Town of East Montpelier, VT

Local Hazard Mitigation Plan

Prepared by the:
Town of East Montpelier
with assistance from the
Central Vermont Regional Planning Commission

Date of Town Adoption: December 2, 2019
Date of Final FEMA Approval:

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1. Introduction

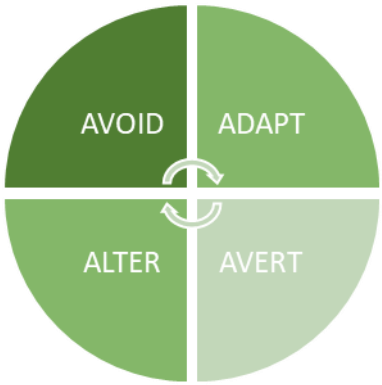
In accordance with the Stafford Act, municipalities may perform mitigation planning and be eligible to receive increased federal funding for hazard mitigation measures. (42 U.S.C. 5165).

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 East Montpelier 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[1] efforts, the Federal Emergency Management Agency (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.

[1] Project Impact was a national initiative started by the Federal Emergency and Management Agency (FEMA) in 1997 to help build disaster resistant communities. This federal initiative shifted the focus of emergency management from responding to disasters to helping to prevent potential damage by taking actions beforehand.

2. Purpose

The purpose of this Local Hazard Mitigation Plan is to assist the Town of East Montpelier in recognizing hazards facing the region and their community and identify strategies to begin reducing risks from acknowledged hazards.

The 2019 East Montpelier Local Hazard Mitigation Plan is an update of the Town's adopted 2013 Local Hazard Mitigation Plan approved by FEMA on March 1, 2013. This Local Hazard Mitigation Plan assists the Town to catalogue hazards facing the region and community, and to identify strategies that reduce risks from acknowledged hazards 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 into the plan, making it up to date, stronger, and more useful to Town officials and residents who will implement the actions and measures going forward. Implementation of this plan will make East Montpelier more resistant to harm and damages in the future, and will help to reduce public costs.

East Montpelier strives to address the strategies, goals and objectives of the 2018 State Hazard Mitigation Plan, including an emphasis on proactive pre-disaster flood mitigation for public infrastructure, appropriate floodplain and river management practices, and fluvial erosion risk assessment initiatives.

The 2019 East Montpelier Local Hazard Mitigation Plan is an update of the 2013 adopted plan. The plan consists of the modified, as described below, sections of the existing plan, which have been reorganized, and new sections:

- Information from the 2013 plan was updated.
- Hazards reflecting the community's priorities were updated.
- The Plan Update Process was updated.
- Plan Maintenance activities were updated.
- The Hazard Analysis Map was updated to reflect current information.
- The status of 2013 mitigation strategies was reviewed and documented.
- The new mitigation strategies section was updated and enhanced to reflect current priorities and intended actions of the community over the next five years.

3. Community Profile

3.1 Environment

East Montpelier is approximately 32-square miles in size and is located in the heart of Washington County. It is bordered by Worcester and Calais to the north, by Marshfield and Plainfield to the east, by Barre Town, Berlin and Montpelier to the south and Middlesex to the west. East Montpelier is characterized by its rural agricultural landscape of rolling hills and broad river valleys. The Town is located within the Winooski Valley watershed and major waterways include the Kingsbury Branch and the Winooski River which flows from Plainfield in the east, through the southern region of East Montpelier and into the City of Montpelier.

The major arterial road, Route 2, runs parallel to the Winooski River and provides regional access from Montpelier and Interstate 89 in the west to St. Johnsbury and Interstate 91 in the east. Route 14 is an additional arterial road which runs north to south through the eastern region of East Montpelier. East Montpelier, North Montpelier and East Montpelier Center are the three historic village settlements within the town boundaries.

3.2 Development Patterns

Housing data provided by the Vermont Housing Finance Agency[2] documents that the population of East Montpelier in 2017 was 2,596 people living in 1,192 housing units. According to the Town Plan, "East Montpelier is primarily a rural residential community, contributing its well educated labor force and an important segment of consumer demand to the surrounding region." The Town "provides only about 2.41 percent of the jobs in the region."

Development in East Montpelier continues to be dispersed rural residential. In the past 10 years, 122 housing units have been built, including a 6-unit condominium complex. In the past 15-20 years, four new roads have been built – Tay-Con Drive, Captain Kidd Road, Jordan Road, and Boulder Ridge Road. These new dead end development roads serve between four and eight residential units. The Town is interested in developing a highway ordinance that would cover all relevant elements, from public acceptance of new roads to curb cut maintenance responsibilities.

While development has increased in East Montpelier over the last ten years, the locations and low densities of these new developments have not caused any increases in vulnerability since the last plan.

[2] Vermont Housing Finance Agency (VHFA) was established in 1974 to finance and promote affordable housing opportunities for low- and moderate-income Vermonters.

3.3 Utilities and Facilities

East Montpelier has no municipal water or wastewater treatment facility, which limits large scale development. Most residents rely on private wells and ground-treatment septic systems with a few exceptions.

- There is one private water supplier, Crystal Springs Water System, which contains 115 connections. This serves East Montpelier Village and surrounding parcels. The water source is just east of Brazier Road on the Pratt parcel, runs down to the village and then out VT Rte. 14 S to include the upper village residences and the business district ending with Huntington Homes. Not all the parcels in the vicinity are on the water system as many have their own private wells. The Town created a fire district in 2010 with the intention to purchase and operate the water system. The fire district was formally dissolved (merged back with the town; town voters approved, followed by the VT Legislature) in 2017 after a failed attempt to purchase Crystal Springs.
- Some schools, apartment complexes and businesses either connect to systems in adjacent towns due to their proximity or have made investments in community systems to serve the development.

Electricity is provided by Washington Electric Co-op and Green Mountain Power (GMP). GMP primarily serves customers who are situated along the Route 2/Route 14 corridor, including North Montpelier and East Montpelier Village, as well as the East Montpelier Center area.

3.4 Public Safety

Police services are provided by the Vermont State Police. The Town has an elected constable.

In 2018, East Montpelier expanded ambulance service to cover the Town of Marshfield. The fire department currently serves Calais, East Montpelier, Plainfield and Marshfield providing Paramedic and Advanced Life Support services. The Town contracts with the East Montpelier Volunteer Fire Department to provide emergency services. The Department responds to fires in both East Montpelier and Calais. The Department operates from two locations: one on Templeton Road and one in East Montpelier Village. According to the 2018 East Montpelier Town Report the Fire Department responded to 673 calls during 2018.

The East Montpelier Town Plan includes descriptions, goals and actions in regards to water quality protection, fire protection and emergency services, and disaster planning. The current East Montpelier Land Use & Development regulations contain Flood Hazard Regulations, including river corridor protection. East Montpelier has an approved Local Emergency Management Plan adopted in 2019.

East Montpelier Fire Department (Photo provided by Bruce Johnson, Town & Zoning Administrator)

3.5 Emergency Relief & Assistance Funding (ERAF)

Vermont's Emergency Relief & Assistance Fund (ERAF) provides State funding to match FEMA Public Assistance grants following a federally declared disaster. In 2014, the ERAF criteria were revised to incentivize communities to be more proactive prior to disasters. The default rate for State contribution towards non-federal Public Assistance match following a declared disaster dropped to 7.5%, requiring municipalities to cover the other 17.5% for Public Assistance projects. Municipalities that take four proactive measures are awarded 12.5% State match. The measures are:

1. Participate in the National Flood Insurance Program (NFIP).
2. Adopt Town Road and Bridge Standards that meet or exceed the VTrans 2013 template.
3. Adopt a Local Emergency Management Plan which is renewed and adopted annually.
4. Adopt a Local Hazard Mitigation Plan approved by FEMA every five years.

Municipalities that wish to further decrease their cost share to 7.5%, with a 17.5% State match, must also meet one of the following criteria:

1. Adopt ANR's River Corridor bylaws, or

Planning Process Meeting Attendees

March 18, 2019 Meeting

Seth Gardner, SB Chair
Carl Etnier, SB
Kim Swasey, SB
Gene Troia, SB Vice-Chair
Amy Willis, SB
Bruce Johnson, TA & ZA
Jonathan DeLaBruere, CVRPC
Dan Currier, CVRPC
Julie Potter, PC Chair
Zach Sullivan, PC Member
Bill George, EMD
Ty Rolland, Fire Chief
Guthrie Perry, Road Foreman
Michael Duane, Moderator
Jon Boucher
Emily Goyette
Tim Lamson
Elliott Morse
Florence Morse

April 1, 2019 Meeting

Carl Etnier, SB
Kim Swasey, SB
Gene Troia, SB Vice- Chair
Amy Willis, SB
Bruce Johnson, TA & ZA
Julie Potter, PC Chair
Jack Zeilenga, Recreation Board
Eric Blaisdell, Times Argus
Guthrie Perry, Road Foreman
Janice Aldrich
Kate Bean
Michael Blanchard
Jason DeForge

PC = Planning Commission
SB = Selectboard
TA = Town Administrator
ZA = Zoning Administrator
EMD = Emergency Management Director

2. Enroll in the NFIP's Community Rating System (CRS)[3], whereby the community must earn credit under Activity 430.[4]

4. Planning Process and Maintenance

4.1 Planning Process

The Central Vermont Regional Planning Commission (CVRPC) coordinated the East Montpelier Local Hazard Mitigation Plan process. CVRPC contacted the Town Administrator (TA) and sent town-specific hazard mitigation material for review, including a survey about hazards and emergency planning. This survey was opened to townspeople on town forum day (March 2, 2019) and closed on March 18, 2019. There were 63 respondents.

After assessing the material, the TA and CVRPC staff held a meeting along with members of the community on March 18, 2019 at the East Montpelier Municipal Offices. Jonathan DeLaBruere of CVRPC summarized the hazard mitigation plan update process, gave a synopsis of the hazard mitigation survey results, and led a discussion on the assessment of and prioritization of hazards affecting East Montpelier. The meeting participants determined that the Town is most vulnerable to dam failures, flood/flash flood/fluvial erosion, hurricane/severe storms, and winter storms/ice storm in conjunction with power failure. The Town will focus most of its mitigation on flooding as it is the most common and damaging hazard.

The Selectboard was shown a draft hazard analysis map and was asked for input. Fire Department Chief Ty Rolland requested that the map show the dam inundation area from the Marshfield dam and the dry hydrants (non-pressurized), noting that there are dry barrel hydrants (pressurized) in town. There was also a discussion of the town's culvert and bridge inventory. The Selectboard reviewed desired mitigation actions listed in the 2013 plan and noted progress made on them.

[3] The NFIP Community Rating System (CRS) was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities exceeding the minimum NFIP standards. Any community in full compliance with the minimum NFIP floodplain management requirements may apply to join the CRS.

[4] Activity 430 (Higher Regulatory Standards) is the primary CRS activity for crediting floodplain development regulations that are more restrictive than the NFIP requirements.

Planning Process
Meeting Attendees

April 1, 2019 Meeting, continued
Bob Fitch
Alex Rob
Paul Winters
Mark Lane
Elliott Morse
Florence Morse

April 22, 2019 Meeting
Seth Gardner, SB Chair
Carl Etnier, SB
Kim Swasey, SB
Amy Willis, SB
Bruce Johnson, TA & ZA
Bonnie Waninger, CVRPC
Julie Potter, PC Chair
Stephen Mills, Times Argus
Ty Rolland, Fire Chief
Toby Talbot, EMD
Kerrie Garvey, Watershed Consulting
Kateri Gomez, Watershed Consulting
Jan Aldrich, Recreation Board
Kate Bean, Recreation Board
Emily Goyette
Mark Lane
Elliott Morse
Florence Morse
Greg Western, Cross Vermont Trails

May 20, 2019 Meeting
Seth Gardner, SB Chair
Carl Etnier, SB
Kim Swasey, SB
Gene Troia, SB Vice-Chair
Amy Willis, SB
Bruce Johnson, TA & ZA
Jonathan DeLaBruere, CVRPC
Bonnie Waninger, CVRPC

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During the April 1, 2019 meeting, the Selectboard worked with Planning Commission Chair Julie Potter to evaluate the probability of and potential damage from various types of hazards in town. This was in preparation for a discussion with members of the Emergency Management Committee and Jonathan DeLaBruere of Central Vermont Regional Planning Commission (CVRPC) at the Selectboard's April 22, 2019 meeting.

Prior to the April 22, 2019 meeting, Bonnie Waninger, Central Vermont Regional Planning Commission Executive Director, had reviewed the Selectboard's work with Julie Potter at its April 1, 2019 meeting, which included rating local hazards and updating a table with the status of mitigation actions planned in the previous plan iteration. Bonnie asked questions to clarify the work, and said that some other towns include out-of-town hazards in their plans. Ty Rolland and Toby Talbot said the only out-of-town hazard the fire department plans for is inundation from a collapse of the dam in Marshfield, and a response plan for that emergency is currently in place.

Bonnie encouraged the town to consider what to add to the plan, with four types of strategies generally used in hazard mitigation planning: Alter, avert, adapt, and avoid. She gave examples of each:

- Alter—raise house so it doesn't flood
- Avert – move house out of floodplain
- Adapt – house floods, but I move furniture up onto blocks
- Avoid – don't build house in floodplain

She left the town the homework of thinking between meetings about things to do in next five years, for the top five hazards. For example, since electrical outages from storms are concerns, we could work with Washington Electric on clearing trees in the right of way.

During the May 20, 2019 meeting, Bonnie and Jonathan guided the board through the actions necessary to finalize the mitigation strategies table. This table is essentially a list of mitigation projects that the town intends to accomplish over the next five years. This table not only identifies potential projects,

Planning Process
Meeting Attendees

May 20, 2019 Meeting, continued
- Sandy Conti, Town Constable
- Jean Vissering, PC
- Kim Watson, PC
- Terry Conti

July 1, 2019 Meeting
- Seth Gardner, SB Chair
- Kim Swasey, SB
- Amy Willis, SB
- Bruce Johnson, TA & ZA
- Julie Potter, PC Chair
- Jonathan DeLaBruere, CVRPC
- Bonnie Waninger, CVRPC
- Carolyn Shapiro
- Jon Boucher

July 22, 2019 Meeting
- Seth Gardner, SB Chair
- Carl Etnier, SB
- Kim Swasey, SB
- Gene Troia, SB Vice-Chair
- Amy Willis, SB
- Bruce Johnson, TA & ZA
- Julie Potter, PC Chair
- Jean Vissering, PC

October 7, 2019 Meeting
- Seth Gardner, SB Chair
- Carl Etnier, SB
- Gene Troia, SB Vice-Chair
- Amy Willis, SB
- Bruce Johnson, TA & ZA
- Ty Rolland, Fire Chief
- Zachary Maia, CVRPC
- Bonnie Waninger, CVRPC

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but also includes target timelines and grant options for the chosen projects. The group also reviewed the 2010 Winooski River Corridor Plan to gauge whether any of the suggested actions in the plan should be incorporated into the hazard mitigation plan, as they were for the 2013 plan.

The Selectboard also reviewed the latest draft hazard analysis map and made suggestions for improvements. The map contains a lot of detail, and can be hard to read even when printed full size, but the thought is that in PDF format, it will be easy to zoom in when viewing on a screen and to read the details.

Once the draft was updated, CVRPC placed a notice for public comments of the draft update on the CVRPC blog and newsletter. The draft update was also available at East Montpelier Municipal Offices, on the East Montpelier website and by request from CVRPC for public review and comments from 7/29/2019 to 8/28/2019. The announcement of the draft update in the CVRPC newsletter reached over 150 people and businesses in the Region's 23 towns, including the adjacent municipalities of Montpelier, Plainfield, Marshfield, Barre Town, Berlin, Middlesex, Worcester and Calais. Staff received comments from Vermont Emergency Management from a preliminary draft review and also from Ned Swanberg, Regional Floodplain Manager for the Central Vermont region. These comments are attached at the end of the plan. Public comments submitted in the future will be reviewed by the Town Administrator (and CVRPC staff dependent on funding) and attached as an appendix. In the future, the plan will be made available during Town Meeting Day and local meetings with State and local officials to allow for more public comment and review. The plan was issued an Approval Pending Adoption from Vermont Emergency Management on November 19, 2019. The Selectboard adopted the plan at their December 2, 2019 meeting.

