Town of Waitsfield, VT
Local Hazard Mitigation Plan

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Prepared by the Town of Waitsfield and CVRPC

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1. Introduction

The impact of expected, but unpredictable natural and human-caused events can be reduced through community planning. The goal of this Local Hazard Mitigation Plan is to provide a local mitigation plan that makes the Town of Waitsfield more disaster resistant.

Hazard mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. Based on the results of previous Project Impact efforts, FEMA and State agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has occurred. 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, however 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.

2. Purpose

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

3. Community Profile

The Town of Waitsfield is a small, rural, residential, and tourism-based community located in the southwestern portion of Washington County. It is bordered by Moretown and Duxbury to the north, by Fayston to the west, by Warren to the south and Northfield to the east.

According to the 2010 Census, Waitsfield has a total population of 1,719 people living in 1,011 housing units. The Town's estimated 2013 population is 1,804, a slight increase. According to the Town Plan "Waitsfield is a rural community with a working landscape, a regional commercial center, a bedroom community, a tourist destination, and is home to a variety of species, habitats and natural resources." The town is characterized as a bedroom community as it provides only about 3.8 percent of the jobs in the Region (VT Dept. of Labor, 2012).

Waitsfield is located in the heart of the 143 sq. mile Mad River watershed, which drains in a northerly direction into the Winooski River Basin, and is bounded to the east by the Northfield mountain range with elevations nearing 3,000 feet. Vermont Route 100 follows the Mad River in a north-south direction and provides connection to Waterbury and Warren. The Village of Irasville is located at the intersection of Vermont Route 100 and Vermont Route 17, which provides passage west beyond the Green Mountains via Appalachian Gap.

According to information contained in the Waitsfield 2012 Town Plan, a dominant characteristic of Waitsfield is the extensive forest cover, especially in mountainous areas and on steep slopes rising from the valley floor. The town's physical character, however, is defined by the contrasting patchwork of that forest with large areas of farmland, especially in the vicinity of Waitsfield Common and the valley floor, and an attractive built environment. Commercial development is concentrated in existing centers, Waitsfield Village and Irasville, and in the Limited Business and Industrial Districts. Residential development is widely distributed throughout town, although concentrations exist in the village centers and in rural areas served by major roads near the villages.

The Town of Waitsfield strives to encourage compact village centers surrounded by rural landscapes. Recent development primarily consists of low-density, scattered residential development in the Forest Reserve district as "a growing market for lots which offer a big view" have increased development pressure. The town has designated Irasville and Waitsfield Village as future growth centers for development, and also maintains the Mad River Park for industrial scale development opportunities. The major new development between 2010 and 2015, other than scattered residential, has been limited to these areas. This included conversion of a retail establishment to a restaurant and addition of 23,000 sq. ft. of impervious parking lot. The remainder of development reviewed under the State Land Use Law in Waitsfield (25 permits)

was accessory to existing development. All new development is required to adhere to the town's Zoning and Subdivision Regulations including the Flood and Fluvial Erosion Hazard (FEH) regulations where applicable. These regulations, and the slow pace of development, mean that the community is similarly vulnerable to hazards as it was in 2010.

The Town completed construction of a municipal water system in 2012, serving approximately 150 parcels in Irasville and Waitsfield Village. The purpose of the water system is to address public health concerns, protect water quality of the Mad River, provide for economic development, and reduce the potential for sprawl outside these areas. The town is currently investigating municipal decentralized wastewater options for its population centers; existing wastewater treatment is provided by on-site systems.

In Waitsfield, electricity is provided by Green Mountain Power to the majority of residents with the exception of a small area along the North Fayston and Airport Roads, which is supplied by the Washington Electric Cooperative. The Town's fire coverage is provided by the Waitsfield-Fayston Volunteer Fire Department, which provides support to the inter-municipal Capital Fire Mutual Aid System. According to the 2014 Waitsfield Town Report the Fire Department responded to a total of 137 calls during 2014 (including 47 motor vehicle accidents, 10 structure fires and 4 wildland fires). The Mad River Valley Ambulance Service provides emergency medical care to all valley residents via its home in Waitsfield Village. Law enforcement is provided by the Vermont State Police and by the Washington County Sheriff's Office which is under contract for 16 hours per week. The Town Constable is also a Deputy Sheriff.

The Town of Waitsfield has an approved Local Emergency Operations Plan that was adopted in March 2016. The Waitsfield Elementary School serves as the Town's primary emergency shelter and the town office is the Emergency Operations Center. The newly constructed town office has an elevator and back up power generation. The Town also adopted Road and Bridge Standards in 2014 with the purpose of increasing the likelihood that town roads and bridges will hold up during flooding and heavy rain events.

The Town Plan was adopted in 2012 and includes a discussion and goals in regards to flood history, public safety, natural resources, land use, floodplain management, vulnerable transportation infrastructure, water quality protection, and climate change. The town's zoning bylaws (2010) include Flood Hazard Area and Fluvial Erosion Hazard Area Overlay Districts, a Forest Reserve District, provisions for Planned Unit Development and standards in regards to surface water protection, steep slopes and lot coverage maximums.

At the time of plan development, Waitsfield has Interim 17.5% Status under the Vermont Emergency Relief and Assistance Fund (ERAF). This State fund contributes to costs for federally assisted repair projects after a Federally Declared Disaster. The Town has earned this Interim Status by adopting Fluvial Erosion Hazard regulations that prohibit new structures. The town is thereby able to receive a 17.5% of total project cost contribution from the State Emergency Relief and Assistance Fund after a Federally Declared Disaster. This status is Interim, however, and will not remain effective in perpetuity. The status expires two years after a Phase 2 Statewide River

Corridor Map is published by the Agency of Natural Resources. In order to maintain the 17.5% Status (make it permanent), Waitsfield will need to modify its Fluvial Erosion Hazard (FEH) regulations to meet the ERAF 17.5% State Share Criteria. At the time of LHMP development, Waitsfield's bylaws do not meet these criteria. Without this revision, Waitsfield's ERAF state contribution rate would revert to 12.5%. Meeting the ERAF 17.5% State Share Criteria will require some adjustment of the FEH area boundaries and may require modification of site and design standards.

The Town is also planning for the long-term impacts and challenges of a changing climate. Climate change poses challenges for the town including more intense storms, frequent heavy precipitation, heat waves and cold spells, extreme flooding, and generally more unstable weather patterns. These climate changes pose risks to both public and private property, as well as economic risks to the agricultural, recreation, and tourism industries. Engaging the community in developing mitigation strategies that reduce the town's vulnerability to the impacts of climate change and furthering the town's commitment to building a resilient community are an important focus of this plan.

4. Planning Process and Maintenance

4.1 Planning Process

The Central Vermont Regional Planning Commission (CVRPC) coordinated the Waitsfield Local Hazard Mitigation Plan process. CVRPC was contacted by the Town Administrator (TA) and sent Town-Specific hazard mitigation material for review. After assessing the material, the TA and CVRPC staff held a meeting along with members of the community on May 7th, 2015 at the Municipal Offices. Preparation for the meeting included a review of the 2012 Waitsfield Town Plan, Local Emergency Operations Plan, 2010 Pre-Disaster Mitigation Plan, 2014 Town Report, 2007 Mad River Geomorphic Assessment Report, 2008 Upper Mad River Corridor Plan, and 2013 Stormwater Management in the Mad River Valley report. Relevant information from these documents is incorporated into various sections of this plan.

The Waitsfield Hazard Mitigation meeting focused on assessing past mitigation projects and compiling information on its current and future hazard mitigation programs, projects and activities. Attendees included the following:

- Valerie Capels, Town Administrator
- Susan Senning, Planning & Zoning Administrator and Floodplain Manager
- Fred Messer, Emergency Management Director
- Joshua Schwartz, Director, Mad River Valley Planning District
- Sacha Peeler, Floodplain Manager, Vermont Agency of Natural Resources
- Gail Aloisio, Central Vermont Regional Planning Commission

The meeting concluded that the town is most vulnerable to dam failures, flood/flash flood/fluvial erosion, hurricanes & severe storms, ice jams, winter storm/ice storm/extreme cold with power

failure. The town will focus most of its mitigation planning on flooding since it is the most common and damaging hazard which impacts the town.

Public input on hazard mitigation planning in Waitsfield occurs both directly during the development of the Local Hazard Mitigation Plan, and through other community planning processes. These processes are listed under Land Use Planning/Management Existing Hazard Mitigation Programs, Projects, and Activities on page 9. Public input activities influencing the outcomes of these projects included town wide surveys and public hearings for the Waitsfield Town Plan, participation of state officials, regional planning representatives and local non-profits in evaluating Waitsfield under the EPA Smart Growth Flood Resilience Checklist, participation by neighboring town officials in the Ridge to River Stormwater Planning project, and public hearings for the adoption of the 2010 Fluvial Erosion Hazard Overlay regulations. Understanding of priorities and community preferences gained during these processes strongly informs the Local Hazard Mitigation Team.

To involve constituents directly during LHMP development, a press release was issued announcing the opportunity for the public and other stakeholders to provide feedback at the June 15, 2015 Waitsfield Selectboard Meeting. This meeting was also broadcast on Mad River Valley TV, the local public access station. The draft plan was also posted to solicit comments on the CVRPC blog and was also available for review and comment at Waitsfield Municipal Offices from 06/10/2015 to 06/19/2015. A copy of the draft plan was emailed to emergency management directors in adjacent towns for comment. No comments were received from the general public, however the Friends of the Mad River provided comments that were incorporated to clarify factual information in the plan. Documentation of opportunities for stakeholder involvement are included as attachments.

In subsequent plan update processes, public comments will be reviewed by the Town Administrator, local officials, and CVRPC Staff (dependent on funding) and attached as an appendix. The draft plan will also be made available at the Town Office and website and at local meetings with State and local officials to allow for more public comment and review. After Approval Pending Adoption, the plan will go before the Selectboard for adoption.

4.2 Plan Update Process

The previous Waitsfield Local Hazard Mitigation Plan was adopted by the Town in 2010 and received FEMA final approval in December 2010. The 2015 update is intended to be submitted as a single-jurisdiction Local Hazard Mitigation Plan.

Community priorities have shifted since 2010 to focus a great deal on flood resilience. The community is more aware of the potential for severe storms to cause flood damage in multiple ways, after the August 2011 Tropical Storm Irene event. Flood resilience planning has come to the forefront of community priorities, as its effects on tourism, economic development, land use and transportation infrastructure were made clear. This is reflected in the numerous projects undertaken since 2011, as listed in Existing Hazard Mitigation Programs, Projects, and

Activities, below. Additional activities and priorities are reflected in the hazard profile describing flooding, and in the Goals and Strategies excerpted from the 2012 Town Plan.

The current plan is an overhaul of the 2010 plan. Below is a list of the revisions that have been made from the past plan and the appropriate sections for reference. Hurricanes and Severe Storms have been added to the hazards posing the worst threats to Waitsfield.

General Updates

- General reorganization/restructuring of the plan according to future FEMA/VEM checklist
    - New sections added – 4.1 Planning Process, 4.3 Plan Maintenance, 5.2 Worst Threat Hazards
- Update of all data and statistics using 2012 Town Plan, 2014 Town Report and US Census Data (Section 3)
- Revaluation, identification and analysis of all significant hazards (Section 5)
- Acknowledgment of implemented mitigation strategies since 2010 – see matrix below (Section 4.2)
- Update of on-going mitigation projects and strategies – see Existing Mitigation Programs, Projects and Activities section (Section 4.2)

Hazard Analysis Updates (Sections 5 and 6)

- New hazards added – Hurricanes & Severe Storms
- Review of Vermont Hazard Mitigation Plan (Section 5 – hazard analysis table)

Maps

- Review of 2010 Areas of Concern map and Local Hazards Analysis map – added Fluvial Erosion Hazard Zones, Emergency Shelter, Emergency Operations Center, additional ice & debris jam locations

The following chart provides an overview of Waitsfield's proposed 2010 hazard mitigation actions along with their current status.

2010 Mitigation Action	2015 Status
Stabilize approx. 300ft of eroding river bank, upstream of covered bridge	• Completed in 2014.
Reduce amount of impervious surface at Bridge Street Market Place parking area	• It was determined that is area is not in the Town's jurisdiction.

Retrofit trenches and expand bioretention areas at Bridge Street Market Place parking area	• It was determined that is area is not in the Town's jurisdiction.
Install tree box filters for street trees on Bridge Street	• Issues of stormwater runoff damage at this area of Bridge Street will be addressed in part by new stormwater infrastructure installed during Bridge St. reconstruction currently underway.
Flood proof municipal offices and library building	• Substantially completed in 2015.
Purchase river channel management rights through river conservation easements	• A parcel upstream of Lareau Farm was placed under river corridor easement in 2012, helping to protect Waitsfield Village downstream. • This action continues to be relevant and is also included in mitigation actions for the 2015 plan.
Upgrade high priority culverts as identified in the municipal Culvert Inventory and Geomorphic Assessment including culvert # 6 on Tremblay Road, culvert # 15 & 22 on North Road, and culvert on Ronk Road.	• Culvert #6 on Tremblay Rd. and Culverts # 15 & 22 on North Road completed in 2014.
Develop a dam failure notification system, including increased communication regarding the Warren timber crib dam	• This action is still relevant and has been included in mitigation actions for the 2015 plan.
Increase Community Rating thru the NFIP's Community Rating System (CRS)	• This action is still relevant and has been included in mitigation actions for the 2015 plan.
Install ice motion detectors	• This action is still relevant and has been incorporated into mitigation actions for the 2015 plan.
Purchase ice cutting and ice breaking equipment	• This action is still relevant and has been incorporated into mitigation actions for the 2015 plan.
Implement recommendations of Fire Station structural analysis	• Completed in 2010.
Develop a program to retrofit/reconstruct roofs of town structures to withstand heavier snow/ice loads	• Fire Station roof was enhanced in 2010 to handle heavier snow loads.

Conduct a tree removal/trimming program to reduce risk of tree fall on structures and above ground utilities	• On-going via the Tree Board.
Develop public alerts about the potential for and impacts of roof collapses	• Working currently to set up training to implement VT-Alert in Waitsfield.

Existing Hazard Mitigation Programs, Projects & Activities

Waitsfield has a number of programs, policies, and organizations that assist with hazard mitigation planning. The ongoing and recently completed programs, projects and activities are listed below and were reviewed during the development of this plan. The Town Plan (2012), Town Report (2014), Zoning Bylaws (2010), Subdivision Regulations (2008), CVRPC's past Regional Mitigation Plan (2005), Local Emergency Operations Plan (2014), and past newspaper articles were all reviewed for pertinent information. The VT State Hazard Mitigation Plan (2013) was reviewed as well for information and future mitigation projects. Information from these sources is incorporated into appropriate sections of the plan. Many of these programs or plans were either developed or updated as a direct result of the devastating impacts of Tropical Storm Irene. Following Tropical Storm Irene, Waitsfield and the other communities in the Mad River Valley have placed a higher emphasis on preparedness and on identifying opportunities to mitigate the impacts of hazard events and become overall more resilient.

<u>Community Preparedness Activities</u>

- Local Emergency Operations Plan, 2014
- Mad River Valley All-Hazards Mitigation Plan, 2005
- School Emergency Evacuation Plan, 2009

<u>Hazard Control & Protective Works</u>

- Maintenance Programs (Bridge & Culvert Inventory) – performed through CVRPC
- Capital Mutual Aid System
- Capital Equipment Plan
- Waitsfield Streambank Stabilization Project

<u>Insurance Programs</u>

- Participation in the National Flood Insurance Program (NFIP) since 1978. Floodplain permitting is administered, monitored and enforced by the Planning and Zoning Administrator and Conditional Use review is conducted by the seven-member Development Review Board. Development review applications also require submittal of a FEMA Elevation Certificate and a Vermont Agency of Natural Resources Project Review Sheet. Flood Insurance Rate Maps and related assistance

are made available both upon request at the municipal offices and via an online link through the municipal web site to digital Flood Insurance Rate Map panels.

