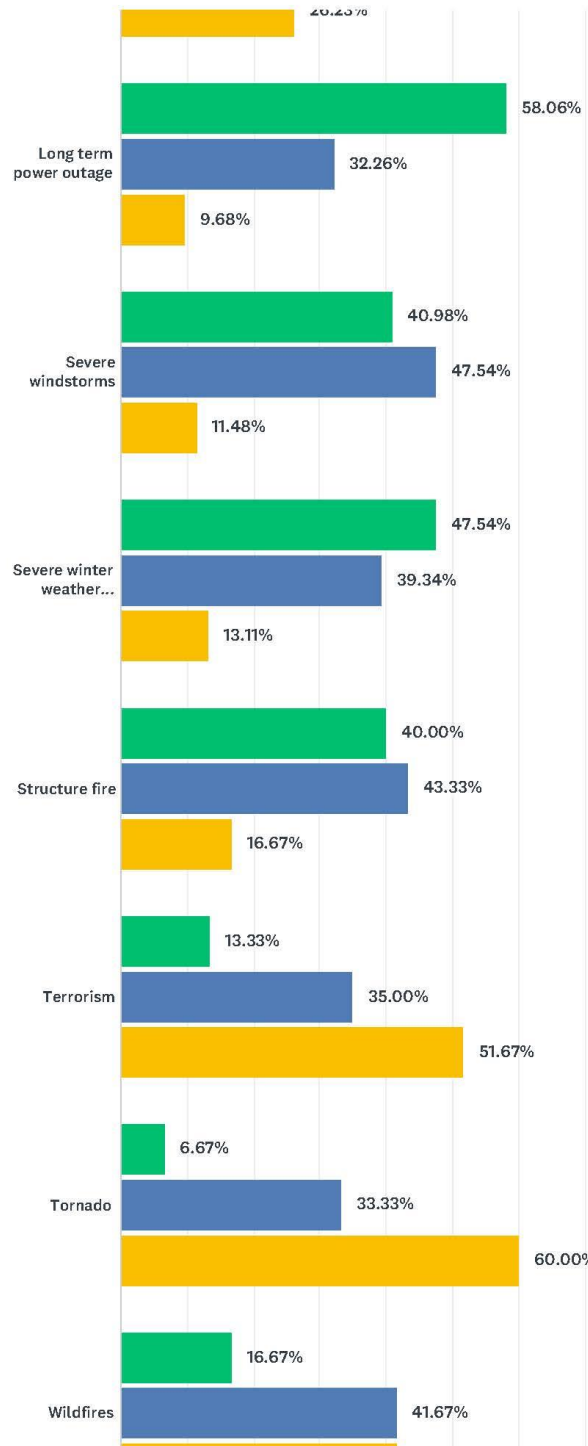
3 / 20



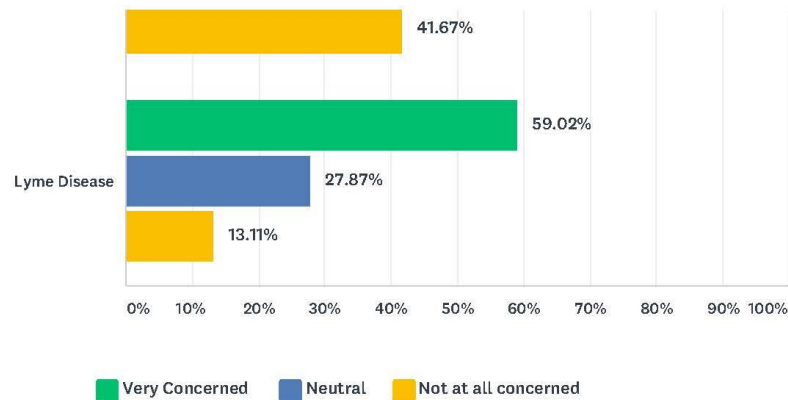
4 / 20



5 / 20



6 / 20



	VERY CONCERNED	NEUTRAL	NOT AT ALL CONCERNED	TOTAL
Avalanche	4.92% 3	4.92% 3	90.16% 55	61
Bird Flu/zoonotic diseases	17.74% 11	29.03% 18	53.23% 33	62
Dam/culvert failure	33.87% 21	32.26% 20	33.87% 21	62
Drought	19.35% 12	50.00% 31	30.65% 19	62
Dust Storm	4.84% 3	6.45% 4	88.71% 55	62
Earthquake	4.84% 3	20.97% 13	74.19% 46	62
Extreme cold/heat	35.48% 22	46.77% 29	17.74% 11	62
Flooding/ice jams	34.43% 21	42.62% 26	22.95% 14	61
Erosion	20.97% 13	51.61% 32	27.42% 17	62
Hail	12.90% 8	50.00% 31	37.10% 23	62
Hazardous materials/transportation spills	32.26% 20	40.32% 25	27.42% 17	62
Hurricane/tropical storm	14.52% 9	46.77% 29	38.71% 24	62
Infectious diseases	26.23% 16	40.98% 25	32.79% 20	61
Infrastructure failures	24.19% 15	37.10% 23	38.71% 24	62
Invasive species (Emerald Ash Borer)	44.44% 28	38.10% 24	17.46% 11	63
Landslide/debris flow	8.33% 5	46.67% 28	45.00% 27	60
Severe thunder/lightning storms	27.87% 17	45.90% 28	26.23% 16	61