Table 1: List of individuals who were invited to comment on the plan		
Organization	*Name, Position*	*Email*
Vermont Emergency Management (VEM)	Stephanie Smith, State Hazard Mitigation Planner	stephanie.a.smith@vermont.gov
Vermont Emergency Management	Lauren Oates, State Hazard Mitigation Officer	Lauren.Oates@vermont.gov
Vermont Emergency Management	Josh Cox, Critical Infrastructure Planner	josh.cox@vermont.gov
Central Vermont Regional Planning Commission	Jonathan DeLaBruere, Emergency Management Planner	delabruere@cvregion.org
Vermont Department of Environmental Conservation (DEC)	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	Eric Blatt, Division Director	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 (FPR)	Dan Singleton, Washington County Forester	dan.singleton@vermont.gov
Vermont Department of Environmental Conservation	Benjamin Green, Dam Safety Engineer	Benjamin.Green@vermont.gov
Town of East Montpelier	Bruce Johnson, Town & Zoning Administrator	eastmontadmin@comcast.net
East Montpelier-Calais Fire Department	Ty Rolland, Fire Chief	ty@blueridgeconstructionllc.com
Town of East Montpelier	Seth Gardner, Selectboard Chair	sethbgardner@hotmail.com

Table 1: List of individuals who were invited to comment on the plan		
Organization	*Name, Position*	*Email*
Town of East Montpelier	Julie Potter, Planning Commission Chair	julianapotter@yahoo.com
East Montpelier Elementary School	Alicia Lyford, Principal	alyford@u32.org
U-32 Middle & High Schools	Steven Dellinger-Pate, Principal	sdpate@u32.org
Washington Central Supervisory Union	Debra Taylor, Interim Superintendent	dtaylor@u32.org
Green Mountain Power	Brenda Spafford	Brenda.Spafford@greenmountainpower.com
Washington Electric Coop, Inc.	Dan Weston, Director Engineering & Operations	dan.weston@wec.coop
Washington County Sheriff's Department	W. Samuel Hill	samuel.hill@vermont.gov
Vermont State Police, Middlesex Barracks	Lieutenant David White	david.white@vermont.gov
Local Emergency Planning Committee 5	Katina Johnson, Chair	Kjohnson_398@comcast.net

Table 2: List of surrounding communities who were invited to comment on the plan			
Municipality	*Person*	*Role*	*Email*
Town of Barre	Donna Kelty	Town Clerk	dkelty@barretown.org
Town of Berlin	Rosemary Morse	Town Clerk	berlintownclerk@berlinvt.org
Town of Calais	Judy Fitch Robert	Town Clerk	calais.townclerk@gmail.com
Town of Marshfield	Bobbi Brimblecombe	Town Clerk	clerk@town.marshfield.vt.us
Town of Middlesex	Sarah Merriman	Town Clerk	mdxclerk@comcast.net
City of Montpelier	John Odum	City Clerk	jodum@montpelier-vt.org
Town of Plainfield	Linda Wells	Town Clerk	l.wells@plainfieldvt.us
Town of Worcester	Katie Winkeljohn	Town Clerk	worcestertclerk@comcast.net

4.2 Existing Hazard Mitigation Programs, Projects & Activities

The ongoing or recently completed programs, projects and activities are listed by mitigation strategy and were reviewed for the development of the plan. The Town Plan (2018), Town Report (2018), Land Use regulations (2015), Local Emergency Management Plan (2019), CVRPC

Regional Plan (2018), and past newspaper articles were reviewed for pertinent information. The Upper Winooski Corridor Plan (2008) and VT State Hazard Mitigation Plan (2018) were reviewed as well for information and future mitigation projects. Information from these sources is incorporated into appropriate sections of the plan.

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing and Funding	Ability to Expand/Improve upon
Community Preparedness Activities	Program – East Montpelier's Local Emergency Management Plan (LEMP) is updated annually.	Updated by Town and Zoning Administrator, Bruce Johnson, and Emergency Management Directors, Bill George and Toby Talbot. Other work provided by Selectboard and CVRPC.	This document is reviewed and updated annually and sent to Vermont Emergency Management for their records. As the current program works well, there is no need to improve on the process or expand it.
	Program – Capital Reserve Plan is maintained by the Town on an annual basis.	Town and Zoning Administrator, Bruce Johnson, and Selectboard.	This document is a multi-year plan that plans for and prioritizes the acquisition and maintenance of capital assets by the Town. As it is readopted annually, this is a time to gauge the effectiveness of the plan and make changes.
	Action – U-32 High School and East Montpelier Elementary School have their own response plans.	Town Administration working with Assistant Principal, Jody Emerson.	Response plans should be carried out and maintained by the schools, and do not need to be improved or expanded upon at this time.
Insurance Programs	Program – East Montpelier will remain as a participant in the National Flood Insurance Program (NFIP).	Town Administration	As long as East Montpelier remains as a participant in NFIP, this program will not need to be improved or expanded upon.
Land Use Planning	Program – East Montpelier will maintain their municipal plan, last adopted in 2018.	Town and Zoning Administrator, Bruce Johnson, with assistance from Planning Commission, Selectboard, and CVRPC.	The current municipal plan is valid through 2026. In 2018, the plan was adopted by the Town and approved by CVRPC, which means that the plan meets all state requirements.

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing and Funding	Ability to Expand/Improve upon
	Program – East Montpelier will implement and maintain their Village Master Plan, last adopted in 2017.	Town and Zoning Administrator, Bruce Johnson, with assistance from Planning Commission, Selectboard, and CVRPC.	East Montpelier adopted their Village Master Plan in 2017, and will use this to guide development in their historic village. As conditions change, the Town may wish to update the plan, but there is no danger to emergency planning by leaving the plan as-is.
	Program – East Montpelier will continue to administer and maintain their zoning regulations, last amended in 2015.	Town and Zoning Administrator, Bruce Johnson, with assistance from Planning Commission, Selectboard, and CVRPC.	East Montpelier's zoning regulations include Flood Hazard Regulations (Article 9) which satisfy the ERAF funding requirement for River Corridor Bylaws. At this time, this document does not need improving nor expanding.
Hazard Control and Protection of Critical Infrastructure & Facilities	Program: Maintenance Programs (Short Bridge Inventory & Culvert Inventory)	CVRPC, Town Administration	Maintenance programs may be improved upon by updating the inventories whenever possible.
	Action: Bridge and culvert structures grant	Town Administration	The Town applies for such grants on an annual basis and the grant methodology cannot be expanded or improved upon at this time.
	Action: Emergency Shelters – East Montpelier Elementary School in East Montpelier (Local) and Barre Auditorium in Barre City (Regional)	School District, East Montpelier Town Administration, Barre City Administration	The maintenance of a local and regional shelter do not need to be improved upon, but the Town may wish to create another local shelter in the future.
	Action: Back-up generators – Fire Department and U-32 school	School District, Fire Department, and Town Administration	Backup generators should be maintained and do not need to be improved currently.
Education/Public Outreach	Program: Fire safety educational programs	Fire Department and Town Administration	Volunteer Fire Department holds fire safety educational programs on a regular basis,

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing and Funding	Ability to Expand/Improve upon
			and is currently at capacity, so this action is not able to be expanded or improved upon at this time.
	Program: Motor vehicle accident response training	Fire Department and Town Administration	Motor Vehicle accident response trainings are held by the volunteer Fire Department on a regular basis, and due to capacity constraints, cannot be expanded or improved upon at this time.
	Program: First responder CPR & hazmat trainings	Fire Department and Town Administration	First responder CPR and hazmat trainings are held by the volunteer Fire Department regularly and due to capacity constraints, cannot be expanded or improved upon at this time.
	Program: School Fire Safety Program	Fire Department, School District, and Town Administration	School Fire Safety Programs are held on a regular basis by the volunteer Fire Department, and due to capacity constraints, cannot be expanded or improved upon at this time.

4.3 Plan Maintenance

The process of evaluating and updating the plan will include continued public participation through public notices posted on the municipal website, and in the East Montpelier Signpost, Times Argus and CVRPC newsletter and blog inviting the public to the scheduled Selectboard (or specially scheduled) meeting. Additional stakeholders invited to the meeting will be:

- Owners of large businesses located throughout town
- VT Agency of Natural Resources (VT ANR), which can provide assistance with NFIP outreach activities, models for stricter floodplain zoning regulations, delineation of fluvial erosion hazard areas, and other applicable initiatives, and

- Central Vermont Regional Planning Commission, which is familiar with disaster preparedness in adjacent communities and can provide assistance with floodplain regulations.

These efforts will be coordinated by the Town Administrator and Selectboard.

Monitoring of plan progress, implementation, and the 5-year update process will be undertaken by the Town Administrator and Planning Commission. 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. The plan is to be a "living document" to allow for new actions to be identified in the five year interim period and amended without formal re-adoption at an annual April Selectboard meeting. Prior to the end of the five year period, the plan will undergo a formal update and be submitted to FEMA for re-adoption following the process outlined the schematic found in the Attachments section.

East Montpelier has incorporated mitigation planning into their long term land use and development planning documents. When updating the 2018 Municipal Plan, the Town created a Hazard Mitigation and Flood Resilience section that is aimed at reducing or eliminating the long-term risk to people and property from natural and human-caused hazards and their impacts. The Town has also considered the Upper Winooski Corridor planning documents for ideas on future mitigation projects and hazard areas. Moving forward, it is the intent of the Town to integrate this local hazard mitigation plan's goals into all planning processes undertaken by the town, including, but not limited to, municipal plan amendments, zoning bylaw amendments, and enhanced energy planning.

4.4 Status of Prior Plan's Mitigation Actions

Table 3: Mitigation actions from the 2012 LHMP and 2019 completed and in-progress actions

2013 Mitigation Action	*2019 Status*
Upgrade and expansion of culvert on Kelton Road	No action – Upgraded after 2011, but hasn't been expanded due to financial constraints
Upgrade and expansion of culvert on Quaker Road	Completed as of 2018
Upgrade and expansion of bridge on Coburn Road; Reengineering of section of Coburn Road	No action – Repaired after 2011, but hasn't been expanded due to financial constraints
Upgrade and expand culverts and stabilize hillside on Muddy Brook	Completed as of 2017

Table 3: Mitigation actions from the 2012 LHMP and 2019 completed and in-progress actions	
2013 Mitigation Action	*2019 Status*
Work with Calais to improve communications regarding Curtis Pond Dam and Adamant Dam issues	Ongoing
Develop inundation model with Green Mountain Power	Report from Green Mountain Power sent annually to East Montpelier
Implement strategies outlined in Upper Winooski River Corridor Plan	No action due to financial constraints
Install generators for Town Office, Town Garage, and Elementary School	Elementary school completed in 2014 and town garage completed in 2018
Provide training to residents on how to insulate homes (pipes, attics) for extreme cold spells	Ongoing
Upgrade electrical systems in municipal buildings and shelters to prevent surge/equipment damage from fluctuating current during ice and wind storms	Shelter has been completed. No action on municipal buildings
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	In compliance with NFIP
Narrowband upgrade for all town radios and installation of repeaters	Narrowband radios for the highway department completed, but no installation of repeater

East Montpelier is less vulnerable in 2019 than in 2013, because of the upgrading and expansion of the culvert on Quaker Road, the upgrading and stabilizing of the hillside on Muddy Brook, the annual reports on inundation flooding modeling by Green Mountain Power, and the installation of two generators at the school and town garage.

5. Community Vulnerability by Hazard

5.1 Hazard Identification and Analysis

Table 5 identifies natural disasters discussed and the worst threat hazards 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. Greater explanations and mitigation strategies of "non-worst threat" hazards can be found in the State of Vermont's Hazard Mitigation Plan.

Table 4: Hazard Assessment Ranking Criteria		
	Frequency of Occurrence: Probability of a plausibly significant event	**Potential Impact:** Severity and extent of damage and disruption to population, property, environment, and the economy.
1	Unlikely: <1% probability of occurrence 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 change in the 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

Table 5: 2019 East Montpelier Hazard Table							
Hazard Impact	**Probability**	**Potential Impact**					**Score***
		Infrastructure	Life	Economy	Environment	Average	
Fluvial Erosion	4	4	3	4	4	3.75	15
Inundation Flooding	3	4	3	4	2	3.25	9.75
Wind	4	2	2	3	2	2.25	9
Ice	3	3	3	3	2	2.75	8.25
Invasive Species	4	1	2	2	3	2.0	8
Snow	4	1	2	2	2	1.75	7
Cold	3	1	3	2	2	2.0	6
Landslides	3	2	2	2	2	2.0	6
Wildfire	2	2	3	2	2	2.25	4.5
Infectious Disease Outbreak	2	1	4	3	1	2.25	4.5
Heat	2	1	3	2	2	2.0	4
Drought	2	1	2	2	3	2.0	4
Hail	3	1	1	1	1	1.0	3
Earthquake	2	1	1	1	1	1.0	2

*Score = Probability x Average Potential Impact

The following hazards were found to be most significant for the Town of East Montpelier:

- Fluvial Erosion
- Inundation Flooding
- Wind Storms
- Ice Storms
- Invasive Species

Those hazards not found to pose the greatest threat to East Montpelier such as snow, cold, landslides, wildfire, infectious disease outbreak, heat, drought, hail, and earthquake are not addressed in this Plan and were not included 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, East Montpelier did not include the following hazards in the risk and vulnerability assessment due to the low occurrence, low vulnerability, and or lack of geographic proximity: civil disturbance, coastal erosion, expansive soils, karst topography, sinkholes, tsunami, and volcano.

Due to the frequent and severe nature of flooding events, East Montpelier believes fluvial erosion is the worst natural hazard within the town and will focus on mitigation efforts to reduce the impacts from such events. A discussion of each worst and moderate hazard is included in the proceeding subsections and a map identifying the location of each hazard is attached (See map titled *Hazard Analysis Map.*) Each subsection includes a list of past occurrences based upon County-wide FEMA Disaster Declarations (DR-#) plus information from local records, a narrative description of the hazard and a hazard matrix containing the following overview information.

Since the last plan in 2013, Dam Failure and Landslides have been removed from the list of priority hazards, but flooding, wind, and ice storms have stayed. The 2019 Plan includes a discussion of invasive species, which the planning team decided to elevate due to the relatively recent increase of damages and illnesses caused by them.

6. Threat Hazards

6.1 Fluvial Erosion/Inundation Flooding

The following history of occurrence list is compiled from the National Oceanic and Atmospheric Administration (NOAA) Storm Events Database, and the FEMA Disaster Declaration site. Local river gauges were also used in the creation of this list. The closest river gauge is located in Montpelier, approximately 8 miles downstream.

Table 8: Fluvial Erosion/Inundation Hazards Occurrences			
Date	*Event*	*Location*	*Extent*
7/1/2017	Flash Flood	Washington County	Heavy rain showers and thunderstorms moved across central VT delivering very heavy localized rainfall.
8/17/2016	Flash Flood	Washington County	Rainfall totals of 3 to 5 inches in a few hours caused flash flooding in central Washington County.
7/19/2015	Flash Flood	Washington County	Thunderstorms with heavy rainfall moved over northeast Washington County Vermont repeatedly for several hours.
4/15/2014	Flood	Washington County	*DR-4178.* Snowmelt from a late season snowpack combined with

Table 8: Fluvial Erosion/Inundation Hazards Occurrences			
Date	*Event*	*Location*	*Extent*
			heavy rain produced widespread flooding
7/3/2013	Flash Flood	Washington County	*DR-4140.* Produced over two inches of rain in one to two hours, resulting in flash flooding.
8/28/2011	Flash Flood (Tropical Storm Irene)	E. Montpelier, Washington County	*DR-4022*. 5-7" of rain. Winooski River crested at 19.05 ft. in Montpelier. Flood stage is 15 ft.
5/26/2011	Flash Flood	E. Montpelier, Washington County	*DR-4001*. 4" of rain; Montpelier gauge at 17.59 ft.
4/23-5/9/2011	Flash Flood	Washington County	*DR-1995*. East Montpelier not affected
8/2/2008	Flash Flood	Washington County	Not a historical crest; data gap
7/11/2007	Flash Flood	Northeast Washington County	*DR-1715*. 3-6" of rain in 2 hours, not a historical crest
6/26/2006	Flood	Washington County	3-4" of rain, not a historical crest
9/16/1999	Tropical Storm Floyd	E. Montpelier, County Wide	*DR-1307*. 5-7" rain county wide. Montpelier flood gauge at 9.30 ft.
6/27/1998	Flash Flood	County Wide	*DR-1228.* 3-6" of rain over 2 day period, not a historical crest
6/12/1996	Flash Flood	East Montpelier	*DR-1124.* Data gap - $15k damage, not a historical crest
8/5/1976	Flood	County Wide	*DR-518.* Montpelier flood gauge at 12.31 ft.
6/30/1973	Flood	County Wide	*DR-397.* Montpelier gauge at 17.55 ft.
9/22/1938	Flood/Hurricane	E. Montpelier, County Wide	Montpelier flood gauge at 14.11 feet
11/03/1927	Flood	E. Montpelier, County Wide	Montpelier flood gauge at 27.10 feet

Flooding/flash flooding/fluvial erosion is East Montpelier's most commonly recurring hazard.

