

Killington, Vermont
2022 Local Hazard Mitigation Plan



Killington Wildfire – May 2021

Photo Credit: taken by Murray McGrath and provided by the Mountain Times

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1 INTRODUCTION

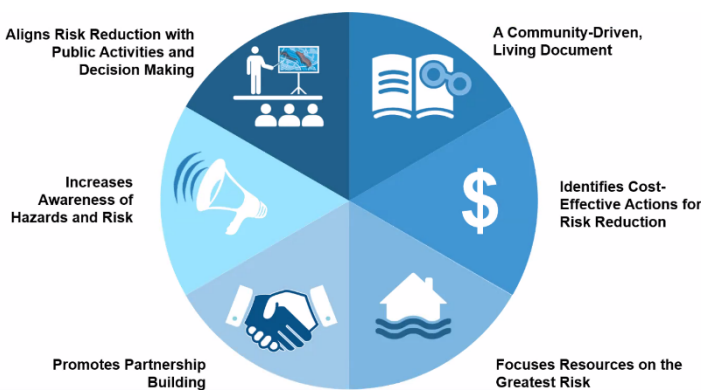
The impact of expected, but unpredictable natural events can be reduced through community planning and action. The goal of this Plan is to provide a natural hazards local mitigation strategy that makes Killington (the Town) more disaster resistant and more resilient after a disaster.

Hazard Mitigation is any sustained policy or action that reduces or eliminates long-term risk to people and property from natural hazards and their effects. FEMA and state agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This Plan recognizes that communities have opportunities to identify mitigation strategies and measures during all the other phases of Emergency Management - Preparedness, Response and Recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe, and identify local actions and policies that can be implemented to reduce the severity of the hazard.

2 PURPOSE

The purpose of this Plan is to assist the Town in identifying all natural hazards facing the community, ranking them according to local vulnerabilities, and developing strategies to reduce risks from those hazards. Once adopted, this Plan is not legally binding; instead, it outlines goals and actions to prevent future loss of life and property.

The benefits of mitigation planning include:



Source: FEMA LHMP Skill Share Workshop 2021

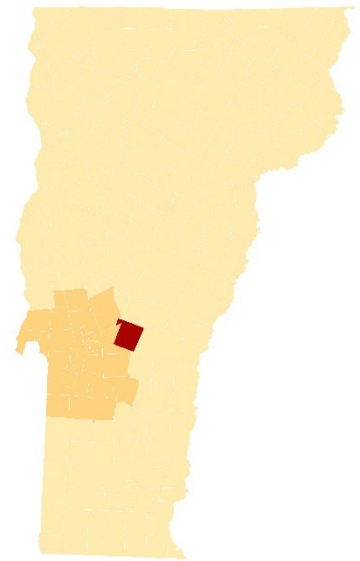
Furthermore, the Town seeks to be in accordance with the strategies, goals, and objectives of the 2018 State Hazard Mitigation Plan.

3 COMMUNITY PROFILE

Land Use and Development Patterns

The current character of Killington as a resort community began in 1957 with the development of what would evolve into the largest ski area in the eastern United States, Killington Ski Resort.

The resort brought new accommodations, restaurants, and retail. The 1970s and 1980s saw steady growth, especially in second home development. The Sherburne Village 400-acre planned-unit development continued to expand, while Pico Ski Resort developed its own residential and commercial village.



As Killington has gained the reputation as a world-class ski resort, it has grown into a four-season resort community. Attractions related to this expansion include the Green Mountain National Golf Course and a variety of large events throughout the year.

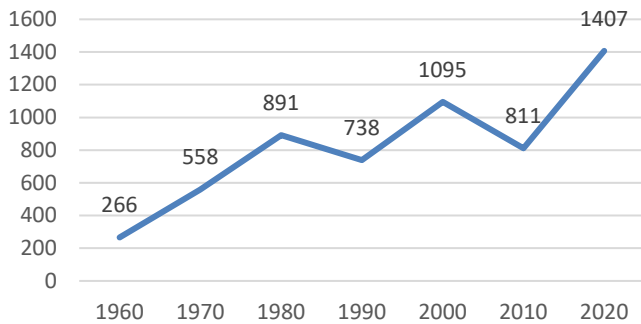
Historically, the hamlet of Sherburne Center (where River Road meets US Route 4) was the prominent focus of community activity. The first settlements in Killington occurred near West Bridgewater and Sherburne Center, along the edge of a stage road connecting Woodstock to Rutland. With the growth in the ski industry, the Killington Basin area now has the greatest concentration of settlement in the Town of Killington. The Ski Village District can accommodate future development of new villages within which skiing and other recreational activities would be integrated with residential and commercial uses.

Land Features

Killington is the highest elevation town in Rutland County. The forested landscape is dominated by two peaks of the Green Mountains' Coolidge Range, Killington Peak and Pico Peak. East of the range, medium density commercial and resort-related residential development leads to the Ottauquechee River, which follows a steep north-south valley. Farther east, East Mountain and nearby hills characterize rugged and remote terrain.

Demographics and Growth Potential

The 2020 American Community Survey Five-Year Estimates prepared by the U.S. Census Bureau shows an estimated population of 1,407 and 2,568 housing units. Killington's population between 2010 and 2020 increased by 73%, one of the largest increases in Vermont during this timeframe.



While the 2020 population is estimated at 1,407, the Town hosts up to 20,000 visitors on busy ski weekends, such as the Women's World Cup.

Between 2010 and 2020, the median age of Killington residents decreased from 54.3 to 48.7; still higher than the Vermont median age of 42.8. The portion of the population over 65 is 20.5%, compared to 19% in Vermont and 16% in the country. The population density of the Town is 30 people per square mile compared to an overall state density of 68.

Killington has the potential for significant growth over the next decade.

The Town has recently received a Tax Increment Financing District (TIF) master determination from the Vermont Economic Business Council.

The Town's TIF District Plan includes a municipal drinking water system and reconstruction of Killington Road. These would support construction of Phase 1 of the Six Peaks Killington project – a replacement lodge for the Snowshed and Ramshead Lodges, 31,622 SF of commercial/retail space, 193 residential units in the Six Peaks Village, and 9 single family lots and 46 duplex units at the Ramshead Brook Subdivision.

In conjunction with the TIF, the Town recently obtained a Bylaw Modernization Grant and is in the process of updating its zoning bylaw. Specifically, the Town is seeking to allow increased density along Killington Road to promote compact development and create more affordable and workplace housing. With both municipal water and sewer along Killington Road, the Town anticipates several vacant and/or underutilized parcels will be redeveloped with more dense development.

In addition, the Town recently granted zoning approval for Base Camp at Bear Mountain. This project consists of 156 residential units. Construction of Phase 1, which consists of 24 town homes, is expected to commence in summer of 2022, although the project has yet to receive its Act 250 approval.

Precipitation and Water Features

Average annual precipitation is 46 inches of rain; with July being the wettest month. Average annual snowfall is 240 inches; with January being the snowiest month. Elevation and geography lend themselves to the high amounts of snowfall in Killington compared to other areas in the region. Winter weather events in Killington often average 9 to 14 inches of snow.

The Ottauquechee River, its many tributaries (Shaw Hill Brook, Kent Brook, Quimby Brook, Taylor Brook, Roaring Brook, Brimstone Brook, Falls Brook), and broad floodplain paralleling US Route 4 is a dominant water feature. Portions of Killington also drain west towards Mendon Brook and north into Tweed River. There are no FEMA-mapped designated floodplains in Killington.

Colton Pond and Kent Pond are adjacent to VT Route 100 and Pico Pond drains to Kent Pond via Kent Brook.

Killington has approximately 760 acres of Class II wetlands. These play an important function in water absorption and holding capacity that thereby reduces the hazards of flooding and replenishes the groundwater supplies.

Drinking Water and Sanitary Sewer

No municipal water system currently exists in Killington, although the development of one is being planned. Most residential and commercial properties maintain individual wells. According to the Town Plan, adopted August 3, 2021, SP Land Company’s existing wells are adequate to serve the needs of currently envisioned resort expansion.

Killington is served by several large capacity sewer treatment facilities. Sherburne Fire District #1 serves most of the Killington Road Commercial District and adjacent residential areas. The Alpine Pipeline serves Pico, expanded development in the Killington Basin, other sections west of the Sherburne Pass, the Route 4 Commercial District and parts of lower Killington Road. Two Killington Resort systems serve the resort and existing development in the Ski Village District – Killington Basin Section. Sunrise condominiums and Topridge development have their own treatment facilities.

The remainder of the sewage treatment and disposal in Town is primarily carried out by individual on-site systems.

Transportation

Killington is about 46.5 square miles in size with primary access via US Route 4, a primary arterial highway linking the eastern and western parts of the state, and VT Route 100, a heavily traveled north/south route through central Vermont.

The 2016 VTrans Town Highway data indicates that Killington has a total of 63.66 road miles: 7.68 miles of Class 2; 34.73 miles of Class 3; 8.67 miles of Class 4; and 12.58 miles of State highway. Approximately 38% of these roads are paved and 62% are gravel.

Several roads are identified as locally important for use as through-ways, detours, short-cuts, and access to critical facilities: Town garage, office, schools, library, public safety building, and public utilities. These are shown in orange in **Figure 1**.

According to the Town’s road erosion inventory, approximately 55% of Killington’s road mileage is hydrologically connected - meaning it is within 100 feet of a water resource (i.e., stream, wetland, lake, or pond). Proximity to water resources can make these sections of road more vulnerable to flooding and fluvial erosion.

According to the Town’s structures inventory, Killington has a total of 25 municipal structures – 14 short structures (6’-20’ length) and 11 long structures (>20’ length). Nine of the town’s long structures are inspected every two years by VTrans through the Town Highway Bridge Program.