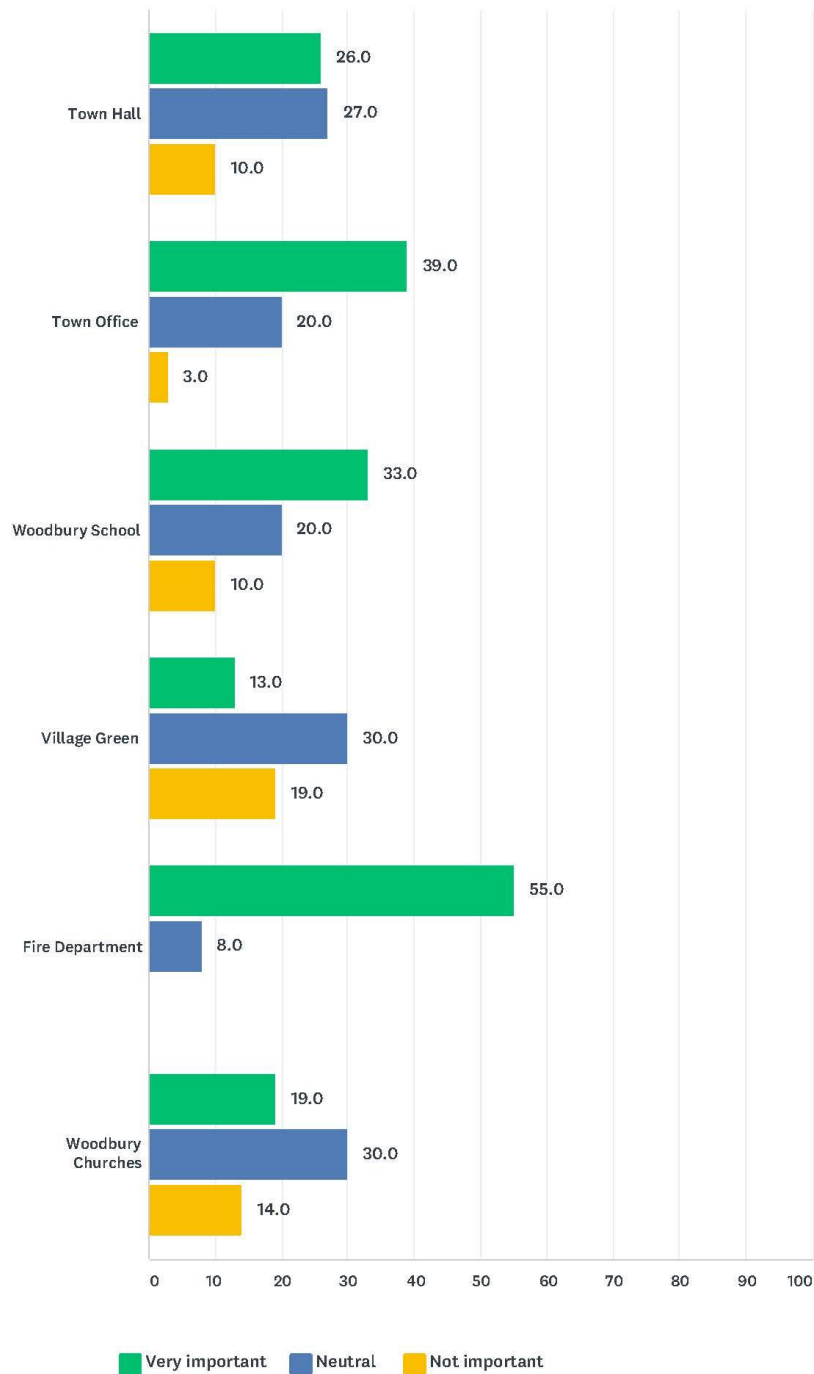
Town of Woodbury 2018 Hazard Mitigation Survey

SurveyMonkey

Long term power outage	58.06% 36	32.26% 20	9.68% 6	62
Severe windstorms	40.98% 25	47.54% 29	11.48% 7	61
Severe winter weather (snow/ice)	47.54% 29	39.34% 24	13.11% 8	61
Structure fire	40.00% 24	43.33% 26	16.67% 10	60
Terrorism	13.33% 8	35.00% 21	51.67% 31	60
Tornado	6.67% 4	33.33% 20	60.00% 36	60
Wildfires	16.67% 10	41.67% 25	41.67% 25	60
Lyme Disease	59.02% 36	27.87% 17	13.11% 8	61

Q4 What community assets are important to you?

Answered: 63 Skipped: 0



	VERY IMPORTANT	NEUTRAL	NOT IMPORTANT	TOTAL	WEIGHTED AVERAGE
--	----------------	---------	---------------	-------	------------------

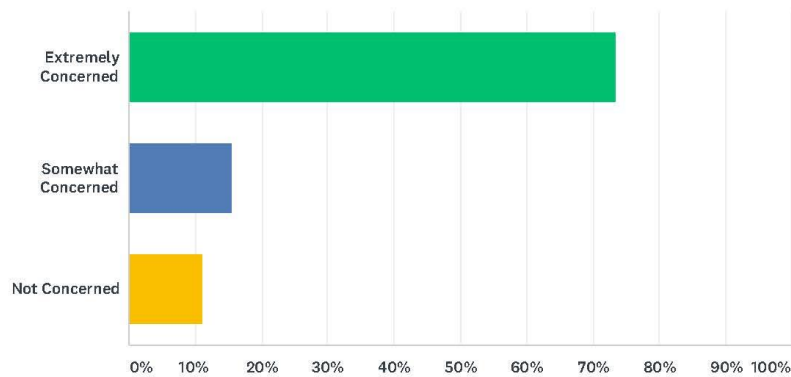
Town of Woodbury 2018 Hazard Mitigation Survey

SurveyMonkey

Town Hall	41.27% 26	42.86% 27	15.87% 10	63	1.75
Town Office	62.90% 39	32.26% 20	4.84% 3	62	1.42
Woodbury School	52.38% 33	31.75% 20	15.87% 10	63	1.63
Village Green	20.97% 13	48.39% 30	30.65% 19	62	2.10
Fire Department	87.30% 55	12.70% 8	0.00% 0	63	1.13
Woodbury Churches	30.16% 19	47.62% 30	22.22% 14	63	1.92

Q5 DO YOU BELIEVE THE LACK OF CELLULAR NETWORK COVERAGE AND WI-FI ACCESS LEAVES THE CITIZENS OF WOODBURY MORE VULNERABLE DURING A DISASTER?