- FLOODING is the overflowing of rivers, streams, drains 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 the process of natural stream channel adjustments. Fluvial erosion causes erosion of sediment in some areas, while causing aggradation of sediment in other. Fluvial erosion processes occur more quickly and severely during flood events.

East Montpelier is located in the Upper Winooski watershed, a sub-watershed of the Winooski River. East Montpelier is a mix of rolling hills with some steep valley approaches towards the river. The water within East Montpelier primarily drains into the Upper Winooski River. The land uses are a mix of large hay farms and pastures, coniferous forest, as well as broadleaf forest. There are three small villages within East Montpelier, with limited commercial development. Residential development is scattered and rural.

East Montpelier participates in the National Flood Insurance Program (NFIP) and has adopted flood hazard regulations with river corridor protection, as well as adopted stream buffer zones. The Flood Rate Insurance Maps (FIRM) of the 100-year floodplain along the Upper Winooski designate floodplain areas through East Montpelier. Based on results of overlaying East Montpelier's current FIRMs with the location of E911 points, 31 structures and 281 properties (1,114 acres) are located within the NFIP's designated 100-year floodplain. There are no repetitive loss properties in East Montpelier. The effective FIRM date is 3/19/2013. The estimated loss for a severe flooding event for all properties within the Town's 100-year floodplain is approximately $34,225,800. East Montpelier has 16 active NFIP policies in force, for a total coverage of $2,578,800.

The Town's Conservation Overlay district limits development in certain areas to protect natural resources and in some places may extend beyond NFIP floodplain boundaries. Stream buffers of 50 feet from Town designated waters also limit some infringement on floodplain areas. Development is limited within the vegetated buffer, and the buffer's purpose is to prevent soil erosion, protect wildlife habitat and maintain water quality. There are 54 properties totaling 314 acres within the area mapped by the State of Vermont as a fluvial erosion hazard zone. The total value of these properties is $6,577,200.

The Zoning Administrator is responsible for enforcement of flood hazard regulations and development in the Conservation Overlay District. The Town has not reported any flood hazard regulation compliance issues. There have been no new structures built in the floodplain. Properties in the floodplain that are undergoing a change of use have permits reviewed and issued by the Development Review Board. Also, the Town has created a map that compares the old and new draft floodplain to identify structures that weren't previously in the floodplain so that owners may obtain flood insurance.

Specific extent data for flood depth levels in East Montpelier is lacking as the closest flood gauge is located in Montpelier. During Tropical Storm Irene, the Montpelier flood gauge was 4 feet above flood stage. The worst flooding event in East Montpelier's history was the 1927 event.

However, exact data from that event is not available. In 1927 event, the Montpelier flood gauge was at 27.10 feet. Since the 1927 flood, a number of flood control dams have been installed in the region to prevent the same flooding extent. During Irene, Coburn Road experienced 8 feet of flooding, while the Towne Hill Road area experienced 5 feet of flooding. This is an estimate of the worst extent. Lesser but more regular flooding occurs in East Montpelier, with generally 1 foot of water in areas designated on the hazard analysis map. For the next update, East Montpelier can better monitor flood waters by having individuals record flood water levels and submit the data to the Town Administrator for the Town's records.

East Montpelier incurred damages from flooding in the spring 2011 floods and Tropical Storm Irene. Damages from these floods are outlined in the Hurricane/Tropical Storm/Severe Storm hazard analysis. The hazard analysis map identifies flooding locations as well as future hazard mitigation grant program projects.

The Upper Winooski Corridor Plan is a valuable tool to help restore the river's health and prevent future flooding impacts. Mitigation and restoration strategies for East Montpelier's section of the Upper Winooski are attached as an appendix for the Town to refer to if future project ideas area needed.

Table 9: Flood/Flash Flood/Fluvial Erosion Hazard Matrix					
Hazard	*Location*	*Vulnerability*	*Extent*	*Impact*	*Probability*
Flood/flash flood/fluvial erosion	Along Upper Winooski, see roads in Hurricane/ Tropical Storm/Severe Storms section	Culverts, bridges, roads, private property within and adjacent flood erosion hazard areas of concern.	6" of rain in 24 hrs., 8 feet flooding on Coburn Rd, 5 feet flooding Towne Hill Rd, 1-2 ft. in low lying area	$310,000 + for damages in May and August 2011	Highly Likely

6.2 Wind Storms

Table 10: Wind Storm Hazards Occurrences			
Date	*Event*	*Location*	*Extent*
6/18/2018	Thunderstorm	Washington County	Several small lines of thunderstorms moved across the state causing some thunderstorm wind damage
10/30/2017	High Wind	East Montpelier, County Wide	*DR-4356*. Sustained winds of 25 to 35 mph with frequent wind gusts of 50 to 70 mph occurred. 30% of the

Table 10: Wind Storm Hazards Occurrences			
Date	*Event*	*Location*	*Extent*
			power grid or >100,000 customers were without power.
7/8/2017	Thunderstorm	Washington County	Scattered thunderstorms developed and moved across the state with a few producing isolated damaging winds
7/8/2014	Thunderstorm	Washington County	Scattered to widespread wind damage across portions of Vermont. Much of the wind damage was tree and utility line damage
6/2/2013	Thunderstorm	Washington County	Widespread thunderstorms with pockets of damaging winds and large hail. Damage occurred on Route 2 corridor between Montpelier and Lunenburg. At the peak of the event, roughly 20,000 customers had lost power.
9/8/2012	Thunderstorm	Washington County	Southerly winds of 20 to 30 mph with frequent gusts in excess of 40 mph across the region
7/4/2012	Thunderstorm	Washington County	Widespread wind damage and frequent lightning with several reports of scattered trees and power lines downed by thunderstorm winds. 65 knots reported.
7/06/2011	Thunderstorm	East Montpelier, County Wide	50 knot winds; 15,000 people in VT lost power
5/26/2011	Hail/Thunderstorms/Flash Flooding	East Montpelier, County Wide	*DR-4001.* 3-5” of rain, 1” hail, 50 knot winds, 25,000 customers lost power in VT. Montpelier gauge at 17.59 ft.
8/9/2010	Thunderstorm/ Wind/Hail	Worcester (adjacent town)	50 knot winds
7/21/2010	Hail	East Montpelier, County Wide	1” Hail
7/18/2008	Hail	East Montpelier, County Wide	1” Hail, 30 knot winds
7/9/2007	Hail, thunderstorms	East Montpelier, County Wide	DR1715 - Baseball sized hail

Table 10: Wind Storm Hazards Occurrences			
Date	*Event*	*Location*	*Extent*
6/19/2006	Hail, thunderstorms	East Montpelier, County Wide	50 knot winds
6/9/2005	Severe thunderstorms	Calais (adjacent town)	Downed power lines, 60 knot winds
9/16/1999	Tropical Storm Floyd	Statewide	*DR-1307*. Tropical storm winds and flooding. Montpelier flood gauge at 9.30 ft.
6/17/1998	Severe Storms	East Montpelier, County Wide	*DR-1228*. 3-6" of rain, not a historical crest in Montpelier
7/15/1997	Severe Storms	County Wide	3-5" of rain
5/19/1982	Thunderstorm winds	East Montpelier, County Wide	56 knot winds
7/3/1964	Hail	County Wide	1.5" hail
9/22/1938	Hurricane	Statewide	Category 1 force winds

Hurricanes and tropical storms are violent rain storms with strong winds that have large amounts of rainfall and can reach speeds up to 200 mph. Hurricane season begins in June and continues through November. These types of storms originate in the warm waters of the Caribbean and move up the Eastern seaboard where they lose speed in the cooler waters of the North Atlantic. A severe thunderstorm is a thunderstorm that contains any one or more of the following three weather conditions: hail that is 3/4 of an inch or greater in diameter, winds 58 miles per hour or greater, and/or tornadoes. Severe storm events can occur late spring and early summer as temperatures increase in the summer season. The frequency and intensity of hurricanes, tropical storms, and severe storms is expected to increase with climate change.

Similar to flooding, the extent of severe storms is not well documented in the Town of East Montpelier. The impact of storms is usually flood related. See flood extent description in flood section above. Flooding impacts areas along the Winooski River and roads listed in the table at the end of the analysis. Wind impacts are town wide. Wind extent from storms is not well documented as there is no monitoring station in East Montpelier. Estimates for wind are gathered from county wide data off the NCDC website. An estimate of the worst anticipated wind extent in East Montpelier based on past occurrences would be Category 1 force hurricane winds and H8 hail according to the Hail/Torro scale. In the future, East Montpelier could consider installing a monitoring station to better gather data for wind events. Wind events can be recorded using the Beaufort or Saffir-Simpson wind scales. Hail events can be recorded using the Torro/Hailstorm Scale.

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

Figure 1: Beaufort Wind Scale

Table 11: Saffir-Simpson Hurricane Wind Scale				
Hurricane Classification				
Strength	**Wind Speed (Kts)**	**Wind Speed (mph)**	**Pressure (Millibars)**	**Pressure (Inches of Mercury)**
Category 1	64-82	74-95	>980	28.94
Category 2	83-95	96-110	965-979	28.50-28.91
Category 3	96-113	111-130	945-964	27.91-28.41
Category 4	114-135	131-155	920-944	27.17-27.88
Category 5	>135	>155	919	27.16
Tropical Cyclone Classification				
Tropical Depression		20-34 Kts		
Tropical Storm		35-63 Kts		
Hurricane		>64 Kts		

Table 12: Hailstorm Intensity Scale		
T#	**Wind Speed (mph)**	**Damage**
0	39-54	Loose litter raised, twigs snapped, crop trails
1	55-72	Minor shed damage, lawn chairs raised
2	73-92	Mobile homes displaced, big branches busted
3	93-114	Mobile homes overturned, big trees uprooted
4	115-136	Mobile homes destroyed, house rafters exposed
5	137-160	Cars levitated, house walls standing
6	161-186	Heavy vehicles lifted, house roofs/walls off
7	187-212	Frame house demolished, trains overturned
8	213-240	Steel-frame buildings buckled, cars hurled far
9	241-269	Trains hurled long way, complete de-barking
10	270-299	Steel-reinforced concrete buildings severely damaged

A severe wind storm struck the area on October 30, 2017, resulting in downed power lines and uprooted trees littered across roads throughout town. Power outages affected the entire region,

with some areas of East Montpelier without power for over a week. FEMA reimbursed the town $13,000 for emergency debris clean-up after the event.

On August 28, 2011, Tropical Storm Irene hit Vermont and deposited 4-5" of rain over East Montpelier. The Town performed over $35,000 of road repairs as a result of the storm. Roads that received the greatest damage were: Coburn Road (and covered bridge), Quaker Road, Cherry Tree Hill Road, Cate Farm Road (and bridge), and Muddy Brook Road. Irene left the Town without power for 3 days.

East Montpelier infrastructure incurred $275,000 in damage during the May 28, 2011 severe storm event. The roads most severely damaged were: Brazier Road, Butterfield Road, Cherry Tree Hill Road, Clark Road, Coburn Road, East Hill Road, Factory Street, Green Road, Guyette Road, Hammett Hill Road, Kelton Road, Muddy Brook Road, Quaker Road, Towne Hill Road, Bliss Road, North Street, Perkins Road, Center Road, Lyle Young Road, Putnam Road, Murray Road, McKnight Road, and Snow Hill Road.

In a July/August 2008 storm event, the town was hit with a series of severe storms and again lost power. Roads that were damaged included: Clark Road, Bliss Road, Brazier Road, Cherry Tree Hill Road, Lyle Young Road, Muddy Brook Road, and Green Road. FEMA reimbursed the Town for $27,000 worth of culvert and road damages in the Towne Hill Road area.

The Town also suffered significant road damage from flash floods during the July 9-11, 2007 storm event. FEMA reimbursed the Town for $14,000 in damages to Horn of the Moon Road, Center Road, Jacobs Road, County Road, and Towne Hill Road.

In May 2005, a microburst took down multiple trees in the areas of Chickering Road, North Street, and Horn of the Moon. The homes in this area lost power. The incident was very isolated.

In 1999, Tropical Storm Floyd passed through Vermont. The primary impact from Floyd was downed trees and power lines due to high winds. 5-7" of rain fell over the Central Vermont Region; however, flood impacts were offset by drought conditions caused earlier in the year.

Table 11: High Wind Hazard Matrix

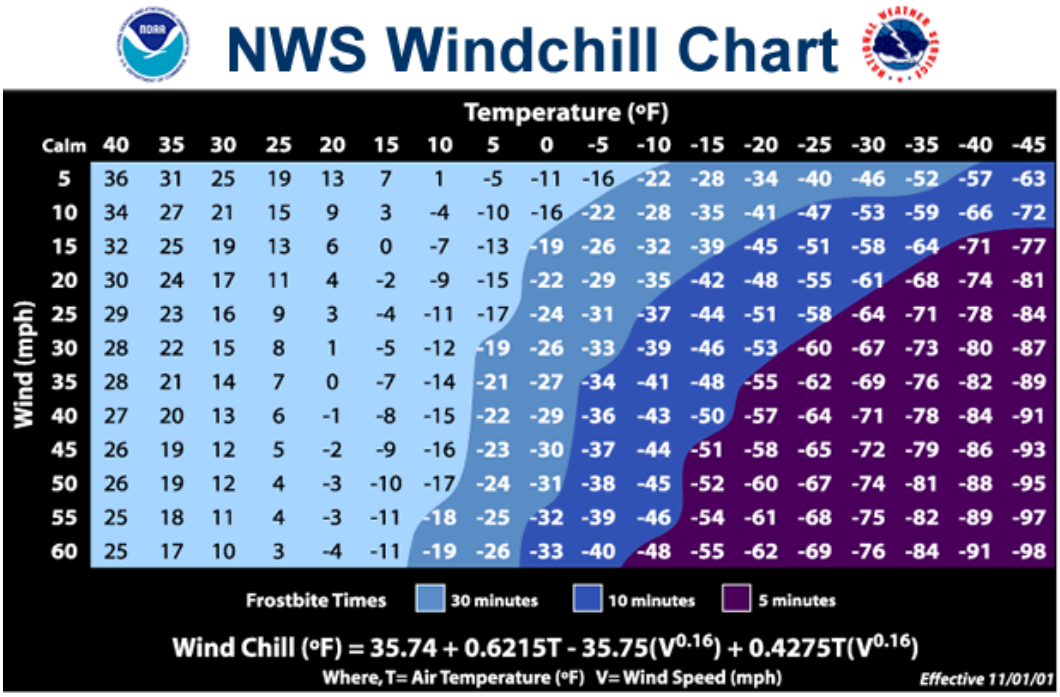
Hazard	*Location*	*Vulnerability*	*Extent*	*Impact*	*Probability*
Hurricane / Tropical/ Severe Storms	Town Wide for Wind impacts; Flooding – Clark Rd, Bliss Rd, Brazier Rd, Cherry Tree Hill Rd, Lyle Young Rd, Muddy Brook Rd, Green Rd., Horn of the Moon Rd, Center Rd, Jacobs Rd, County Rd, and Towne Hill Rd.	Large trees along roads and utility Right-Of-Ways, as well as culverts and bridges	Tropical Storm/Cat 1 hurricane wind speeds during Irene and Floyd; 5-7" of rain; H8 hail	$310,000 + for damages in May and August 2011	Highly Likely

Table 11: High Wind Hazard Matrix					
Hazard	*Location*	*Vulnerability*	*Extent*	*Impact*	*Probability*
		across Town.			