Land Use Planning/Management

- Waitsfield Town Plan, 2012
- Mad River Geomorphic Assessment Report, 2007
- Upper Mad River Corridor Plan, 2008
- Mad River Valley Road Erosion Study, 2012
- U.S. EPA Smart Growth Implementation Assistance Flood Resilience Checklist
- Stormwater Management Regulation in the Mad River Valley, 2013
- Vermont Downtown Action Team Flood & Economic Resilience Design Charette
- Irasville Master Planning
- Flood Resilient Transportation Pilot Study, 2015
- Waitsfield Zoning Bylaws 2010: Districts and General use Standards
    - Flood Hazard Area Overlay District (Table 2.10) - Limits construction of structures in floodplain areas designated within the Flood Insurance Rate Map for Waitsfield. Prohibits new principal structures in all districts except Village Residential and Village Business.
    - Fluvial Erosion Hazard Area Overlay District (Table 2.11) – Prohibits new structures, storage and fill in fluvial erosion hazard areas designated on the Fluvial Erosion Hazard Area Map for Waitsfield.
    - Forest Reserve District (Table 2.08) – Maximum density of 1 unit per 25 acres, permitted uses limited to agriculture and forestry, additional standards for resource protection and limits on clearing.
    - Surface Water Protection Standards (Section 3.12) - Requires a 50- to 100-foot undisturbed, naturally vegetated buffer strips from streams depending on average grade of adjacent riparian land and a 50 foot buffer from wetlands.

Investing in Growth in Safer Areas

- Waitsfield Water System Investments
- Waitsfield Decentralized Loan Program

Restoration of Flood Storage Capacity

- Bridge Street Pocket Park- The town purchased 0.05 acres on the riverbank in Waitsfield Village to turn it into a floodable pocket park. The building formerly on the site was severely damaged from flooding and erosion during Tropical Storm Irene in 2011. The project also includes refurbishment of the bridge adjacent to the park, which often receives damage during flooding events.

Protection/Retrofit of Infrastructure and Critical Facilities

- Dry Hydrant Program

- Municipal Emergency Generator
- Bridge Street Improvements, including stormwater infrastructure and rehabilitation of Bridge St. Covered Bridge
- Relocating the Town Offices outside of the floodplain

Public Awareness, Training & Education

- Fire safety educational programs
- First responder CPR & HazMat trainings
- CERT Program
- Disaster Animal Response Team (DART)
- Municipal web site: Flood information web page & E911 web page
- 211 Emergency Information phone resource

4.3 Plan Maintenance

The Waitsfield Local Hazard Mitigation Plan will be evaluated and, if necessary, updated annually at an April meeting of the Planning Commission (PC). Evaluation and updates by the PC will also occur within six months after every federal disaster declaration and as updates to town plan/zoning and river corridor plans come into effect. The plan will be reviewed by the Selectboard, Town Administrator and public at the above mentioned April Planning Commission meeting. A tracking chart is included in the appendix to document the progress of mitigation projects. CVRPC will help with updates or if no funding is available, the Planning Commission will update the plan.

The process of evaluating and updating the plan will include continued public participation through public notices posted on the municipal website, Front Porch Forum, the Valley Reporter, and CVRPC newsletter and blog inviting the public to a Selectboard meeting to provide comment on the updates. Additional stakeholders invited to the meeting will be the business owners located throughout town. Also invited in the future will be the VT Agency of Natural Resources (VT ANR), as they are able to provide assistance with NFIP outreach activities, models for stricter floodplain zoning regulations, delineation of River Corridor areas, and other applicable initiatives. These efforts will be coordinated by the Town Administrator and Planning Commission.

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 during regularly scheduled Selectboard meetings. 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.

Waitsfield has continued to integrate the Local Hazard Mitigation Planning process with the core community planning process, the Municipal Plan. Each iteration of both of these plans has coordinated its goals with the goals of the other. Page 26 lists policies from the 2012 Town Plan that demonstrate the increasing sophistication of that planning process to take into account hazard mitigation principles. The goals in the 2012 Town Plan have expanded on goals laid out in the 2010 LHMP.

It is recommended the Town continue to review and incorporate elements of the Local Hazard Mitigation Plan when updating the Municipal Plan and Flood Hazard bylaws. The incorporation of the Local Hazard Mitigation Plan into the Town Plan, possible future zoning regulations and additional flood hazard bylaws will also be considered after declared or local disasters. The Town shall also consider reviewing future Upper Mad River Corridor planning documents for ideas on future mitigation projects and hazard areas.

5. Risk Assessment

5.1 Hazard Identification and Analysis

The natural disasters included in the table below were discussed and the worst threat hazards were identified based upon the likelihood of the event and the community's vulnerability to the event. Hazards not identified as a "worst threat" may still occur, but due to a low likelihood of the event and/or the community's vulnerability being limited to a routine emergency, this plan will not address avalanche/landslide, extreme heat, drought, earthquake, high wind, structure fire, tornado, or wildfire/forest fire. Greater explanations and mitigation strategies of "non-worst threat" hazards can be found in the State of Vermont's Hazard Mitigation Plan.

Risk Assessment Table			
Hazard	Probability [1]	Community Vulnerability[2]	Worst Threat[3]
Avalanche/Landslide	Low	No	
Dam Failures	Med	Yes	X
Extreme Heat	Med	No	
Drought	Med	No	
Earthquake	Low	No	

[1] High Probability of happening: Near 100% probability in the next year.
Medium Probability of happening: 10% to 100% probability in the next year or at least once in the next 10 years.
Low Probability of happening: 1% to 10% probability in the next year or at least once in the next 100 years.
[2] Does the hazard present the threat of disaster (Yes)? Or is it just a routine emergency (No)?
[3] Worst threat – Identified hazard presents threat of loss of life and property – hazard mitigation activities are identified; Mode

Risk Assessment Table			
Hazard	Probability [1]	Community Vulnerability[2]	Worst Threat[3]
Flood/Flash Flood/Fluvial Erosion	High	Yes	X
High Wind	Med	No	
Ice Jam	Med	Yes	X
Hurricane/Severe Storms/Hail	Med	Yes	X
Structure Fire	Low	No	
Tornado	Low	No	
Wildfire/Forest Fire	Low	Yes	
Winter Storm / Ice Storm/Extreme Cold with Power Failure	High	Yes	X

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

- Dam Failures
- Flood/Flash Flood/Fluvial Erosion
- Ice Jam
- Hurricane/Severe Storms
- Winter Storm/Ice Storm/Extreme Cold with Power Failure

Due to the frequent and severe nature of flooding events, Waitsfield recognizes flooding as the worst natural hazard within the Town and will focus mitigation efforts on reducing the impacts from flooding events.

A discussion of each worst hazard is included in the proceeding subsections and a map identifying the location of each hazard is attached (See map titled *Areas of Local Concern.*) Each subsection includes a list of past occurrences based upon county-wide FEMA Disaster Declarations (DR-#) plus information from local records, a narrative description of the hazard and a hazard description matrix containing the following overview information:

Hazard	Location	Vulnerability	Extent	Impact	Probability
Type of hazard	General areas within the municipality which are vulnerable to the identified hazard	Types of structures impacted	Magnitude of hazard – scale dependent on hazard	Dollar value or percentage of damages	Probability of hazard occurring based upon past events: **HIGH** = Near 100% probability in the next year. **MED** =10% to 100% probability in the next year or at least once in the next 10 years. **L**OW = 1% to 10% probability in the next year or at least once in the next 100 years.

5.2 Worst Threat Hazards

Dam Failure

Dam failure can occur with little warning and may be the result of rainstorm, debris jam, accumulation of melting snow, or due to human or technological mis-operation. The Vermont Department of Environmental Conservation's Dam Safety and Hydrology Section compiles and tracks dam safety data in Vermont as part of the Vermont Dam Inventory (VDI). The VDI identifies 162 dams in Central Vermont, ranging from hydroelectric dams (in-service and historic) to flood control dams to historic milldams.

According to the VDI, there are two dam sites in Waitsfield; one located on the Mad River near the Great Eddy Bridge on Bridge Street and the other located at the Sugarbush snow-making pond, adjacent to the Mad River near Route 100 on the southern town boundary. The Great Eddy Bridge no longer poses a failure threat as it has been breached and now functions more as a channel feature than to impound flow.

The Sugarbush snow-making pond dam is classified according to the VDI as "low hazard potential". A low hazard potential dam is defined as "failure or mis-operation may result in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property." This dam, as well as the walls of the snowmaking pond, are vulnerable to migration of the Mad River channel, which runs parallel to the pond. On three occasions, the river has avulsed into the snowmaking pond, damaging both the walls of the pond and the dam. The change in flow of the river deposited 45,000 yards of material into the snowmaking pond and cost $600,000 to clean up, as reported by a local newspaper. Specific flows or water levels are not measured at the dam. Although the dam has not failed to date, release of the impounded water in the pond threatens to exacerbate flood damage downstream during flood events.

Figure 1 Sugarbush Snowmaking Pond. River avulsion damage after Tropical Storm Irene.

In addition, the following dams were identified during the LHMP plan update process: a dam at the Waitsfield Town Pond (located at the intersection of Route 100 and Carroll Road) and the Warren Village Dam (a timber crib dam located south of Waitsfield, upstream on the Mad River in Warren Village). The Waitsfield Town Pond impoundment nearly failed in spring 2008 during a rain on snow event. The dam was repaired by the town in 2009 and is no longer recognized as a hazard. The VDI identifies the Warren Village Dam as a low hazard potential dam. A dam study was proposed to examine the timber crib dam and referenced in the 2005 Waitsfield Pre-Disaster Mitigation Plan, yet the study was suspended as a result of a Warren town-wide vote.

While no dam inundation study has been undertaken for either the Sugarbush snowmaking pond or the Warren timber crib dam, a dam failure would most likely cause localized flooding and river channel adjustments downstream. The Vermont Center for Geographic Information has not calculated and mapped the dam inundation areas of any dams within the Mad River Watershed, therefore the impact and vulnerability of this hazard is undefined. Still, there are 203 properties within Waitsfield's NFIP's designated 100-year floodplain, and these properties could be vulnerable to flooding following a dam failure event. Additionally, the main

transportation route, Route 100, would most likely sustain moderate damage. At this time, there are no major construction plans proposed within the designated floodplain and all development is subject to adhere to the town's Flood and Fluvial Erosion Hazard zoning regulations. As described below in the Flooding hazard profile, these regulations protect any proposed development from inundation hazards caused by dam failure.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Dam Failure	Area downstream from the Sugarbush snow-making dam and the Warren Village dam.	Rt. 100, potentially all properties within NFIP 100-yr floodplain	Moderate	Estimated loss for all properties within 100-yr floodplain = ~ $56,505,050	Medium

Flood/Flash Flood/Fluvial Erosion

History of Occurrence: (Mad River Valley encompasses the towns of Waitsfield, Warren, Moretown and Fayston. The Mad River flood gauge is located in Moretown, approximately 6.5 miles downstream. Information from NCDC web site and FEMA DR list).

Date	Event	Location	Extent
4/15/2014-4/18/2014	Flash Flood	Waitsfield, Washington County	Mad River flood gauge at 10.02 ft; Several roads were damaged.
7/4/2013	Flood	Waitsfield, Washington County	Mad River crested at 9.33 ft; minor field flooding.
8/28/2011	Flash Flood (TS Irene)	Waitsfield, Washington County	Mad River crested at 19.06 feet – flood stage is at 9'; 5-7" of rain - DR 4022
5/20/2011	Flash Flood	Waitsfield, Washington County	4+" of rain; driveways, culverts and roads washed out;
4/23-5/9/2011	Flash Flood	Washington County	DR 1995 –
10/1/2010	Flood	Waitsfield, Washington County	4-5" of rain; Mad River flood gauge at 10.39 ft
8/2/2008	Flood	County-wide	Mad River flood gauge at 7.89 ft; DR 1790
3/15/2007	Flood; ice jams	Mad River Valley	Mad River flood gauge at 13.5 ft
12/24/2003	Flood	Mad River Valley	Mad River flood gauge at 14.17 feet, DR 1448
12/17/2000	Flood	Mad River Valley	3" of rain; no data for Mad River Gauge

5/11/2000	Flood	Mad River Valley	Mad River flood gauge at 9.96 ft
9/17/1999	Flood	County-wide	Mad River flood gauge at 8.23 ft; DR 1307 (TS Floyd)
6/27/1998	Flash Flood	County-wide	3-6" of rain over 2 day period – Mad River flood gauge at 14.13 ft, DR1228
1/27/1996	Flood	County-wide	Mad River flood gauge at 9.03 ft; DR 1101
8/6/1995	Flood	Mad River Valley	Mad River flood gauge at 8.12 ft
3/31/1987	Flood	Mad River Valley	Mad River flood gauge at 11.97 ft
3/13/1977	Flood; ice jams	Mad River Valley	Mad River flood gauge at 13.72 ft
8/5/1976	Flood	County-wide	Mad River flood gauge at 13.47 ft – DR 518
9/22/1938	Flood	Waitsfield, County-wide	Mad River flood gauge at 16.34 ft
11/03/1927	Flood	Waitsfield, County-wide	Mad River flood gauge at 19.40 ft

Flooding/flash flooding/fluvial erosion is Waitsfield'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.

The most prominent body of water within Waitsfield is the Mad River, which originates in Granville Gulf and flows in a northerly direction along Vermont Route 100 and 100B, converging with the Winooski River in Moretown. Several stream tributaries originating in Waitsfield's upland areas converge with the Mad River in the Mad River Valley.

Waitsfield experienced a significant flood in 1998 and, more recently, a flood in the spring of 2011, and a devastating flood from Tropical Storm Irene in August of that same year. Given the recent devastating flooding from Tropical Storm Irene, the town has reinvigorated its commitment to improving resiliency and recognizes the importance of mitigation planning to better protect public roads, bridges, municipal buildings, and other public infrastructure. The construction of a new municipal office building in a safe area out of the floodplain highlights this commitment.

The town has adopted flood hazard area regulations to limit development within flood hazard areas, as required for municipal participation in the federal flood insurance program. These regulations are intended to protect life and property, and to allow property owners to obtain National Flood Insurance Program (NFIP) flood insurance and mortgages at relatively affordable

rates. In 2010, the town adopted new floodplain regulations and maps as mandated by the Federal Emergency Management Agency (FEMA) and the NFIP and added a fluvial erosion hazard overlay district to limit losses due to flooding and streambank erosion and reduce the impacts associated with flooding.

According to the Moretown River gauge, at the following water levels, the impact to the surrounding areas will be:

- **Water level – 13.5 ft** – About 4 feet of water will cover Rte 100 south of Moretown…nearly reaching a trailer park.
- **Water level – 12 ft** – At 12 feet, Rte 100 will be covered with water in Moretown… Rte 100B will be partially covered. Water will inundate Telephone Flats near Waitsfield.
- **Water level – 9 ft** – At 9 feet…the Mad River begins to leave its banks. Field flooding occurs between Waitsfield and Moretown…and some local roads will flood.

According to the Upper Mad River Corridor Plan (2008), "Recent floods on the Mad River have brought to light the legacy of previous land uses and channel management activities. Historical deforestation of hillslopes in the watershed delivered large amounts of sediment to the river channel in the 18th and 19th centuries. Channel management (e.g., straightening, dredging, and bank armoring) during the middle part of the 20th century increased the channel's flood flow capacity and decreased its access to floodplain areas, leading to the present-day river conditions with degraded biotic habitat and increased erosion hazards." The Mad River may have indeed been named *Mad* due to its flashy nature. Steep slopes, heavy rain events, undersized culverts and areas of impervious surfaces all contribute to the resulting damages of flash flooding. Flash flooding and associated stormwater run-off carrying pollutants and fertilizers into the rivers and waterways also possess a health risk and degrades water quality. Reducing impervious surfaces and encouraging green infrastructure can help mitigate the impacts of stormwater and reduce water pollution.

To address both the flooding and water quality implications of stormwater runoff, Waitsfield and the other 4 towns in the Mad River Valley are starting a planning initiative to improve stormwater management. Called Ridge to River, the initiative will focus on the following strategies:

- Educate local officials, road crews, contractors and land owners about the implications of their routine decisions on stormwater runoff
- Minimizing erosion and stormwater runoff from land disturbance through better regulations, procedures, trainings, policies and inspection & reporting protocols
- Improving practices for roadway construction and maintenance and repair by both municipal road crews and local contractors
- Reducing the "water footprint" of land uses such as development, driveways, and recreation trails

- Ensure municipal permitting, standards and enforcement require effective erosion control & stormwater management
- Promote partnership with farmers, foresters and other working lands stewards

These strategies will all have effects that reduce the creation and/or exacerbation of flash flooding and inundation hazards from stormwater runoff. At the time of plan development the project team was reviewing the results of an information gathering report produced by the project consultant, and starting to review regulatory differences between the municipalities to identify the most effective improvements to regulatory strategy.