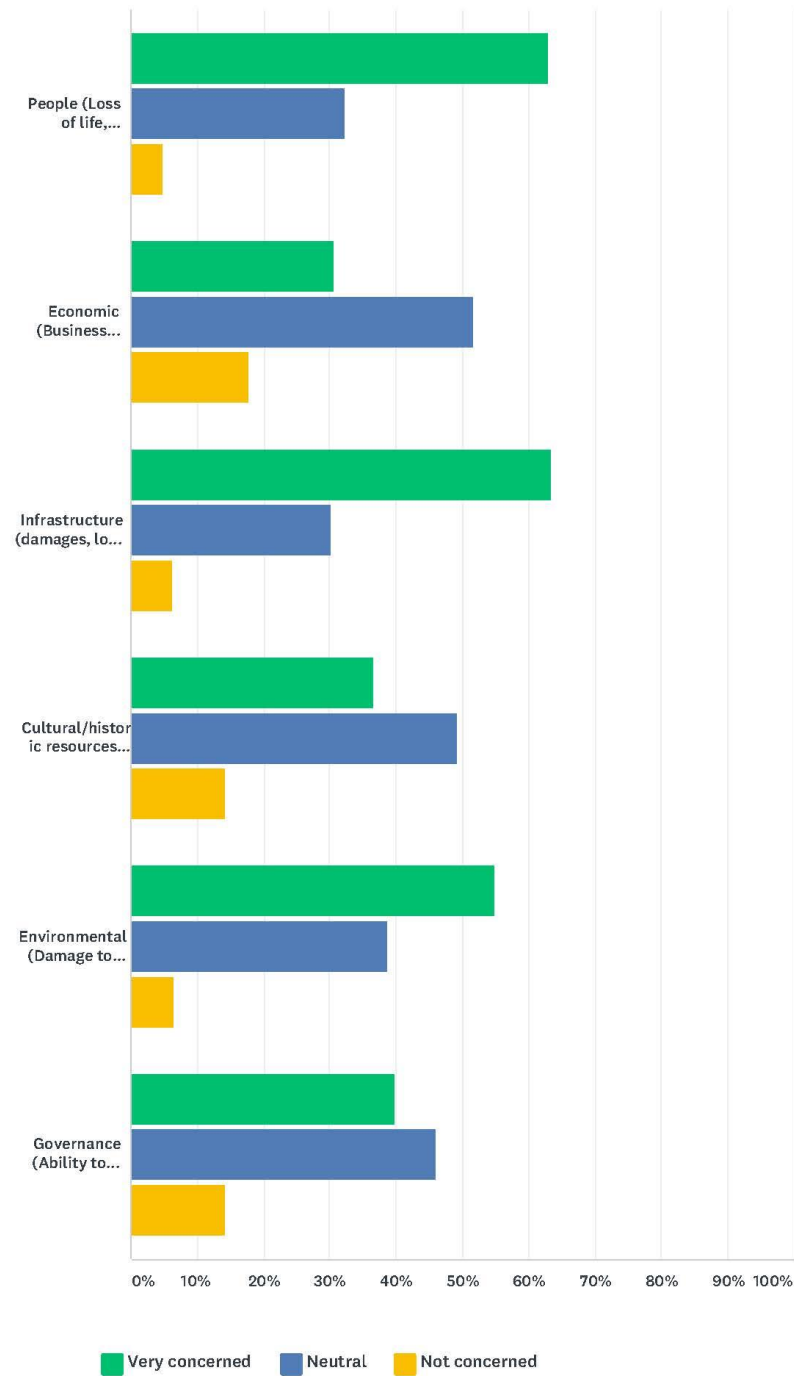
Answered: 45 Skipped: 18



ANSWER CHOICES	RESPONSES
Extremely Concerned	73.33% 33
Somewhat Concerned	15.56% 7
Not Concerned	11.11% 5
TOTAL	45

Q6 In terms of vulnerability to hazards, how concerned are you about the following?