Killington has a total of 924 culverts within the municipal road right-of-way, all of which were inventoried in 2020. Only 21% of culverts are listed in poor, critical, or urgent condition and should be considered for replacement and/or upgrade in accordance with the Town Road and Bridge Standards. The local road network is maintained by the municipal highway department, whose garage is located on River Road.

Electric Utility Distribution System

Electric service to approximately 3,225 accounts is provided by Green Mountain Power via several circuits. Average annual outage statistics between 2017 and 2021 are summarized in **Table 1**.

Table 1: Power Outage Summary

Average Annual (2017-2021)	
Avg # of times a customer was without power in a year	1.85
Avg length of each outage in hours	4.26
# of hours the typical customer was without power	7.86
2021 only	
Avg # of times a customer was without power in a year	1.02
Avg length of each outage in hours	3.22
# of hours the typical customer was without power	3.28

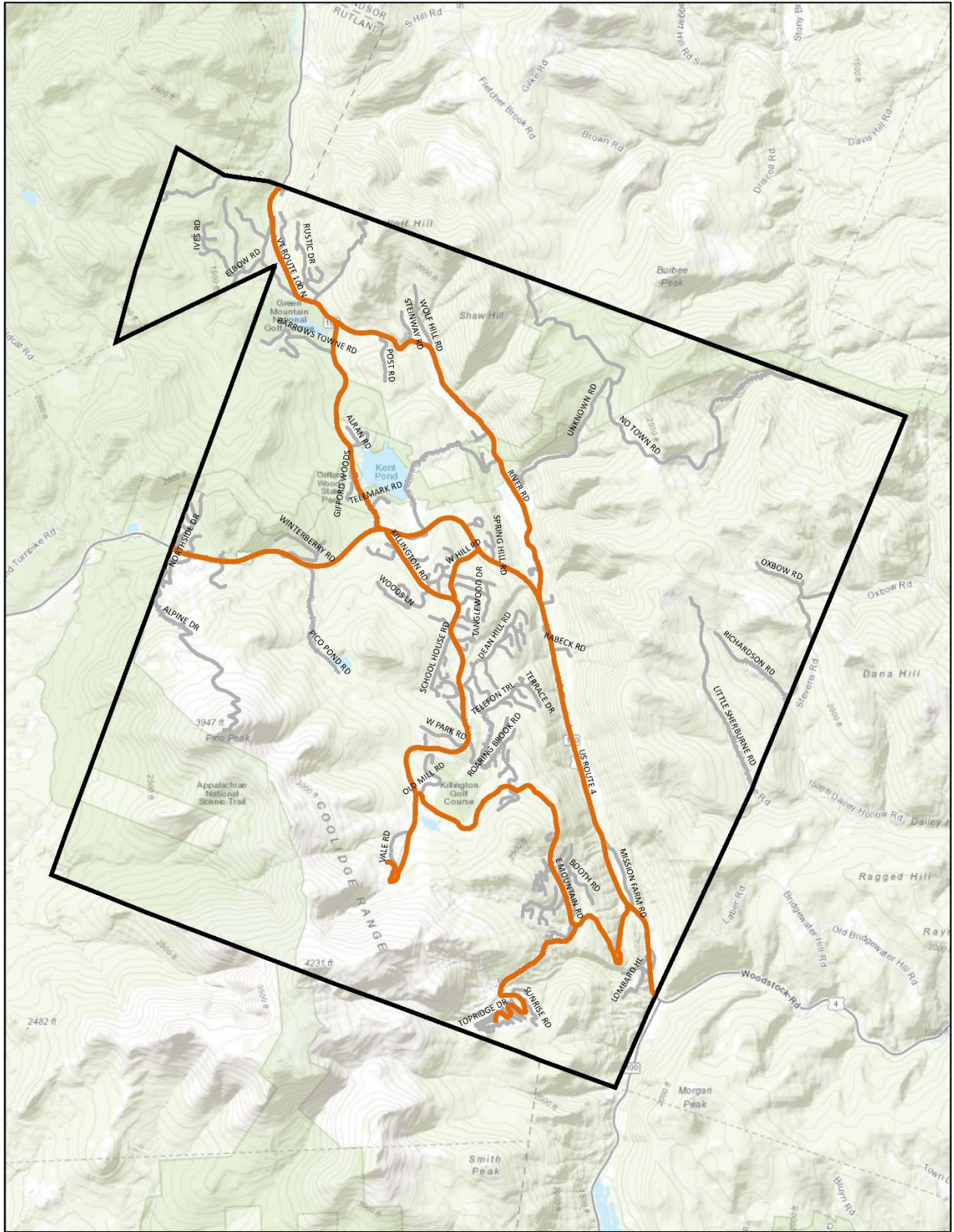


Figure 1: Locally Important Routes for Through-Ways, Detours, Short-Cuts, and Access to Critical Facilities
Shown in orange

The longest power outage affecting the greatest number of accounts between 2017 and 2021 was 4.15 hours and impacted 1,068 accounts. There was an outage lasting 85.89 hours in 2018, but it affected only 5 accounts.

Public Safety

The Town contracts with Sherburne Volunteer Fire Department, Inc. (SVFD) to provide fire, first response, and search and rescue services. In 2022, the Town voted to municipalize these services. In 2020, the Town completed construction of a new Public Safety Building on Killington Road. This facility houses the SVFD and Killington Police Department. SVFD is an active member of both the Rutland County and Connecticut Valley Fire Mutual Aid Programs. The nearest hospital is the Rutland Regional Medical Center. Ambulance service is provided by the Regional Ambulance Service.

Emergency Management

Killington's Fire Chief serves as the Emergency Management Director (EMD). They work with others in town to keep the Local Emergency Plan up to date as well as to coordinate with nearby towns and regional emergency planning efforts.

4 PLANNING PROCESS

Plan Developers

Steffanie Bourque, an Emergency Management Planner at the Rutland Regional Planning Commission (RRPC), assisted the Town with updating its Local Hazard Mitigation Plan. Pre-Disaster Mitigation Program funds from FEMA supported this process.

The Hazard Mitigation Planning Team members who assisted with the update include the Town Manager/Road Commissioner, Fire Chief/EMD, and representatives from the Selectboard, Planning Commission, and Planning Department.

Plan Development Process

The 2022 Killington Local Hazard Mitigation Plan is an update to the 2016 single jurisdiction mitigation plan. A summary of the process taken to develop the 2022 update is provided in **Table 2**.

Table 2: Plan Development Process

March 29, 2022: Hazard Mitigation Planning Team kick-off meeting. Planning Team members were confirmed. Discussed what a LHMP is; the benefits of hazard mitigation planning; current plan status; the planning process; outreach strategy; and plan sections. Planning Team meetings were not open to the public.

March/April 2022: Notice posted on RRPC and Town websites/social media that the Town is engaged in hazard mitigation planning and updating the LHMP. Notice emailed to officials (Selectboard and Planning Commission chairs, Town Managers, Clerks, Emergency Management Directors) in neighboring towns of Mendon, Chittenden, Pittsfield, Stockbridge, Bridgewater, and Plymouth and Key Partners (Rutland Natural Resources Conservation District, Western VT Floodplain Manager, Department of Health Emergency Preparedness Specialist, VTrans District 3 Projects Manager). Notice included instructions to contact the RRPC for information on the planning process and opportunities for public input – see **Appendix D**.

April 28, 2022: Planning Team meeting – confirmed plan purpose and completed work on community profile. Began work on community hazard risk assessment, storm history, and identifying assets vulnerable to the highest risk natural hazards.

June 2, 2022: Planning Team meeting – completed work on hazard identification and risk assessment. This is a critical milestone in the plan development process and the draft plan was readied for public meeting on June 15.

June 15, 2022: Draft LHMP presented at a joint meeting of the Killington Planning Commission and Selectboard to encourage public input from local government and the public that could affect the plan's conclusions and better integrate with Town initiatives. This meeting was recorded and aired on PEGTV. Draft shared with Key Partners for input on vulnerable locations and assets. Draft posted for public comment period with instructions to email comments to Lisa Davis, Town Planning Consultant. Comments were accepted until July 6, 2022 – see **Appendix D**.

July 6, 2022: Draft LHMP discussed at Killington Planning Commission meeting with an opportunity to share public comments.

Table 2: Plan Development Process (cont.)

July 14, 2022: Planning Team meeting – discussed comments received on June draft; completed work on hazard identification and risk assessment. Began work on hazard mitigation strategy – confirmed mitigation goals, discussed community capabilities, and updating the status of 2016 mitigation actions.

September 1, 2022: Planning Team meeting – continued work on hazard mitigation strategy – completed community capabilities; updated status of 2016 mitigation actions; and evaluated range of possible mitigation actions.

September 22, 2022: Planning Team meeting – completed work on hazard mitigation strategy; plan maintenance; and changes since the 2016 plan. Draft LHMP finalized for presentation to local officials and the public at joint meeting of the Killington Planning Commission and Selectboard on November 2, 2022.

November 2, 2022: Final draft LHMP presented at joint meeting of the Killington Planning Commission and Selectboard for review and comment. This meeting was recorded and aired on PEGTV. Plan emailed to neighboring towns and Key Partners. Draft posted for public comment period with instructions to email comments to Lisa Davis, Town Planning Consultant. Comments were accepted until November 16, 2022 – see **Appendix D**.

November 16, 2022: Draft LHMP discussed at the Killington Planning Commission meeting with an opportunity to share public comments.

November 28, 2022: Killington Selectboard approved submittal of final draft LHMP to Vermont Emergency Management (VEM) for Approval Pending Adoption (APA).

December 5, 2022: Final draft LHMP submitted to VEM for APA.

In addition to the local knowledge of Planning Team members and other relevant parties, several existing plans, studies, reports, and technical information were utilized in the preparation of this Plan. A summary of these is provided in **Table 3**.