Waitsfield participates in the NFIP and has adopted flood hazard regulations, as well as adopted stream buffer zones. The Flood Insurance Rate Maps (FIRM) of the 100 year floodplain along the Mad River and the lower reaches of its major tributaries designate flood plain areas through Waitsfield (759 acres, 4.58% of land area). Based on results of overlaying Waitsfield's current FIRMs with the location of E911 points, 20 structures and 203 properties are located within the designated 100-year floodplain. These include 6 commercial structures, one farm structure, one public structure and 8 residential structures.

There are no repetitive loss properties in Waitsfield. The effective FIRM date is 3/19/2014. The estimated loss for a severe flooding event for all properties within the Town's 100 year floodplain is approximately $56,505,050. Waitsfield has 34 active NFIP policies in force (19 in Zone A), for a total coverage of $6,552,400.

The Forest Reserve zoning district limits development in certain areas to protect natural resources and in some places may extend beyond floodplain boundaries. Stream buffers of 50- to 100-feet from surface waters also limit some infringement on floodplain areas. Development is limited within the vegetated buffer with a purpose of preventing soil erosion, protecting wildlife habitat and maintaining water quality. New low density residential development added in the Forest Reserve district since 2010 has been less vulnerable from flooding & fluvial erosion hazards due to this regulation. Within the area mapped by the State of Vermont as a fluvial erosion hazard zone, there are 105 properties totaling 550 acres. The total value of these properties is $29,226,750.

The Planning & Zoning Administrator also serves as the town's Floodplain Manager and is responsible for enforcement of flood hazard regulations. 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 undergo a change of use are required to obtain a permit which is reviewed and issued by the Development Review Board.

The Flood Hazard Area Overlay regulations and Fluvial Erosion Hazard Area regulations are Waitsfield's primary mechanism for protecting new development from flood losses. The Flood Hazard regulations prohibit new principal structures in all districts except the Village Residential and Village Business Districts. The Fluvial Erosion Hazard (FEH) regulations prohibit all new structures, except accessory uses and non-structural property improvements associated with

pre-existing structures. The FEH area covers much of the area in the Village not subject to the Flood Hazard regulations. Acting together, these regulations guide establishment of new long-term investment and growth away from the majority of the land in these hazard areas. All though new investment related to existing uses and in the Village will continue, a great deal of new development has been protected from flooding.

A new project that will help Waitsfield guide new infrastructure and development away from flood hazards is a reanalysis and update of the floodplain boundaries. Central Vermont Regional Planning Commission is leading a project to model the entire floodplain of the Mad River and provide data and maps that the towns along the river can use for flood mitigation planning. The project will model flood events more frequent than the 1 percent chance annual flood (100 year flood). Waitsfield does not currently have a model or boundary maps for these events. The 1 percent chance FEMA flood insurance rate maps also date from the 1970's and are in need of re-evaluation with more modern methods. Having more accurate data will allow Waitsfield to identify specific locations more vulnerable to flooding and better protect both existing and future development in those locations. The flood boundaries produced by the project will be in conformance with FEMA mapping specifications, but will need additional processing for a formal FEMA map amendment request.

The community will also consider potential new protections for new development in the Fluvial Erosion Hazard area when they decide whether or not to modify Waitsfield's Fluvial Erosion Hazard regulations to comply with the ERAF 17.5% State Share Criteria, as described on page 4. Complying with these criteria may mean regulating additional areas where new development could occur, and adopting stricter standards for that development. The community has identified an evaluation of the implications of changing the Fluvial Erosion Hazard regulations to maintain 17.5% ERAF contribution as a project in the Mitigation Action Plan (p. 30).

Waitsfield Village has historically been affected by flooding events. A June 1998 flood event brought the Mad River out of its banks and inundated numerous buildings including Joslin Memorial Library, which houses the Town Offices on the first floor. Water levels nearly reached Vermont Route 100, damaged the Great Eddy Bridge, and eroded the banks of the Mad River upstream of the Village.

During a flash flood event on June 28, 2010, more than 2 ½ inches of rain fell. The Valley Reporter newspaper characterized the event in its July 1, 2010 edition as follows: "area streams and brooks rose so fast that culverts were overwhelmed, roads washed away and rivers breached their banks." Flooding was also reported behind the Bridge Street Marketplace in Waitsfield when the smaller streams emptied into the Mad River.

Waitsfield experienced substantial flash flooding during the May 2011 event and several roads and associated infrastructure were impacted. These include:

- Brook Road
- Bushnell Road
- Common Road
- Cross Road
- East Road
- Floodwoods Road
- Hastings Road
- Joslin Hill Road
- Long Road
- North Road
- Old Center Fayston Road
- Palmer Hill Road
- Palmer Lane
- Rolston Road
- Ski Valley Acres
- Tremblay Road

During Tropical Storm Irene in August 2011, the Mad River flood gauge was 19.06 feet above flood stage, the second highest crest on record. A "Tropical Storm Irene Limit of Inundation" map for the village area of Waitsfield is included as an Attachment. This is an estimate of the worst extent. The worst flooding event in Waitsfield's history was the 1927 event with the Mad River flood gauge at 19.40 feet above flood stage; however, exact data from that event is not available.

Tropical Storm Irene caused severe damage to residences, businesses and infrastructure in the Mad River Valley. In Waitsfield, many roads were closed and several areas heavily damaged. The storm left Waitsfield isolated for a few days until the Agency of Transportation reopened Route 100 south of Route 17, which was washed out by Mill Brook.

A heavily hit area was the Bridge Street Marketplace in Waitsfield Village where several businesses were impacted, the covered bridge sustained structural damage and a historic building was destroyed. The Fiddlers Green area, home to several businesses, also sustained heavy damage. In more rural parts of the town, several farms were flooded with crops destroyed.

Several homes were flooded when Shephard's Brook jumped its bank and also destroyed five driveways. These properties have been subject to similar damage in subsequent storms since Tropical Storm Irene. The Agency of Natural Resources, CVRPC and the municipality are helping the property owners consider various mitigation options. Mitigation will likely involve both short term and long term approaches. These projects are proposed in the Mitigation Action implementation plan.

It is estimated that Waitsfield incurred $175,567 in public infrastructure damages and over $1.18 million in total with NFIP claims and individuals and household program.

Conservation of undeveloped areas at flood risk are also important tools to enhance long-term flood protection. Waitsfield contains several tracts under easement by the Vermont Land Trust or municipally-owned that contain portions of the Special Flood Hazard Area. These conserved areas (~190 acres) represent approximately 25% of the mapped Special Flood Hazard Area in the Town of Waitsfield.

The Upper Mad River Corridor Plan is a valuable tool to help restore the River's health and prevent future flooding impacts. It is used to inform the community of areas with high potential benefit for purchasing river channel management rights, as well as bridges, culverts and other structures that could be upgraded to mitigate damage. The Waitsfield Project and Strategy

Recommendation Summary Table from the Upper Mad River Corridor Plan is attached for reference and consideration for future mitigation projects.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Flood/flash flood/fluvial erosion	Floodplain, area in extent of TS Irene inundation map, see above road locations	Culverts, bridges, roads, infrastructure private property	TS Irene - ~6" of rain, Mad River flood gauge at 19.06 ft; 9 ft is flood stage (see extent of inundation map in Attachments)	Over $1.18 million from TS Irene; $56 million in floodplain properties	High

Ice Jams

History of Occurrence (from VT State Hazard Mitigation Plan):

Date	Event	Location	Extent
3/22/2003	Ice Jam	Mad River, Washington County	Data gap, unknown

According to the US Army Cold Region Research and Engineering Lab an ice jam is a stationary accumulation of fragmented ice or frazil that restricts flow. Ice jams can form on rivers where the flow capacity is exceeded, around sharp bends, or at the confluence of two rivers.

The Vermont Division of Emergency Management and the Vermont Agency of Natural Resources developed a statewide list of historic ice jam locations; the list does not contain precise locations, only affected towns and streams. The Vermont State Hazard Mitigation Plan, updated 2013, identifies an ice jam on the Mad River on March 22, 2003.

According to Barry Cahoon, Stream Alteration Engineer with the Vermont River Management Section, the stretch of the Mad River in the vicinity of the Bridge Street covered bridge is susceptible to ice jams. In the event of an ice jam properties upstream of Bridge Street would be susceptible river bank erosion and flood inundation. New development in this area, however, would be very minimally vulnerable to these threats. The entire area susceptible to ice scour and erosion is regulated by the Fluvial Erosion Hazard Area regulations. These regulations prohibit all new structures, except accessory uses and non-structural improvements to pre-existing structures. The Flood Hazard Area regulations do allow new principle structures to be constructed in the Village Residential and Business Districts, however the majority of this hazard area near the Bridge Street Bridge is also regulated by the Fluvial Erosion Hazard regulations. The Village is also nearly built out in terms of new primary structures. Waitsfield will also be able to use updated inundation flood models and mapping to plan mitigation measures for ice jam flooding.

Jams of debris and hay bales also cause flooding in the same locations as ice jams during the warmer months. Locations susceptible to this include the Butternut Bridge and Tremblay Bridge.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Ice Jam	Mad River in vicinity of Bridge Street covered bridge, Waitsfield Village	Properties upstream; privates residences, business, municipal infrastructure	Minimal - Moderate	Data gap - $ amount unknown	Medium

Hurricane/Severe Storms/Hail

History of Occurrence: (Mad River Valley encompasses the towns of Waitsfield, Warren and Fayston).

Date	Event	Location	Extent
7/04/2013	Flash Flood	Waitsfield Washington County	The Mad River at Moretown rose above its flood stage of 9.0 feet and crested at 9.33 feet. At 9.0 feet minor field flooding begins and water approaches local roads for Waitsfield to Moretown.
7/23/2012	Hail	Waitsfield Washington County	Numerous reports of damaging winds and large hail.
8/28/2011	Tropical Storm, Flash Flood (TS Irene)	Waitsfield Washington County	Mad River flood gauge at 19.07 feet; 10.07 feet above flood stage (flood stage is 9 feet) – DR 4022.
7/06/2011	Thunderstorm	Washington County	50 knot winds; 15,000 people in VT lost power.
5/26/2011	Hail/Thunderstorms/Flash Flooding	Waitsfield Washington County	1” hail, 25,000 customers lost power in VT, 3-5” of rain, not a historical Mad river crest DR 4001.

Date	Event	Location	Extent
5/20/2011	Flash Flooding	Waitsfield Washington County	Twenty roads were damaged or covered in water from flash flooding in Waitsfield east of Route 100. The town lost 35 culverts, and 14 roads suffered damage. In addition, a new water system under construction was damaged.
8/9/2010	Thunderstorm/Wind/Hail	Waitsfield	50 knot winds
7/21/2010	Hail	Washington County (Mad River Valley)	1" Hail
7/18/2008	Hail	Mad River Valley	1" Hail, 30 knot winds
7/9/2007	Hail, thunderstorms	Mad River Valley	Baseball sized hail DR 1715
7/1/2006	Hail, thunderstorms	Mad River Valley	1" Hail, severe t-storms
9/29/2005	Severe thunderstorms	Mad River Valley	Downed trees and power lines, 35 knot winds
9/16/1999	Tropical Storm Floyd	Statewide	Tropical storm winds and flooding
7/22/1999	Hail, Thunderstorms	Mad River Valley	1.5" hail, severe t-storms
6/27/1998	Severe Storms	County-wide	Mad River gauge 14.13 ft DR 1228
7/15/1997	Severe Storms	County-wide	3-5" of rain, Not a historical crest
5/19/1982	Thunderstorm winds	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 is between the months of June and 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 in the 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.

The impact of severe storms in Waitsfield is usually flood related, although hail and wind have also caused damage. See the flood section above for a characterization of flood hazards and vulnerabilities. The hail that fell during the May 26, 2011 storm event caused significant private

property damage in Waitsfield. Windows, roofs, and vehicles usually sustain the most damage during such an event. Although 1" hail events happen in most years in Washington County, damage in Waitsfield is not frequent or significant enough to provide ample mitigation benefits for the costs associated with additional mitigation projects such as requiring more resilient building materials.

The vulnerability of primary concern for Waitsfield related to wind is power outages. Town staff and officials notify the two electric utility companies that serve the town whenever threats to the system are observed, such as when the highway crews are maintaining roads during and after a storm. During 2015 and 2016, Green Mountain Power implemented a substantial vegetation management project to mitigate risks of downed vegetation to electrical service. Both of these activities serve to protect both existing and future development from suffering electrical outages. Other mitigation strategies are in place to protect future development exclusively. The subdivision regulations require all utilities, including electric, to be buried for new developments. Waitsfield's Land Use Regulations also limit development above 1,700 feet in elevation to forestry and agricultural uses, unless the lot was previously subdivided. This affords some protection to new development at higher elevations where wind hazards are greater.

In 1999, Tropical Storm Floyd passed through Vermont. The primary impact from Floyd was downed trees and power lines due to high winds. 5-8" of rain fell over the Central Vermont Region; however, flood impacts were offset by drought conditions from earlier in the year.

As described in the Flooding hazard profile above, a great deal of new development in Waitsfield is protected from flooding caused by severe storms through the Flood Hazard Area Overlay regulations and Fluvial Erosion Hazard Area regulations. It will also be mitigated by the stormwater planning, flood modeling, and fluvial erosion planning projects described.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Hurricane/Severe Storms	Town-wide for Wind and Hail impacts, see flooding above for locations	Culverts, bridges, private property, power lines, trees	Floyd - 5-7" of rain, winds 31 mph ~6" rain – TS Irene ; Mad River flood gauge at 19.07 feet; 9 ft is flood stage	Over $1.18 million from TS Irene	Medium

Extreme Cold/Winter Storm/Ice Storm in conjunction with Power Failure

History of Occurrences (County-wide)
Snow and/or ice events occur on a regular basis. Recent significant events have included:

Date	Event	Location	Extent
12/9/2014-12/11/2014	Winter Storm	Waitsfield, County-wide	18” of snow
11/26/2014	Winter Storm	Waitsfield, County-wide	13” of snow
3/12/2014	Winter Storm	Waitsfield, County-wide	12-20” of snow
3/6/2011	Winter Storm	Waitsfield, County-wide	12-18” of snow, 10,000 customers lost power state-wide
2/23/2010	Winter Storm	Waitsfield, County-wide	20” of snow and 50,000 customers lost power state-wide
2/22/2009	Winter Storm	Waitsfield, County-wide	16” of snow, 30 mph wind gusts
2/1/2008	Winter Storm	Waitsfield, County-wide	3-7” of snow and ice ¼-1/2”thick, 50 mph wind gusts
2/14/2007	Winter Storm	Waitsfield, County-wide	22” of snow
2/14/2006	Winter Storm	Waitsfield, County-wide	30” of snow
1/4/2003	Winter Storm	Waitsfield, County-wide	19” of snow
3/5/2001	Winter Storm	Waitsfield, County-wide	15-30” of snow
12/31/2000	Winter Storm	County-wide	10” of snow
1/15/1998	Winter Storm	Waitsfield, County-wide	10-12” snow (not a DR in Washington County)
12/29/1997	Winter Storm	Waitsfield, County-wide	21” of snow
12/7/1996	Winter Storm	Waitsfield, County-wide	12” of snow
3/21/1994	Winter Storm	Waitsfield, County-wide	5-11” of snow
11/1/1993	Winter Storm	Waitsfield, County-wide	15” of snow
1/3/1993	Freezing Rain	Waitsfield, Statewide	¼-1/2” freezing rain

A winter storm is defined as a storm that generates sufficient quantities of snow, ice, or sleet to result in hazardous conditions and/or property damage. Ice storms are sometimes incorrectly referred to as sleet storms. Sleet is similar to hail only smaller and can be easily identified as frozen rain drops (ice pellets) that bounce when hitting the ground or other objects. Sleet does not stick to wires or trees, but in sufficient depth, can cause hazardous driving conditions. Ice

storms are the result of cold rain that freezes on contact with the surfaces coating the ground, trees, buildings, overhead wires and other exposed objects with ice, sometimes causing extensive damage. Periods of extreme cold tend to occur with these events.