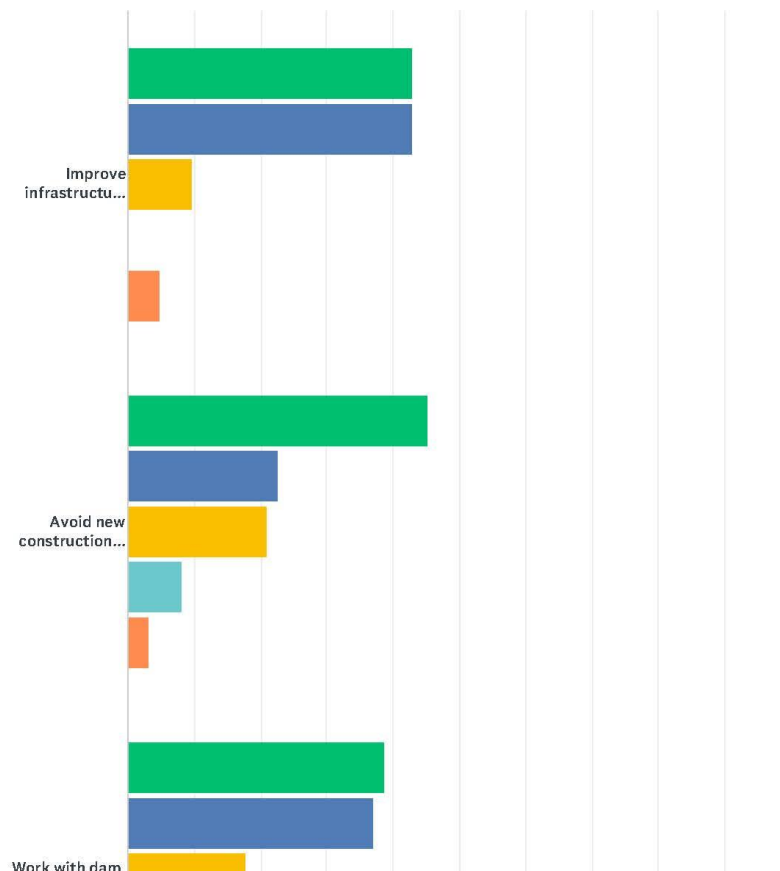
Answered: 63 Skipped: 0



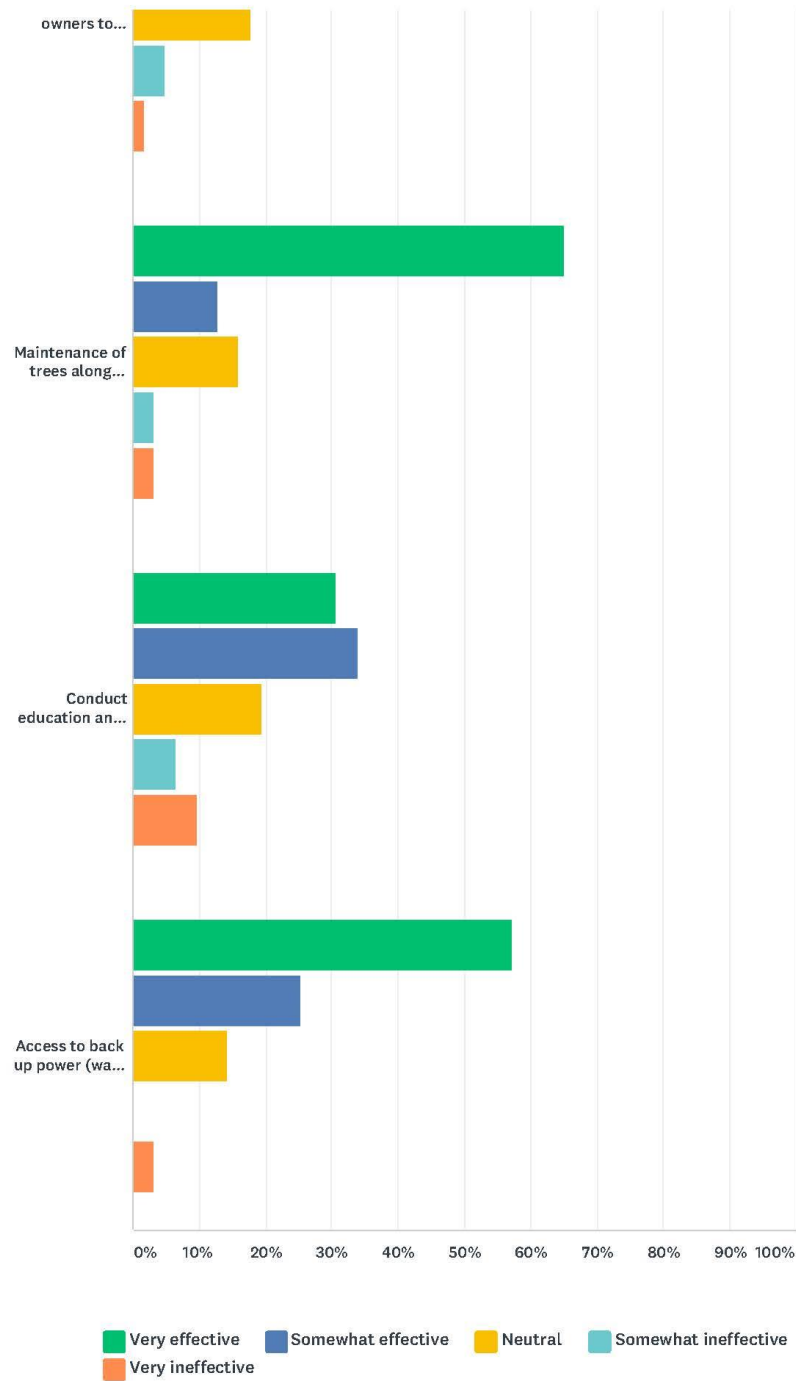
	VERY CONCERNED	NEUTRAL	NOT CONCERNED	TOTAL
People (Loss of life, injuries)	62.90% 39	32.26% 20	4.84% 3	62
Economic (Business interruptions, crop/equipment damage)	30.65% 19	51.61% 32	17.74% 11	62
Infrastructure (damages, loss of roads, bridges, utilities, schools)	63.49% 40	30.16% 19	6.35% 4	63
Cultural/historic resources (Elementary school, Town hall, Town office)	36.51% 23	49.21% 31	14.29% 9	63
Environmental (Damage to trees, water contamination, erosion)	54.84% 34	38.71% 24	6.45% 4	62
Governance (Ability to provide municipal services)	39.68% 25	46.03% 29	14.29% 9	63

Q7 In your opinion, how effective would the following actions be to reduce or eliminate the risk of future damages?

Answered: 63 Skipped: 0



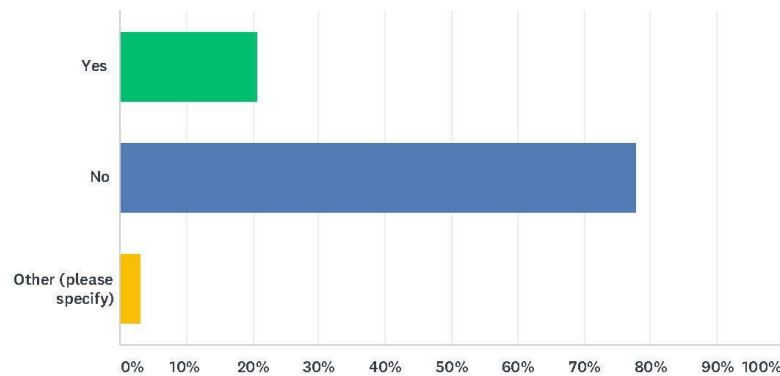
12 / 20



	VERY EFFECTIVE	SOMEWHAT EFFECTIVE	NEUTRAL	SOMEWHAT INEFFECTIVE	VERY INEFFECTIVE	TOTAL
Improve infrastructures (Upgrade roads, bridges)	42.86% 27	42.86% 27	9.52% 6	0.00% 0	4.76% 3	63
Avoid new construction in areas subject to flooding and erosion	45.16% 28	22.58% 14	20.97% 13	8.06% 5	3.23% 2	62
Work with dam owners to understand hazards	38.71% 24	37.10% 23	17.74% 11	4.84% 3	1.61% 1	62
Maintenance of trees along utility rights of way	65.08% 41	12.70% 8	15.87% 10	3.17% 2	3.17% 2	63
Conduct education and awareness programs	30.65% 19	33.87% 21	19.35% 12	6.45% 4	9.68% 6	62
Access to back up power (water supply, emergency shelter)	57.14% 36	25.40% 16	14.29% 9	0.00% 0	3.17% 2	63

Q8 Have you ever received information about how to make your home/household safer from Natural disasters?

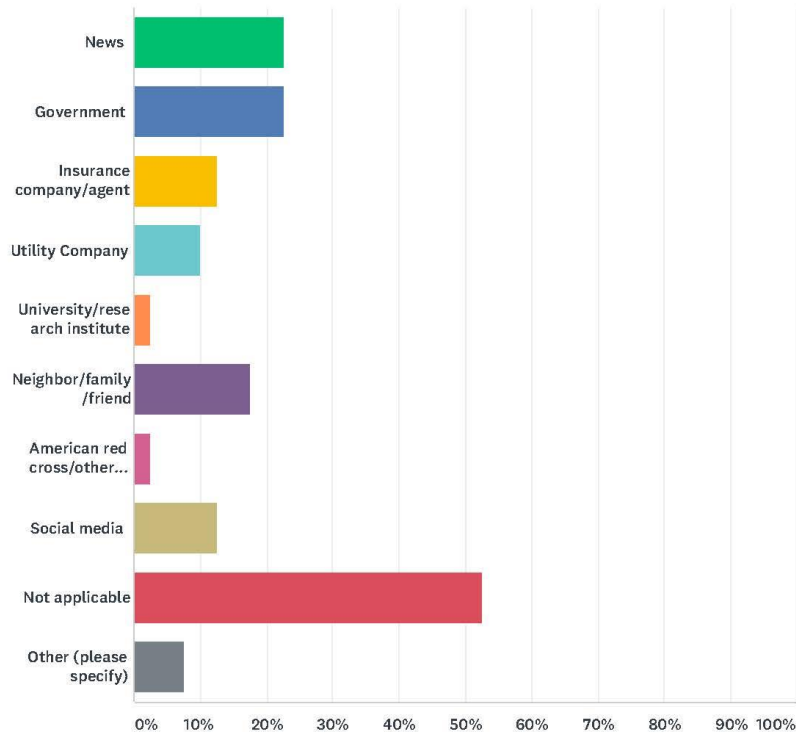
Answered: 63 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	20.63%	13
No	77.78%	49
Other (please specify)	3.17%	2
Total Respondents: 63		