Table 3: Existing Plans, Studies, Reports & Technical Information

2022 Local Emergency Management Plan

2021 Killington Town Plan

2021 FEMA NFIP Insurance Reports

2021-2017 Green Mountain Power Outage Data

2020 Zoning Bylaws

2020 American Community Survey Five-Year Estimate

2020 Road Erosion Inventory

2018 State of Vermont Hazard Mitigation Plan

2016 Stormwater Infrastructure Mapping Project

2016 Falls Brook Stormwater Report

2013 Ottauquechee River Watershed River Corridor Plan

2006 Roaring Brook Watershed Phase 1 and 2 Stream Geomorphic Assessment

VTrans Town Highway Bridge Inspection Reports

Vermont Statewide Highway Flood Vulnerability and Risk Map

VTrans Transportation Resiliency Planning Tool

RRPC Local Liaison Reports of Storm Damage

National Oceanic and Atmospheric (NOAA) National Climatic Data Center's Storm Events Database

FEMA Disaster Declarations for Vermont

OpenFEMA Dataset: Public Assistance Funded Project Summaries for Vermont

Changes Since the 2016 Plan

The Killington Town Plan, readopted in 2021, is a framework and guide for reaching community land use goals. It is based on specific objectives concerning the way the town desires to accommodate future growth and attempts to balance a wide range of competing interests and demands.

The intent of the Killington Zoning Bylaws is to provide for orderly community growth, to further the purposes established in Title 23 VSA Chapter 117 § 4302, and to implement the duly adopted Town Plan. Together, the Town Plan and Zoning Bylaws, are designed to encourage planned growth and concentrated development in those areas of the Town which provide for higher density, and which can develop the necessary infrastructure to support such development more readily than in other sections of Town.

As described in the Community Profile section of this Plan, the Town has the potential for significant growth over the next decade. Recent issuance of a Tax Increment Financing District (TIF) master determination from the Vermont Economic Business Council is an important part of supporting prospective development.

According to zoning permit records, a total of 223 permits were issued between January 2016 and August 2022. Approximately 70% were for residential activities including additions, sheds, garages, and decks. During this period, 30 permits were issued for the construction of new single-family homes and 131 permits were issued for renovations, additions, decks, and garages. Four (4) permits were issued for the creation of an accessory dwelling unit; three (3) permits were issued to allow for the conversion of a single-family home to a two-family home; and one (1) permit was for the demolition of a single-family home. Five (5) permits were issued to condominiums for projects ranging from improved walkways to the reconstruction of the water treatment plant. Six (6) permits were issued for subdivision of land including lot line adjustments.

In addition to residential permits, 17 permits were issued to the Killington Ski Resort for activities ranging from improvements to the ski slopes and parking lots to the construction of a new base lodge. Six (6) permits were issued to hotels and lodges for renovations and additions. Ten (10) permits were issued to restaurants for various activities although multiple permits were related to construction of takeout windows and outdoor seating during the COVID pandemic. The balance of zoning permits was issued for activities ranging from seasonal tents, signs, and other miscellaneous activities.

Development in Killington since 2016 has not made the community more vulnerable to natural hazards.

The Town's mitigation priorities have shifted. In 2016, the Killington Local Hazard Mitigation Plan was an all-hazards (natural and human-caused) plan. Flooding; hazardous materials, radiological and chemical/biological incidents; highway accidents; severe thunderstorms; and winter storms, ice storms, and power outages posed the highest risks to Killington.

The 2022 Plan update focused exclusively on natural hazards. This is not to say previously identified human-caused hazards are not a risk, they just are no longer addressed in this Plan. The Town again ranked severe winter storms (with associated extreme cold, snow, ice) and thunder/tropical storms (with associated flash flooding and fluvial erosion) as some of the community's highest risk natural hazards. In addition, they ranked high winds and wildfire as other highest risk natural hazards.

In 2022, the Town did not formally assess the risk associated with invasive species; however, they did discuss the potential hazards and risks associated with the Emerald Ash Borer (EAB) given the confirmed detection in Rutland County in October 2020. Invasive species were not included in the 2016 Plan.

Killington has made some progress in completing the mitigation projects identified in the 2016 Plan – see **Appendix C**.

Of all their accomplishments, the Town is most proud of their transportation resiliency work. Using their culvert inventory, the Town has developed a capital budget with a schedule for culvert replacement. The capital budget was developed shortly after Tropical Storm Irene in 2012 and is approved annually as part of the municipal budget. Since 2016, the Town has replaced approximately 50 culverts.

As previously mentioned, the Town completed construction of a new Public Safety Building on Killington Road in 2020. This facility houses the Sherburne Volunteer Fire Department, Inc. and Killington Police Department.

In addition, all municipal critical facilities have been equipped with back-up power.

Actions taken by Killington since 2016 have made the community more prepared and less vulnerable to future natural hazard impacts.

Nonetheless, due to an increase in the frequency and intensity of weather events, the Town remains vulnerable to severe winter storms, high winds, wildfire, flash flooding, fluvial erosion, and invasive species (particularly the Emerald Ash Borer).

As a result, the Town has identified a range of mitigation actions to address extreme cold/snow/ice, high wind, wildfire, flash flooding, fluvial erosion, and the Emerald Ash Borer – see **Table 6**.

5 HAZARD IDENTIFICATION AND RISK ASSESSMENT

After engaging in discussions, the Town identified the following “highest risk hazards” that they believe their community is most vulnerable to:

Local Vulnerabilities and Risk Assessment

One of the most significant changes from the 2016 Plan is the way hazards are assessed. To be consistent with the approach to hazard assessment in the 2018 State Hazard Mitigation Plan, the Hazard Mitigation Planning Team conducted an initial analysis of known natural hazard events¹ to determine their probability of occurring in the future (high probability events are **orange** in Table 4).

The Planning Team then ranked the hazard impacts associated with the known natural hazard events based on the probability of occurrence and potential impact to life, the economy, infrastructure, and the environment. The ranking results are presented in Table 4.

- **Extreme cold, snow, and ice associated with winter storms**
- **High winds associated with thunder/tropical storms, tornados, and severe winter storms**
- **Wildfire**
- **Flash flooding and fluvial erosion associated with thunder/tropical storms**

Each of these “highest risk hazards” (**orange** in Table 4) are further discussed in this section and depicted in the Local Natural Hazards and Vulnerabilities Map in Appendix B.

The “lower risk hazards” that are considered to have a low probability of occurrence and low potential impact are not discussed. For information on these hazards, consult the State Hazard Mitigation Plan.

Table 4: Community Hazard Risk Assessment

Hazard Event	Hazard Impacts	Probability	Potential Impact					Score
			Life	Economy	Infrastructure	Environment	Average	
Thunderstorm	Flash Flood/Fluvial Erosion	4	2	3	4	3	3.00	12.00
Ice Jam	Inundation	3	2	1	1	2	1.50	4.50
Tropical Storm/Hurricane	High Wind	4	3	4	4	4	3.75	15.00
Tornado	Hail	3	3	1	2	1	1.75	5.25
Landslide	Landslide	1	2	2	2	1	1.75	1.75
Winter Storm	Cold/Snow/Ice	4	4	4	4	4	4.00	16.00
Drought	Heat	2	3	2	2	2	2.25	4.50
	Drought	3	3	2	2	3	2.50	7.50
Wildfire	Wildfire	4	3	4	4	4	3.75	15.00
Earthquake	Earthquake	2	2	2	2	1	1.75	3.50

*Score = Probability x Average Potential Impact

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

¹This Plan defines natural hazards as atmospheric, hydrologic, geologic, and wildfire phenomena. Hazards not necessarily related to the physical environment, such as infectious disease, were excluded from consideration by the Planning Team.

Invasive Species

The Planning Team did not formally assess the risk associated with invasive species; however, they did discuss the potential hazards and risks associated with the Emerald Ash Borer (EAB) specifically.

Vermont's EAB infestation was first detected in 2018 in northern Orange County. In October 2020, a new detection of EAB in West Rutland was confirmed making Killington a town in the High Risk Area. This is the first confirmed detection in Rutland County. An inventory of trees within the road right-of-way would be needed to determine how many Ash trees are at risk. The potential risk to public and private woodlots and impacts on the local economy have not been quantified.

Highest Risk Hazard Profiles

Inundation/Flash Flooding/Fluvial Erosion

Floods can damage or destroy property; disable utilities; destroy or make impassable roads and bridges; destroy crops and agricultural lands; cause disruption to emergency services; and result in fatalities. People may be stranded in their homes for a time without power, heat, or communication or they may be unable to reach their homes. Long-term collateral dangers include the outbreak of disease, loss of livestock, broken sewer lines or wash out of septic systems causing water supply pollution, downed power lines, loss of fuel storage tanks, fires, and release of hazardous materials.

As noted in the State Hazard Mitigation Plan, "Flooding is the most common recurring hazard event in Vermont" (2018: 55). There are two types of flooding that impact Vermont communities: inundation and flash flooding. Inundation is when water rises onto low lying land. Flash flooding is a sudden, violent flood which often entails fluvial erosion (stream bank erosion).

Inundation flooding of land adjoining the normal course of a stream or river is a natural occurrence. If these floodplain areas are in their natural state, floods likely would not cause significant damage.

While inundation-related flood loss can be a significant component of flood disasters, the more common mode of damage in Vermont is associated with fluvial erosion, often associated with physical adjustment of stream channel dimensions and location during flood events. These dynamic and oftentimes catastrophic adjustments are due to bed and bank erosion of naturally occurring unstable stream banks, debris and ice jams, or structural failure of or flow diversion by human-made structures. An ice jam occurs when the ice layer on top of a river breaks into large chunks which float downstream and cause obstructions (State HMP 2018). Historically, Killington has not been vulnerable to ice jams.