6.3 Ice Storm

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. An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. The loss of power is concerning for East Montpelier as there have been instances where power has not been restored within 72 hours. These accumulations of ice also make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of ¼" or greater. 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.

The physical impacts of winter storms are town wide due to the expansive nature of winter storms. For the next plan update, East Montpelier will more closely monitor winter storms to determine the worst impacts possible on the Town. Based on past occurrences, the worst anticipated winter weather East Montpelier could experience would be 2-3' in 24 hours of snow with more at higher elevations and several days of power outages. The worst recent storms were in March 2011 and February 2006. Scales to measure the extent of wind storms are:



One of the major impacts 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.

Additionally, sensitive populations such as the older persons or persons with disabilities may be susceptible to extreme cold when power is lost and heating systems are run on electricity (versus gas or natural fuels). If power is lost, some populations may need to be relocated to areas with power so that medical equipment can function. Additionally limited mobility of some persons may make it difficult to relocate in general or in times of emergencies. The Town encourages neighbors to check on those neighbors who they may believe to be at risk during times of emergency. The Fire Department also has a list of those with medical needs. In the future, the Town can map the location of sensitive populations and trouble spots on roads that reach those populations to identify additional routes. Also, the Town can continue to provide outreach and education of the impacts of winter storms to these populations.

Other major impacts include closed roads, restricted transportation and large buildings collapsing under the weight of heavy snows.

As a result of the Valentine's Day storm in 2006, power was out for extended days, and two privately owned barns collapsed due to heavy snow loads. Route 2, a major thoroughfare, was

closed for about half of the day. Ice was a major factor in the delay of Route 2 opening. No public shelters were opened. The Town encouraged those without power to seek shelter with friends and family.

By observing winter storm watches and warnings, adequate preparations can usually be made to lessen the impact of snow, ice and sleet, and below freezing temperature conditions on the Town of East Montpelier. Providing for the mass care and sheltering of residents left without heat or electricity for an extended time and mobilizing sufficient resources to clear broken tree limbs from roads, are the primary challenges facing community officials. East Montpelier should plan and prepare for these emergencies. That planning and preparedness effort should include the identification of mass care facilities and necessary resources such as cots, blankets, food supplies and generators, as well as debris removal equipment and services. Sheltering areas for East Montpelier include East Montpelier Elementary School and the Barre Auditorium facility in Barre City. The Town encourages residents who are in remote locations to be equipped with generators and backup fuel supplies in the event of prolonged power outages and travel restrictions.

Table 13: Ice Storm Hazard Matrix					
Hazard	*Location*	*Vulnerability*	*Extent*	*Impact*	*Probability*
Extreme Cold/Winter or Ice Storm in conjunction with power failure	Town Wide	Older persons & persons with disabilities populations, remote structures, old/under insulated structures, utilities, trees	18+" snow in March 2011 storm in 24 hrs.	Additional sheltering/ plowing/ emergency services costs for town - $15,000	Likely

6.4 Invasive Species

Invasive species are plants, animals, and other organisms that are introduced to a non-native ecosystem and also cause harm to the environment, economy, or human health. They are primarily spread by human activities that are introduced intentionally for reasons like agriculture, medicine, sport, decoration, land stability, and biological control.

<u>Emerald Ash Borer</u>

As of June 2019, emerald ash borer (EAB), a destructive forest insect from Asia, had been confirmed in seven Vermont towns: Orange, Plainfield, Barre, Groton, Montpelier, Stamford, South Hero, and Bristol.

Figure 8: Emerald Ash Borer Agrilus planipennis

Photo Credit: VT Urban & Community Forestry

EAB overwinters as larvae under the bark of ash trees where it feeds on the inner bark tissue. Once infested, ash trees rapidly decline and die in 1-5 years, if not treated, and may become a hazard to public safety. EAB is known to be established in 34 states and four Canadian provinces. It is responsible for widespread decline and mortality of hundreds of millions of ash trees in North America. Three species of ash trees - Green Ash (Fraxinus pennsylvanica), Black Ash (Fraxinus nigra), and White Ash (Fraxinus americana) – are found in Vermont.

Ash trees comprise approximately 5% of Vermont forests. They also are a very common and important urban tree. EAB threatens all three species of Vermont's ash trees. It could have significant ecological and economic impacts. There are no proven means to control EAB in forested areas, though individual trees can sometimes be effectively treated. An inventory will facilitate realistic management of EAB by prioritizing removals, identifying trees suitable for treatment, and budgeting for tree treatment or removal. Upon completion of an inventory, municipalities are urged to transition this collected data into an EAB Management Plan where they will identify the most appropriate approach to take including removing the tree, having it treated, or letting it succumb to EAB and fall on its own.

Figure 9: EAB movement under the bark of an ash tree

Photo Credit: VT Urban & Community Forestry

Vermont towns should understand their public ash tree population, including ash trees:

- In the right-of-way in town centers (street trees) and in high-use areas
- In parks, town greens, or other town-owned recreational areas

- In the right-of-way on rural roads
- In natural areas, i.e. town forests, that could impact public safety if diseased or dying, such as those along trails
- On private land that impact town properties or the town right-of-way, or are a priority for preservation

The Vermont Urban and Community Forestry program offers annual grants to support the development of sustainable urban and community forestry programs at the local level. This funding should be considered seed money to help communities care for tree canopy and foster tree stewardship by taking the necessary actions to develop and sustain a community-wide tree program.

This year, the annual grants program was focused on supporting twenty Vermont communities in emerald ash borer (EAB) planning and will be receiving funding (up to $2,000 per town) to prepare for and manage the impacts of EAB locally. The Town of East Montpelier was one of the selected communities and have indicated that they will use these funds for public outreach, roadside ash inventory, EAB management plan development, and monitoring for EAB.

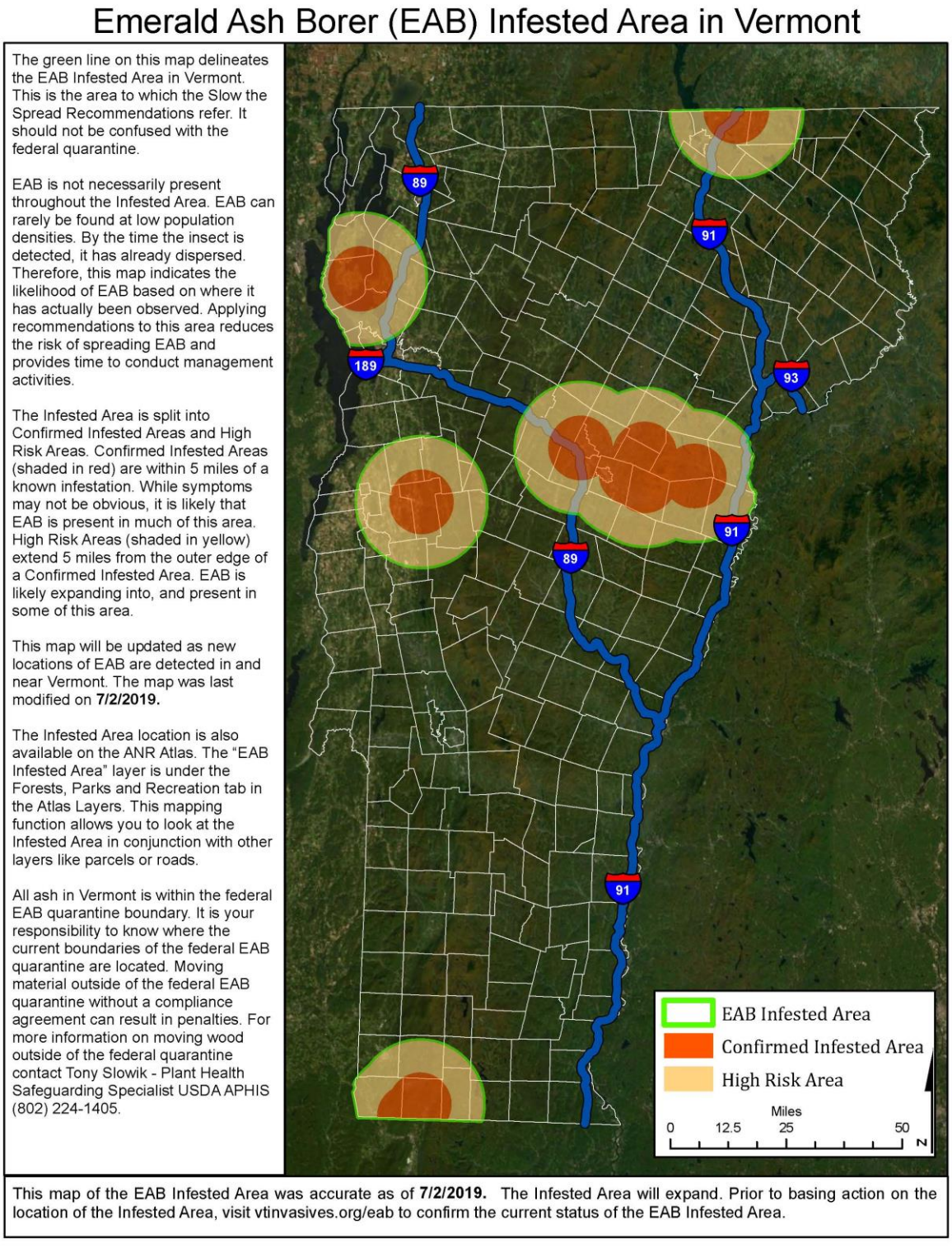


Figure 10: EAB Infestation Map of Vermont

Chervil

Wild Chervil is a weed belonging to the parsley family (Apiaceae). It is becoming a serious problem in hay fields and pastures in Central Vermont. Its 3-4-foot height, fern-like leaves, and white flowers arranged in a compound umbel pattern are quite pronounced during late May to early July. It is commonly found along roadsides and in meadows in Central Vermont.

Figure 11: Wild Chervil, Anthriscus sylvestris
Photo Credit: VT Urban & Community Forestry

Over the past five years, this weed has spread rapidly. It propagates by both seed and by lateral budding at the top of the root. It competes aggressively with forage crops for light, water and nutrients and often kills off the surrounding vegetation by shading it. It is particularly damaging to forage crops, but it has not been a problem in cultivated or tilled fields.

Wild chervil is not poisonous to livestock and, although it is unpalatable when large, animals will graze it effectively when small. The stems are very slow to dry and, if harvested in forage, will reduce crop quality due to molding. This weed also serves as a host for the parsnip yellow fleck virus that infects carrots, celery, and parsnips.

Wild chervil is very difficult to control because of its extremely deep taproot and tolerance to selective herbicides. Rosettes and immature plants can be controlled by digging out the roots. Mature plants must be removed below the root crown to prevent resprouting.

Giant Hogweed

CAUTION: The sap from this plant is dangerous. If it gets on your skin and you are exposed to the sun, it can cause severe burns. Always wear thick gloves and long pants and shirts.

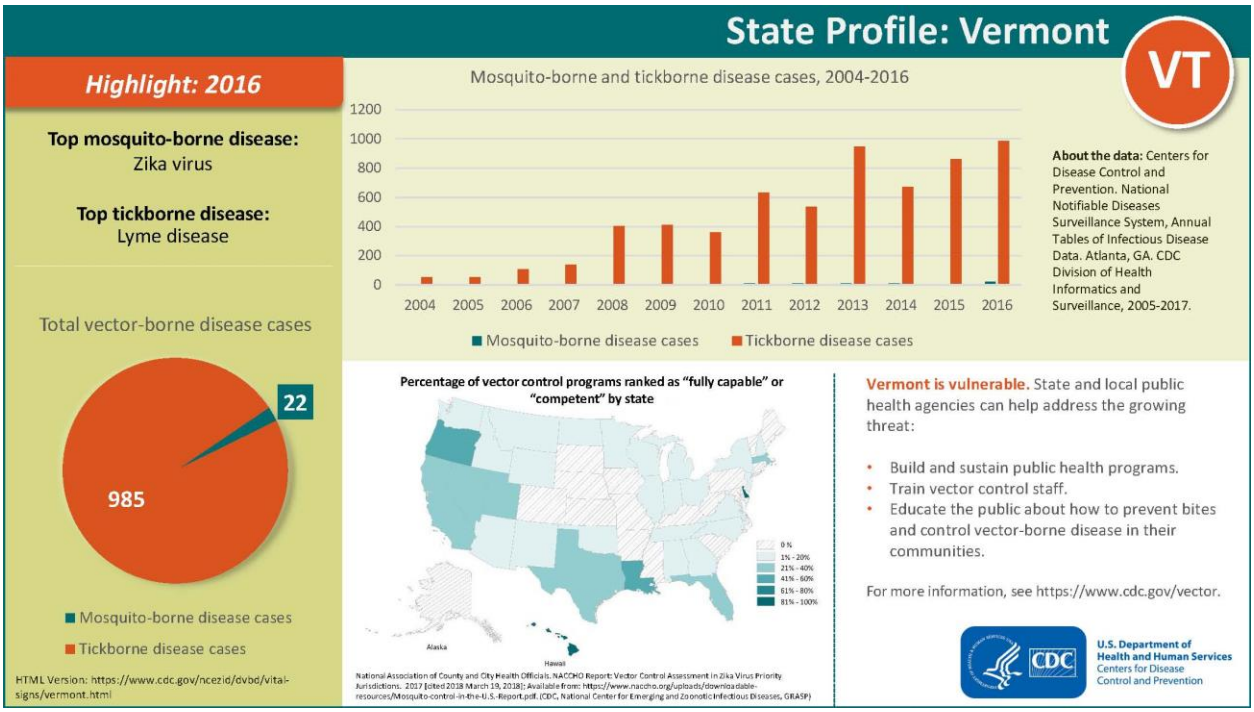
Figure 12: Giant Hogweed, Heracleum mantegazzianum
Photo Credit: VT Urban & Community Forestry

Giant hogweed is designated as a Federal Noxious Weed, because it produces sap that causes skin sensitivity to UV radiation and leads to blistering and severe burns. Due to its size and rapid growth, giant hogweed is an aggressive competitor capable of displacing native plants. It dies back during the winter months, leaving bare ground open to erosion on riverbanks and steep slopes.

Giant hogweed is native to Europe and Asia, but it was first introduced into the United States in 1917 for ornamental purposes. It can invade a variety of habitats but prefers moist, disturbed soils such as riverbanks, ditches and railroad right-of-ways. It sprouts in early spring, and flowers early July. This perennial plant dies back after flowering, leaving tall dead stalks. It forms perenating buds which lie dormant through winter until the next growing season. It reproduces by seed dispersal only, not vegetatively. Each flower head contains approximately 1500 seeds, which can remain viable for up to ten years.

Manual treatment can be moderately to highly effective for giant hogweed including both mechanical and chemical management. Giant hogweed leafs out very early compared to most native vegetation, thus making it easy to detect. It is beneficial to manually remove this plant before it begins flowering later in the growing season.

Vector-Borne Diseases



a) Tick-Borne

Diseases spread by ticks continue to be a serious public health concern in Vermont. Tick-borne diseases are being reported to the Health Department more frequently in the past decade, with Lyme disease being the most common. Other tick-borne diseases, such as anaplasmosis and babesiosis, are on the rise as well. Tularemia is a rare disease that can also be transmitted by ticks.

The Health Department's Vector-borne Disease Program tracks and responds to tick-borne diseases. The Department collects and analyzes data to detect trends in disease activity, investigates reported cases of tick-borne diseases, collaborates with other state agencies and educates Vermonters about disease risks and prevention strategies.

The best way to prevent tick-borne diseases is to prevent tick bites by using a tick repellent that has been proven safe and effective. Check your body daily for ticks, and if you have been bitten, remove ticks as soon as you can and watch for symptoms of a tick-borne disease.

b) Mosquito-Borne

Mosquito season in Vermont begins in the spring, but does not typically pose a health risk until the summer months. By July, some mosquitoes may be carrying viruses that cause diseases such as West Nile virus (WNV) infection and Eastern equine encephalitis (EEE).

The Health Department's Vector-borne Disease Program is responsible for tracking and responding to mosquito-borne diseases. The Department investigates reported cases of disease, collects and analyzes data to detect trends in disease activity, collaborates with other state agencies and works to educate Vermonters about prevention. Mosquitoes from around the state are collected and tested for evidence of WNV and EEE. The Department tracks this information and provides a report that is updated weekly.