Q9 If so, from what source?

Answered: 40 Skipped: 23



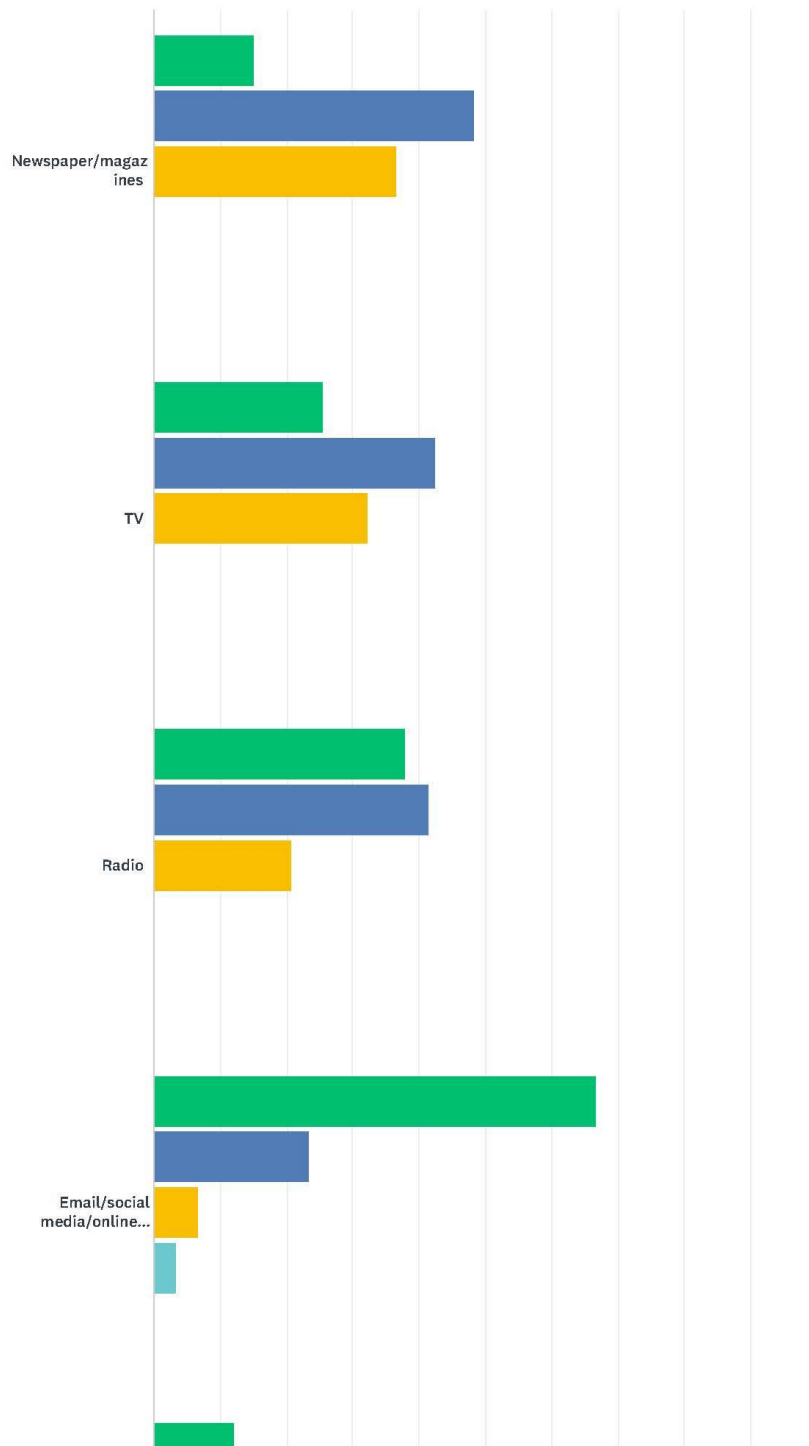
ANSWER CHOICES	RESPONSES	
News	22.50%	9
Government	22.50%	9
Insurance company/agent	12.50%	5
Utility Company	10.00%	4
University/research institute	2.50%	1
Neighbor/family/friend	17.50%	7
American red cross/other non-profit	2.50%	1
Social media	12.50%	5
Not applicable	52.50%	21
Other (please specify)	7.50%	3
Total Respondents: 40		

Q10 What's the most effective way for you to receive information about making your home/household safer from natural disaster?