Several major flooding events have affected the state in recent years, resulting in multiple Presidential Disaster Declarations. From 2003 to 2010, Rutland County experienced roughly \$2.6 million in property damages due to flood events.

The worst flooding event in recent years came in August of 2011 from Tropical Storm Irene (DR4022), which dropped up to 10-11 inches of rain in some areas of Rutland County. Irene caused 2 deaths and \$55,000,000 in reported property damages and \$2.5 million in crop damages in Rutland County.

Although the storm was technically a tropical storm, the effects of the storms are profiled in this flooding section, since the storm brought only large rainfall and flooding to the Town, not the high winds typically associated with tropical storms. This caused most streams and rivers to flood in addition to widespread and severe fluvial erosion. Killington experienced \$2,217,295 in local damages during Irene - \$108,158 Individual Assistance and \$2,109,137 Public Assistance.

From 2012 to 2020, Rutland County experienced approximately \$3.5 million in property damages; with \$1.9 million due to a flash flood event in July 2017 (DR4330) and \$1 million due to a flash flood event in April 2019 (DR4445).

In Killington, flooding is a risk. Damages from Tropical Storm Irene were significant, resulting in approximately \$2,217,295 in impacts. In Killington, damage due to flooding usually consists of impacts to roads, bridges, and culverts.

As determined in the Community Hazard Risk Assessment, Table 4, even though inundation flooding is considered to have a likely probability of occurrence in Killington, when it occurs the potential impacts are low – making inundation flooding a lower risk natural hazard in Killington.

There are no FEMA-mapped special flood hazard areas in the Town of Killington and the Town does not participate in the National Flood Insurance Program.

There are no repetitive loss properties.

On the other hand, flash flooding can occur any time the area has heavy rain. It can impact areas in Town that are located outside of floodplains, including along streams confined by narrow valleys. Killington is vulnerable to road washouts from flash flooding on several roads, including Class IV and private roads. Impacts can be exacerbated by undersized culverts and inadequate ditching.

There are more than 500 town owned bridges and culverts and another 400+ privately owned driveway culverts in Killington. Although the Town has replaced more than 100 culverts since Irene, numerous culverts that are either undersized or in poor condition remain. Some of the critical infrastructure include:

- Short-structure B29 at the crossing of Roaring Brook and Dean Hill Road, just east of the intersection with Killington Road.



Dean Hill Road #B29

B29 is a 50' wide steel corrugated squashed culvert. It is undersized and failing. The culvert was overtopped during Irene. Failure of this structure would cause significant flooding on both Killington Road and Dean Hill Road. Dean Hill Road provides access to many residential homes and flooding of this road would be very disruptive.

- Culvert 02-19 on Killington Road. This 60' long, 4' wide ellipse/squashed steel corrugated culvert is significantly undersized. It needs to be replaced with a structure that is bank-full width to match the walkway bridge.
- Culvert 86-02 on Trailside Drive. This 60' long, 30" wide rip-rap header steel corrugated round culvert is undersized and eroding the road surface of Trailside Drive when the inlet of the culvert tops out and scouring the northern bank of East Mountain Road, creating the potential to undermine its subbase. Trailside Drive is prone to washouts in this location and on the upper portion with the location of two culverts.
- Culvert 86-07 on Trailside Drive (located ±1,300' up the road from culvert 86-02). This 61' long, 14" wide rip-rap header steel corrugated round culvert compounds a washout issue on upper Trailside Drive in tandem with the adjacent western culvert 86-08 – a 45' long, 4' wide stone masonry header smooth plastic round culvert.

This short video documents a flash flooding event on Trailside Drive in 2021.



- Long-structure B32 over the Roaring Brook, just east of US Route 4 and adjacent to culvert 1-45. This 34' long concrete T-beam bridge was built in 1925 and is in a state of heavy deterioration.
- Short-structure B6 on River Road north of Wolf Hill Road. This 9' side rip-rap header steel corrugated culvert is undersized. The floor of the culvert is corroded. There is potential for failure and roadway topping.
- Short-structure B4 on River Road across from the town garage. This bridge is aging and may need replacement.
- Culvert 01-32 on River Road, just north of the town garage/public library entrance. This 64' long, 18" wide steel corrugated round culvert is undersized and aging out. Failure of either B4 or culvert 01-32 would impede access to the town garage and public library.

Due to its topography, Killington has many steep roads, which make them vulnerable to washouts. These include Thundering Brook Rd, Wolf Hill Rd, Tanglewood Dr, West Hill Rd, Trailside Dr, Brad Mead Dr, Alpine Dr, Prior Dr, Currier Rd, Ives Rd, Roundabout Rd, Doubleday Hill Rd, Post Rd, Rustic Dr, Rockwell Rd, Winding Way (where it turns to a Class 4), and Dean Hill Rd (at the intersection of Cubs Concourse and Bearly Hi Way).

Failure of culverts or road washouts would have a significantly negative impact on the Town. As shown in **Figure 1**, Killington Road and River Road are locally important. Killington Road is the primary commercial road providing access to most of the businesses in town. Moreover, a large portion of residents live on roads that have access off Killington Road. River Road provides access between Routes 4 and 100. Additionally, the Town Office, Town Garage, and public library are all located on River Road.

The inventory of hydrologically connected roads completed in 2020 for the Municipal Roads General Stormwater Discharge Permit also identified areas vulnerable to flash flooding and included recommended corrective actions to make these areas more resilient.

Stream Geomorphic Assessments (SGAs) provide information about the physical condition of streams and the factors that influence their stability. SGA of the Ottauquechee River was completed in 2012. This work was conducted to gather more detailed information about the stream channel and inform current and future planning and restoration efforts.

Two reaches in Killington (M29 and M30) were studied and projects at these locations were recommended to protect the river corridor, restore the riparian buffer, improve floodplain access, and manage stormwater runoff from East Mountain Road.

SGA within the Roaring Brook watershed was completed in 2005. The assessments provided evidence that the mainstem of Roaring Brook has been significantly altered by floodplain encroachment, channel straightening, and the disturbance of riparian vegetation. Projects were recommended to implement stormwater and sediment control efforts, adopt zoning regulations to limit further floodplain encroachment and protect riparian buffers, develop and implement a river corridor protection plan, and replace undersized structures (bridges/culverts).

Since 2013, the Town has mitigated an undersized culvert with a bridge replacement on Ravine Road to protect the watershed.

As weather patterns shift and we see larger storms and more frequent freeze-thaw cycles, the Town will monitor for signs that rivers that have historically been stable becoming less stable, with increased erosion, widening, trees falling in from its banks, etc.

Flooding Hazard History

These are the most up to date significant events impacting Killington. Federal declarations are depicted in **bold**.

4/15/2019: DR4445 1-2” rain with significant snow melt: no reported local damage; swift water rescue of trapped motorist; \$1,000,000 regional damage

7/1/2017: DR4330 3-4” rain the previous 3-4 days with flash flooding on 7/1/17: \$3,000 local damage; \$1,972,000 regional damage

6/25-7/11/2013: DR4140 heavy rain over multiple days: no reported local damage; \$420,000 regional damage

8/28/2011: DR4022 Tropical Storm Irene with ±5” rain: \$2,217,295 local damage (\$108,158 Individual / \$2,109,137 Public Assistance)

3/6/2011: ice jam flooding: Rt. 4 near Killington Skyeship

8/12/2004: heavy rain: \$10,000 regional damage

12/16/2000: DR1358 2-4” rain: \$7,530 local damage

High Wind

Thunderstorms can produce high winds, lightning, flooding, rain, large hail, and even tornadoes. Thunderstorm winds are generally short in duration, involving straight-line winds and/or gusts more than 50 mph. Thunderstorm winds can cause power and communication outages, transportation and economic disruptions, significant property damage, and pose a high risk of injuries and loss of life.

From 2004 to 2010, for thunderstorms that caused more than \$200,000 in damage, Rutland County experienced nearly \$2 million in property damage. From 2011 to 2020, thunderstorms resulted in just under \$2.4 million in damage in Rutland County, with \$525,000 due to a high wind event in May 2017.

Downed trees within the road right-of-way are the root cause of many power outages. When a power outage occurs, communication systems become compromised. Since most of the town’s telephone system is served by fiber optics, an in-home battery provides the electricity necessary to make a call. The battery life is less than eight hours, whether the phone is used or not.

There are many areas in Killington without reliable cell service, further compounding the problem of contacting emergency services during power outages. This is of concern given Killington’s remote and seasonal residents.

Violent windstorms are possible here; Killington is susceptible to high directional winds town wide. Many storms with high winds result in downed trees, damaged phone and power lines, buildings, and other property. Killington is vulnerable to power outages, which pose a potentially significant risk to many residents.

To mitigate the impacts of power outages, the following public buildings/critical facilities have been equipped with back-up power or generator hook-up: Public Safety Building, Killington Elementary School, town garage, and wastewater treatment plant.

The Town Office and public library have a 2-day Tesla battery and solar source for limited back-up power at these facilities.

The Public Safety Building serves as the local Emergency Operations Center (EOC). During a disaster, the municipal response is managed from the EOC, this would include all communications – from phone calls to internet browsing and 2-way radio. Connectivity is crucial in times of crisis. Telecommunications are needed for warning systems before disaster, as well as for response during and recovery after.

If a power outage coincides with a large-scale sheltering event, the primary local shelter at the Killington Elementary School is equipped with back-up power.



Wind Damage – March 7, 2022

Although the Town and Killington Resort are prepared for power outages, many of the local hotels and condominiums do not have back-up power. This could be problematic during a long-term power outage, especially because all these facilities are served by drilled wells for water supply.

In addition to power outages, high winds can damage buildings and other property. For example, the roof of the Medical Clinic was damaged. Communication radio repeaters, part of the State's emergency communication system, at the top of Killington and Pico peaks are also vulnerable to high wind events.