The best way to avoid mosquito-borne diseases is to prevent mosquito bites. The Health Department recommends wearing long-sleeved shirts and long pants when outside, limiting time spent outdoors at dawn and dusk when the mosquitoes are most active, and using an insect repellent that has been proven to be safe and effective against mosquitoes.

7. Mitigation

7.1 Town Plan Goals that Support Local Hazard Mitigation

- Protect and improve quality of ground water and surface water of East Montpelier and protect the health of its citizens. *(Wastewater Goal)*
- Ensure that the road network provides safe and adequate transportation for all road users balanced with retaining the scenic and natural character of roadways. *(Transportation Goal)*
- Minimize potential damage from natural disasters and strengthen the community's ability to anticipate, respond to, and recover from natural disasters. *(Hazard Mitigation & Flood Resiliency Goal)*

East Montpelier's Town Plan was updated in 2018. The Town is interested in adding goals which relate to mitigation planning. The Town Plan has a section related to hazard mitigation and flood resiliency.

The 2019 Local Hazard Mitigation Plan consists of the following goals:

1. To reduce the risk to human life and property from the natural hazard of fluvial erosion.
2. To reduce the risk to human life and property from the natural hazard of inundation flooding.
3. To reduce the risk to human life and property from the natural hazard of wind storms.
4. To reduce the risk to human life and property from the natural hazard of ice storms.
5. To reduce the risk to human life and property from the hazard of invasive species.

Specific hazard mitigation strategies related to goals of the Plan include:

- Ensure existing and future drainage systems are adequate and functioning properly.
- Preserve and prevent development in areas where natural hazard potential is high.
- Ensure that all residents and business owners are aware of the hazards that exist within East Montpelier and ways they can protect themselves and insure their property.
- Ensure that emergency response services and critical facilities functions are not interrupted by natural hazards.

7.2 Identified Hazard Mitigation Programs, Projects & Activities

Hazard mitigation programs, projects and activities that were identified for implementation at the Town Local Hazard Mitigation meeting are:

Table 14: 2019-2024 Mitigation Strategies					
Hazard Mitigated	*Mitigation Action*	*Local Leadership*[5]	*Prioritization (High, Med, Low)*[6]	*Possible Resources*[7]	*Time Frame*
All Hazards	Install generator at Municipal Office Building	SB	High	Capital Reserve	2019 - 2021
Winter Storms	Upgrade electrical system in Municipal Office Building	SB	High	Capital Reserve	2019-2021
Invasive Species	Provide public education materials and trainings to reduce exposure to and spread of invasive species	SB/PC	High	General Fund	Ongoing
Invasive Species	Develop action plan to deal with the effects of the Emerald Ash Borer on the town's ash trees	SB/PC/Hwy Dept/RRVAPAC[8]	High	VT Urban & Community Forestry Program, General Fund	2019-2020
Winter Storms/Extreme Cold	Provide public education materials and trainings to residents on how to weatherize homes	SB/PC/Energy Committee	High	Efficiency Vermont, Capstone Community Action	Ongoing
Wind/Ice/Snow Storms	Review WEC & GMP plans to clear trees from utility ROWs to limit power outages	SB/Hwy Dept	High	General Fund	2019-2020
Wind/Ice/Snow Storms	Collaborate with WEC & GMP to synchronize tree cutting plans for utility ROWs to limit power outages	SB/Hwy Dept	Med	General Fund	2019-2022

[5] SB – Selectboard, PC - Planning Commission, ANR – Agency of Natural Resources

[6] **High** prioritization denotes that the action is either critical or potential funding is readily available and should have a timeframe of implementation of less than two years. **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. **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

[7] HMGP – Hazard Mitigation Grant Program, EMGP – Emergency Management Grant Program, PSIC/NTIA – National Telecommunications and Information Administration, USDA – United States Dept. of Agriculture

[8] Rural Road Vegetation Assessments Project Advisory Committee

Table 14: 2019-2024 Mitigation Strategies					
Hazard Mitigated	*Mitigation Action*	*Local Leadership*[5]	*Prioritization (High, Med, Low)*[6]	*Possible Resources*[7]	*Time Frame*
Flood/Fluvial Erosion	Upsize culvert on Morse Farm County Road	SB/Hwy Dept	High	VTrans Structures Grant	2019-2021
Flood/Fluvial Erosion	Upsize culvert on Mallory Brook County Road	SB/Hwy Dept	High	VTrans Better Roads Grant	2019-2021
Flood/Fluvial Erosion	Upsize culvert on Mallory Brook Center Road	SB/Hwy Dept	Med	VTrans Structures Grant	2019-2024
Flood/Fluvial Erosion	Erosion control/road stabilization on Hammett Hill Road	SB/Hwy Dept	Med	Grants In-Aid	2019-2024
Flood/Fluvial Erosion	Erosion control/road stabilization at the Town Garage Sand Shed	SB/Hwy Dept	Med	VTrans Transportation Alternatives Grant Program, VTrans Municipal Highway & Stormwater Mitigation program	2019-2024
Flood/Fluvial Erosion	Erosion control/road stabilization on Horn of the Moon Road	SB/Hwy Dept	High	VTrans Better Roads Grant	2019-2021

VEM also emphasizes a collaborative approach to achieving mitigation on the local level. Partnering efforts among ANR, VTrans, ACCD, Regional Planning Commissions, FEMA Region 1 and other agencies result in these agencies and organizations working together to provide assistance and resources to towns interested in pursuing mitigation projects and planning initiatives.

The 2019-2024 Mitigation Strategies table lists mitigation actions in regards to local leadership, prioritization, possible resources, and timeframe. Prioritization was based upon the economic impact of the action, the community's need to address the issue, the action's cost, and the availability of potential funding. Due to the frequency and damage caused by flooding, mitigation actions which address areas that are frequently flooded will be the highest priority of the Town.

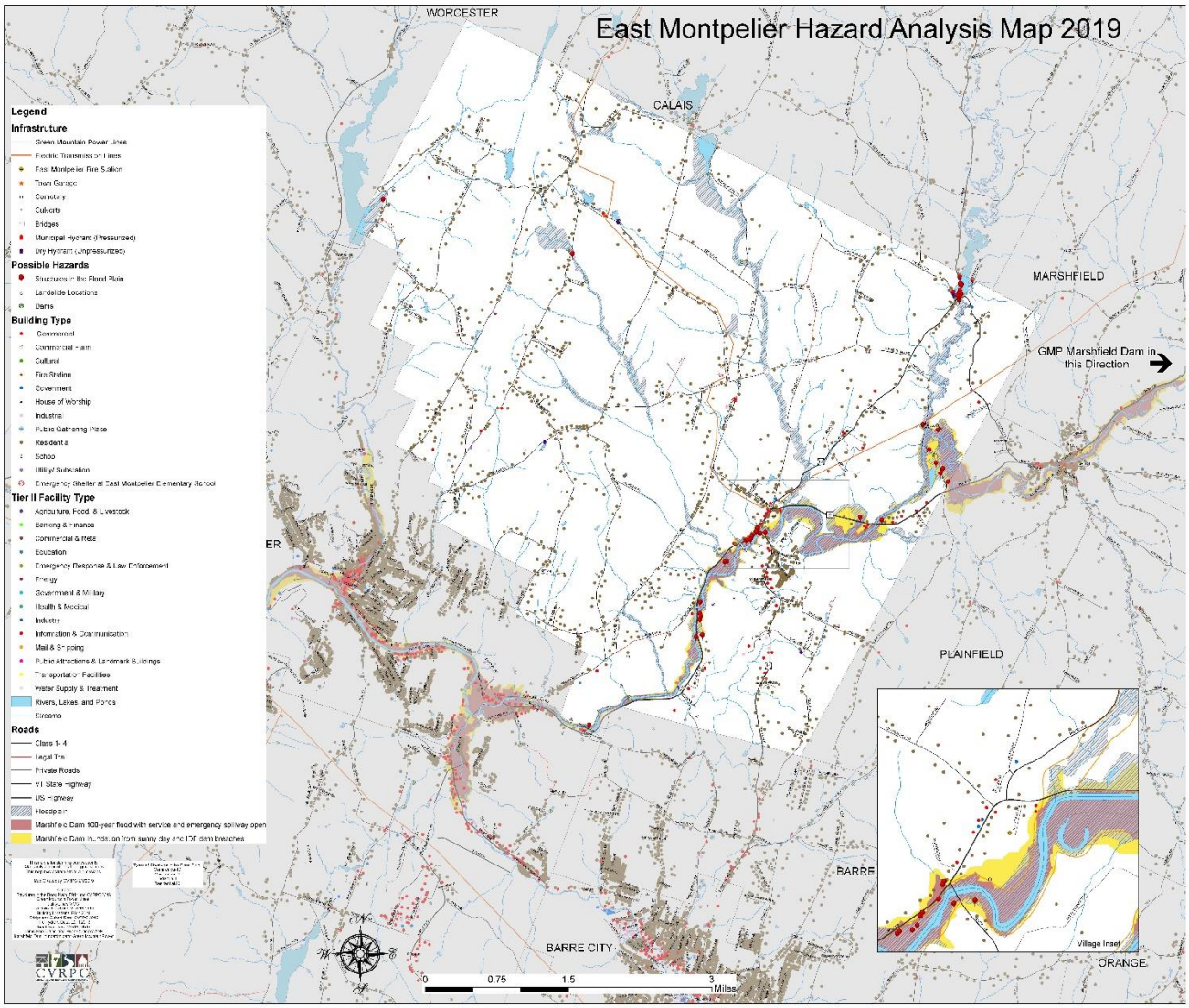
Other mitigation actions listed will be performed as funds become available and dependent on public interest.

East Montpelier understands that to apply for FEMA funding for mitigation projects, a project must meet FEMA benefit cost criteria. The Town also must have a FEMA-approved Hazard Mitigation Plan.

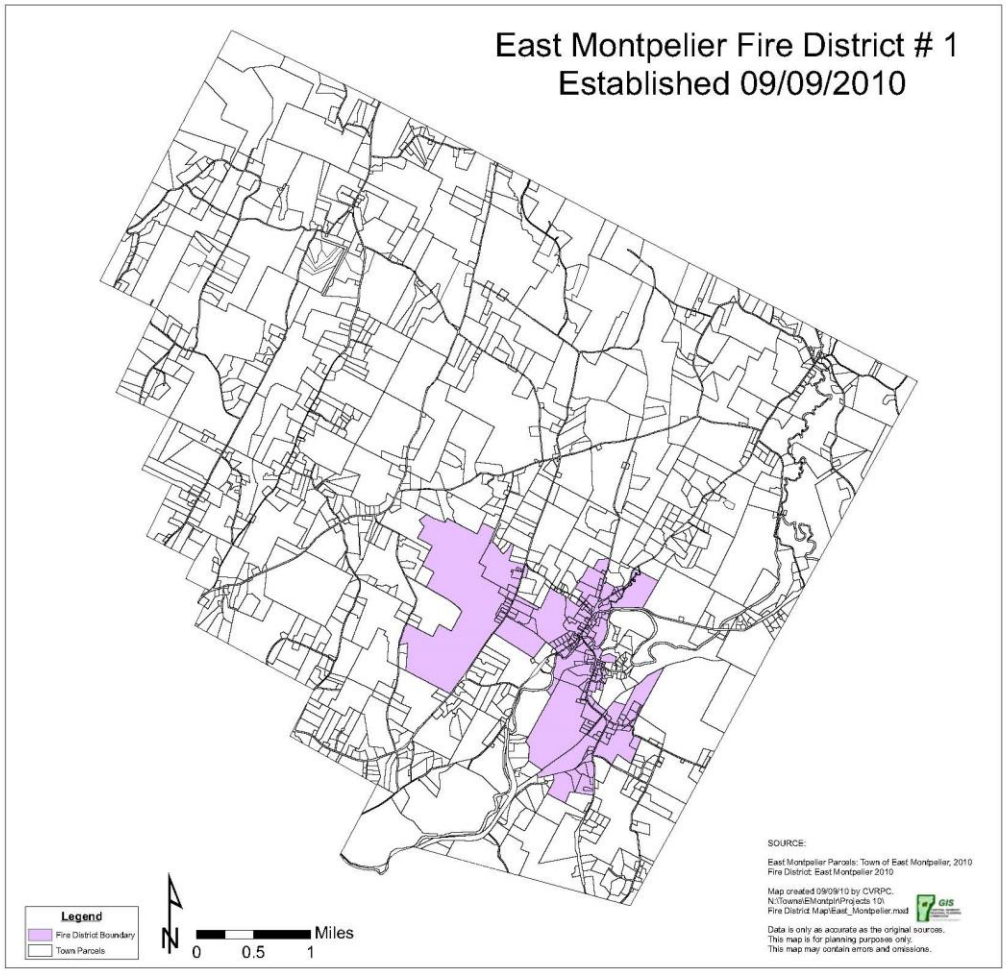
8. Attachments

- Hazards Analysis Map
- East Montpelier Fire District
- Hazard Analysis Survey Questions & Results
- 5-Year Plan Maintenance and Review Process
- Town Resolution adopting the Plan
- VEM Comments as Addressed 08/05/2019
- VT DEC Comments Received 08/15/2019

2019 HAZARD ANALYSIS MAP



East Montpelier Fire District (Crystal Springs)

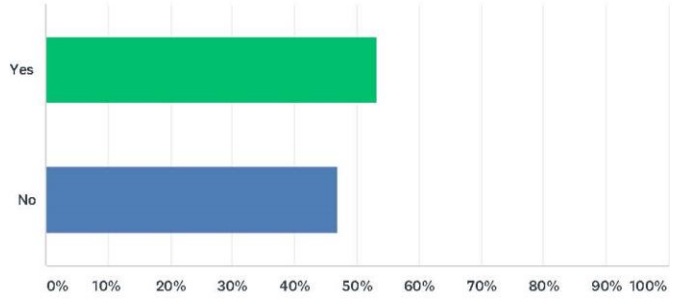


Hazard Analysis Survey Questions & Results

East Montpelier Hazard Mitigation Plan Community Survey

Q1 Have you ever been impacted by a natural disaster in East Montpelier?