The physical impacts of winter storms are town-wide due to the expansive nature of winter storms. For the next plan update, Waitsfield will more closely monitor winter storms to determine the worst impacts possible on the town. Based on past occurrences, the worst anticipated winter weather Waitsfield 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 December 2014 and March 2011.

Wind Chill Extent Scale

NWS Windchill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

On February 14, 2007, Vermont experienced one of the heaviest snowfalls on record. According to the State Hazard Mitigation Plan, updated 2013, some areas of Vermont received 28 to 36 inches of snow in 25 to 48 hours. The National Oceanic and Atmospheric Administration classified this storm as a Category 3 "Major" Winter Storm.

In Waitsfield, the heavy snow resulted in downed trees and power outages along North Road and at least one roof collapse. The roof collapse at the Turner Barn, a local farm, killed 5 cows and displaced 16 cows according to the March 1, 2007 Valley reporter newspaper article.

The cost to rebuild the barn was estimated at approximately $50,000 - $60,000. To reduce the frequency of this impact, the community mobilizes to help neighbors shovel roofs vulnerable to collapse and prevent accumulation of snow load.

Scales to measure the extent of winter storms are:

Heavy snowfall – Waitsfield is significantly affected when they experience an accumulation of 7 inches or more of snow in a 12-hour period or 13 inches or more in a 24-hour period.
Blizzard – Waitsfield is significantly affected when they experience sustained wind speeds in excess of 40 mph accompanied by heavy snowfall or large amounts of blowing or drifting snow.
Ice storm – Waitsfield is significantly affected when they experience ice accumulations of ¼" or greater.

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. As mentioned in the Severe Storms hazard profile, Waitsfield's subdivision regulations protect new development from this hazard by requiring electrical utilities to be buried.

Additionally, sensitive populations such as the elderly or handicapped may be susceptible to extreme cold when electrical 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 electricity 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 in order 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 and restricted transportation. Although the primary travel route through town, Rt. 100, is maintained by the State Agency of Transportation, the town prioritizes other important locally maintained routes for storm maintenance, namely emergency response routes and school bus routes. Once alternative routes for vulnerable populations are identified, these can be integrated into prioritization too.

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. 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. Waitsfield should plan and prepare for these

emergencies. Planning and preparedness efforts 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. The Waitsfield Elementary School serves as the town's primary sheltering area. 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.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Extreme Cold/Winter or Ice Storm in conjunction with power failure	Town-wide	Power outages: along North Road. Roof Collapses: Large barns, garages and storage facilities, including the Fire Station.	18"+ snow in March 2011 storm in 24 hours, Blizzard of 1888	±$60,000	Medium

6. Mitigation

6.1 Hazard Mitigation Goals and Strategies

The goal of this Hazard Mitigation Plan is:

- To take actions to reduce or eliminate the long-term risk to human life and property from:
  - Dam failure
  - Flooding/Flash Flooding/Fluvial Erosion
  - Ice Jams
  - Hurricane/Severe Storms
  - Extreme Cold/Winter Storms/Ice Storms

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

- Ensure existing and future drainage systems are adequate and functioning properly, particularly both public and private roadway drainage systems.
- 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 Waitsfield 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.

6.2 Town Plan (2012) Polices that Support Local Hazard Mitigation

- Use road maintenance practices that factor in the frequency of flash flooding, the increased frequency and magnitude of high storm flows resulting from climate change, and the high costs associated with repairing or replacing undersized transportation infrastructure (8.F-26)
- Goal: Flood resiliency, mitigation, and restoration following flood events such as the one that occurred in May 2011 and Tropical Storm Irene which occurred in August 2011. Particular attention should be paid to protecting the flood-prone Historic District in Waitsfield. (11.K-3)
- Identify and protect important natural resources, including prime agricultural soils, forest resources (soils, products, habitat), significant wildlife habitat, floodplains, river corridors, water resources and other features described in this plan. (11.L-1)
- Support the efforts of local, regional and statewide conservation organizations to protect open space in Waitsfield through voluntary programs (e.g., purchase or donation of development rights). Priorities for open space protection include: riparian lands, river corridors and floodplain. (11.L-4.f)
- Continue to prevent development of critical facilities in flood-prone areas and in the floodplain and floodway. (11.L-32)
- Continue to protect natural and beneficial functions for mitigating flood hazards. (11.L-33)
- Promote hazard mitigation as a cost-effective measure to improve the town's resilience to flooding (11.L-34)
- Protect the Historic District using hazard mitigation strategies, including flood-proofing and/or elevating structures. (11.L-35)
- Develop and implement flood hazard mitigation plans when possible. [Planning Commission, Development Review Board, Selectboard] (11.M-14)
- Maintain the Agricultural-Residential District for the purpose of supporting the continued operation and expansion of agricultural operations, forest management, the preservation of rural resources and natural features, and to accommodate low density residential development while encouraging moderate or high density clustered residential development in appropriate locations. To this end: Ensure that land subdivision and residential development is designed in a manner to protect the rural landscape (e.g., farmland, open meadows, forested ridge lines) and land characterized by fragile features (e.g., floodplains, wetlands, steep slopes), and to avoid the fragmentation and development of land containing significant areas of primary agricultural soils. (12.M-4.c)

Waitsfield's 2012 Town Plan integrates a variety of hazard mitigation principles. Waitsfield's Town Plan will be updated in 2017. The Town is interested in expanding on goals which relate to mitigation planning.

6.2 Capacity to Expand Mitigation Programs

Based on an analysis of existing policies and programs, and the hazard risks and vulnerabilities affecting the community, the Town of Waitsfield has identified areas for expansion and improvement of existing capacities to mitigate hazards. The majority of programs as described in the Community Profile and Existing Hazard Mitigation Programs, Projects & Activities, are considered adequate to accomplish Waitsfield's mitigation goals. The following describes program areas in which Waitsfield may have the ability to expand mitigation efforts.

Since the implementation of Waitsfield's Fluvial Erosion Hazard (FEH) Regulations in 2010, State of Vermont recommendations for fluvial erosion hazards, and incentives for post-disaster financial assistance have changed. Waitsfield has the opportunity to consider if expanding their current FEH Regulations to include additional state recommended provisions will be beneficial for preventing losses, when weighed against more near-term economic gains and other competing land use considerations. This is especially important in the Village area.

The State recommended FEH regulations are also tied to a higher FEMA Public Assistance state share and Waitsfield's Fluvial Erosion Hazard Regulations have temporarily earned this higher reimbursement rate. The community must decide whether or not to adopt the state recommended FEH regulations in order to make the higher reimbursement permanent. The effect of the reimbursement rate on the municipal budget is very important, however it is possible the adoption of the state-recommended provisions will create drawbacks for compact development and tourism. The community will have to weigh these costs and benefits before determining its capacity to expand FEH mitigation measures.

Waitsfield does not currently participate in the Community Rating System (CRS). CRS is a voluntary program for communities that engage in floodplain management that exceeds the minimum NFIP standards. Under the CRS program, flood insurance premium rates are discounted for activities which exceed NFIP floodplain management requirements. Adequate staff capacity for administration and strong community support for potential addition of capacity will be necessary for the CRS program to be cost beneficial to the municipality, however it is worthwhile for the community to consider this potential area of expansion.

Strengthening partnerships with other organizations, agencies and jurisdictions also gives Waitsfield the capacity to expand mitigation efforts for its worst threat hazards. The Regional Planning Commission can assist with planning, inventory and analysis for flood mitigation measures and preventative maintenance of transportation infrastructure. The Mad River Valley Planning District serves two neighboring jurisdictions, and can help coordinate further efforts that address inter-jurisdictional hazards. Improving coordination with other emergency response organizations will also expand the capacity of Waitsfield's emergency responders.

6.3 Identified Hazard Mitigation Programs, Projects & Activities

Hazard mitigation programs, projects and activities that were identified for implementation through the local hazard mitigation planning process are outlined in the table on the following page.

The Town of Waitsfield, in partnership with the Central Vermont Regional Planning Commission (CVRPC), hosted a community input meeting in May 2015 to discuss potential mitigation activities. Meeting attendees included town staff and officials, Emergency Management Director, Central Vermont Regional Planning Commission, the Mad River Valley Planning District, and the regional Floodplain Coordinator for the State of Vermont. During the meeting, attendees reviewed existing mitigation strategies and discussed possible mitigation strategies that Waitsfield could adopt for the next 5 years and beyond. Local and institutional knowledge of the community and the region, as well as existing and vulnerable public infrastructure helped formulate the potential mitigation activities.

Selection and prioritization of activities for implementation was based on community risk, cost, benefits, the availability of potential funding, available staff capacity, overall feasibility and any other considerations unique to the potential project. Overall favorability of the project by residents and stakeholders was also considered. A chart documenting the various considerations for analyzing and prioritizing potential mitigation actions is included as an Attachment.

Economic considerations play a major role in the community's selection and prioritization of mitigation actions. Many of the projects would not be feasible for Waitsfield to implement without outside funding assistance, as the tax base is not large enough to support more than one or two infrastructure projects greater than $50,000 per year. The level of community support for a project is often reflective of cost, especially when a portion of the project cost must be raised from the tax base. . Staff capacity is also an economic consideration, as added staff, especially for ongoing mitigation programs, often involves raising most of the labor costs from the tax base. Lastly, in recent years, the community appetite for major long-term projects has also diminished as multiple projects supported by outside and local funds have come to conclusion.

The following Mitigation Action Implementation Chart sets out a plan for mitigation activities in regards to local leadership, partnering roles and organizations, possible resources, project timeframe and prioritization.

Waitsfield understands that in order to apply for FEMA funding for mitigation projects, the Town must have a FEMA approved Hazard Mitigation Plan and mitigation projects must meet FEMA cost benefit criteria. The following mitigation activities include potential and future Hazard Mitigation Grant Program (HMGP) and public assistance projects that may need to be implemented as a result of a future declared disaster. Waitsfield is committed to developing and implementing hazard mitigation measures to reduce damage and avoid the associated costs that would otherwise occur to homes, businesses, and public infrastructure during a natural disaster.

Mitigation Project Implementation Chart						
Hazard Mitigated	**Mitigation Action**	**Local Leadership[1]**	**Partners[1]**	**Possible Resources[2]**	**Time Frame**	**Prioritization (High, Med, Low)**
Flooding/Flash Flooding/Fluvial Erosion, Ice Jams, Dam Failure, Hurricane/Severe Storms	Participate with the 5 Mad River Valley towns in stormwater management planning for the Mad River Valley watershed (Ridge to River).	Zoning Administrator(Z.A.)/Floodplain Manager	Mad River Valley Planning District, FMR	HMPG, Municipal Planning Grant, High Meadows Fund	Summer 2015 – Winter 2017	High
All Hazards	Complete enrollment in VT Alert Program.	Emergency Management Director	Fire Dept.	Vermont Emergency Management	Complete Summer 2016	High
Flooding/Flash Flooding/Fluvial Erosion, Ice Jams, Hurricane/Severe Storms	Create a flood model meeting FEMA specifications to update existing floodplain boundaries along the Mad River, including Waitsfield.	Z.A. / Floodplain Manager	CVRPC, MRVPD, Planning Commission, Selectboard, FMR, ANR	CDBG-18 Disaster Recovery	June 2017	High
Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Continue to evaluate and upgrade high priority culverts. Seek funding for culvert and bridge upgrades.	Selectboard	Road Commissioner, Town Administrator, CVRPC	Municipal Budget, AOT Town Highway Structures Program, Better Backroads	Fall 2016 – Fall 2020	High
Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Identify vulnerable road segments and necessary improvements to prevent failure during flood episodes.	Road Commissioner	Road Commissioner, CVPRC	Municipal Budget, Municipal Planning Grant	Summer 2017 – Fall 2020	High

Mitigation Project Implementation Chart						
Hazard Mitigated	**Mitigation Action**	**Local Leadership[1]**	**Partners[1]**	**Possible Resources[2]**	**Time Frame**	**Prioritization (High, Med, Low)**
Flooding/Flash Flooding/Fluvial Erosion, Ice Jams, Hurricane/Severe Storms	Flood-proof the Waitsfield Village Meeting House and the Library.	Town Administrator	Town Administrator, MRVPD, CVRPC	HMPG, CDBG-DR	Fall 2017	High
Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Conduct restoration on lower Shepard Brook to repair damaged river banks and remove bar of debris and sediment	Private Landowners, Z.A./ Floodplain Manager	ANR, CVRPC	Vermont Community Foundation, Vermont Disaster Relief Fund	Fall 2017	Medium
Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Evaluate fluvial erosion hazard regulations and maps and discuss with key stakeholders to determine maintenance of eligibility for highest state share of post-disaster FEMA Public Assistance.	Z.A. /Floodplain Manager	ANR, Planning Commission, Town Administrator, Selectboard	Municipal Budget	Summer 2016-Summer 2017	Medium
Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Upgrade one culvert and one bridge on Ronk Road.	Selectboard	Road Commissioner, Town Administrator	Municipal Budget, AOT Town Highway Structures Program, Better Backroads	Summer 2017 – Summer 2019	Medium

Mitigation Project Implementation Chart						
Hazard Mitigated	**Mitigation Action**	**Local Leadership[1]**	**Partners[1]**	**Possible Resources[2]**	**Time Frame**	**Prioritization (High, Med, Low)**
Dam Failure, Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Develop a dam failure notification system, including increased communication regarding the Warren timber crib dam & Sugarbush snowmaking pond.	Emergency Management Director	Fire Department	Municipal Budget, Fundraising	Summer 2017 - Winter 2019	Medium
All Hazards	Obtain generator for town garage (manual switch).	Emergency Management Director	Selectboard, Road Commissioner	DEMHS Generator Grant Program, Municipal Budget	Winter 2017- Winter 2019	Medium
Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Evaluate feasibility of alternative mitigation options to protect properties along lower Shepard Brook, such as flood chutes or property acquisition	Z.A./ Floodplain Admin., Town Administrator	CVRPC, DEMHS, ANR, Landowners	HMGP	Fall 2018	Low
Dam Failure, Flooding/Flash Flooding/Fluvial Erosion, Ice Jams, Hurricane/Severe Storms	Investigate cost-effectiveness of enrollment in NFIP Community Rating System.	Town Administrator	Selectboard, Z.A., ANR, Regional Planning Commission	Municipal Budget	Summer 2016- Summer 2019	Low
Extreme Cold/ Winter Storm/ Ice Storm w/Power Failure	Conduct outreach to vulnerable residents about CARE: Citizens Assistance Registration for Emergencies	Town Clerk & Administrative Staff	United Way, 211, VT E911	Municipal Budget	June 2017	Low

Mitigation Project Implementation Chart						
Hazard Mitigated	**Mitigation Action**	**Local Leadership[1]**	**Partners[1]**	**Possible Resources[2]**	**Time Frame**	**Prioritization (High, Med, Low)**
Ice Jams	Develop a plan for ice monitoring and coordination with local contractors, ANR & AOT for removal.	Emergency Management Director	Local Contractors, ANR, AOT	Municipal Budget	Winter 2018 – Winter 2020	Low
Flooding/Flash Flooding/Fluvial Erosion, Hurricane/Severe Storms	Coordinate with partners to seek out opportunities to purchase river channel management rights through river conservation easements.	Town Administrator	Conservation Commission, Mad River Conservation Partnership (MRVPD, VLT, FMR)	High Meadows Fund/VCF, ANR Ecosystem Restoration Program, CDGB, ANR Rivers Management Program	Fall 2016 – Fall 2020	Low