High Wind Hazard History

These are the most up to date significant events impacting Killington. Federal declarations are depicted in **bold**.

3/1/2021: 46 mph wind: \$35,000 regional damage
 12/25/2020: 43 mph wind: \$25,000 regional damage
 8/4/2020: 45 mph wind: \$25,000 regional damage
 2/24/2019: 48 mph wind: \$25,000 regional damage
 4/1/2018: 55 mph wind: \$50,000 regional damage
 10/30/2017: 40 mph wind: \$100,000 regional damage
 10/28/2015: 40 mph wind: \$50,000 regional damage
 9/2/2014: 55 mph wind: \$25,000 local damage
 10/29/2012: 50 mph wind: \$25,000 regional damage
 12/1/2010: 56 mph wind: \$250,000 regional damage
 8/16/2007: 55 mph wind: \$50,000 local damage
 10/28-29/2006: 50 mph wind: \$15,000 regional damage
 6/20/2006: 50 mph wind: \$5,000 local damage
 9/29/2005: 35-45 mph wind: \$50,000 regional damage
 6/9/2004: 50 mph wind: \$5,000 local damage

Extreme Cold/Snow/Ice

In the Rutland Region, most winter weather events occur between the months of December and March. Throughout the season, winter weather events can include snowstorms, mixed precipitation events of sleet and freezing rain, blizzards, glaze, extreme cold, the occasional ice storm, or a combination of any of the above. Events can also be associated with high winds or flooding, increasing the potential hazard.

The costs of these storms come in the form of power outages due to heavy snow or ice accumulations, damaged trees, school closings and traffic accidents.

From 2001 to 2010, Rutland County experienced \$2.7 million in property and crop damage from winter storms. 2011 to 2020 experienced \$1.58 million in property damage, with \$300,000 due to a 10" - 20" heavy, wet snowfall across the county on December 9, 2014.

There have been four winter storm-related federally declared Disasters in the county (the ice storm of January 1998 – DR 1201; severe winter storms in December 2000 and 2014 – DR 1358 and DR 4207, respectively; and severe storm and flooding in April 2007 – DR 1698).

Typically, towns' vulnerability to snow and ice storms are power outages and loss of road accessibility. As previously described, the Town is prepared for a power outage during a severe winter storm, even if the outage coincides with a sheltering event.

Extreme cold can have impacts on public health and safety. Like high wind events, especially if extreme temperatures coincide with power outages which can cut off heat and communication services. Severe winter storm impacts can put vulnerable populations (e.g., older adults, children, sick individuals, pets) at even greater risk. See the High Wind hazard profile above for more information about the Town's vulnerability to power outages.

In general, the Town is not vulnerable to loss of road accessibility due to snow accumulation or drifting. The municipal fleet of snowplows ensure most roads (except for some Class IV and private roads) are accessible, even in major snow events. Roads adjacent to critical facilities are well maintained.

East Mountain Road, which provides access between Killington Road and US Route 4, is a locally important road. Due to its steep slope, it can be difficult to drive during major winter storms. Further, it is vulnerable to flooding during rain events that can take place during the winter months.

Extreme Cold/Snow/Ice Hazard History

These are the most up to date significant events impacting Killington. Federal declarations are depicted in **bold**.

4/15/2021: 7" snow: \$10,000 regional damage
 2/7/2020: 8-12" snow; ¼" ice: \$15,000 regional damage
 11/26/2018: 4-8" heavy snow: \$25,000 regional damage
 3/31/2017: 13" snow: \$10,000 regional damage
 12/29/2015: 3-5" snow with freezing rain: \$20,000 regional damage: 3 indirect fatalities and 3 injuries in vehicle accident on Route 4
 2/1-2/2015: Record cold month with 15 to 20+ days below zero and 10" snow: \$10,000 regional damage
 1/7/2015: 0 to 10 degrees with winds of 15-30 mph creating wind chills colder than -20 to -30 below zero: no reported local damages
12/9/2014: DR4207 10-20" snow: \$16,595 local damage; \$200,000 regional damage
 3/12-13/2014: 22" snow and 35-40 mph wind gusts: \$20,000 regional damage
 12/26/2012: Snowfall rate of 1-2" per hour with accumulations of 8-18": \$10,000 regional damage
 2/23/2010: 6-30" snow: \$200,000 regional damage
 12/11/2008: 5-9" snow/glaze ice: \$25,000 regional damage
4/15-16/2007: DR1698 "Nor'icane" with 3" snow and rain with 60 to 80 mph winds: \$1,000,000 regional damage
 2/14/2007: 20" heavy snow: \$75,000 regional damage
 10/25/2005: 19" snow: \$100,000 regional damage
3/5/2001: EM3167 2-18" snow: \$16,830 local damage

The worst reported fire during this time occurred during May 2021. The fire started off US Route 4, behind the (former) Kokopelli Inn, just west of Goodro Lumber and east of River Road. The fire was started by new landowners who were burning brush and "slash" left over by previous logging on the land. They did not have a permit to burn as required by town ordinance. The fire burned for several days and after initially being contained, it flared up again, requiring fire departments from 10 towns to provide mutual aid.

For the initial fire, over 85 people from 10 departments responded to the fire. Accessing the fire on the mountainside was challenging. A small river blocked access to a logging road that led up to the fires. Trucks could not cross, so crews used ATVs to carry water, hoses, people, and supplies over the river and up the mountain. The fire burned 25-26 acres initially and the flare-up added a few more. State Forest Fire Supervisor, Lars Lund, who was on the scene, estimated that in total it burned about 30 acres, which puts it squarely in the category of a "large forest fire for Vermont," he said.



Killington Wildfire – May 2021

Wildfire

A wildfire is any outdoor fire that is not controlled, supervised, or prescribed. Wildfire probability depends on local weather conditions (lightning, drought, extreme heat); outdoor activities (camping, debris burning, construction); and the degree of public cooperation with fire prevention measures. The 2017 Vermont Wildland Fire Program Annual Report notes that most fires in Vermont are caused by burning debris.

Between 2016 and 2022, the Town reported on average three (3) wildfires per annum, many of which were caused by human negligence.

In September 2020, a forest fire broke out at the Deer Leap area of the Green Mountain National Forest. The fire was caused by human activity, most likely someone leaving a smoldering campfire unattended.

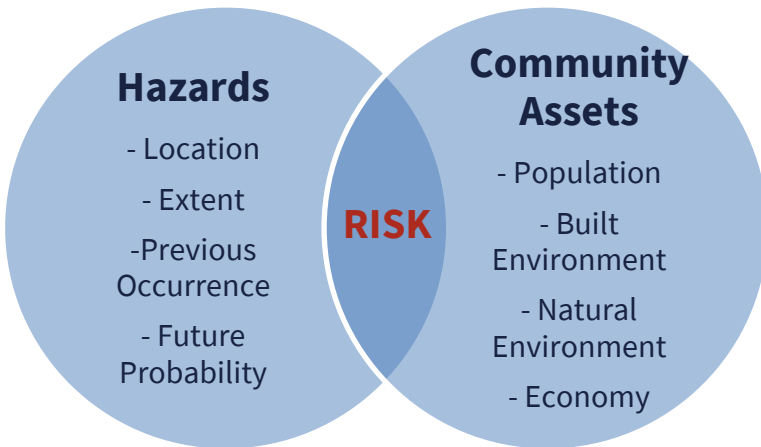
Wildfires can result in widespread damage to property and loss of life. Once a wildfire threatens a community, it is often too late to protect nearby structures, and people must be evacuated.

According to the 2018 Vermont Hazard Mitigation Plan, Vermont has a reliable system of fire suppression infrastructure coordinated at the State-level. Furthermore, Vermont’s climate, vegetation type, and landscape tend to discourage major wildfire resulting in a wildfire threat in Vermont that is relatively low based on historical occurrences.

The Town believes there is a wildfire risk based on past occurrence and an increase in outdoor recreation in the large tracts of forested areas surrounding Killington.

Any occurrence of a larger wildfire in Killington would likely be the result of local weather conditions (e.g., long period of drought followed by a large scale wind event increasing the fuel loading), but the average return interval of catastrophic large fires range upwards to 600 years.

Wildfire vulnerability is considered to be higher in the wildland-urban interface – the area where infrastructure interacts with undeveloped land, creating the potential for fire to move from a forested environment to residential development.



The Hazard Identification and Risk Assessment is the foundation for the mitigation strategy to reduce future losses.

Vulnerability Summary

Flash Flooding/Fluvial Erosion

Location¹: Flash Flooding – Killington Rd, River Rd, Trailside Dr, Dean Hill Rd, Thundering Brook Rd, East Mountain Rd, Wolf Hill Rd, Tanglewood Dr, West Hill Rd, Brad Mead Dr, Alpine Dr, Prior Dr, Currier Rd, Ives Rd, Rockwell Rd

Vulnerable Assets¹: Roads, bridges, culverts

Extent: ±5” rain; extent data for fluvial erosion is unavailable

Impact: \$2,217,295 local damage

Probability: >75% chance per year

High Wind

Location¹: Town-wide

Vulnerable Assets¹: Power lines, buildings, emergency communication radio repeaters, telecommunication systems, trees

Extent: ±55 mph winds

Impact: \$50,000 local / \$250,000 regional damage

Probability: >75% chance per year

Extreme Cold/Snow/Ice

Location¹: Town-wide

Vulnerable Assets¹: Roads, culverts, bridges, trees, power lines, telecommunication systems

Extent: Up to 30” of snow; ¼” ice; 80 mph winds; 15 to 20+ days below zero

Impact: \$16,830 local / \$1,000,000 regional damage

Probability: >75% chance per year

Wildfire

Location¹: Town-wide; most vulnerable in the wildland-urban interface

Vulnerable Assets¹: buildings, recreational trails

Extent: 30 acres

Impact: \$150,000 local damage

Probability: >75% chance per year

¹ See Appendix B: Local Natural Hazards and Vulnerabilities Map

6 HAZARD MITIGATION STRATEGY

The highest risk natural hazards and vulnerabilities identified in the previous section of this Plan directly inform the hazard mitigation strategy outlined below, which the community will strive to accomplish over the coming years. The mitigation strategy chosen by the Town includes the most appropriate activities to lessen vulnerabilities from potential hazards.