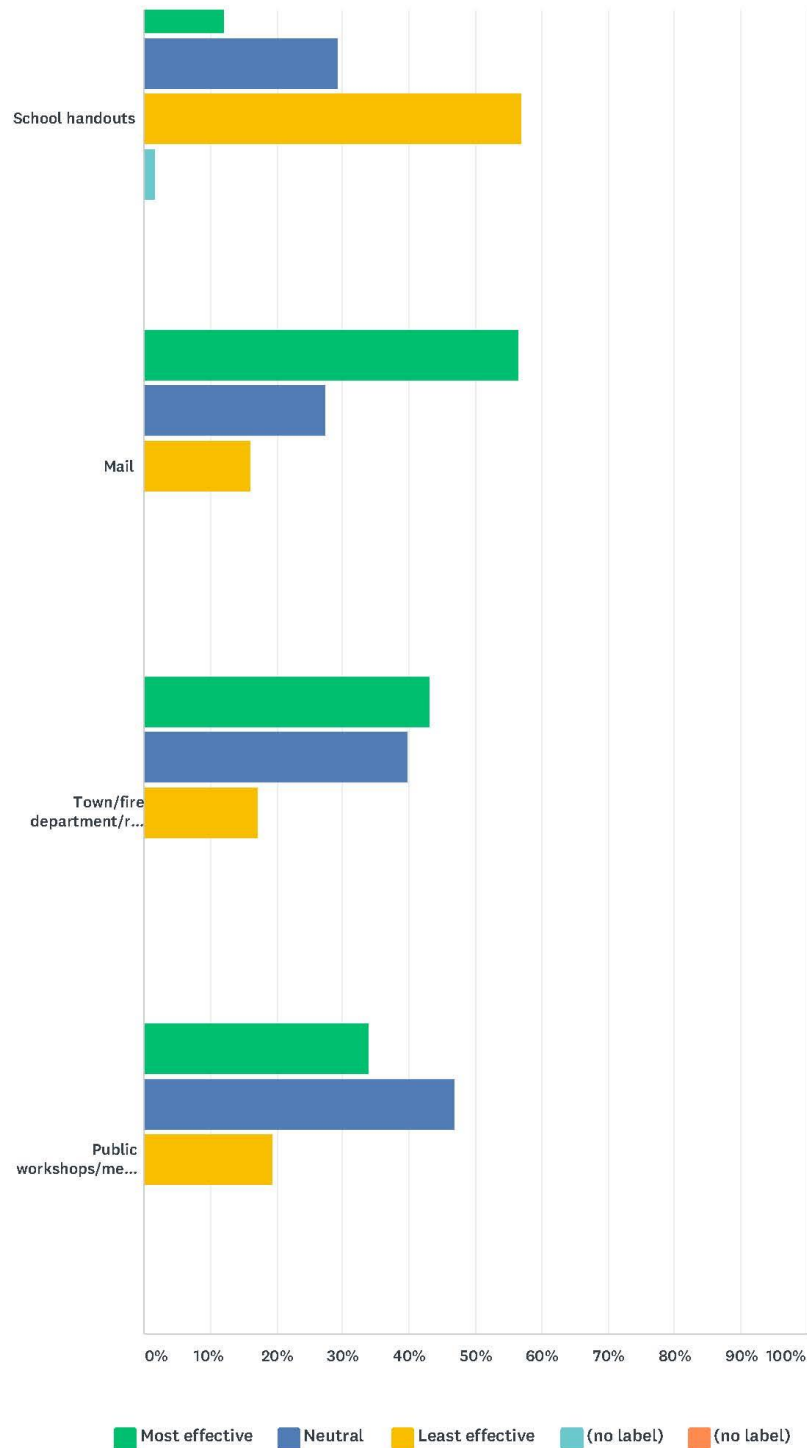
Answered: 63 Skipped: 0



15 / 20



16 / 20



	MOST EFFECTIVE	NEUTRAL	LEAST EFFECTIVE	(NO LABEL)	(NO LABEL)	TOTAL
Newspaper/magazines	15.00% 9	48.33% 29	36.67% 22	0.00% 0	0.00% 0	60
TV	25.42% 15	42.37% 25	32.20% 19	0.00% 0	0.00% 0	59
Radio	37.93% 22	41.38% 24	20.69% 12	0.00% 0	0.00% 0	58
Email/social media/online news	66.67% 40	23.33% 14	6.67% 4	3.33% 2	0.00% 0	60
School handouts	12.07% 7	29.31% 17	56.90% 33	1.72% 1	0.00% 0	58
Mail	56.45% 35	27.42% 17	16.13% 10	0.00% 0	0.00% 0	62
Town/fire department/rescue	43.10% 25	39.66% 23	17.24% 10	0.00% 0	0.00% 0	58
Public workshops/meetings	33.87% 21	46.77% 29	19.35% 12	0.00% 0	0.00% 0	62

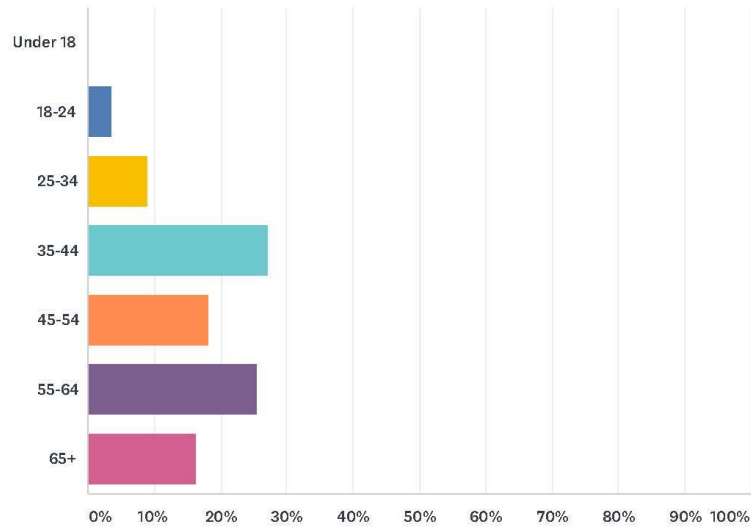
Q11 Thank you for completing the Town of Woodbury Hazard Mitigation Survey. If you would like to receive further updates about Hazard mitigation planning please enter your email below. The demographic information below is optional, and used only for statistical purposes.

Answered: 19 Skipped: 44

ANSWER CHOICES	RESPONSES	
Name	94.74%	18
Company	0.00%	0
Address	0.00%	0
Address 2	0.00%	0
City/Town	0.00%	0
State/Province	0.00%	0
ZIP/Postal Code	0.00%	0
Country	0.00%	0
Email Address	94.74%	18
Phone Number	0.00%	0

Q12 Age

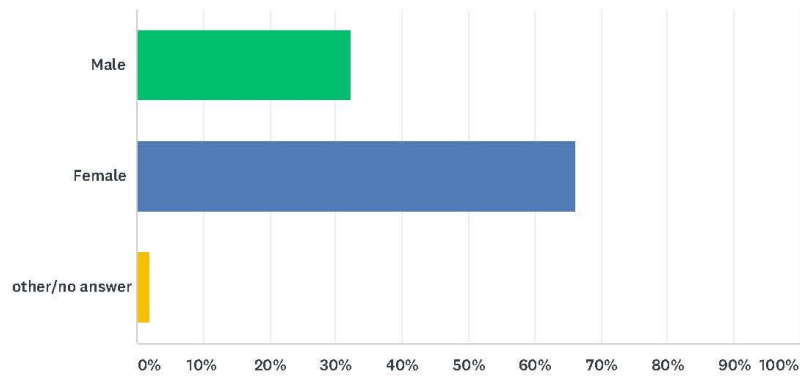
Answered: 55 Skipped: 8



ANSWER CHOICES	RESPONSES	
Under 18	0.00%	0
18-24	3.64%	2
25-34	9.09%	5
35-44	27.27%	15
45-54	18.18%	10
55-64	25.45%	14
65+	16.36%	9
TOTAL		55