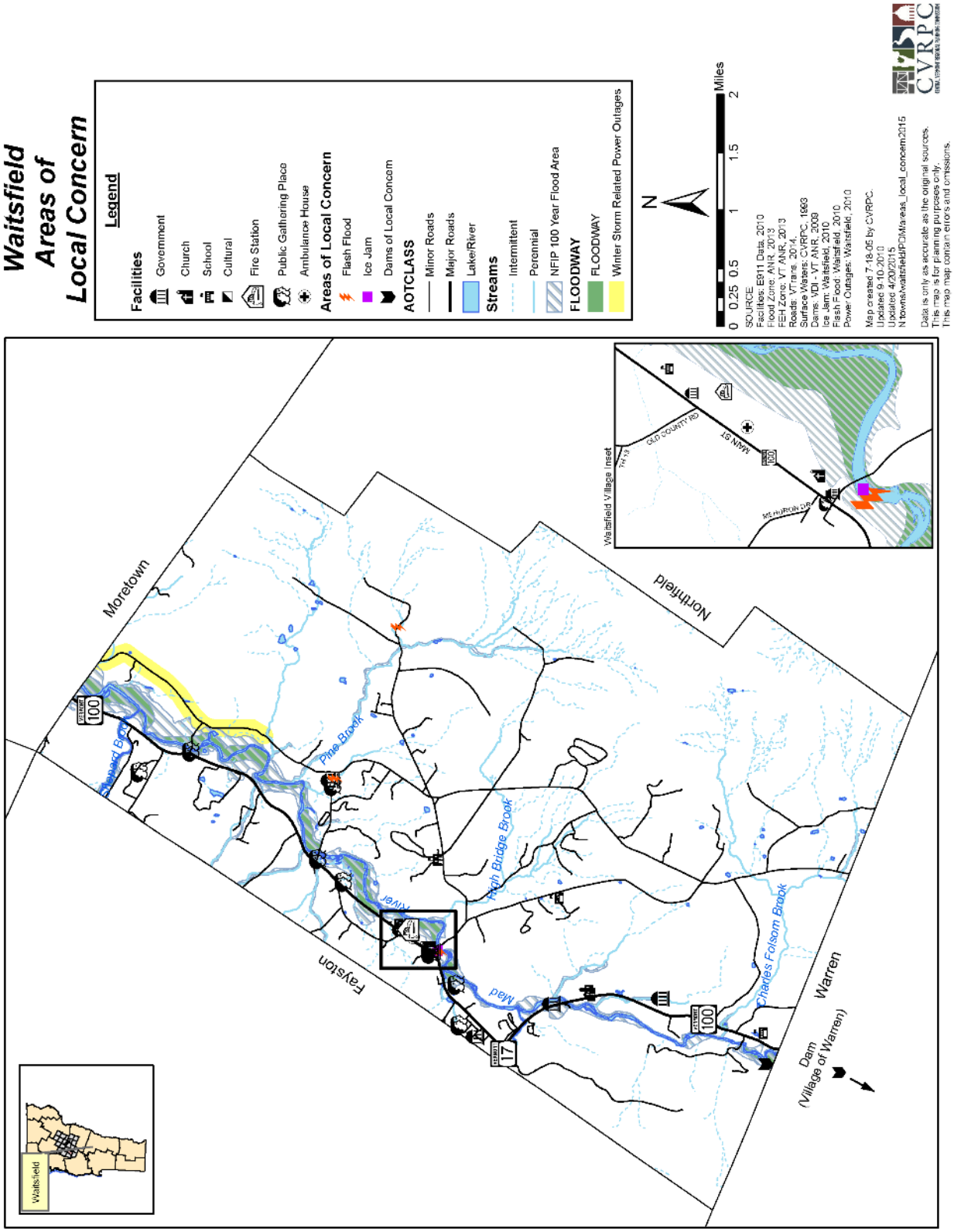
SB – Selectboard, PC - Planning Commission, ANR – Agency of Natural Resources, AOT – Agency of Transportation, FMR – Friends of the Mad River, MRVPD – Mad River Valley Planning District, VLT – Vermont Land Trust, CVRPC- Central Vermont Regional Planning Commission

[2] HMGP – Hazard Mitigation Grant Program, EMGP – Emergency Management Grant Program, PSIC/NTIA – National Telecommunications and Information Administration, USDA – United States Dept. of Agriculture, VCF – Vermont Community Foundation, CDBG – Community Development Block Grant

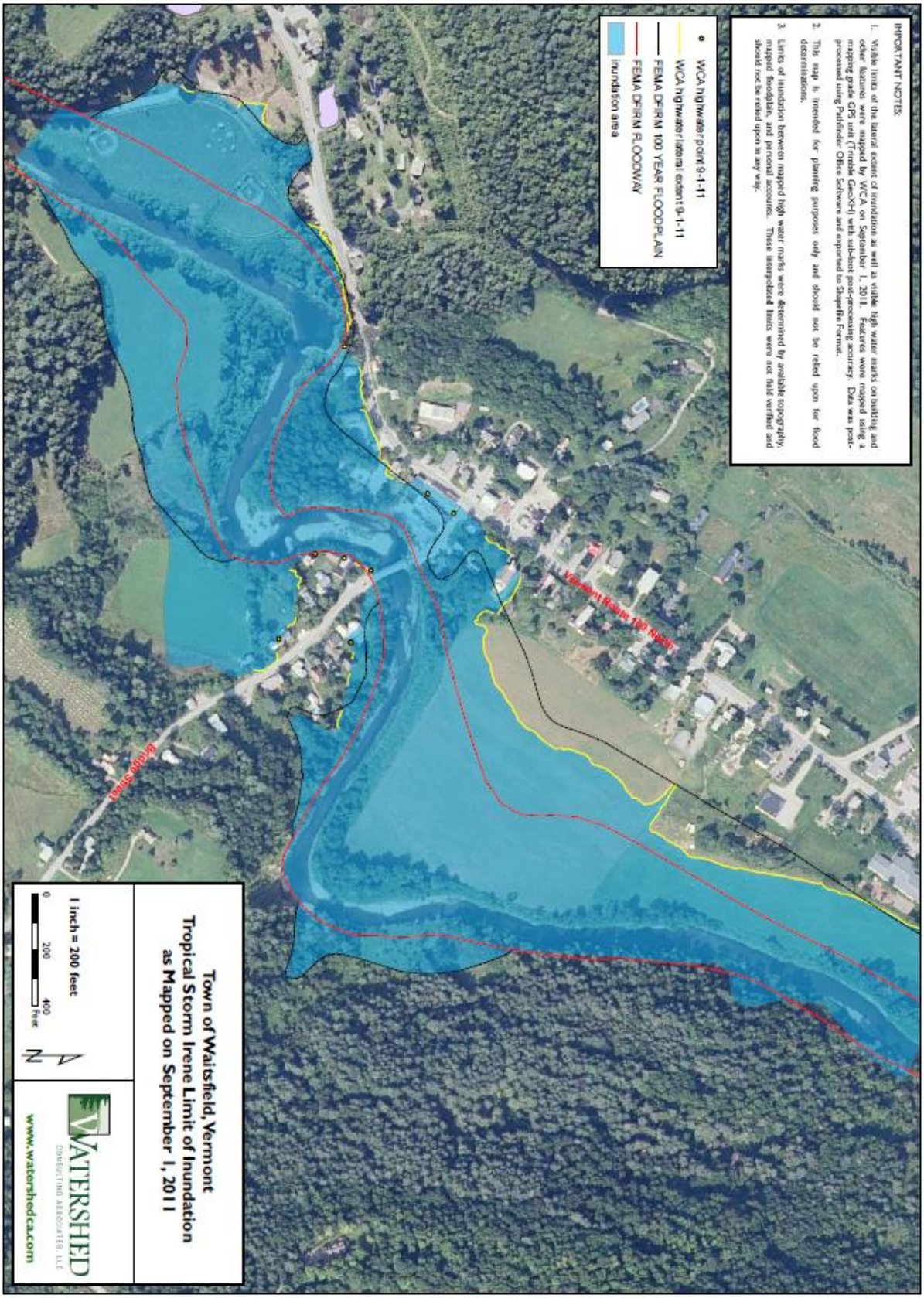
Attachments

- Areas of Local Concern Map
- Town of Waitsfield TS Irene Limit of Inundation Map (2011)
- Potential Mitigation Action Analysis and Prioritization Chart
- Upper Mad River Corridor Plan - Mad River Corridor Planning Project and Strategy Summary Table (Reaches M11-15 are in Waitsfield)
- Documentation of Stakeholder Involvement
- 5 Year Plan Maintenance and Review Process
- Mitigation Project Tracking Chart
- Certificate of Adoption

Areas of Local Concern Map



Tropical Storm Irene Limit of Inundation Map (2011)



Potential Mitigation Actions Analysis & Prioritization Chart							
Hazard	**Vulnerability**	**Mitigation Action**	**Risk to Community**	**Costs**	**Benefits**	**Other Factors:** *Financial Resources Available Community Support (Political) Staff Capacity Available, etc.*	**Selection &/or Priority**
Flooding/ Flash Flooding/ Fluvial Erosion, Ice Jams, Dam Failure, Hurricane/ Severe Storm	damage caused or exacerbated by stormwater contributions to inundation or fluvial erosion flooding	Participate with the 5 Mad River Valley towns in stormwater management planning for the Mad River Valley watershed (Ridge to River).	Hazard Likelihoods: High, Medium	Volunteer time for Selectboard & Planning Commission representatives, staff time in interviews	improve knowledge and practices to reduce losses to municipal infrastructure and private property, find compounded benefits through collaboration with entire watershed	supported completely by a private grant, minimal staff resources needed until education and change in practices implemented, small-medium increase in efforts for staff will have big impact during implementation	High
Flooding/ Flash Flooding/ Fluvial Erosion, Ice Jams, Hurricane/ Severe Storms	Existing & future development along the Mad River	Create a flood model meeting FEMA specifications to update existing floodplain boundaries along the Mad River, including Waitsfield. Will include specifically identifying areas vulnerable to flood events more frequent than 1 percent annual chance (100 year) flood.	Hazard Likelihoods: High, Medium	$60,000 for consultant	Allow development to be mitigated from the effects of more frequent floods by understanding the boundaries and locations most susceptible, as well as have more accurate boundaries of the 1 percent chance and less frequent floods.	CDGB-18 Disaster Recovery funds awarded, CVRPC is project lead. staff capacity will be adequate to provide coordination and feedback	High
Flooding/ Flash Flooding/ Fluvial Erosion, Hurricane/ Severe Storms	particularly vulnerable culverts & bridges	Continue to evaluate and upgrade high priority culverts. Seek funding for culvert and bridge upgrades.	Hazard Likelihoods: High, Medium	$3,000-$8,000 for town-wide inventory with RPC/AOT/ANR to assess erosion & stormwater problems affecting culverts & water quality	address the culverts at most risk first, and efficiently. Ensure the investment in replacement also makes the structure less likely to be damaged during high flows.	AOT District Funding Programs, Better (Back) Roads (20% local match), managing a consultant or assistance from RPC/AOT/ANR within normal staff activities	High
Flooding/ Flash Flooding/ Fluvial Erosion, Hurricane/ Severe Storms	road segments	Identify vulnerable road segments and necessary improvements to prevent failure during flood episodes.	Hazard Likelihoods: High, Medium	Some of the work could be rolled into the inventory process described above, if performed separately, the cost range would be similar, $3,000-$8,000	Investments in roadways are less likely to be lost, and roads are still accessible after flood episodes	AOT District Funding Programs, Better (Back) Roads (20% local match), community support likely, managing a consultant or assistance from RPC/AOT/ANR within normal staff activities	High
Flooding/ Flash Flooding/ Fluvial Erosion, Ice Jams, Hurricane/ Severe Storms	community facilities, businesses, Waitsfield Village Meeting House, Library	Seek funding for flood-proofing community facilities and businesses, including the Waitsfield Village Meeting House and Library.	Hazard Likelihoods: High, Medium	$50,000-$1,000,000	the Village is the economic, institutional and cultural center of the community, to maintain these values, community facilities should be protected from future damage, and businesses should be incentivized to protect their	CDGB, staff capacity for managing grant or loan fund is currently limited, but available. Community financial suppport may need to be spread out over time, but is likely to be given	High

Potential Mitigation Actions Analysis & Prioritization Chart							
Hazard	**Vulnerability**	**Mitigation Action**	**Risk to Community**	**Costs**	**Benefits**	**Other Factors:** *Financial Resources Available Community Support (Political) Staff Capacity Available, etc.*	**Selection &/or Priority**
					capital assets and operations from loss		
Flooding/ Flash Flooding/ Fluvial Erosion, Hurricane/ Severe Storms	damage to property in FEH area	Evaluate fluvial erosion hazard regulations and maps and discuss with key stakeholders to determine maintenance of eligibility for highest state share of post-disaster FEMA Public Assistance.	Hazard Likelihoods: High, Medium	$500-$2,000 outreach, language revision, meetings. Staff & volunteer PC time	greater protection of assets in the Fluvial Erosion Hazard/River Corridor Protection area, and reduced municipal costs for repairs after a Federally Declared Disaster in the magnitude of saving $5,000 on a $100,000 repair project	MPG, Zoning Administrator is available to facilitate the community decision, outreach will be key to determine community support. ERAF savings is likely to gain support, but additional regulation is likely to face some opposition	Medium
Flooding/ Flash Flooding/ Fluvial Erosion, Hurricane/ Severe Storms	Vulnerable properties near the bottom of Shepard Brook	Conduct restoration to repair damaged river banks and remove bar of debris and sediment	Hazard Likelihoods: High, Medium	$10,000-$20,000	temporarily mitigate risk to residences and surrounding property, best option for short term protection while longer lasting but more complex alternatives are evaluated	Vermont Community Foundation, Vermont Disaster Relief Fund. Staff resources available for any local permitting review	Medium
Flooding/ Flash Flooding/ Fluvial Erosion, Hurricane/ Severe Storms	Vulnerable properties near the bottom of Shepard Brook	Evaluate feasibility of alternative mitigation options to protect properties, such as flood chutes or property acquisition	Hazard Likelihoods: High, Medium	$20,000-$40,000 for alternatives evaluation	Provide cost and effectiveness information to inform decision making about how to provide long term mitigation for approximately 5 families that have experienced repeated losses at their properties	HMGP. Community support has not yet been assessed. Staff capacity may be supplemented by technical assistance from CVRPC.	Low
Flooding/ Flash Flooding/ Fluvial Erosion, Hurricane/ Severe Storms	Ronk Road bridge and culvert	Upgrade one culvert and one bridge on Ronk Road.	Hazard Likelihoods: High, Medium	$5,000-$50,000 for culvert, $500K -2 Mil. for bridge	culvert and bridge will be more resilient to future high flows. Secure roadway access for homes and businesses	AOT assistance and municipal budget funding, community supports budget expenditure, within normal range of activities for staff	Medium
Dam Failure, Flooding/ Flash Flooding/ Fluvial	Warren timber crib dam, Sugarbush snowmaking	Develop a dam failure notification system, including increased communication regarding the Warren timber crib dam & Sugarbush snowmaking pond.	Hazard Likelihoods: High, Medium	volunteer time, $1,000-$10,000 depending on technology and protocols used	allow evacuation of homes and businesses downstream or warning of potential for failure	capacity available with EMD and Fire Chief, etc., community support likely	Medium

Potential Mitigation Actions Analysis & Prioritization Chart							
Hazard	**Vulnerability**	**Mitigation Action**	**Risk to Community**	**Costs**	**Benefits**	**Other Factors:** *Financial Resources Available Community Support (Political) Staff Capacity Available, etc.*	**Selection &/or Priority**
Erosion, Hurricane/ Severe Storms	pond, assets downstream						
Dam Failure, Flooding/ Flash Flooding/ Fluvial Erosion, Ice Jams, Hurricane/ Severe Storms	all assets impacted by these hazards	Investigate cost-effectiveness of enrollment in NFIP Community Rating System.	Hazard Likelihoods: High, Medium	staff time for research, analysis, and coordinating any technical assistance	clear determination if any resilience and premium benefits Waitsfield might receive are worthwhile balanced against the administrative burdens of enrollment and program maintenance	if admin. burden results in need for additional staffing, community may resist those costs, staff capacity exists for evaluating cost effectiveness	Low
Flooding/ Flash Flooding/ Fluvial Erosion, Hurricane/ Severe Storms	assets vulnerable up and downstream of segment	Coordinate with partners to seek out opportunities to purchase river channel management rights through river conservation easements.	Hazard Likelihoods: High, Medium	variable land purchase/easement costs	protect the riparian areas themselves, as well as the river corridor and floodplain functions the protect assets up and downstream	Ecosystem Restoration Program, FMR, Land Trust partnerships. Staff capacity restricted	Low
Hurricane/ Severe Storms - Hail	significant private property damage	Adopt regulations applying to new construction and/or retrofit of existing buildings that require use of techniques to minimize hail damage, such as: --shutters, laminated window glass, hail-resistant roof -coverings or flashing --roof sheathing to prevent hail penetration --hail resistant roofing & siding.	Low	$1,000-$3,000 to conduct outreach, write, and adopt regulations. Ongoing administration & enforcement costs. Additional construction costs for more resilient materials.	reduced damage to structures. however based on the low frequency of significant damage, the gain in loses prevented is not likely to be greater than the added costs of more resilient materials	MPG as part of larger project. Not likely to to be supported by the community based on cost/benefit. Most damage of this type is repaired through homeowners or business insurance claims	Not Implemented
Hurricane/ Severe Storms - Wind	see above	train staff as spotters to better gather data for wind events	Hazard Likelihood: Medium	$0-$400 training costs	better understand the extent (magnitude) and frequency of wind events that cause damage directly in Waitsfield	As staff already report threats to the electrical service system, and the electical utilities have made recent efforts to mitigate risks to the system, the cost and use of staff capacity is not outweighed by the likely benefit.	Not Implemented