Mitigation Goals

The Hazard Mitigation Planning Team discussed mitigation goals and identified the following as the community's main mitigation goals:

- Reduce or avoid long-term vulnerabilities to identified hazards.
- Reduce the loss of life and injury resulting from these hazards.
- Mitigate financial losses incurred by municipal, residential, industrial, agricultural, and commercial establishments due to disasters.
- Reduce the damage to public infrastructure resulting from these hazards.
- Encourage hazard mitigation planning as a part of the municipal planning process; specifically, update the Town Plan to include hazard mitigation goals and objectives.
- Recognize the connections between land use, stormwater management, road design, maintenance, and the effects from disasters.
- Ensure that mitigation measures are sympathetic to the natural features of community rivers, streams, and other surface waters; historic resources; character of neighborhoods; existing land use and the capacity of the community to implement them.

Community Capabilities

Each community has a unique set of capabilities, including authorities, programs, staff, funding, and other resources available to accomplish mitigation and reduce long-term vulnerability. Killington's mitigation capabilities that reduce hazard impacts or that could be used to implement hazard mitigation activities are listed below.

Administrative and Technical

In addition to the Emergency Management staff described in Section 3, municipal staff that can be used for mitigation planning and to implement specific mitigation actions include: Town Manager, 7-member Highway Department, 3-member Finance Department, Town Clerk/Treasurer, Assistant Clerk, Assistant Treasurer, Town Planner, Zoning Administrator.

In addition to paid staff, there is a 3-member Selectboard, 5-member Planning Commission, 5-member Development Review Board, Fire Chief, Health Officer, Tree Warden, and Fire Warden.

To augment local resources, the Town has formal mutual aid agreements for emergency response – fire and public works. Technical support is available through the RRPC in the areas of land use planning, emergency management, transportation, GIS mapping, and grant writing. Technical support is also available through the State ANR for floodplain administration and VTrans Districts for hydraulic analyses.

Strengths: new Public Safety building fully equipped with life safety and emergency management equipment ● high functioning local emergency management team ● highly experienced and trained municipal staff ● established maintenance program for cleaning stormwater infrastructure

Areas for Improvement: public works staff could benefit from training in online mapping and asset management resources – ANR Atlas, VTCulverts, MRGP REI Portal

Planning and Regulatory

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Examples of planning capabilities that can either enable or inhibit mitigation include land use plans, capital improvement programs, transportation plans, stormwater management plans, disaster recovery and reconstruction plans, and emergency preparedness and response plans. Examples of regulatory capabilities include the enforcement of zoning ordinances, subdivision regulations, and building codes that regulate how and where land is developed, and structures are built.

Municipal Plan: Readopted August 2021

Description: A framework and guide for reaching community objectives regarding future development.

Relationship to Natural Hazard Mitigation Planning: Includes specific goals and policies related to mitigating natural hazards.

Zoning Regulations: Adopted November 2020

Description: Provides for orderly community growth promoting the health, safety, and general welfare of the community.

Relationship to Natural Hazard Mitigation Planning: Establish site plan review requirements and zoning districts with specific standards for proposed development. Intent is to provide orderly community growth, the further the purposes Title 24 VSA Chapter 117, §4302, and implement the Town Plan.

Road and Bridge Standards: Adopted September 2019

Description: Provide minimum codes and standards for construction, repair, maintenance of town roads and bridges.

Relationship to Natural Hazard Mitigation Planning: Standards include management practices and are designed to ensure safety of the traveling public, minimize damage to road infrastructure during flood events, and enhance water quality protections.

Road Erosion Inventory Report: December 2020

Description: Prioritizes those infrastructure projects necessary to improve transportation network resiliency and water quality.

Relationship to Natural Hazard Mitigation Planning: Improvements are designed to minimize or eliminate flood impacts on hydrologically connected road segments.

Local Emergency Management Plan: Adopted March 2022

Description: Establishes lines of responsibility and procedures to be implemented during a disaster and identifies high risk populations, hazard sites, and available resources.

Relationship to Natural Hazard Mitigation Planning: Includes actions for tracking events and response actions including damage reports to facilitate funding requests during recovery. This type of information can be essential to preparing hazard mitigation project applications for FEMA funding.

Fire Department ISO Rating: Issued in 2018

Description: The Sherburne Volunteer Fire Department's ISO rating is 4/10W. This rating is a score from 1 to 10 that indicates how well-protected the community is by the local fire department.

Relationship to Natural Hazard Mitigation Planning: Everyone wants to keep family, home, and business safe from fires. The ISO rating is a measure of the effectiveness of a community's fire services.

Strengths: plans are updated on a regular basis ● Town has a full-time Director of Planning and Zoning and a part-time Zoning Administrator

Areas for Improvement: land use regulations should be updated to reduce impacts from natural hazards ● Town should consider adopting building code that requires building permits for new construction ● Town should consider adopting subdivision regulations so development of large tracts of land incorporate hazard mitigation goals and objectives

Financial

Financial capabilities are the resources that a community has access to or is eligible to use to fund mitigation actions.

Killington's current annual town budget is approximately \$6 million, with \$700,000 to fund the Highway Department. Although the Town has not done so in the past, it is eligible to incur debt through general obligation bonds to fund mitigation actions.

As previously described, Killington recently received a Tax Increment Financing District (TIF) master determination from the Vermont Economic Progress Council. With the TIF District and resulting private real property development (Six Peaks Killington), the town's tax base will expand considerably over the next 20 years. The incremental increase in tax revenues generated by Six Peaks Killington will be used to pay the debt service on bonds that will be used to pay for presently \$62.3 million in drinking water and transportation infrastructure improvements.

Sherburne Fire District #1's annual budget includes \$473,000 for sanitary sewer services along Killington Road.

Strengths: capital budget anticipates road reconstruction and culvert upgrades

Areas for Improvement: maximize grant opportunities for mitigation projects ● establish a reserve fund that can be used to fund mitigation actions

Education and Outreach

Killington has several education and outreach opportunities that could be used to implement mitigation activities and communicate hazard-related information:

- Town website
- Mountain Times
- Sherburne Memorial Public Library
- Killington Active Seniors
- Greater Killington Women’s Club
- Bone Builders

Strengths: strong online presence – Town website ●
local newspaper that publishes weekly – Mountain Times ●
several active community groups

Areas for Improvement: adopt standard procedures to inform residents of heating fire hazards during extreme cold events, brush fire hazards during extended dry periods, evacuation routes, and emergency shelters educate residents on the importance of securing a burn permit

National Flood Insurance Program Compliance

The National Flood Insurance Program (NFIP) is a voluntary program managed by FEMA. The focus of the NFIP is to reduce the impacts of flooding on private and public structures through 1) local community adoption of a minimum set of local land use regulations in FEMA-mapped floodplains and 2) the availability of federally backed flood insurance.

Killington does not participate in the NFIP because there are no mapped floodplains in the town per the current Flood Insurance Rate Map (FIRM), dated August 28, 2008. Despite the lack of mapped floodplain, issuance of a FIRM makes them eligible to join. Community enrollment in the NFIP would provide all citizens (renter or property owner) with access to federally backed flood insurance, regardless of whether the structure is located within a FEMA-mapped floodplain.

State Incentives for Flood Mitigation

Vermont’s Emergency Relief Assistance Funding (ERAF) provides state funding to match FEMA Public Assistance after federally declared disasters. Eligible public costs are generally reimbursed by FEMA at 75% with the State matching 7.5%.

The State will increase its match to 12.5% or 17.5% of the total cost if communities take steps to reduce flood risk as described below.

12.5% funding for eligible communities that have adopted four (4) mitigation measures:

- 1) NFIP participation
- 2) Town Road and Bridge Standards
- 3) Local Emergency Plan
- 4) Local Hazard Mitigation Plan

17.5% funding for eligible communities that also participate in FEMA’s Community Rating System OR adopt Fluvial Erosion Hazard or other river corridor protection bylaw that meets or exceeds the Vermont ANR model regulations.

Killington’s ERAF rate is 7.5%. Enrollment in the NFIP and adoption of a FEMA-approved Local Hazard Mitigation Plan would increase this to 12.5%.

Mitigation Action Identification

The Hazard Mitigation Planning Team discussed the mitigation strategy, reviewed projects from the 2016 Plan, and identified possible new actions from the following categories for each of the highest risk natural hazards identified in Section 5.

- 1) **Local Plans and Regulations:** These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.
- 2) **Structure and Infrastructure Projects:** These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This applies to public or private structures as well as critical facilities. These projects may be eligible for funding through FEMA’s Hazard Mitigation Assistance Program.
- 3) **Natural Systems Protection:** These actions minimize damage and losses and preserve or restore the functions of natural systems.
- 4) **Education and Awareness Programs:** These actions inform and educate the public about hazards and potential ways to mitigate them.

Although this action reduces risk less directly than structural projects or regulation, it is an important foundation as greater understanding is more likely to lead to community support for direct actions.

Local Plans and Regulations

Integrate Mitigation into Capital Improvement Programs: Include in capital improvement programs by incorporating risk assessment and hazard mitigation principles into capital planning efforts.

Manage Development in Erosion Hazard Areas: The intent of River Corridor Bylaws is to allow for wise use of property within river corridors that minimizes potential damage to existing structures and development from flood-related erosion.

Improve Stormwater Management Planning: Rain and snowmelt can cause flooding and erosion in developed areas. A community-wide stormwater management plan can address stormwater runoff.