Answered: 62 Skipped: 1

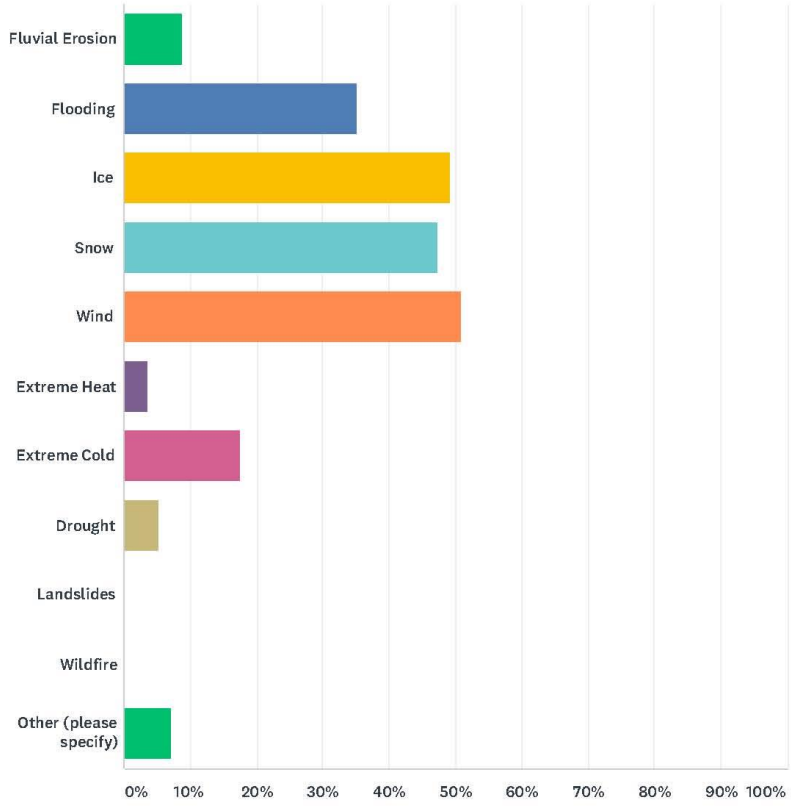


ANSWER CHOICES	RESPONSES	
Yes	53.23%	33
No	46.77%	29
TOTAL		62

1 / 17

Q2 Which of the following hazards have impacted you the most? (Check all that apply)

Answered: 57 Skipped: 6



ANSWER CHOICES	RESPONSES	
Fluvial Erosion	8.77%	5
Flooding	35.09%	20
Ice	49.12%	28
Snow	47.37%	27
Wind	50.88%	29
Extreme Heat	3.51%	2
Extreme Cold	17.54%	10
Drought	5.26%	3
Landslides	0.00%	0

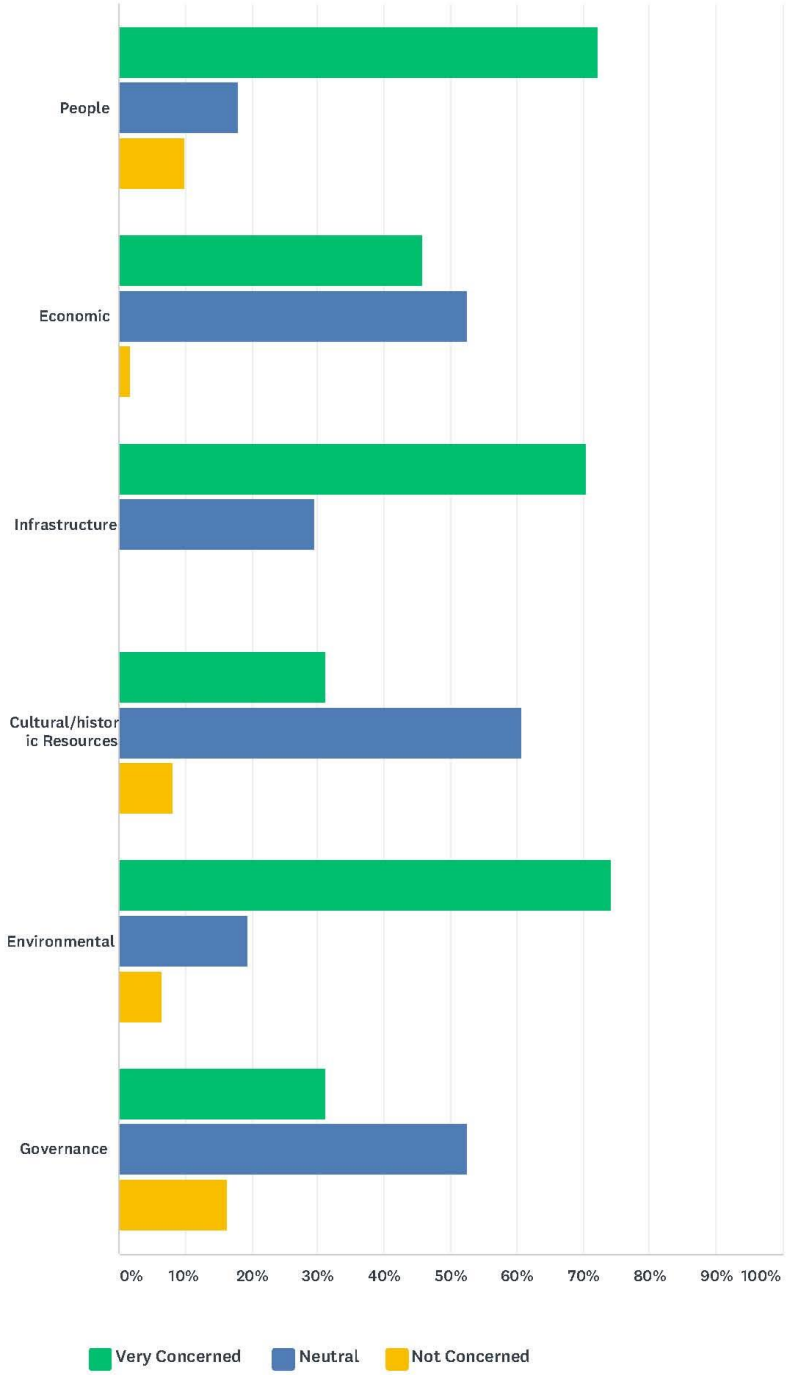
Wildfire	0.00%	0
Other (please specify)	7.02%	4
Total Respondents: 57		

#	OTHER (PLEASE SPECIFY)	DATE
1	N/A	3/18/2019 8:39 AM
2	none of these	3/16/2019 12:08 PM
3	Multi-day power outages due to wind and ice and snow storms	3/5/2019 11:41 AM
4	power outages	3/4/2019 11:03 AM

Q3 In terms of vulnerability to hazards, how concerned are you about the following?

Answered: 62 Skipped: 1

East Montpelier Hazard Mitigation Plan Community Survey



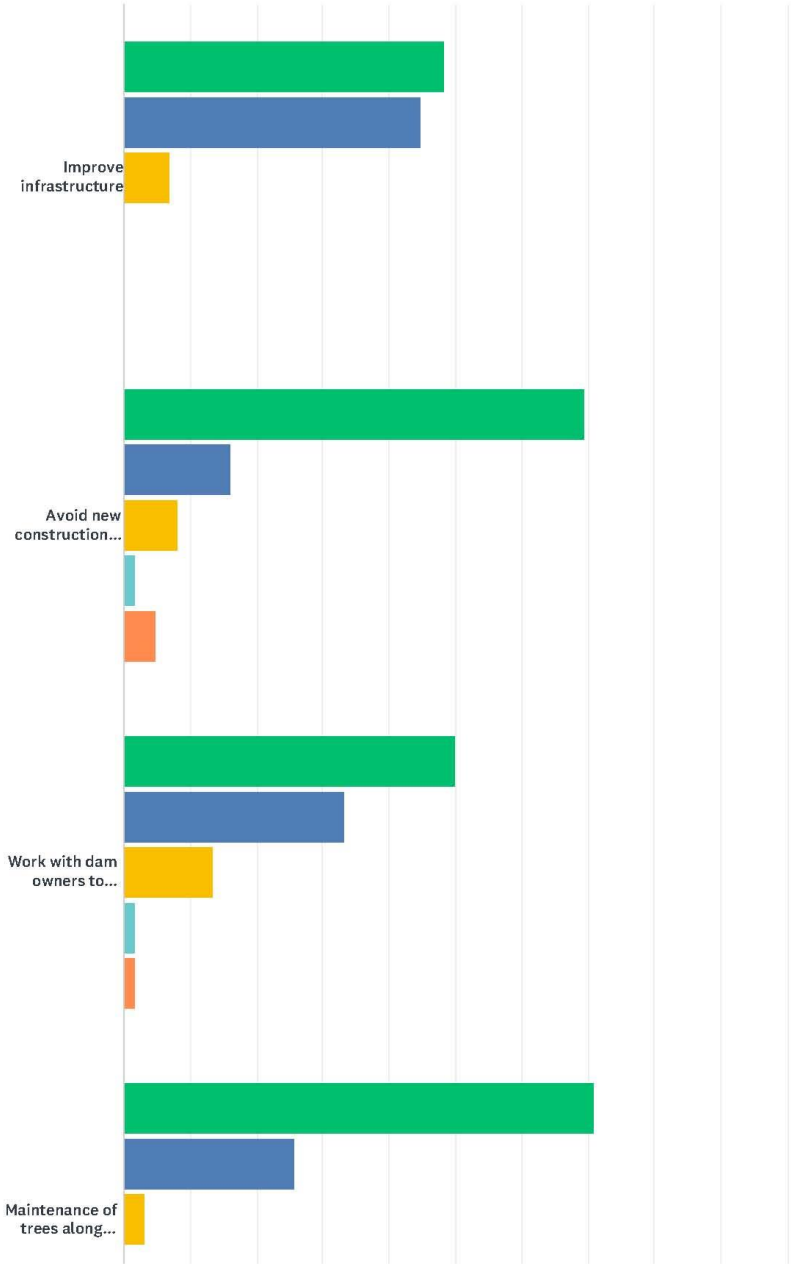
	VERY CONCERNED	NEUTRAL	NOT CONCERNED	TOTAL

5 / 17

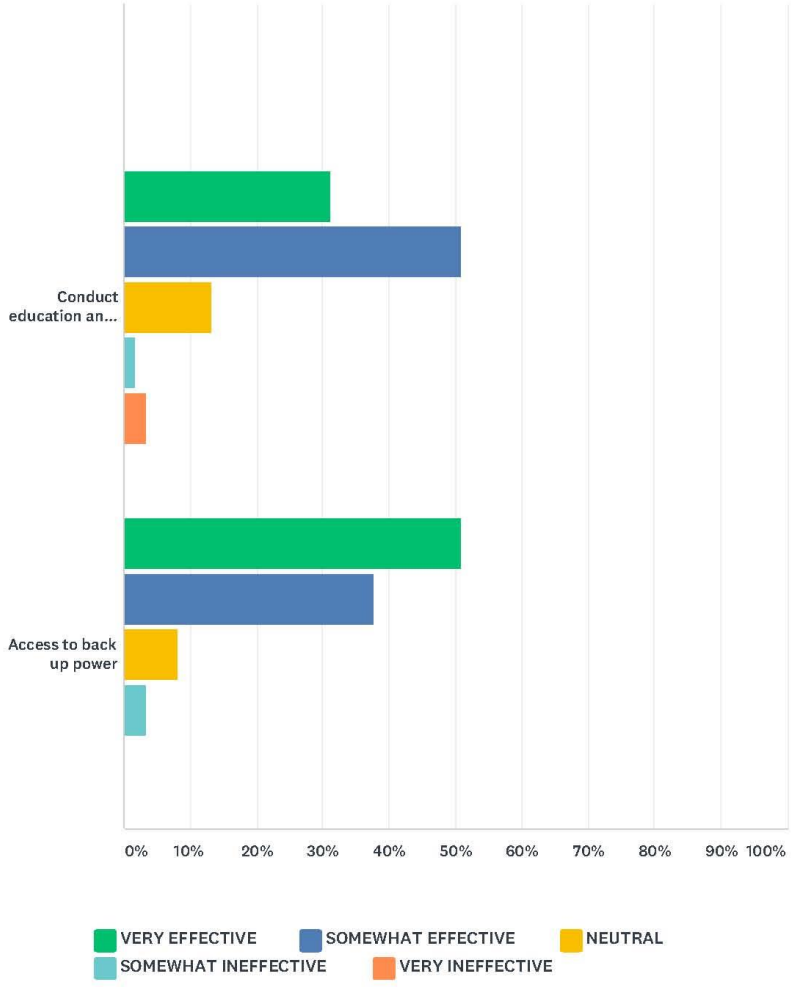
People	72.13% 44	18.03% 11	9.84% 6	61
Economic	45.90% 28	52.46% 32	1.64% 1	61
Infrastructure	70.49% 43	29.51% 18	0.00% 0	61
Cultural/historic Resources	31.15% 19	60.66% 37	8.20% 5	61
Environmental	74.19% 46	19.35% 12	6.45% 4	62
Governance	31.15% 19	52.46% 32	16.39% 10	61

Q4 How effective would the following actions be in reducing or eliminating the risk of future damages?

Answered: 62 Skipped: 1



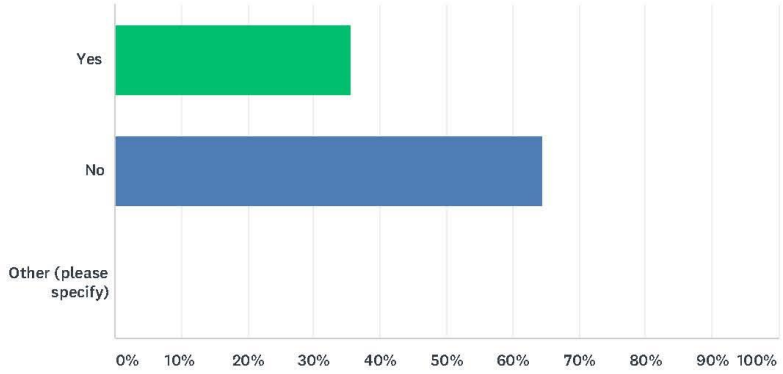
7 / 17



	VERY EFFECTIVE	SOMEWHAT EFFECTIVE	NEUTRAL	SOMEWHAT INEFFECTIVE	VERY INEFFECTIVE	TOTAL
Improve infrastructure	48.28% 28	44.83% 26	6.90% 4	0.00% 0	0.00% 0	58
Avoid new construction in areas subject to flooding and/or erosion	69.35% 43	16.13% 10	8.06% 5	1.61% 1	4.84% 3	62
Work with dam owners to understand and prevent hazards	50.00% 30	33.33% 20	13.33% 8	1.67% 1	1.67% 1	60
Maintenance of trees along utility right of way	70.97% 44	25.81% 16	3.23% 2	0.00% 0	0.00% 0	62
Conduct education and awareness programs	31.15% 19	50.82% 31	13.11% 8	1.64% 1	3.28% 2	61
Access to back up power	50.82% 31	37.70% 23	8.20% 5	3.28% 2	0.00% 0	61

Q5 Have you ever received information about how to make your home safer from natural disasters?

Answered: 62 Skipped: 1

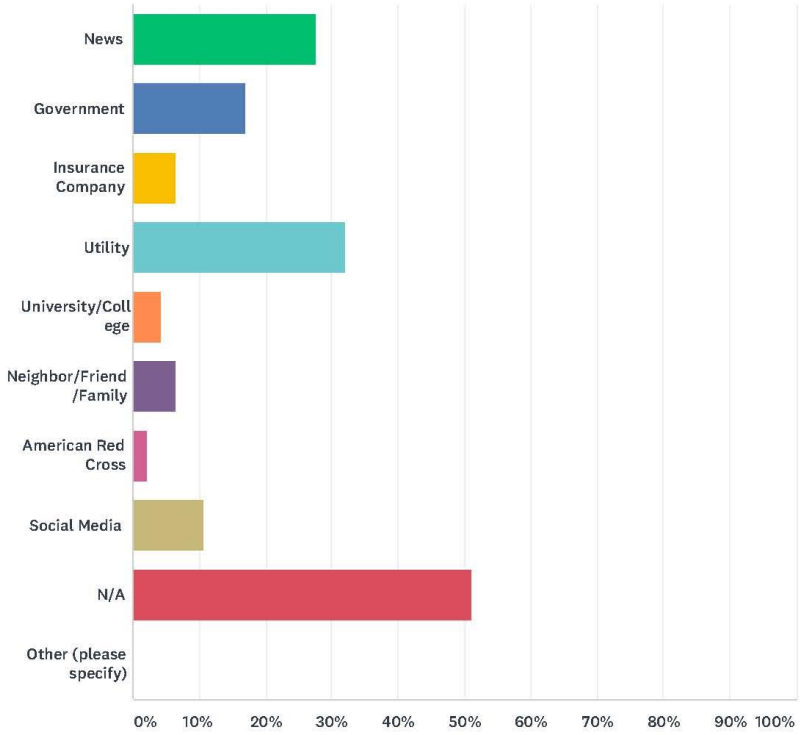


ANSWER CHOICES	RESPONSES	
Yes	35.48%	22
No	64.52%	40
Other (please specify)	0.00%	0
TOTAL		62

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q6 If so, from what source? (Check all that apply)