Potential Mitigation Actions Analysis & Prioritization Chart							
Hazard	**Vulnerability**	**Mitigation Action**	**Risk to Community**	**Costs**	**Benefits**	**Other Factors:** *Financial Resources Available Community Support (Political) Staff Capacity Available, etc.*	**Selection &/or Priority**
Ice Jams	scour damage around Bridge Street Bridge	repeal the Land Use Regulation provision allowing modification of the stream setback standard in the Village Business District to prevent new construction close to the streambank and vulnerable to ice jam scouring	Hazard Likelihood: Medium	staff time for outreach to Village property owners, language revision, hearings	this strategy is not likely to realize much benefit, as the area encompassed by the stream buffer regulations is also regulated by the Fluvial Erosion Hazard regulations prohibiting new structures.	MPG as part of larger project. Not likely to enjoy community support.	Not Implemented
Ice Jams	structures & upstream assets	Develop a plan for ice monitoring and coordination with local contractors, ANR & AOT for removal.	Hazard Likelihood: Medium	staff and volunteer official time	removal or management of ice jam quickly before damage occurs	community support likely although perception of urgency likely lower than other projects	Low
Severe Winter Weather	Sensitive Populations	Conduct outreach to vulnerable residents about CARE: Citizens Assistance Registration for Emergencies	Hazard Likelihood: High	Staff & volunteer time to integrate into existing information channels about emergency preparedness	provides easier access for state level responders to know of special response needs households, as well as a level of redundancy against local FD records	adequate staff capacity available	Low
Severe Winter Weather	closed roads/ restricted transport	Preposition snow removal/road way maintenance equipment for quicker access to vulnerable areas	Hazard Likelihood: High	Staff time to drop off & secure equipment	quicker response and access to some roads under specific conditions	staff & equipment capacity is limited for this strategy, as only 3 highway crew and 3 vehicles are available. The time and coordination involved in dropping off equipment would not actually create quicker response	Not Implemented
Severe Winter Weather	Electrical Service	Negotiate with utilities for higher priority power restoration for town	Hazard Likelihood: High	Staff, EMD, Fire Chief time for research, meetings, potential consultant costs	less time spent being vulnerable to the risks of outage, especially for sensitive populations	negotiating changes in the utilities protocols or policies to achieve a favorable outcome is likely to be very resource intensive before a favorable outcome is achieved, because the utilities have a great deal of autonomy in setting these priorities. The use of resources is not worthwhile.	Not Implemented

Potential Mitigation Actions Analysis & Prioritization Chart							
Hazard	**Vulnerability**	**Mitigation Action**	**Risk to Community**	**Costs**	**Benefits**	**Other Factors:** *Financial Resources Available Community Support (Political) Staff Capacity Available, etc.*	**Selection &/or Priority**
All Hazards	damage preventable through notification of imminent hazard	Complete enrollment in VT Alert Program.	Hazard Likelihoods: High, Medium	EMD time	low cost effort improving communications with residents & property owners, allowing them to take timely precautions, build confidence in emergency response services	low staff burden, likely to be very well received by community	High
All Hazards	town garage operations & response	Obtain generator for town garage (manual switch).	Hazard Likelihoods: High, Medium	$5,000-$15,000	garage operations are particularly critical during a disaster to keep roadways passable and warn of damage or other passability dangers	community support likely fairly strong, within existing staff capacities	Medium

Table 6.2: Mad River Corridor Planning Project and Strategy Summary Table, Reaches M11-M19

Project #, Stream Type, Evolution Stage, RGA, RHA	Site Description and Importance, Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits (All projects are aimed at achieving RMP goals)	Potential Partners and Costs	Land Use Conversion
M11-1 C III Fair Fair	Along reach 57% straightened, incised (1.8), currently widening. Some parcels already conserved/protected.	Protect stream corridor to allow for flow and sediment attenuation and to improve water and habitat quality. Also to avoid encroachment into the corridor and future expense of protecting those investments.	Feasibility depends on willingness of landowners to cooperate. High priority due to stream sensitivity, extensive straightening, and potential for further encroachment.	Habitat benefits, recreation, hunting, clean water.	RMP, VLT Relatively low cost for corridor acquisition or easement acquisition, or dev. & mgmt. rights	Corridor land use was hay and some crop area.
M11-2	2 areas identified: 1) Old oxbow area, which was connected as recently as 1962 (possibly 1972); 2) upstream of Pine Rd bridge near farm on LB.	Restore incised reach through recapture of abandoned channel areas and/or stream corridor protection. Further study necessary to investigate active channel recapture.	Feasibility depends on willingness of landowners to cooperate. High priority due to presence of abandoned channel areas and relatively little encroachment.	Reduce bank erosion pressure and velocities downstream, improved habitat diversity.	Moderate costs involve corridor easement, recapture of abandoned channel areas. RMP, VLT, Town of Waitsfield.	Wooded oxbow area, some hay and shrubs in other areas.
M11-3	Meadow Road Bridge-currently undersized and only 86% of the bankfull width.	Replace Structure as it is up for replacement.	No major problems were associated with this structure so lower priority.	Reduced flood/erosion risks.	WHIP, Better Back Roads, Town of Waitsfield	None, as bridge already exists.
M12-1 C III Fair Fair	Area upstream of Waitsfield Village near the ball field and straightened section. Also upstream encompassing the M13 reach break. Moderately incised (1.6) and currently widening with bank erosion and bar	Protect stream corridor to allow for passive restoration of the reach and to reduce encroachment. Investigate potential for recapture of meander to west of ball field or possibly to the east, with the backwater at the	High priority due to stream sensitivity, extensive straightening, and potential for further encroachment (this assumes the ball field can move if	Reduce pressure and erosion on LB near residences and Rt 100. Attenuate sediment upstream rather than allowing it	Relatively low cost for easements or corridor purchase. RMP, VLT, Town of Waitsfield, Waitsfield Couples Club.	Ball field-recreation, hay, forest & residential in upstream portion of reach. Potential for

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Project #, Stream Type, Evolution Stage, RGA, RHA	Site Description and Importance, Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits (All projects are aimed at achieving RMP goals)	Potential Partners and Costs	Land Use Conversion
	aggradation (esp. at constrictions). 32% straightened.	downstream left bend. In areas with building and road constraints, restore the channel with bed forms and floodplain features in equilibrium with the higher stream power.	necessary); the upstream more wooded part may be a lower priority if development pressure is low.	to transport to the Covered Bridge area.		dev. w/in corridor at upstream end.
M12-2	A breached dam with old abutment on the left bank downstream of the ball field with levee extending onto the floodplain. This should be done in conjunction with corridor protection of M12 and M11 if sediment is allowed to move downstream. Covered Bridge in Waitsfield Village	Remove the dam and widen the levee. Assess the volume of sediment and potential consequences of removing the sediment or allowing it to move downstream. Also assess if grade controls might be necessary to protect against head cutting of the channel. Investigate options for widening the constriction at the Covered Bridge.	High priority because dam is derelict and interrupting sediment transport. Not feasible due to investments in the floodplain and previous work addressing the dam.	Sediment from this area could assist channel evolution downstream.	High if sediment must be removed and if investments must be moved. Town of Waitsfield, RMP.	Just upstream of Village area & covered Br.
M13-1 C III Fair Fair	Some straightening, bank armoring, and confinement by Rt 100. Moderately incised (1.6) and actively widening w/ bank erosion, poorly vegetated buffer. High potential for planform adjustment noted, especially at Lareau Farm area. Some planting has been done, but many trees killed by deer and dry conditions.	Protect stream corridor to allow for passive flood plain and meander redevelopment already underway. Possibly implement an inexpensive corridor planting program due to the poor vegetation.	High priority corridor protection. Protecting the corridor and planting were also the preferred options found in the Field Geology Report (Field, 2007)	Trails, wildlife habitat, improved instream habitat, reduced erosion/flood risks.	Relatively low cost for plant material and easements or corridor purchase. RMP, VLT, Town of Waitsfield, NRCS.	Some hay, parts of corridor are forested.

Project #, Stream Type, Evolution Stage, RGA, RHA	Site Description and Importance, Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits (All projects are aimed at achieving RMP goals)	Potential Partners and Costs	Land Use Conversion
	Previous owner of current Town parcel may have removed all topsoil.					
M13-2	The area downstream of the swim hole to just downstream of the M13 reach break. In the swim hole area with road constraints, past work constructed stabilization and habitat improvement features.	Protect the stream corridor to allow for sediment and flow attenuation. Possibly implement a corridor planting program due to the poor vegetation.	High priority due to location at the Mill Brook confluence and downstream of the swim hole area which is confined due to the road and upstream of M12 which is a transport reach.	Reduce bank erosion pressure and velocities downstream, improved habitat diversity.	Relatively low cost for plant material and easements or corridor purchase. RMP, VLT, Town of Waitsfield, NRCS.	Right bank terrace appeared to be hay/pasture.
M14-1 **Bc to F** **departure** **IV** **Fair** **Good**	Bedrock left bank, possible gorge; semi-confined, but appears to be forming "modern" floodplain area with alluvial benches along channel edges.	Protect stream corridor to allow for continued adjustment and to improve water and habitat quality.	Lower priority due to presence of woody vegetation and perceived lack of development pressure (steep slopes).	Possible area for trails.	Relatively low cost for easement or corridor purchase. RMP, VLT, Town of Waitsfield.	Corridor wooded, except for upper most part where a house sits on the RB (possible area for planting, likely stable due to BR)
M15-1 **C** **IV** **Good** **Fair**	Some channel straightening, armoring, and encroachment from Rt 100. Adjacent snowmaking pond and withdrawal. "Fair" RGA condition with bedrock providing some vertical and lateral control. Moderately incised (1.4). M15 is taking	Protect stream corridor at the Kingsbury parcel to allow for adjustment, sediment attenuation and to moderate effects from upstream (M16 and Clay Brook) A buffer planting program could help establish buffer away from eroding banks and	Higher priority due to stream sensitivity and also to help compensate for increased stream power from M16. Options mainly on the right bank due to the snowmaking pond on	Reduce bank erosion pressure and velocities downstream, improved habitat diversity.	Relatively low cost. RMP, VLT, Town of Waitsfield, Yestermorrow, MRVPD.	Hay and residential, pond on left bank.

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Project #, Stream Type, Evolution Stage, RGA, RHA	Site Description and Importance, Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits (All projects are aimed at achieving RMP goals)	Potential Partners and Costs	Land Use Conversion
	the hit from Clay Bk entering the system just upstream of a confined area of M16. Clay Brook had incision and multiple MFs, sediment is passing through the confined area of M16 and is deposited in M15.	provide stability as the channel migrates.	the left bank.			
M15-2	From the snowmaking pond through the Punch Bowl area down to the confined area of M14. Area is currently aggrading and migrating, but providing valuable sediment attenuation downstream of significant sediment inputs from Clay Brook and the fairly constricted areas in M16 and adjacent to the snowmaking pond, and upstream of the confined M14 reach.	Corridor protection to allow this site to continue to function as an attenuation area. Bedrock grade control at the Punch Bowl with large bars and migration. Stabilize stream banks at Punch Bowl only if preserving the site is desired. This would increase the priority of protecting attenuation assets downstream (M13). RB adjacent to the house had riprap.	High priority to protect the corridor here to help moderate effects of upstream sediment inputs and ski area alterations. Punch Bowl would likely have pools at bedrock areas. Feasibility depends on landowner willingness.	Could preserve public access to the Punch Bowl. Reduce bank erosion pressure and velocities downstream, improved habitat diversity.	RMP, Sugarbush, VLT, Town of Waitsfield.	Hay, shrub-forest, residential
M15-3	Adjacent to the snowmaking pond, a diversion weir is in the channel with a flume and water withdrawal. Some riprap present.	Remove the snowmaking pond, or improve the withdrawal area to reduce sediment build-up and annual dredging. Study alternatives to the weir for filling and monitoring for the snowmaking pond. Remove riprap opposite the	Contingent on corridor protection and landowner willingness to participate.	Reduce sediment buildup and need for dredging at the weir, reduce pressure on opposite banks, improve habitat diversity.	Unsure of costs associated with water withdrawals and associated flow-monitoring equipment. Further investigation needed.	Appeared to be hay, some residential

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Project #, Stream Type, Evolution Stage, RGA, RHA	Site Description and Importance, Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits (All projects are aimed at achieving RMP goals)	Potential Partners and Costs	Land Use Conversion
		snowmaking pond to reduce pressure and chance of avulsion into the pond. Possibly gain/recreate some floodplain on the right bank adjacent to the snowmaking pond and/or on the left bank just downstream of the Rt 100 bridge.				
M15-4	Warren Trestle Bridge has sediment deposition upstream, stepped footers and deteriorating abutments.	Replace structure with an appropriately sized bridge.	The Town of Warren and VTRANS have been working to find a larger trestle bridge and have apparently located one.	Keeping the trestle style will preserve that icon of the valley.	David Hoyne at VTRANS, Town of Warren	None, bridge already exists.
M16-1 C-F departure III Fair Fair	Channel experienced a stream type departure of C to F (incision 2.1, entrenchment 1.2) and has lost floodplain access. Altered by channel straightening and bank armoring, and constriction from Rt. 100, increasing stream power. Some riprap being undermined. Area upstream of Riverside Park is heavily armored on left bank.	Protect corridor in the vicinity of Riverside Park to allow for channel adjustment and sediment attenuation. Depositional reach currently has limited sediment attenuation areas, which exacerbates sediment deposition problems in downstream reach at Snowmaking Pond.	Feasibility depends on willingness of landowners to cooperate. High priority as this is one of the few areas until M15 where sediment attenuation is possible.	Improved biotic habitat and reduced sediment loading of Mad River watershed to Winooski and Champlain Basins. Reduced risk of future structural damage.	Town of Warren, RMP, MRCP. Cost of corridor acquisition or easement acquisition. Or dev. & mgmt. rights	Limit structural development of Riverside park.
M16-2 C-F departure	Channel experienced a departure of C to F (incision 2.1, entrenchment 1.2) and	Protect corridor in the upper reach to allow for channel adjustment and sediment	Feasibility depends on willingness of landowners to	Improved biotic habitat and reduced sediment	RMP, MRCP. Cost of corridor acquisition or	Convert low-intensity agricultural

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Project #, Stream Type, Evolution Stage, RGA, RHA	Site Description and Importance, Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits (All projects are aimed at achieving RMP goals)	Potential Partners and Costs	Land Use Conversion
III Fair Fair	has lost floodplain access. Armoring in upper reach along Rodger's parcel.	attenuation. Remove bank armoring on left bank where future meanders will not impact Route 100.	cooperate. High priority because attenuation areas are limited in reach.	loading of Mad River watershed to Winooski and Champlain Basins.	easement acquisition. Or dev. & mgmt. rights	lands to forest.
M16-3 C-F departure III Fair Fair	Channel experienced a departure of C to F (incision 2.1, entrenchment 1.2) and has lost floodplain access. Altered by channel straightening and bank armoring, and constriction from Rt 100, increasing stream power. Some riprap being undermined.	In areas without building and road constraints, restore incised section of reach through "active" restoration of bed forms and/or floodplain features in equilibrium with channel bed elevation and increased stream power. Protect the stream corridor and plant buffer vegetation in conjunction with restoration projects.	Medium – high priority as there is no recently abandoned floodplain, but there are some potential areas where floodplain could be lowered. Appears to have been depositional reach in past.	Improved biotic habitat and reduced sediment loading of Mad River watershed to Winooski and Champlain Basins.	RMP Relatively high to excavate new floodplain. Additional costs in corridor easements/ acquisition & plantings	Convert low-intensity agricultural lands to forest.
M17-1 B to F departure IV Fair Good	Reach is in a bedrock gorge with some aggradation observed. Wooded buffer is greater than 100 feet. 50 Feet of riprap was on the left bank at the Bradley Brook confluence.	Protect stream corridor to prevent encroachment and buffer clearing.	Low priority for corridor protection due to the wooded corridor and unlikely encroachment pressure.	Maintained buffer for input of LWD and shading for biotic habitat.	RMP, MRCP Cost of corridor acquisition or easement acquisition.	Largely forested corridor.
M18-1 Ba I Fair Good	Reach in a rock gorge downstream of the Warren Crib Dam and confined by bedrock banks. Channel adjustment is unlikely due to bedrock. Some of the	Protect the woody vegetation in the corridor to prevent further clearing. Possibly plant buffer in area just downstream of M19 reach break.	Low-Medium priority for protection because current encroachment has not impacted channel stability (due to bedrock controls).	Preserves wooded setting of the village. Maintained buffer for input of LWD and	Town of Warren. Low cost to implement policy.	Residential, Warren Village. No "conversion" would be needed - only