Reduce Impacts to Roadways: The leading cause of death and injury during winter storms is from automobile or other transportation accidents, so it is important to plan for and maintain adequate road and debris clearing capabilities.

Develop a Road Right-of-Way Vegetation Management Plan: Identify community priorities and plan of action for site-specific tree and roadside forest management to increase roadside resilience.

Map and Assess Vulnerability to Wildfire: Identify wildfire hazard areas and assess overall community vulnerability.

Develop a Wildland-Urban Interface Code: Develop specific design guidelines and development review procedures for new construction, replacement, relocation, and substantial improvement in wildfire hazard areas.

Develop a Community Wildfire Protection Plan: A CWPP 1) identifies and prioritizes areas for hazardous fuel reduction, 2) recommends treatments that will protect an at-risk community and essential infrastructure, 3) recommends measures to reduce structural ignitability. A CWPP may address issues such as wildfire response, community preparedness, and structure protection.

Structure and Infrastructure Projects

Remove Existing Structures from Flood Hazard Areas: Remove structures from flood-prone areas to minimize future flood losses and preserve lands subject to repetitive flooding.

Improve Stormwater Drainage Capacity: Minimize inundation flooding and fluvial erosion by 1) increasing drainage/absorption capacities with green stormwater management practices; 2) increasing dimensions of undersized drainage culverts in flood-prone areas; 3) stabilizing outfalls with riprap and other slope stabilization techniques; and 4) re-establishing roadside ditches.

Conduct Regular Maintenance for Drainage Systems: Help drainage systems and flood control structures continue to function properly. Techniques include: 1) routinely cleaning and repairing stormwater infrastructure – culverts, catch basins, and drain lines; 2) routinely cleaning debris from support bracing underneath low-lying bridges; and 3) inspecting bridges and identifying if any repairs or retrofits are needed to maintain integrity or prevent scour.

Protect Infrastructure and Critical Facilities: Minimize losses to infrastructure and protect critical facilities from flood events by 1) elevating roads above the base flood elevation to maintain dry access; 2) armoring the banks of streams near roadways to prevent washouts or 3) rerouting a stream away from a vulnerable roadway; and 4) floodproofing critical facilities.

Protect Power Lines: Power lines can be protected from natural hazard impacts by 1) inspecting and maintaining hazardous trees in the road right-of-way and 2) burying power lines.

Protect Critical Roadways: Use snow fences or living snow fences (e.g., rows of trees or other vegetation) to limit blowing and drifting of snow.

Retrofit Critical Facilities: Critical facilities can be protected from the impacts of high winds and winter storms by 1) retrofitting them to strengthen structural frames to withstand wind and snow loads; 2) anchoring roof-mounted mechanical equipment; and 3) installing back-up generators or quick connect wiring for a portable generator.

Retrofit At-Risk Structures with Ignition-Resistant Materials: Protect existing structures in wildfire hazard areas using non-combustible materials and technologies.

Create Defensible Space Around Structures and Infrastructure: Local governments can implement defensible space programs to reduce risk to structures and infrastructure.

Natural Systems Protection

Protect and Restore Natural Flood Mitigation

Features: Natural conditions often provide floodplain protection, riparian buffers, groundwater infiltration, and other ecosystem services that mitigate flooding. It is important to preserve such functionality. Examples include 1) adding vegetative buffers in riparian areas; 2) stabilizing stream banks; 3) removing berms; 4) minimizing impervious area development; and 5) restore incision areas.

Implement a Fuels Management Program: To reduce hazards vegetation fuels on public lands, near essential infrastructure, or on private lands by work with landowners. The program can include 1) performing fuel management techniques; 2) using prescribed burns to reduce fuel loads; 3) sponsoring local “slash and clean-up days” to reduce fuel loads along the wildland-urban interface.

Education and Awareness Programs

Educate Residents about Extreme Winter Weather:

Winter storms create a higher risk of car accidents, hypothermia, frostbite, carbon monoxide poisoning, and heart attacks from overexertion. Educational outreach can help minimize these risks.

Assist Vulnerable Populations: Take measures to ensure vulnerable populations are adequately protected from impacts of natural hazards, such as 1) organizing outreach and 2) establishing and promoting accessible heating or cooling centers.

Increase Wildfire Awareness: Target citizens and businesses to increase awareness of wildfire risk and strategies for protecting homes and infrastructure. Consider 1) offering online GIS hazard mapping; 2) working with Vermont Department of Forests, Parks, and Recreation to provide wildfire safety information to residents.

Mitigation Action Evaluation and Prioritization

For each mitigation action identified, the Hazard Mitigation Planning Team evaluated its potential benefits and/or likelihood of successful implementation. Each action was evaluated against a broad range of criteria, including a planning level assessment of whether the costs are reasonable compared to the probable benefits. Results of this evaluation are presented in **Table 5**.

Mitigation Action Implementation

After careful evaluation and prioritization, the Planning Team agreed on a list of actions that are acceptable and practical for the community to implement.

Actions without overall public support/political will were not selected for implementation. Actions whose costs were not reasonable compared to probable benefits were also not selected.

For the selected actions, the Planning Team then 1) assigned a responsible party to lead the implementation of each action; 2) identified potential funding; and 3) developed a timeframe for implementation. This action plan is presented in **Table 6**.

Note that the Town will make every effort to maximize use of future Public Assistance Section 406 Mitigation opportunities when available during federally declared disasters.

Table 5: Mitigation Action Evaluation and Prioritization

Mitigation Action	Life Safety	Prop Protect	Tech	Political	Admin	Other Obj	Benefit Score	Est Cost	C/B
Local Plans and Regulations									
Recommended for Implementation									
Integrate Mitigation into Capital Improvement Programs	1	1	1	1	1	1	6	1	Yes
Plan for and Maintain Adequate Road and Debris Clearing Capabilities	1	1	1	1	1	1	6	1	Yes
Update Road Erosion and Culvert Inventories	1	1	1	1	1	1	6	1	Yes
Review VTrans Bridge Inspection Reports ¹ and Plan for Identified Repairs to Prevent Scour	1	1	1	1	1	1	6	1	Yes
Develop a Road Right-of-Way Vegetation Management Plan	1	1	1	1	0	1	5	1	Yes
Map and Assess Vulnerability to Wildfire	1	1	1	0	0	1	4	1	Yes
Develop a Wildfire Fuels Management Plan	1	1	1	0	0	0	3	1	Yes
Not Recommended for Implementation									
Manage Development in Erosion Hazard Areas with River Corridor Bylaws	1	1	1	-1	1	1	4	1	Yes
Improve Stormwater Management Planning by Completing a Stormwater Master Plan	1	1	1	0	-1	1	3	1-2	No
Develop a Wildland-Urban Interface Code	1	1	1	-1	-1	1	2	1	Yes
Develop a Community Wildfire Protection Plan	1	1	1	-1	-1	1	2	1	Yes
Structure and Infrastructure Projects									
Recommended for Implementation									
Routinely Clean and Repair Stormwater Infrastructure	1	1	1	1	1	1	6	1	Yes
Install/Re-establish Roadside Ditches	1	1	1	1	1	1	6	1	Yes
Stabilize Outfalls	1	1	1	1	1	1	6	1	Yes
Protect Power Lines and Roadway by Inspecting and Removing Hazardous Trees in Road ROW	1	1	1	1	1	1	6	1	Yes
Increase Dimension of Drainage Culverts in Flood-Prone Areas	1	1	1	1	1	1	6	1-3	Yes
Remove Existing Structures from Flood-Prone Areas	1	1	1	1	1	1	6	2-3	Yes
Not Recommended for Implementation									
Increase Drainage/Absorption Capacities with Green Stormwater Management Practices	1	1	1	1	1	1	6	1	Yes
	Planning Team did not recommend this action for implementation because there are no known project locations; however, the Town will look for future opportunities and implement GSM projects as appropriate.								
Bury Power Lines	1	1	1	1	1	1	6	3	No
Elevate Roads Above Base Flood Elevation to Maintain Dry Access	1	1	1	0	1	1	5	3	No
Retrofit At-Risk Structures with Ignition-Resistant Materials	1	1	1	-1	1	0	3	3	No
Routinely Clear Debris from Support Bracing Underneath Low-Lying Bridges	No low-lying bridges with support bracing, so the Planning Team did not evaluate this action.								
Floodproof Critical Facilities	No critical facilities that require floodproofing, so the Planning Team did not evaluate this action.								

¹ VTrans inspects all town-owned bridges in the State's Town Highway Bridge Program every two years. Bridge inspection reports are available on the VTrans website.

Mitigation Action	Life Safety	Prop Protect	Tech	Political	Admin	Other Obj	Benefit Score	Est Cost	C/B
Structure and Infrastructure Projects (cont.)									
Not Recommended for Implementation (cont.)									
Use Snow Fence on Critical Roadways	As described in Section 5, drifting is not an issue on any critical roadways, so the Planning Team did not evaluate this action.								
Retrofit Critical Facilities to Strengthen Structural Frames to Withstand Wind and Snow Loads	No critical facilities that need structural retrofits, so the Planning Team did not evaluate this action.								
Anchor Roof-Mounted Mechanical Equipment on Critical Facilities	No critical facilities with roof-mounted mechanical equipment, so the Planning Team did not evaluate this action.								
Install Back-up Generators or Quick Connect Wiring at Critical Facilities	As described in Section 5, all critical facilities have been equipped with some form of back-up power, so the Planning Team did not evaluate this action.								
Create Defensible Space Around Structures and Infrastructure	All critical facilities already have a clear zone, so the Planning Team did not evaluate this action.								
Natural Systems Protection									
Not Recommended for Implementation									
Establish Vegetative Buffers in Riparian Areas	Planning Team did not evaluate these actions because there are no known areas; however, the Town will look for future opportunities to implement natural systems protection projects that meet the goals of this Plan.								
Remove Berms and/or Accumulated Debris from Stream to Restore Flood Capacity									
Stabilize Stream Banks									
Restore Incision Areas									
Implement Fuels Management Program	1	1	1	1	-1	1	4	2	No
Planning Team did not feel there was administrative capacity to implement a program and instead recommended mapping and assessing wildfire vulnerability and developing a fuels management plan.									
Education and Awareness Programs									
Recommended for Implementation									
Educate Residents About Winter Weather	1	1	1	1	1	1	6	1	Yes
Keep the Ditches Clean Campaign	1	1	1	1	1	1	6	1	Yes
Increase Wildfire Awareness	1	1	1	1	1	1	6	1	Yes
Not Recommended for Implementation									
Assist Vulnerable Populations	Town already has a plan in place to identify and monitor the needs of vulnerable populations – see current Local Emergency Management Plan.								