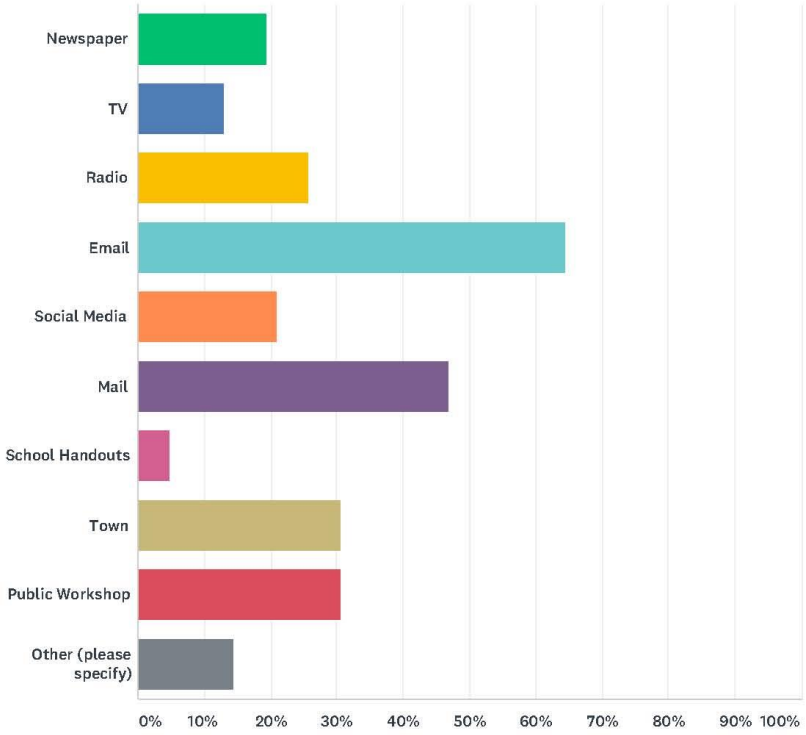
Answered: 47 Skipped: 16



ANSWER CHOICES	RESPONSES	
News	27.66%	13
Government	17.02%	8
Insurance Company	6.38%	3
Utility	31.91%	15
University/College	4.26%	2
Neighbor/Friend/Family	6.38%	3
American Red Cross	2.13%	1
Social Media	10.64%	5
N/A	51.06%	24
Other (please specify)	0.00%	0
Total Respondents: 47		

Q7 What is the most effective way for you to receive information about making your home safer from natural disasters? (Check all that apply)

Answered: 62 Skipped: 1



ANSWER CHOICES	RESPONSES	
Newspaper	19.35%	12
TV	12.90%	8
Radio	25.81%	16
Email	64.52%	40
Social Media	20.97%	13
Mail	46.77%	29
School Handouts	4.84%	3
Town	30.65%	19
Public Workshop	30.65%	19
Other (please specify)	14.52%	9

Total Respondents: 62

#	OTHER (PLEASE SPECIFY)	DATE
1	I have lived a long time and am up to speed on how things can get ugly out there. Don't need anyone to tell me that a hurrican or tornado can take the roof off. That's why I went to great lengths to add hurricane clips to my rafters... and pay my homeowners insurance bill.	3/16/2019 12:08 PM
2	front porch forum - information series	3/15/2019 5:49 PM
3	Signpost	3/11/2019 12:08 PM
4	Front Porch Foram	3/11/2019 11:18 AM
5	don't know	3/8/2019 9:05 PM
6	website to check	3/8/2019 7:46 PM
7	Vermont 911	3/8/2019 6:24 PM
8	Front Porch Forum, East Montpelier "Signpost"	3/5/2019 11:41 AM
9	Front Porch Forum	3/2/2019 7:13 PM

Q8 Please provide any additional information that you feel will be beneficial in the drafting of our hazard mitigation plan.

Answered: 21 Skipped: 42

#	RESPONSES	DATE
1	N/A	3/18/2019 8:39 AM
2	Is there any place to rent generators during a power outage?	3/17/2019 3:23 PM
3	consider the impacts of mud and steep slopes	3/16/2019 12:53 PM
4	I really don't get what your trying to do. If someone lives near a river they should be ready to abandon their home on a moments notice. You need to know a wind can destroy your place regardless of it's location. If the power goes out your pipes will freeze if you don't have some way to make heat. And if it snows 6 feet of heavy wet stuff you'll need a tractor to dig you out because your pickup truck plow won't work. But this is just normal stuff and not really worth getting all organized about. Oh, maybe someone could go around and point out that the giant tree in your neighbors yard will crush their house if it falls on it. Oh, wouldn't that be their insurance agent?	3/16/2019 12:08 PM
5	Road ROW tree management	3/11/2019 11:18 AM
6	Emergency shelter options, coordinator for emergency assistance to those affected.	3/10/2019 1:15 PM
7	I think it's good to have a plan and response in mind, but I don't think there's a need to go overboard.	3/10/2019 10:52 AM
8	na	3/9/2019 10:43 AM
9	Need to do a better job of crowning the roads and maintaining ditches and culverts.	3/9/2019 9:23 AM
10	none	3/9/2019 8:21 AM
11	Willing to help preparing or planning.	3/8/2019 7:46 PM
12	Detailed plan	3/8/2019 11:31 AM
13	As storms become more severe, frequent and widespread, we've found that it can take a week or more to get power, phone and internet back online. Do utility companies have a plan for addressing this problem, other than business as usual?	3/8/2019 9:31 AM
14	GREEN INFRASTRUCTURE. This is affordable, effective, sustainable. Please educate yourselves on drought and flood mitigation strategies using soil science. Emphasis on GREEN INFRASTRUCTURE.	3/4/2019 2:19 PM
15	Send brief text message when dangerous weather events or other hazards are expected.	3/3/2019 12:55 PM
16	Higher level of accuracy of Federal Flood Maps including acknowledging when flood-prevention infrastructure is working and in place, Like the Kingsbury Branch dam in North Montpelier Village; correcting maps where appropriate.	3/3/2019 10:45 AM
17	Each town and City should have adequate Fallout shelters designated for the amount of people and everybody should know where to go when Irene hit the winds came across the farm field and I thought we were going to lose the house I brought the kids down in the dirt basement from that day on I always wondered is something like this was to happen again where would I bring my family	3/3/2019 9:30 AM
18	Building more resiliency in our electric grid and greater localized food security	3/2/2019 9:06 PM
19	Communication is a concern of mine. What happens when cell phones fail due to a cosmic event or whatever... I would hope that we support truly local radio stations who are an invaluable service during times of bad storms.	3/2/2019 7:11 PM
20	Information on shelter sites, emergency contact numbers, places where cell phones can be recharged in case of power loss	3/2/2019 6:48 PM
21	Remind people that when power fails so does water pump and perhaps heating system.	3/2/2019 6:18 PM

5-Year Plan Review/Maintenance Process

Adopt Plan

- Brief local leadership on plan approval
- Formally adopt plan
- Publicize plan approval and adoption
- Celebrate success

Implement Plan

- Confirm/clarify responsibilities
- Integrate mitigation actions
- Monitor and document implementation of projects and actions
- Establish indicator of effectiveness or success

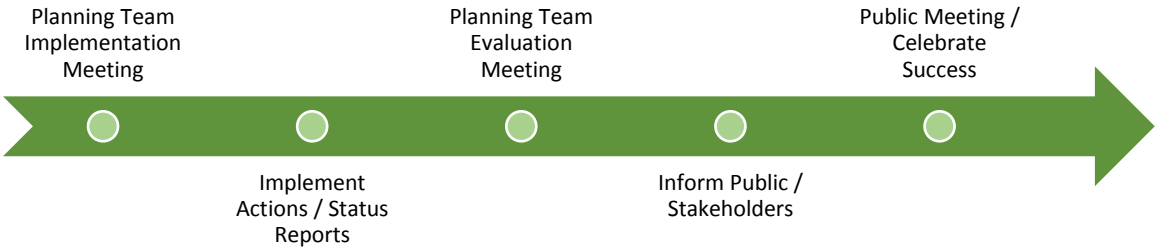
Evaluate Plan Results

- Effectiveness of planning process
- Effectiveness of actions
- Document success & challenges of actions
- Update and involve community
- Celebrate successes

Revise Plan

- Review factors affecting community's context
- Analyze findings; determine whether to revise process or strategy
- Incorporate findings into the plan

After Plan Adoption – Annually Implement and Evaluate



Fifth Year, and After Major Disaster Evaluate and Revise

Town Resolution Adopting the Plan

CERTIFICATE OF ADOPTION
December 2, 2019
Town of East Montpelier, Vermont Selectboard

A resolution adopting the Town of East Montpelier, Vermont 2019 Local Hazard Mitigation Plan

WHEREAS, the Town of East Montpelier has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the 2019 East Montpelier, 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 East Montpelier has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its 2019 East Montpelier, 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 East Montpelier; and

WHEREAS, the Plan recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of East Montpelier 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 East Montpelier eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by Town of East Montpelier Selectboard:

1. The 2019 East Montpelier, Vermont Local Hazard Mitigation Plan is hereby adopted as an official plan of the Town of East Montpelier;

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 Selectboard by the Emergency Management Director or Coordinator.

IN WITHNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of East Montpelier on this 2nd day of December, 2019.

Selectboard Chair Seth Gardner

Selectboard Member Gene Troia

Selectboard Member Carl Etnier

Selectboard Member Amy Willis

Selectboard Member Casey Northrup

ATTEST

Town Clerk Rosie Laquerre

VEM Comments as Addressed 08/05/2019

LOCAL MITIGATION PLAN REVIEW TOOL

Jurisdiction Name & State: East Montpelier, Vermont

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: East Montpelier	**Title of Plan: Hazard Mitigation Plan**	**Date of Plan: 7/23/2019**
Single or Multi-jurisdiction plan? Single	**New Plan or Plan Update? Plan Update**	
Regional Point of Contact: Jonathan DeLaBruere **Title: Emergency Management Planner** **Agency: Central Vermont Regional Planning Commission** **Phone Number: 802-229-0389** **E-Mail: delabruere@cvregion.com**	**Local Point of Contact: Bruce Johnson** **Title: Town & Zoning Administrator** **Agency: Town of East Montpelier** **Phone Number: 802-223-3313** **E-Mail: eastmontadmin@comcast.net**	

State Reviewer:	**Title:**	**Date:**
Stephanie A. Smith	Hazard Mitigation Planner	8/5/19

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region I		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 4, Page 7-11	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 4, Page 9-11	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1)) Since the plan was out for public comment when submitted, make sure to update with any additional feedback received. I would also update the headers in table 1 and 2 to past tense, individuals who *were* invited to comment. CVRPC: Table 1 updated to "were invited," Table 2 updated to "were invited." On page 9, language was updated to include, "Staff received comments from Vermont Emergency Management from a preliminary draft review and also from Ned Swanberg, Regional Floodplain Manager for the Central Vermont region. These comments are attached at the end of the plan." Comments are attached as a pdf to the end of the plan.	Section 4, Page 7-11		X
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 4, Page 11-12	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 4, Page 12-13. Page 55	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i)) Is there a specific SB meeting each year that you will be monitoring and evaluating? CVRPC: Page 13 amended to reflect "amended without formal re-adoption at an annual April Select Board meeting."	Section 4, Page 12-13, Page 55		
ELEMENT A: REQUIRED REVISIONS			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i)) You will need to include an omission rationale statement, i.e. briefly explain why you are not addressing the other hazards. CVRPC: Amended page 16-17 to include the following statement: "Those hazards not found to pose the greatest threat to East Montpelier such as snow, cold, landslides, wildfire, infectious disease outbreak, heat, drought, hail, and earthquake are not addressed in this Plan and were not included 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, East Montpelier 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, tsunami, and volcano."	Section 5, Page 15-34		X

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i)) Make sure the probability you list in the summary section at the end of each hazard profile matches what you have in your hazard assessment table on pg. 16. CVRPC: Language amended in Flood/Flash Flood/Fluvial Erosion Hazard Matrix on page 20 to "highly likely," High Wind Matrix to "Highly Likely" (to reflect 4 in chart), Ice Matrix to "Likely". Any other past occurrences you can include for ice storms? CVRPC: No. See image: **Storm Events Database** **Search Results for Washington County, Vermont** **Event Types:** Ice Storm **Washington county contains the following zones:** 'Washington' 0 events were reported between 01/01/1950 and 05/31/2019 (25353 days) **Summary Info:** Number of County/Zone areas affected: 0 Number of Days with Event: 0 Number of Days with Event and Death: 0 Number of Days with Event and Death or Injury: 0 Number of Days with Event and Property Damage: 0 Number of Days with Event and Crop Damage: 0 Number of Event Types reported: 0 **Column Definitions:** 'Mag': Magnitude, 'Dth': Deaths, 'Inj': Injuries, 'PrD': Property Damage, 'CrD': Crop Damage	Section 5, Page 15-34		X
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii)) What you have included in the summary table at the end of each hazard profile is a bit light to meet this requirement. Specifically, what in East Montpelier is vulnerable to each hazard? E.g. critical facilities, specific areas in the community that are the most vulnerable, etc. CVRPC: In flood/flash flood/fluvial erosion matrix, added, "within and adjacent to flood erosion hazard areas of concern." In High Wind matrix, added "Large trees along roads and utility Right-Of-Ways, as well as culverts and bridges across Town." Left Ice the same. You have a bit more info in the ice storm section re: vulnerable populations, which is good.	Section 5, Page 20		X
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 5, Page 18	X	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3)) The list in section 4.2 is a start—you will need to include whether you can improve or expand upon any of these capabilities to better implement mitigation actions. Most communities address this in a table, let me know if it would be helpful to see an example from a different plan. CVRPC: Table added on p. 12. List adapted to Table. Inclusion of improvements/expansions column.	Section 4, Page 11-12		X
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 5, Page 18-19	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i)) I'm not seeing your hazard mitigation goals. CVRPC: Added/Replaced text on p. 38 to include: "The 2019 Local Hazard Mitigation Plan consists of the following goals: 1. To reduce the risk to human life and property from the natural hazard of fluvial erosion. 2. To reduce the risk to human life and property from the natural hazard of inundation flooding. 3. To reduce the risk to human life and property from the natural hazard of wind storms. 4. To reduce the risk to human life and property from the natural hazard of ice storms. 5. To reduce the risk to human life and property from the hazard of invasive species."	Section 7, Page 36		X
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 7, Page 36	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii)) You will need to include start and end date for your actions, e.g. 2019-2021 or Spring 2020-Fall 2020. CVRPC: Start dates (2019) added for each action on p. 39, 40. "Ongoing" remains since it will be ongoing during the 5-year duration of this plan.	Section 7, Page 37		X

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii)) Pg. 13 is good re: past integration—briefly include how you will continue to integrate the LHMP into other planning mechanisms going forward. CVRPC: Added on p. 15. "Moving forward, it is the intent of the Town to integrate this local hazard mitigation plan's goals into all planning processes undertaken by the town, including, but not limited to, municipal plan amendments, zoning bylaw amendments, and enhanced energy planning."	Section 4, Page 13 Section 7, Page 35		X
ELEMENT C: REQUIRED REVISIONS			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3)) You start to address this in section 3.2—include whether vulnerability has remained the same, increased or decreased since the previous plan and briefly explain based on the location of new development or any mitigation project that may have resulted in reduced vulnerability. CVRPC: Added language on p. 4 to state, "While development has increased in East Montpelier over the last ten years, the locations and low densities of these new developments have not caused any increases in vulnerability since the last plan," and on p. 16. "East Montpelier is less vulnerable in 2019 because of the upgrading and expansion of the culvert on Quaker Road, the upgrading and stabilizing of the hillside on Muddy Brook, the annual reports on inundation flooding modeling by Green Mountain Power, and the installation of two generators at the school and town garage."	Section 7, Page 35		X
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 4, Page 13-14	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3)) I'm not seeing where you address this. Include how priories have changed or stayed the same since the previous plan and briefly what those priorities are. CVRPC: On p. 19, added, "Since the last plan in 2013, Dam Failure and Landslides have been removed from the list of priority hazards, but flooding, wind, and ice storms have stayed. The 2019 Plan includes a discussion of invasive species, which the planning team decided to elevate due to the relatively recent influx of damages and illnesses caused by them."	Section 7, Page 35		X

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Page 56	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))			
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

SECTION 3:

MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township / village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township / village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
14												
15												
16												
17												
18												
19												
20												

VT DEC Comments

Considerations of Flood-Related Elements for East Montpelier LHMP
8/15/19 Ned Swanberg, VT DEC

Hello Bruce Johnson and LHMP Planners,

Thank you for welcoming some thoughts about East Montpelier's draft LHMP. I know there may be a bit of a hiatus with the East Montpelier process until CVRPC identifies a new planner to work your community – but maybe this can be of use.

I will follow up with a copy of the draft and various loose suggestions as "comments".

Below is a more substantial suggestion about how to articulate the flooding-related hazards (across Vermont) with some of the possible information that you might include specifically in East Montpelier.

The primary impetus here is that erosion-caused damage is far and away the biggest issue in Vermont, I don't think that most LHMP plans articulate the problem clearly and may miss the important opportunities for mitigation. Also, because East Montpelier has already adopted River Corridor protections, I think the town's LHMP could speak more unambiguously about how River Corridor protection fits into the picture.

River Corridor protection is a statewide goal in the Vermont Hazard Mitigation Plan and in statute. However, many of the Town-level templates in circulation could use shed more light on the topic. Perhaps the general approach below could be a start toward that and a model for others?