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Project #, Stream Type, Evolution Stage, RGA, RHA	Site Description and Importance, Including Stressors and Constraints	Project or Strategy Description	Technical Feasibility and Priority	Other Social Benefits (All projects are aimed at achieving RMP goals)	Potential Partners and Costs	Land Use Conversion
	Warren Village development encroaches into the corridor.			shading for biotic habitat.		new develop. limited.
M19A-1 **C-F** **departure** **III** **Fair** **Fair**	Stream corridor included residential development, roads, and low buffer width. A departure from C to F had occurred and the channel lacks floodplain access (incision 2.01). May have been a B type before the crib dam.	Adopt a no filling or cutting in the stream corridor policy to prevent further encroachments.	High feasibility. High priority due to current level of fill and development.	Maintained buffer for input of LWD and shading for biotic habitat. Reduced property damage.	Town of Warren. Low cost to implement policy.	Residential, Warren Village. No "conversion" would be needed - only new develop. limited.
M19A-2 **C-F** **departure** **III** **Fair** **Fair**	This segment has been straightened and partially armored and is influenced by sedimentation upstream of the Crib Dam. Channel is aggrading and attempting to widen but hindered by riprap application.	Remove Crib Dam. Investigate whether allowing some of the coarse gravel sediment to move downstream would cause negative impacts to infrastructure or channel adjustments downstream.	High priority due to the structure being non-essential. Recommended to be done in conjunction with corridor protection of sediment attenuation areas downstream (i.e., reach M16).	Improved biotic habitat and fish migration. Reduced flood/erosion risks. Improvement of incision in downstream reaches (M16)	High cost, especially if sediment needs to be removed. Town of Warren, RMP, USCOE	Possibly controversial due to age of dam/historical nature. Some residential properties and lawns may be reconfigured for new channel dimensions.
M19A-3	Covered Bridge north of Warren Village. Channel is aggrading and attempting to widen but hindered by riprap application.	Replace covered bridge or widen the bridge footings to accommodate the equilibrium channel width.	High priority if crib dam removed due to bed changes and potential increased adjustments.	Improved biotic habitat. Reduced flood/erosion risks. Improvement of incision in downstream reaches (M16)	VTAOT, Town of Warren	Possibly controversial due to historic significance of bridge. No major land use conversion required.

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Documentation of Stakeholder Involvement

VOLUNTEER FORM TO DOCUMENT IN-KIND SERVICES - MATCH INFORMATION

PROGRAM: PDM-C Local Hazard Mitigation Planning
DATE OF MEETING: May 7th, 2015
MEETING LOCATION: Wait House, Waitsfield VT
TOPIC: Review Draft LHMP for Waitsfield
MEETING TIME: 1pm - 3:30 pm

VOLUNTEER ATTENDEES - CLAIMED

No.	NAME	AFFILIATION	MILEAGE ROUND TRIP	MEETING HOURS	TOTAL MILEAGE @ 0.565	TOTAL TIME @ $20.00
21	Gail Aloisio	CVRPC		2.5	-	-
22	Sacha Pealer	VT DEC - Rivers Program		2.5	-	-
23	Susan Sennino	Town of Waitsfield PCD		2.5	-	-
24	Valerie Capels	Town of Waitsfield		2.5	-	-
25					-	-
26					-	-
27					-	-
28					-	-
29					-	-
30					-	-
31					-	-
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49					-	-
50					-	-
51					-	-
52					-	-
53					-	-
54					-	-
55					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

FEDERALLY SUPPORTED PERSONNEL - CAN NOT CLAIM

No.	NAME	AFFILIATION	MILEAGE ROUND TRIP	MEETING HOURS	TOTAL MILEAGE @ 0.565	TOTAL TIME @ $20.00
56					-	-
57					-	-
58					-	-
59					-	-
60					-	-
61					-	-
62					-	-
63					-	-
64					-	-
65					-	-
		Sub Total	0.00	0.00	$0.00	$0.00

TOTAL MATCH $0.00
TOTAL Non-Volunteer Match -
TOTAL VOLUNTEER MATCH $0.00

6/28/05 One Meeting Form

DRAFT

Warren looks to install EV charging station

By Rachel Goff

Currently, there are 891 electronic vehicles registered in the state of Vermont. That number has increased from only 88 registered EVs in the state in 2012, and Green Mountain Power (GMP) is looking to add EV charging stations throughout the state to reduce range anxiety, or drivers' fear that they won't have enough juice in their car to make it from one destination to the next.

At their meeting on Tuesday, June 9, Jen Cortez, innovation champion at GMP, talked with the Warren Select Board about the town's options for installing a public electronic vehicle (EV) charging station.

Because most people who own electronic vehicles have charging stations in their homes, public charging stations "are not typically accommodating the locals," Cortez said. Instead, installing public EV charging stations accommodates tourists driving through town. "You're enticing them to stay a little longer," Cortez told the board.

While charging, tourists "may run to the store to grab a soda or a bag of chips, or if they may need to waste 45 minutes to an hour to get some charge they may sit down and have a salad, a sandwich, have lunch or have dinner," Cortez said.

To install an EV charging station with GMP, the host—in this case the town of Warren—is responsible for paying to bring power from the electric panel to the station, which Cortez said can cost between $4,000 and $8,000. After that, GMP pays for the rest of the installation and is responsible for all operation and maintenance fees.

If Warren were to install one port, it would pay a monthly host fee of $39 to GMP. It would also cover the cost of electricity, which Cortez said averages about $25 per month at a well-used station, but for that it would be reimbursed by the power company each year.

After hearing the costs, which could be about $5,000 up front and about $500 a year total, "I just don't see the high demand for it," select board member Bob Ackland said of EV charging stations.

Indeed, "I see one station as symbolic," select board member Randy Graves said, but he sees a network of stations "as a really important feature for The Valley in marketing itself."

Already, there is one public EV charging station at Village Grocery in Waitsfield, two Tesla charging stations at West Hill House Bed & Breakfast in Warren and Sugarbush Resort is planning on installing an EV charging station up on the mountain. There is also an EV charging station at Red Hen Baking Company in Middlesex.

In Warren, the town has looked into several locations for an EV charging station, including behind The Warren Store, in the municipal parking lot, at the park and ride and at East Warren Community Market.

According to Cortez, the best spot in terms of safety and convenience would be behind The Warren Store, because people could shop and eat while they wait for their car to charge, but the board pointed out that that's privately owned land. Moving forward, they agreed to gather more information about the cost of getting power to an EV charging station at each potential location.

"To me, this sounds like something we'd have to budget for, first off," select board chair Andy Cunningham said. "I think it's something that, if I read it correctly ... people in the town want," he said, "so I think we should consider it and figure out the best spot for it."

Waitsfield undertakes hazard mitigation planning

Waitsfield is working to create a plan for reducing the impacts of disasters in the community. With the assistance of the Central Vermont Regional Planning Commission, officials and responders are drafting a Hazard Mitigation Plan to be approved by the Federal Emergency Management Agency (FEMA). Area residents are invited to provide feedback on the plan at the June 15 select board meeting.

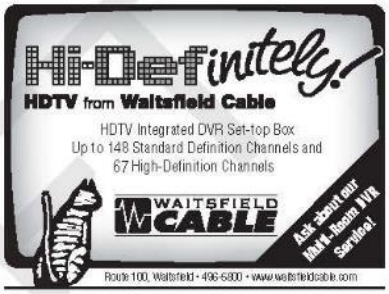
Hazard mitigation planning is a measure that municipalities can take to reduce local costs for infrastructure repair after a disaster. By completing a FEMA hazard mitigation plan, the town will meet requirements to be granted a lower local contribution rate when using federal disaster assistance funds. Hazard mitigation planning allows communities to identify projects that reduce the impacts and costs of disasters to property by moving it out of harm's way, improving infrastructure, or educating property owners.

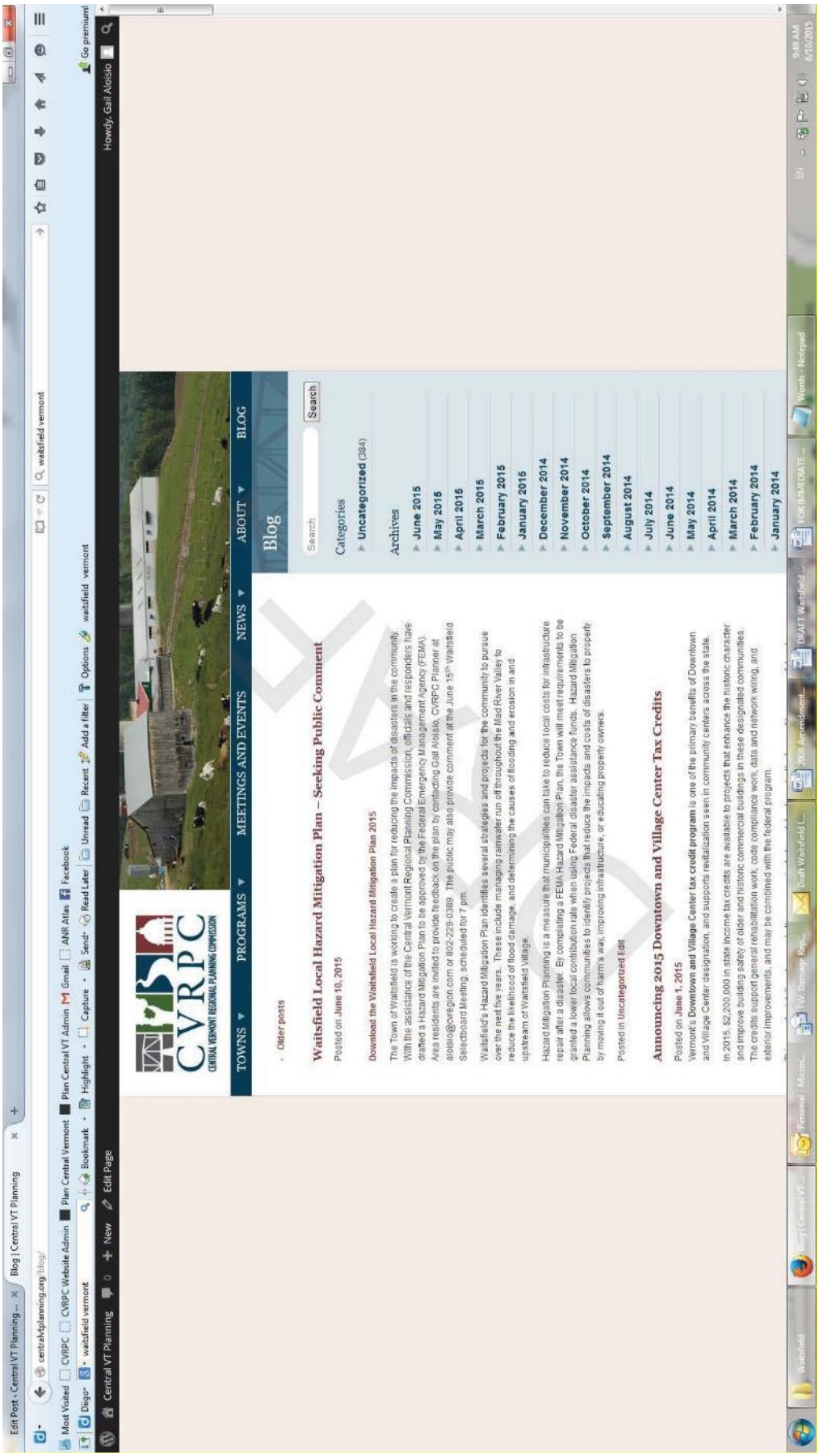
Waitsfield's hazard mitigation plan identifies several strategies and projects for the community to pursue over the next five years. These include managing rainwater runoff throughout the Mad River Valley to reduce the likelihood of flood damage and determining the causes of flooding and erosion in and upstream of Waitsfield Village.

After completing a hazard mitigation plan, the town will also have access to a special FEMA funding program which provides grants for projects intended to reduce the impacts of disasters. Such projects include elevating structures out of the flood plain, retrofitting bridges and culverts to take greater stream flows and fortifying public buildings against heavy snows or wind.

The hazard mitigation plan can be reviewed at the Waitsfield town office or online at the Central Vermont Regional Planning Commission website at www.centralvtplanning.org and Waitsfield's website at www.waitsfieldvt.us.

Residents are also invited to comment on the plan at the June 15 select board meeting, 7 p.m., at the Waitsfield town office. Comments and questions may be submitted to Gail Aloisio, CVRPC assistant planner, at (802) 229-0389 or aloisio@cvregion.com.

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CENTRAL VERMONT REGIONAL PLANNING COMMISSION
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MEETINGS AND EVENTS
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Waitsfield Local Hazard Mitigation Plan – Seeking Public Comment
Posted on June 10, 2015
Download the Waitsfield Local Hazard Mitigation Plan 2015
The Town of Waitsfield is working to create a plan for reducing the impacts of disasters in the community. With the assistance of the Central Vermont Regional Planning Commission, officials and responders have drafted a Hazard Mitigation Plan to be approved by the Federal Emergency Management Agency (FEMA). Area residents are invited to provide feedback on the plan by contacting Gail Aloisio, CVRPC Planner at aloisio@cvregion.com or 802-229-0389. The public may also provide comment at the June 15th Waitsfield Selectboard Meeting, scheduled for 7 pm.
Waitsfield's Hazard Mitigation Plan identifies several strategies and projects for the community to pursue over the next five years. These include managing rainwater run off throughout the Mad River Valley to reduce the likelihood of flood damage, and determining the causes of flooding and erosion in and upstream of Waitsfield Village.
Hazard Mitigation Planning is a measure that municipalities can take to reduce local costs for infrastructure repair after a disaster. By completing a FEMA Hazard Mitigation Plan, the Town will meet requirements to be granted a lower local contribution rate when using Federal disaster assistance funds. Hazard Mitigation Planning allows communities to identify projects that reduce the impacts and costs of disasters to property by moving it out of harm's way, improving infrastructure, or educating property owners.
Posted in Uncategorized Edit
Announcing 2015 Downtown and Village Center Tax Credits
Posted on June 1, 2015
Vermont's Downtown and Village Center tax credit program is one of the primary benefits of Downtown and Village Center designation, and supports revitalization seen in community centers across the state.
In 2015, $2,200,000 in state income tax credits are available to projects that enhance the historic character and improve building safety of older and historic commercial buildings in these designated communities. The credits support general rehabilitation work, code compliance work, data and network wiring, and exterior improvements, and may be combined with the federal program.
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About Waitsfield

Area Attractions & Things to Do

Boards, Commissions, & Committees

- Board of Civil Authority
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- Conservation Commission
- Development Review Board
- Energy Committee
- Mad Bikes of Waitsfield
- Planning Commission
- School Board
- Selectboard
- Scenic Roads Committee
- Tree Board
- Water Commission
- Water & Sewer Task Force
- Zoning Board of Adjustment

Other Boards, Commissions, & Committees

- Mad River Resource Management Alliance
- Mad River Valley Planning District Steering Committee
- Mad River Valley Recreation District
- Rural Resource Commission

Waitsfield Selectboard • Agenda

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Selectboard Meeting

Monday, June 15, 2015, 7:00 P.M.