Q13 Sex

Answered: 56 Skipped: 7



ANSWER CHOICES	RESPONSES	
Male	32.14%	18
Female	66.07%	37
other/no answer	1.79%	1
TOTAL		56

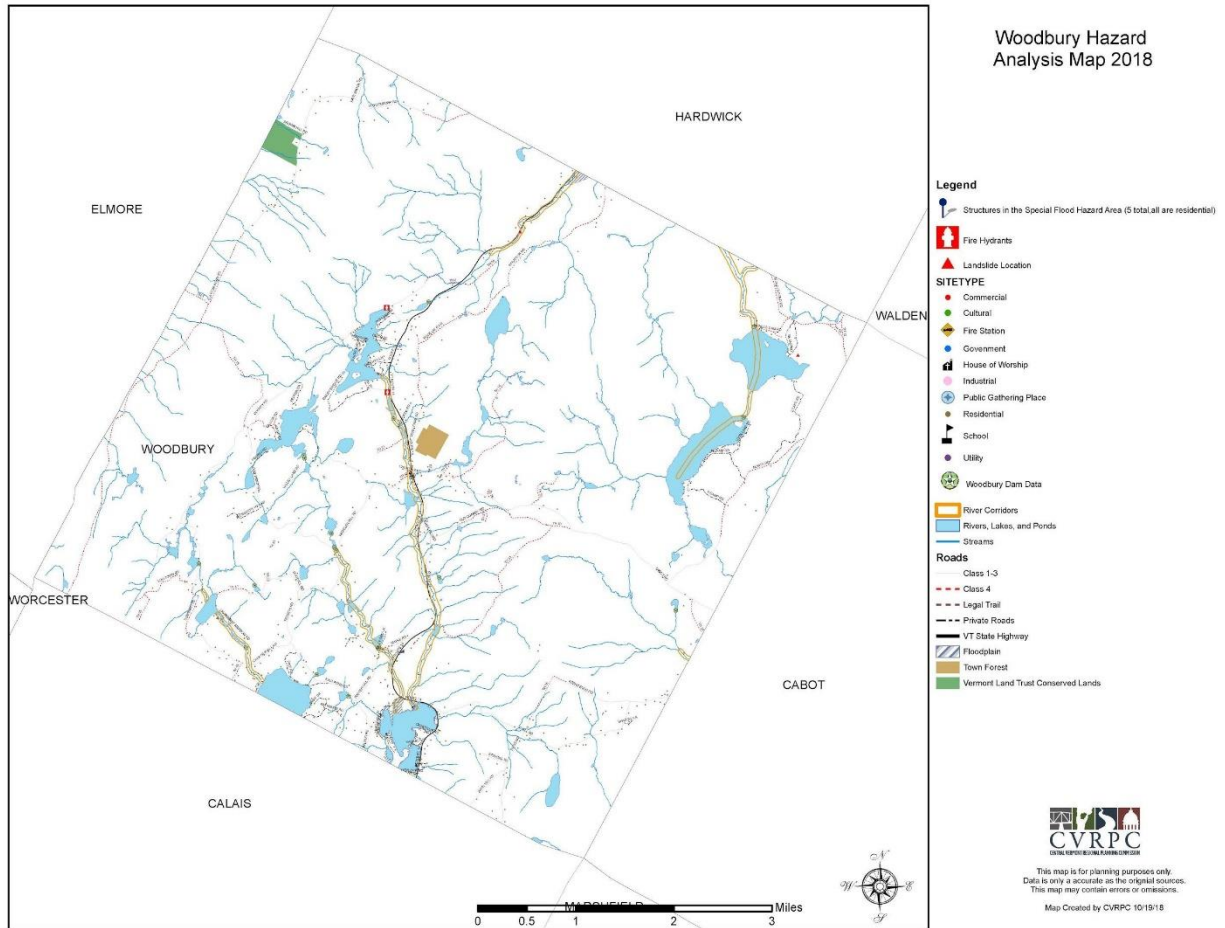
Woodbury Hazard Mitigation Plan - Timeline as of 12/03/18

Work to Complete Prior to Meeting	CVRPC Send the following to the Town: <ul style="list-style-type: none"> Revised project schedule for Dec. 8 draft Plan submission to VEM List of public engagement ideas List of potential stakeholders 2013 Woodbury LHMP and FEMA plan review tool 2018 Duxbury LHMP State hazards list 	Town <ul style="list-style-type: none"> Notice meeting and prepare meeting agenda
Planning Team Meeting #1 October 25, 2018 <u>Agenda</u> <ul style="list-style-type: none"> Review Plan update process Review Duxbury Plan & discuss Town's vision for Woodbury LHMP Revise project timeline and discuss roles & responsibilities Develop list of stakeholders and confirm planning team Set Planning Team meeting dates and public engagement event dates Develop list of available plan resources Review State hazard list to identify preliminary list of 5 priority hazards Review draft maps and identify changes and new maps Discuss next steps and priority tasks 		
	CVRPC <ul style="list-style-type: none"> Collect data of 5 priority natural hazards Update existing maps or create new maps <ul style="list-style-type: none"> Hazard analysis map (with fire hydrants) Develop vulnerability assessment for known priority hazards (ex. winter storms, severe storms, and flooding) 	Town <ul style="list-style-type: none"> Solicit additional Planning Team members, if desired Develop text addressing: <ul style="list-style-type: none"> Town capability Goals Integration with other documents
<ul style="list-style-type: none"> Review mitigation actions from 2013 LHMP and identify completed and in-progress actions. If no progress made on an action, draft text to discuss why progress was not made. Identify new mitigation actions that are in progress or that the Town knows it wants to include in the LHMP update. 		
Planning Team Meeting #2 November 8, 2018 <u>Agenda</u> <ul style="list-style-type: none"> Progress check-in – Town & CVRPC Process check-in - roles & responsibilities outside of text development Discuss vulnerability assessment Review status of 2013 mitigation actions Identify programs, projects & activities for 2018 LHMP (prevention and mitigation strategies) 		
	CVRPC <ul style="list-style-type: none"> Draft a Town/CVRPC contract for the project Complete the vulnerability assessment table Draft text for work completed to date Develop draft text for <ul style="list-style-type: none"> Plan evaluation process Plan maintenance Planning process Prepare materials for second public engagement event, if needed Develop contact list and addresses for adjacent towns and individuals at a regional or state level who will be invited to comment on the plan 	Town <ul style="list-style-type: none"> Update community profile text Complete prevention/mitigation strategies table, if needed Develop contact list and addresses for individuals at a local level who will be invited to comment on the plan Warn public engagement event and organize the event logistics (secure location, etc.), if needed Email meeting summary for Planning Team Meeting #2 and any Selectboard meeting discussions to andrews@cvregion.com
Public Engagement Event #2 Either November 12, 2018 Selectboard meeting or Online survey promoted through Front Porch Forum and other venues.		