Flood Hazards

1. **Erosion Damage**
2. **Floodplains**
3. **Stormwater**
4. **Dams**

1. Erosion Damage

Most of the damage from natural events in Vermont is due to the erosive power of water. This is primarily in the form of damage to public roads, culverts and bridges. Communities can reduce damage through actions including River Corridor protection, upsizing culverts, implementing the MRGP, adopting Low Impact Development standards and restoring floodplain functions.

Construction near streams and rivers is often too close. When improved property near stream channels gets protected by armoring it often straightens the channel and increases the erosive power of high water. River Corridor protection provides room for the channel to adjust and avoids increasing the erosion and flood risk to neighboring properties and critical public infrastructure.

High water events on small streams are often called “flash floods” and cause considerable damage through erosion. Small streams are often artificially confined and steepened by roads. Further encroachments toward the channel may eliminate the few remaining places for lateral adjustments and floodplain functions. Flash flood hazards on high gradient streams are seldom mapped on the Flood Insurance Rate Map.

Where steep streams drop abruptly into a larger valley, they may rapidly deposit sediments including sand, gravel, and boulders. The hazards associated with these alluvial fans and depositional environments can be difficult to manage.

Protecting the “room needed by the river” is a statewide hazard mitigation priority. River corridors identify the room needed by the stream or river channel to develop and maintain its least erosive slope in the valley. When functional river corridors are not protected, and the area becomes developed, the channel becomes increasingly straightened, erosive and damaging; and delivers more flood water downstream faster.

River Corridor protection is a statewide goal, required in Act 250, the Flood Hazard Area and River Corridor Rule and many municipal permits. Communities adopting no adverse impact regulations for River Corridors can benefit from the highest level of Emergency Relief and Assistance Funds after federally declared disasters.

By protecting River Corridors and floodplain functions through no adverse impact standards the community does not knowingly and directly put new structures and people at risk, establishes clear guidance for new development, accommodates a process that reduces damage from erosion and inundation for structures and infrastructure already at risk, and establishes the foundation for successful site specific mitigation actions.

East Montpelier adopted River Corridor Protections in 2015. Additionally, East Montpelier requires 25 feet of vegetated buffers on stream banks helping to protect bank stability and other co-benefits.

River Corridor and floodplain restoration opportunities are identified under R22-R-24 of Table 8 of the Upper Winooski River: Plainfield to Montpelier, River Corridor Plan (2010). Sites noted include:

- Coburn Covered Bridge
- Restoring riparian buffers
- Removing berms in two locations
- Improving State Route 2 bridge – Vtrans

The Plan also identifies stream crossing structures that are undersized, have hazardous orientations or might additionally qualify for funding through Fish and Wildlife. The Vermont DEC Stream Geomorphic Assessment data is online as Winooski, Montpelier. to Cabot Bridge / Culvert Reports

The Vermont Culvert Geomorphic Compatibility Screening Tool February 2008 describes the assessment method and the compatibility score. A low score is less compatible.

Selection of Impaired Culverts Based on Low Compatibility Score and Low AOP Score

Priority Culverts	CompatablitlySum	AOPCourseScreen	Location	BankfullWidthPercent	IceDebrisJam	OpennesssRatio	Outflanking	PoorLocation
1	11	Orange	Structure located on Snow Hill Road between Old Trail Road & Putnam Road	40.3	1	2.53	1	1
2	11	Red	@ intersection with Sanders circle road TH 19	57.7	1	0.85	1	1
3	11	Red	0.1 mi south of Haggett Rd	59.2	1	0.23	1	1
4	12	Red	Approx 3/10 mile south of Juction RT 14 & US 2	36.5	1	0.39	1	1
5	12	Gray	Just upstream of the Route 2 Mallory Brook culvert Structure # 300028007112071	47.9	1	2.42	1	0
6	12	Gray	400 ft northeast of Fontaine Ln	52.6	1	0.17	1	1
7	12	Gray	intersection of Towne Hill Rd with Bliss Rd	58.8	1	0.27	1	0
8	12	Gray	500 ft south of Fassett Rd	61.5	1	0.24	1	0
9	12	Red	0.5 mi south of Easter Rd	85.7	1	0.26	1	1
10	13	Gray	Elevation - 765	41.2	1	1.26	1	1
11	13	Red	.25 mi east of Vincent Flats Rd	44.4	1	0.07	1	0
12	13	Orange	along Murray Rd, just over the Montpelier/East Montpelier border	46.5	1	0.54	1	0
13	13	Red	@ BM 695	48.1	1	1.25	1	0
14	14	Red	.25 mi north of US-2	31.3	1	0.02	1	0

2. Floodplains – Special Flood Hazard Areas

Special Flood Hazard Areas in East Montpelier are mapped along the Winooski River, Bennett Brook, Kingsbury Branch, Mallory Brook, Sodom Pond Brook, Long Meadow Brook near Wrightsville Reservoir, and several locations near ponds and wetlands. The detailed flood study on the mainstem of the Winooski River was published in 1983. The Digital Flood Insurance Rate Map of 3/19/2013 incorporated the existing data.

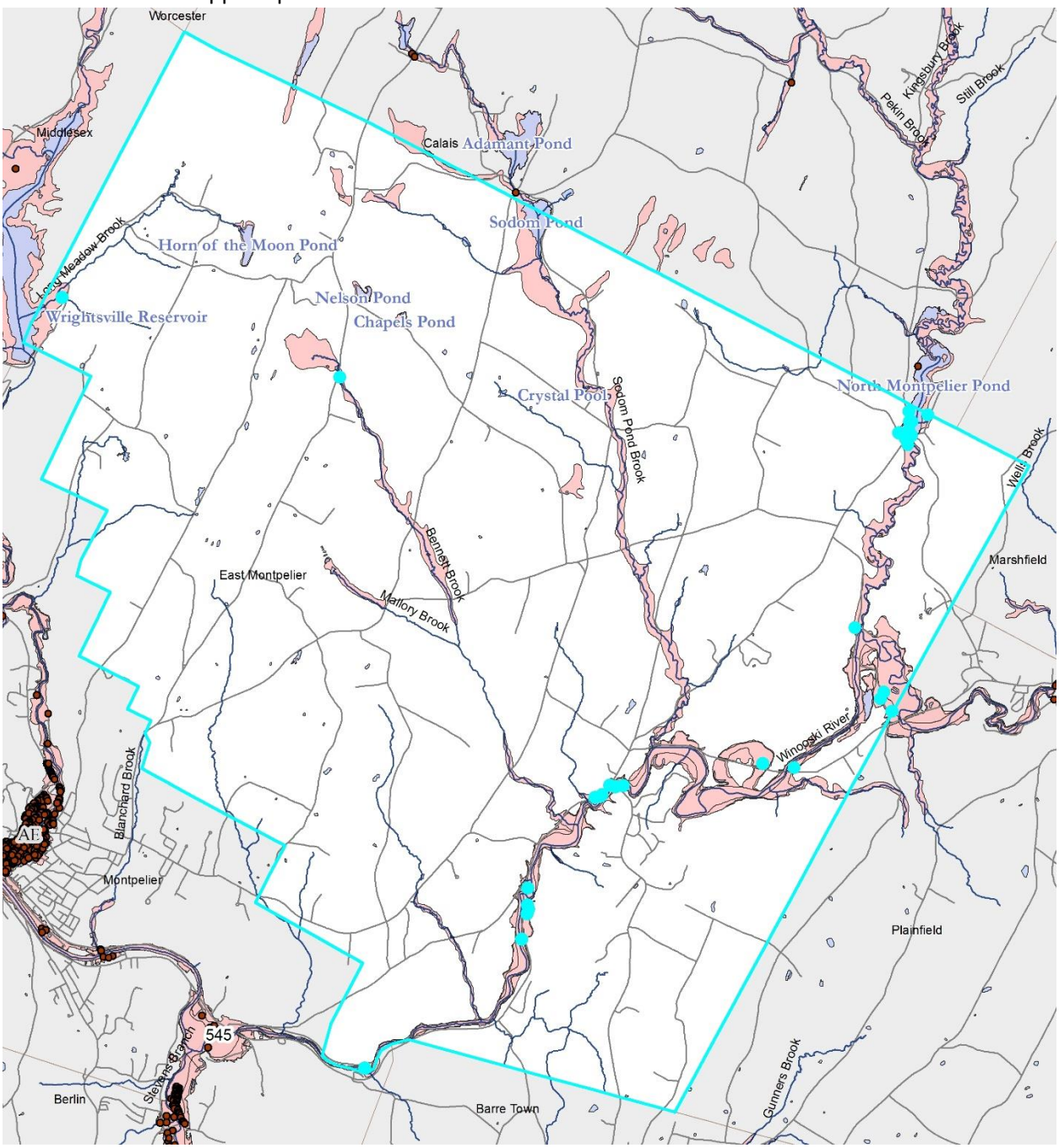
According to the East Montpelier Community Report on Flood Ready, the community has approximately 33 buildings within the Flood Hazard Area, roughly three percent of all structures in town. This is likely an undercount.

E911 Points in SFHA	Count
SINGLE FAMILY DWELLING	19
COMMERCIAL	6
MULTI-FAMILY DWELLING	3
OTHER	2
GOVERNMENT	1
INDUSTRIAL	1
MOBILE HOME	1
	33

Approximately 70% of the buildings in the high-risk area are “self-insured” meaning they do not have flood insurance policies in force.

Any building in the SFHA may be eligible for acquisition through FEMA’s Hazard Mitigation Assistance program.

Structures in the Mapped Special Flood Hazard Areas:



Floodway

Several structures including at least three single-family homes, a mobile home and a commercial building are within the Floodway portion of the SFHA. The Floodway is an area characterized by more frequent and higher velocity floodwater.

One action opportunity is to further refine the structure risk information with use of the new one-foot contours from lidar and Elevation Certificates where available. Structures with basements in the SFHA face particularly high levels of risk from inundation. Other factors including exposure to erosion hazards, and opportunities for co-benefits including floodplain restoration and public access should be assessed.

Another follow up opportunity is to reach out directly to the owners of vulnerable buildings to be sure they are informed regarding hazard area constraints and mitigation opportunities.

3. Stormwater

Low Impact Development (LID) standards are intended to avoid increasing stormwater discharges from new impervious surfaces, notably roofs, driveways and parking areas.

East Montpelier has adopted LID standards as a component of subdivision regulations.

4. **Dams**

East Montpelier has eight dams in Town. The Town is downstream of Marshfield No. 6, a high hazard dam at Molly's Pond.

Dam Name	**Stream**
Bennett Brook	Bennett Brook
Chapels Pond	Sodom Pond Brook-TR
Crystal Pool	Sodom Pond Brook
Montpelier No. 4	Winooski River
Montpelier No. 5	Winooski River
Nelson Pond	Sodom Pond Brook-TR
North Montpelier Pond	Kingsbury Branch
Pazini	Kingsbury Branch-TR

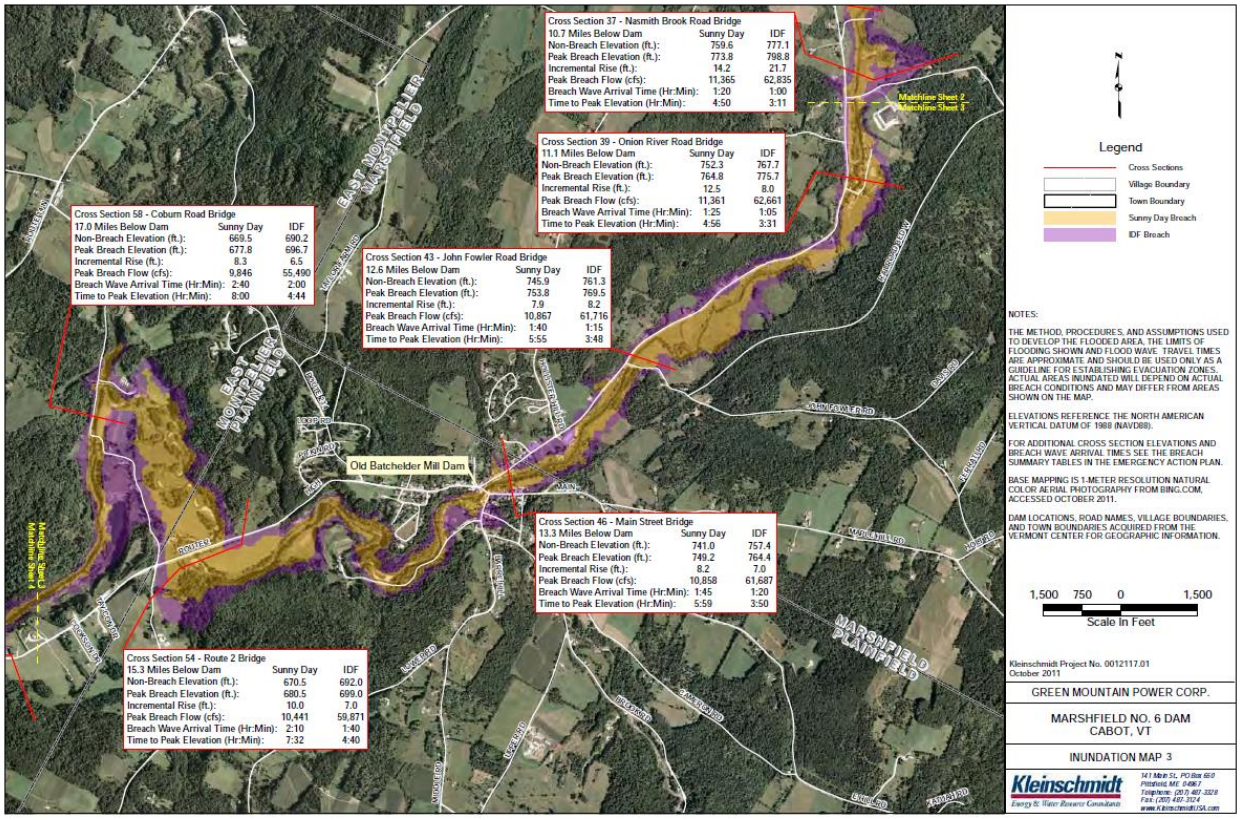
Montpelier Dam No. 4 is on the Winooski at the southern edge of town.

Upstream of East Montpelier, the Marshfield No. 6 dam on Molly's Pond is considered a high hazard dam due to the presence of structures (including 42 in East Montpelier), that could be affected in the unlikely event of a dam breach.

An Emergency Action Plan was completed in October 2011. The dam owner, Green Mountain Power is responsible for notifications during times of concern. The Vermont State Police have the responsibility of coordinating efforts of all governmental and private organizations as would be necessary to respond to and coordinate actions for an impending or actual failure of the Marshfield No. 6 dam.

During a dam failure under high water conditions (Inflow Design Flood) the breach wave would arrive in East Montpelier 2.5 hours after the breach formation and would peak another 6 to 7 hours later. The

peak flow rates would be only slightly less than those in Plainfield (~60,000 cfs), which would be in the range of 2 to 2.5 times the 500-year flow.



Current regulations in East Montpelier prohibit new structures in the SFHA and River Corridor. This area includes much of the area inundated by the potential IDF event.

Living With Dams: Know Your Risks FEMA P-956 / February 2013 E-book version

Other possible concerns:

5. Ice Jams
   The USACE CRREL Ice Jam Database does not have recent records of ice jams in East Montpelier.

6. Landslide Risk
   Landslide data in Washington Co.
   https://dec.vermont.gov/geological-survey/hazards/landslides
   http://anrgeodata.vermont.gov/datasets/landslides

7. Earthquake and Multi-Hazard Analysis
   VGS

https://dec.vermont.gov/sites/dec/files/geo/HazDocs/WashingtonCountyNESECReport.pdf

8. Drought
   https://water.usgs.gov/ogw/drought/

   https://www.usgs.gov/special-topic/water-science-school/science/droughts-things-know?qt-science_center_objects=0#qt-science_center_objects

   https://groundwaterwatch.usgs.gov/NetMapT1L2.asp?sc=50&ncd=rtn

   https://maps.waterdata.usgs.gov/mapper/index.html?state=vt

   https://waterdata.usgs.gov/vt/nwis/rt Streamflow

   https://waterdata.usgs.gov/vt/nwis/nwis