Waitsfield Town Office

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AGENDA

Links to documents and off-site pages will open in a separate window.

I. Call to Order: 7:00 P.M.

II. Regular Business.

1. Review agenda for addition, removal, or adjustment of any items per 1 VSA 312(d)(3)(A). (5 +/- min.)
ACTION: Review agenda.
• VLCT FAQs (10 pgs, 638 KB)

2. Public forum. (5 min.)

3. Public Hearing: Waitsfield Hazard Mitigation Plan. (20 +/- min.)
ACTION: Receive public input; discussion.
• Draft Hazard Mitigation Plan (42 pgs, 2,721 KB)

4. Butternut Hill Road plan for landowner concerns (tentative). (10 +/- min.)
ACTION: Vote on proposal.

5. Festival permit application: Round Up on the River, July – Sept. 2015, at the Bridge Street Marketplace (tentative). (10 +/- min.)
ACTION: Vote on application.

6. Covered Bridge rehab and Bridge Street improvement projects update. (60 +/- min.)
ACTION: Actions as necessary.

7. Town Office relocation update. (45+/- min.)
ACTION: Determine next steps.
• Expenses and revenues table (1 pg, 237 KB)
• E-mail re United Bank branch costs (6 pgs, 235 KB)
• Peoples United Bank branch costs (4 pgs, 121 KB)

8. Consideration of quotes for fiscal year transition loan. (5 +/- min.)
ACTION: Vote to select bank.

9. Community Wastewater Loan Fund Program planning cost allocation follow-up. (5 +/- min.)
ACTION: Vote on method for allocating the planning costs to the individual projects.

10. Selection of contractor for 2015 paving. **May include deliberation in executive session.** (5 +/- min.)
ACTION: Vote to select paving contractor.

DRAFT

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Not available for PDF & Microsoft Office Documents

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• Paving bids (3 pgs, 36 KB)

11. Selection of consultant for design and engineering of the Waitsfield Village West Phase 2 sidewalk. **May include deliberation in executive session.** (10 +/- min.)
ACTION: Vote to select consultant.

12. Bills payable and Treasurer's warrants.

13. Approval of June 1, 2015 meeting minutes.
• 06/01/2015 (6 pgs, 241 KB)

14. Selectboard roundtable. (10 +/- min.)

15. Town Administrator's report. (5 min.) (6 pgs, 185 KB)

III. Other Business.
1. Correspondence/reports received.

V. Executive session re contract negotiation and pending litigation.

IV. Adjourn.

NEXT MEETINGS:
June 22, 2015
July 13, 2015

All times are approximate.

Changes in the items and order of the agenda may to occur.

Updated June 15, 2015

Waitsfield's Official Web Site

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DRAFT

Town of Waitsfield Selectboard

Date: June 15, 2015

	Name	Of / For	Contact Info (optional)
1.	Gail Alosio	CVRPC	
2.	PAUL HARTSHORN	WAITSFIELD SELECT	
3.	Scott Kingsbury	Waitsfield Select	
4.	Lisa B. Harvey	resident	
5.	BARBARA GULISANO	BRIDGE ST	GULISANO@USA.NET
6.	Sal Spinosa	W-field S-board	same
7.	Anthony ITALIANO	MRVTV	Tony@MRVTV.com
8.	Peter Edlund	resident	
9.	AnneMarie DeFreest	resident	
10.	Darryl Forrest	resident	
11.	TONY MILLER	"	
12.	Valerie Capels	Town of Waitsfield	townadmin@gmavt.net
13.	SAM GULISANO	resident	
14.	DAVID SELLERS	MADSONVILLE	DAVE@SELLERSANDCompany.COM
15.	Jay Seeking	resident	
16.	Serena Fox	Resident	—
17.	S. Hemsehmann	"	
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DRAFT

Gail Aloisio

From:	Laura Ranker
Sent:	Friday, June 12, 2015 10:15 AM
To:	Allen A. Tinker; Jeff Campbell; Andrew Cunningham (propertymanagement@madriver.com); Christopher Hoar (christopher.hoar@state.vt.us); jeff schulz; Thomas Martin, Moretown Selectboard Chair/EMD; Michele Beard (mbeard@gmavt.net)
Cc:	Waitsfield Town Administrator Valerie J. Capels (townadmin@madriver.com); Gail Aloisio
Subject:	FW: Waitsfield Local Hazard Mitigation Plan
Attachments:	DRAFT Waitsfield Local Hazard Mitigation Plan 2015.pdf
Importance:	High

Dear EMDs/EMCs,
Please find attached the draft Waitsfield Local Hazard Mitigation Plan for your review and comment. Please refer to the email below from Gail Aloisio, CVRPC Assistant Regional Planner. Thank you for your consideration and time.

Laura Ranker, Emergency Planner

From: Gail Aloisio
Sent: Thursday, June 11, 2015 5:23 PM
To: Laura Ranker
Subject: Waitsfield Local Hazard Mitigation Plan

Hi Laura,

Thank you for sending the email below to the EMD's from the Towns abutting Waitsfield: Fayston, Warren, Northfield, Moretown and Duxbury. When you send it, could you please copy Valerie Capels, the Waitsfield Town Administrator, please? Her email is townadmin@madriver.com. Thanks for copying me, too.

Thank you for your help,

Gail

Greetings, Emergency Management Directors,

The Town of Waitsfield would like to invite your comment on its new Local Hazard Mitigation Plan. A copy of the plan is attached. Waitsfield has identified projects that will help prevent future damage and losses due to dam failure, flooding, severe storms, ice jams and severe winter weather. As the policies and programs pursued by Waitsfield have the potential to affect neighboring communities, Waitsfield would like to invite your feedback on their plan. Highlights from the projects identified in the plan include:

- Coordinate with partners to seek out opportunities to purchase river channel management rights through river conservation easements
- Participate with the 5 Mad River Valley towns in stormwater management planning for the Mad River Valley watershed
- Conduct floodplain analysis for flooding impacts in Waitsfield Village, including above the Bridge Street Bridge
- Develop a dam failure notification system, including increased communication regarding the Warren timber crib dam & Sugarbush snowmaking pond

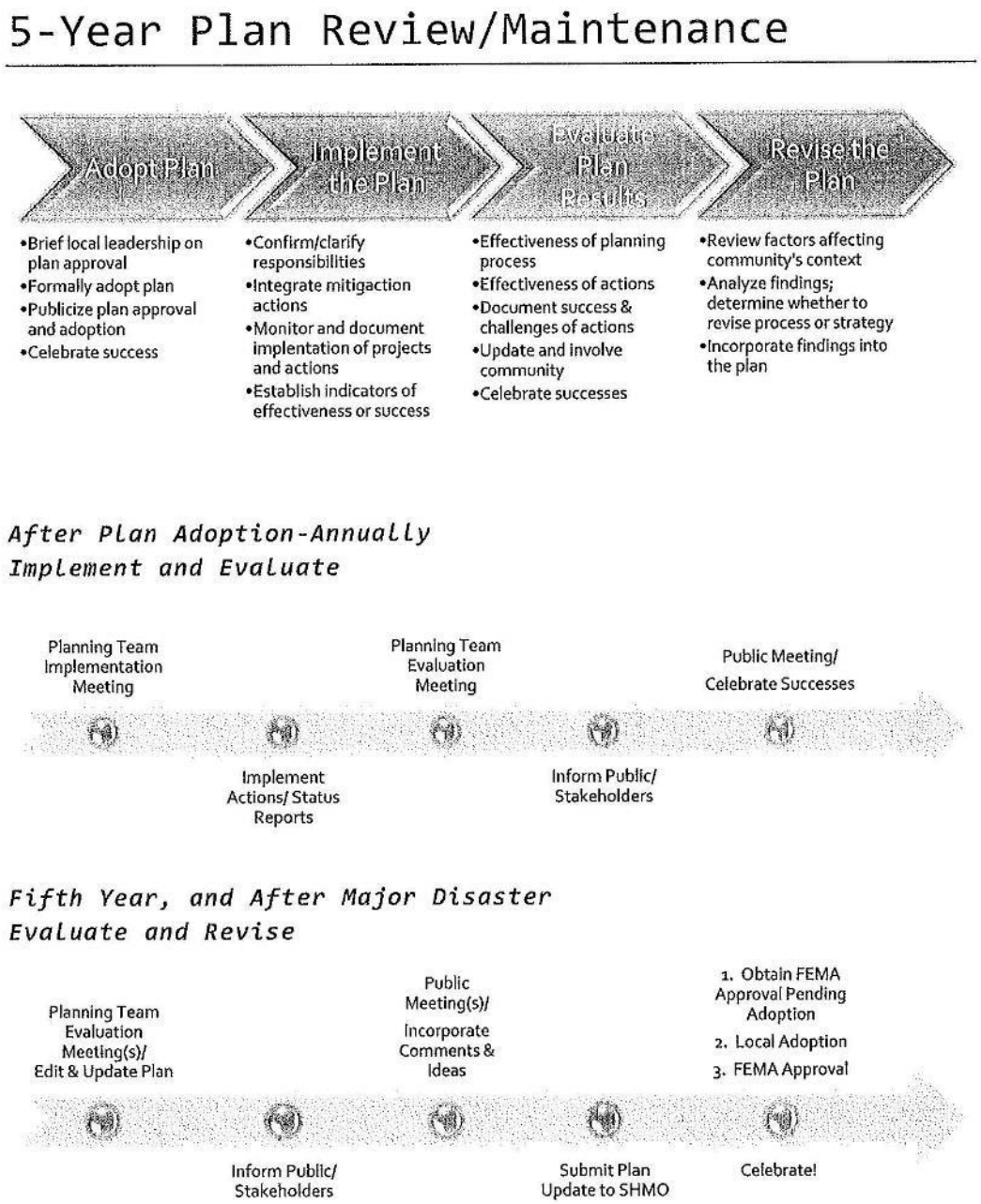
1

Your comments may be submitted to myself at Central Vermont Regional Planning Commission, or to Valerie Capels, Waitsfield Town Administrator, at townadmin@madriver.com. The Plan may also be viewed at the Waitsfield Municipal Offices, and the Selectboard will be taking additional comments on the Local Hazard Mitigation Plan at its meeting this Monday, June 15th. The meeting is at 7 pm at the Waitsfield Municipal Offices.

Thank you very much for your input.

DRAFT

5 Year Plan Maintenance and Review Process



Mitigation Project Tracking Chart						
Mitigation Action	**Local Leadership[1]**	**Partners[1]**	**Possible Funding/ Assistance Resources[2]**	**Projected Completion Time Frame**	**Priority (High, Med, Low)**	**STATUS**
Participate with the 5 Mad River Valley towns in stormwater management planning for the Mad River Valley watershed (Ridge to River).	Zoning Administrator (Z.A.) / Floodplain Manager	Mad River Valley Planning District, FMR	HMPG, Municipal Planning Grant, High Meadows Fund	Summer 2015 – Winter 2017	High	
Complete enrollment in VT Alert Program.	Emergency Management Director	Fire Dept.	Vermont Emergency Management	Complete Summer 2016	High	
Create a flood model meeting FEMA specifications to update existing floodplain boundaries along the Mad River, including Waitsfield.	Z.A. / Floodplain Manager	CVRPC, MRVPD, Planning Commission, Selectboard, FMR, ANR	CDBG-18 Disaster Recovery	June 2017	High	
Continue to evaluate and upgrade high priority culverts. Seek funding for culvert and bridge upgrades.	Selectboard	Road Commissioner, Town Administrator, CVRPC	Municipal Budget, AOT Town Highway Structures Program, Better Roads	Fall 2016 – Fall 2020	High	
Identify vulnerable road segments and necessary improvements to prevent failure during flood episodes.	Road Commissioner	Road Commissioner, CVPRC	Municipal Budget, Municipal Planning Grant	Summer 2017 – Fall 2020	High	

Mitigation Project Tracking Chart						
Mitigation Action	**Local Leadership[1]**	**Partners[1]**	**Possible Funding/ Assistance Resources[2]**	**Projected Completion Time Frame**	**Priority (High, Med, Low)**	**STATUS**
Flood-proof the Waitsfield Village Meeting House and the Library.	Town Administrator	Town Administrator, MRVPD, CVRPC	HMPG, CDBG-DR	Fall 2017	High	
Conduct restoration on lower Shepard Brook to repair damaged river banks and remove bar of debris and sediment	Private Landowners, Z.A./ Floodplain Manager	ANR, CVRPC	Vermont Community Foundation, Vermont Disaster Relief Fund	Fall 2017	Medium	
Evaluate fluvial erosion hazard regulations and maps and discuss with key stakeholders to determine maintenance of eligibility for highest state share of post-disaster FEMA Public Assistance.	Z.A. /Floodplain Manager	ANR, Planning Commission, Town Administrator, Selectboard	Municipal Budget	Summer 2016-Summer 2017	Medium	
Upgrade one culvert and one bridge on Ronk Road.	Selectboard	Road Commissioner, Town Administrator	Municipal Budget, AOT Town Highway Structures Program, Better Backroads	Summer 2017 – Summer 2019	Medium	
Develop a dam failure notification system, including increased communication regarding the Warren timber crib dam & Sugarbush snowmaking pond.	Emergency Management Director	Fire Department	Municipal Budget, Fundraising	Summer 2017 - Winter 2019	Medium	

Mitigation Project Tracking Chart						
Mitigation Action	**Local Leadership[1]**	**Partners[1]**	**Possible Funding/ Assistance Resources[2]**	**Projected Completion Time Frame**	**Priority (High, Med, Low)**	**STATUS**
Obtain generator for town garage (manual switch).	Emergency Management Director	Selectboard, Road Commissioner	DEMHS Generator Grant Program, Municipal Budget	Winter 2017-Winter 2019	Medium	
Evaluate feasibility of alternative mitigation options to protect properties along lower Shepard Brook, such as flood chutes or property acquisition	Z.A./ Floodplain Admin., Town Administrator	CVRPC, DEMHS, ANR, Landowners	HMGP	Fall 2018	Low	
Investigate cost-effectiveness of enrollment in NFIP Community Rating System.	Town Administrator	Selectboard, Z.A., ANR, Regional Planning Commission	Municipal Budget	Summer 2016-Summer 2019	Low	
Conduct outreach to vulnerable residents about CARE: Citizens Assistance Registration for Emergencies	Town Clerk & Administrative Staff	United Way, 211, VT E911	Municipal Budget	June 2017	Low	
Develop a plan for ice monitoring and coordination with local contractors, ANR & AOT for removal.	Emergency Management Director	Local Contractors, ANR, AOT	Municipal Budget	Winter 2018 – Winter 2020	Low	

Mitigation Project Tracking Chart						
Mitigation Action	**Local Leadership[1]**	**Partners[1]**	**Possible Funding/ Assistance Resources[2]**	**Projected Completion Time Frame**	**Priority (High, Med, Low)**	**STATUS**
Coordinate with partners to seek out opportunities to purchase river channel management rights through river conservation easements.	Town Administrator	Conservation Commission, Mad River Conservation Partnership (MRVPD, VLT, FMR)	High Meadows Fund/VCF, ANR Ecosystem Restoration Program, CDGB, ANR Rivers Management Program	Fall 2016 – Fall 2020	Low	

Certificate of Adoption

TOWN OF WAITSFIELD

Certificate of Adoption
Resolution to Adopt the Local Hazard Mitigation Plan

WHEREAS, the Town of Waitsfield has worked with the Central Vermont Regional Planning Commission, the Mad River Valley Planning District, Emergency Management Director, and other municipal officials to identify hazards, analyze past and potential future losses due to natural and manmade-caused disasters, and identify strategies for mitigating future losses; and

WHEREAS, the Waitsfield Local Hazard Mitigation Plan contains several potential projects to mitigate damage from disasters that could occur in the Town of Waitsfield; and

WHEREAS, a duly-noticed public meeting was held by the Town of Waitsfield Selectboard on April 10, 2017 to formally adopt the Waitsfield Local Hazard Mitigation Plan;

NOW, THEREFORE BE IT RESOLVED that the Waitsfield Selectboard adopts the Waitsfield Local Hazard Mitigation Plan Update.

Dated at Waitsfield, Vermont, this 10th day of April, 2017 by the Waitsfield Selectboard:

Paul Hartshorn (Chair)

Sal Spinosa (Vice Chair)

Anne Bordonaro

Kari Dolan

Darryl Forrest

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