<u>Purpose</u> Gather input on prevention and mitigation strategies		
Planning Team Meeting #3 Thursday, November 29, 2018 <u>Agenda</u> <ul style="list-style-type: none"> Review public input on mitigation strategies Finalize plan update process Finalize plan maintenance process Review text developed to date 		
<u>Outcome</u> <ul style="list-style-type: none"> Mitigation strategies table is finalized Plan update process is finalized for text development Plan maintenance process is finalized for text development Text changes are identified so that CVRPC can finalize draft text developed to date 		
Work to Complete Prior to Meeting	CVRPC <ul style="list-style-type: none"> Finalize draft text and email to Planning Team for review by end of day on December 3 	Town <ul style="list-style-type: none"> Planning Team members review draft text and forward comments to CVRPC by December 5 for compilation. Email meeting summary for Planning Team Meeting #3 and any Selectboard meeting discussions to andrews@cvregion.com
Planning Team Meeting #4 December 6, 2018 <u>Agenda</u> <ul style="list-style-type: none"> Review & edit draft plan text 		
<u>Outcome</u> <ul style="list-style-type: none"> Approve draft LHMP for submission to VEM Draft LHMP for public comment 		
Work to Complete Prior to Submitting to VEM	CVRPC <ul style="list-style-type: none"> Submit preliminary draft plan to VEM and public so its staff can initiate the review process 	Town <ul style="list-style-type: none"> Email meeting summary for Planning Team Meeting #4 and Selectboard meeting discussions to andrews@cvregion.com by end of day on December 7
<ul style="list-style-type: none"> Approve changes made in response to VEM comments 		
Work to Complete	CVRPC	Town

	<ul style="list-style-type: none"> Submit approved draft plan to VEM for final review and submission to FEMA 	<ul style="list-style-type: none"> Email meeting summary for Planning Team Meeting #4 and Selectboard meeting discussions to andrews@cvregion.com
--	---	--

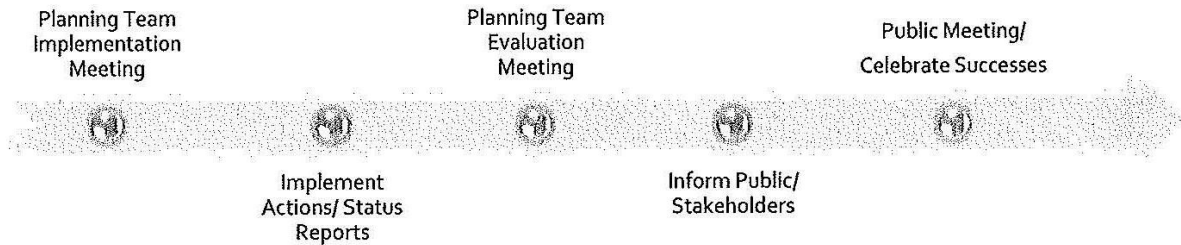
2018 Local Areas of Concern Map



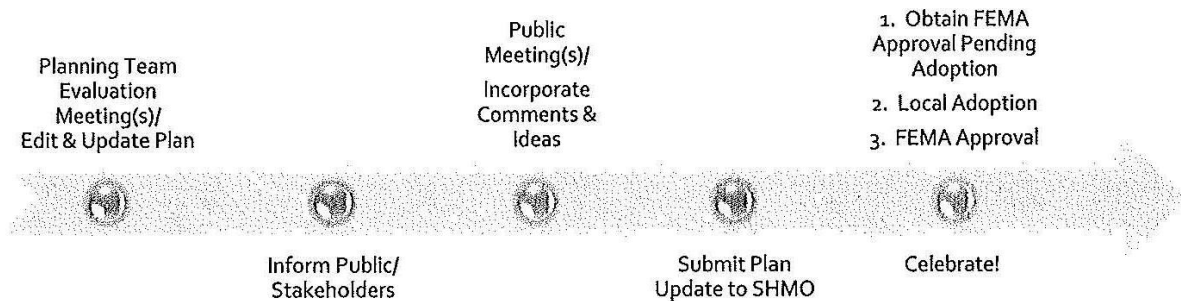
5-Year Plan Review/Maintenance



After Plan Adoption-Annually Implement and Evaluate



Fifth Year, and After Major Disaster Evaluate and Revise



CERTIFICATE OF ADOPTION

February 4th 2019

TOWN OF WOODBURY, VERMONT SELECTBOARD

A RESOLUTION ADOPTING THE WOODBURY, VERMONT 2018 LOCAL HAZARD MITIGATION PLAN

WHEREAS, the Town of Woodbury has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **2018 Woodbury, Vermont Local Hazard Mitigation Plan**, which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Woodbury has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **2018 Woodbury, Vermont Local Hazard Mitigation Plan (Plan)** under the requirements of 44 CFR 201.6; and

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

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

WHEREAS, adoption of this **Plan** will make the Town of Woodbury eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by Town of Woodbury Select Board:

1. The **2018 Woodbury, Vermont Local Hazard Mitigation Plan** is hereby adopted as an official plan of the Town of Woodbury;
2. The respective officials identified in the mitigation action plan of the **Plan** are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and **Plan** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and

4. An annual report on the process of the implementation elements of the Plan will be presented to the Select Board by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed its signature and the corporate seal of the Town of Woodbury this 4th day of February 2019.

Select Board Chair

Select Board Member

ATTEST

Town Clerk