Table 5 Evaluation Criteria:

Life Safety – How effective will the action be at protecting lives and preventing injuries?

Property Protection – How effective will the action be at eliminating or reducing damage to structures and infrastructure?

Technical – Is the mitigation action a long-term, technically feasible solution?

Political – Is there overall public support/political will for the action?

Administrative – Does the community have the administrative capacity to implement the action?

Other Community Objectives – Does the action advance other community objectives, such as capital improvements, economic development, environmental quality, or open space preservation?

Rank each of the above criteria in Table 5 with a -1, 0, or 1 using the following table:

1= Highly effective or feasible

0 = Neutral

-1 = Ineffective or not feasible

Estimated Cost – 1 = less than \$50,000; 2 = \$50,000 to \$100,000; 3 = more than \$100,000

C/B – Are the costs reasonable compared to the probable benefits? Yes or No

Table 6 Community Lifelines Description: A Community Lifeline enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security. The primary objective of lifelines is to ensure the delivery of critical services that alleviate immediate threats to life and property when communities are impacted by disasters. These critical services are organized into one of seven lifelines:












 Safety and Security	 Food, Water, Shelter	 Health and Medical	 Energy (Power & Fuel)	 Communications	 Transportation	 Hazardous Materials
<ol style="list-style-type: none"> 1. Law Enforcement 2. Fire Service 3. Search & Rescue 4. Government Service 5. Community Safety 	<ol style="list-style-type: none"> 1. Food 2. Water 3. Shelter 4. Agriculture 	<ol style="list-style-type: none"> 1. Medical Care 2. Public Health 3. Patient Movement 4. Medical Supply Chain 5. Fatality Management 	<ol style="list-style-type: none"> 1. Power Grid 2. Fuel 	<ol style="list-style-type: none"> 1. Infrastructure 2. Responder Communications 3. Alerts, Warnings, & Messages 4. Finance 5. 911 & Dispatch 	<ol style="list-style-type: none"> 1. Highway/Road/Motor Vehicle 2. Mass Transit 3. Railway 4. Aviation 5. Maritime 	<ol style="list-style-type: none"> 1. Facilities HAZMAT, Pollutants, Contaminants

Table 6: Mitigation Action Implementation

Plan for and Maintain Adequate Road and Debris Clearing Capabilities: A leading cause of death and injury during winter storms is from auto accidents so it is important to plan for and maintain adequate road and debris clearing capabilities. This includes capital planning and annual funding to support the facilities (garage and equipment) and an appropriate number of staff needed to maintain the transportation network in Killington.

<p>ADDRESSED HAZARDS</p> <div style="display: flex; align-items: center; margin-bottom: 10px;">  <p>Winter Storm Primary Hazard</p> </div> <div style="display: flex; align-items: center;">  <p>High Wind</p> </div> <p>Lead Party Town Manager</p> <p>Type of Project Local Plans and Regulations</p>	<p>COMMUNITY LIFELINES TARGETED</p> <div style="display: flex; align-items: center; margin-bottom: 10px;">  <p>Safety & Security</p> </div> <div style="display: flex; align-items: center;">  <p>Transportation Primary Lifeline</p> </div> <p>Area of Impact Town-wide; ±64-mile road network Town Garage, River Road</p>	<p>FUNDING SOURCES</p> <ul style="list-style-type: none"> • Local funding <p>PARTNERSHIPS</p> <ul style="list-style-type: none"> • Selectboard <p>BENEFIT SCORE = 6</p> <p>PROJECT TIMELINE To coincide with preparing annual Town budget each October</p>
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Update Road Erosion and Culvert Inventories: These inventories were completed in 2020 and serve as the basis for asset management and should be kept up-to-date annually, with a full reassessment every 5 years.

<p>ADDRESSED HAZARDS</p> <div style="display: flex; align-items: center; margin-bottom: 10px;">  <p>Flooding</p> </div> <p>Lead Party Town Manager</p> <p>Type of Project Local Plans and Regulations</p>	<p>COMMUNITY LIFELINES TARGETED</p> <div style="display: flex; align-items: center; margin-bottom: 10px;">  <p>Safety & Security</p> </div> <div style="display: flex; align-items: center;">  <p>Transportation Primary Lifeline</p> </div> <p>Area of Impact Town-wide; ±21 miles of hydrologically connected roads and ±369 culverts</p>	<p>FUNDING SOURCES</p> <ul style="list-style-type: none"> • Local funding • VTrans Grant Programs <p>PARTNERSHIPS</p> <ul style="list-style-type: none"> • Rutland RPC <p>BENEFIT SCORE = 6</p> <p>PROJECT TIMELINE 2025 construction season</p>
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Plan for Bridge Repairs: Several town bridges are vulnerable to flash flooding and/or fluvial erosion. The Town will implement a **Bridge Inspection Program** to ensure the VTrans inspection reports for long structures will be reviewed and used to plan for needed flood-related bridge repairs such as scour, as needed.

ADDRESSED HAZARDS



Flooding

Lead Party

Town Manager

Type of Project

Local Plans and Regulations

COMMUNITY LIFELINES TARGETED



Safety & Security



Transportation

Primary Lifeline

Area of Impact

Long structures: B8, B19, B21, B23, B26, B27, B28, B32, B38

FUNDING SOURCES

- Local funding
- VTrans Structures Program

PARTNERSHIPS

- VTrans

BENEFIT SCORE = 6

PROJECT TIMELINE

Review VTrans Reports Oct 2023
Develop Plan(s), if needed Jul 2024

Develop a Road Right-of-Way (ROW) Vegetation Management Plan: Hazard trees in the road ROW can contribute to power and communication outages as well as debris in the roadway during wind events and winter storms. This hazard is exacerbated by the possibility of an Emerald Ash Borer infestation. To increase roadside resilience, Killington will develop a plan to identify 1) community priorities and 2) plan of action for site-specific tree and roadside forest management.

ADDRESSED HAZARDS



High Wind

Primary Hazard



Winter Storm



Invasive Species

Lead Party

Town Manager

Type of Project

Local Plans and Regulations

COMMUNITY LIFELINES TARGETED



Energy

Primary Lifeline



Transportation



Communications

Area of Impact

Town-wide

FUNDING SOURCES

- Local funding

PARTNERSHIPS

- Vermont Urban & Community Forestry Program (UCF)
- Tree Warden

BENEFIT SCORE = 5

PROJECT TIMELINE

UCF Outreach Jul 2023
Complete Plan by Dec 2025

Map and Assess Vulnerability to Wildfire: The first step in local planning is to identify wildfire hazard areas and assess overall community vulnerability. Killington will use GIS mapping of wildfire hazard areas to assess vulnerability and make planning decisions through comparison with zoning, development, and infrastructure.

ADDRESSED HAZARDS



Wildfire

Lead Party

Killington Fire and Rescue

Type of Project

Local Plans and Regulations

COMMUNITY LIFELINES TARGETED



Safety & Security

Area of Impact

Town-wide

FUNDING SOURCES

- Local funding
- FEMA/VEM Mitigation Grant

PARTNERSHIPS

- Rutland RPC
- Town Manager
- Fire Warden
- ANR Wildland Fire Control Program

BENEFIT SCORE = 4

PROJECT TIMELINE

Complete by 2027

Develop Wildfire Fuels Management Plan: A Fuels Management Plan outlines the approach to alter the types, amounts, and arrangement of hazardous vegetative fuels on public lands, near essential infrastructure, or on private lands. Well-planned treatments can lead to fewer, smaller, and less damaging fires. This can be coordinated with a vegetation management plan.

ADDRESSED HAZARDS



Wildfire

Lead Party

Killington Fire and Rescue

Type of Project

Local Plans and Regulations
Natural Systems Protection

COMMUNITY LIFELINES TARGETED



Safety & Security

Area of Impact

Town-wide

FUNDING SOURCES

- Local funding
- FEMA/VEM Mitigation Grant

PARTNERSHIPS

- Town Manager
- Fire Warden
- ANR Wildland Fire Control Program

BENEFIT SCORE = 3

PROJECT TIMELINE

Complete by 2028

Routinely Clean and Repair Stormwater Infrastructure: Regular maintenance is one of the most effective ways to mitigate the impacts of flooding. Routine cleaning and repairs of catch basins, ditches, and culverts will be done according to the Highway Department’s maintenance schedule and the Municipal Roads General Permit (MRGP).

ADDRESSED HAZARDS



Flooding

Lead Party

Town Manager

Type of Project

Structure and Infrastructure

COMMUNITY LIFELINES TARGETED



Safety & Security



Transportation
Primary Lifeline

Area of Impact

Town-wide; ±64-mile road network, and ±924 culverts

FUNDING SOURCES

- Local funding

PARTNERSHIPS

- None

BENEFIT SCORE = 6

PROJECT TIMELINE

See Highway Department’s Maintenance Schedule and MRGP

Install/Re-work Roadside Ditches: Properly installed and stabilized roadside ditches are critical to protect the integrity of the road. Although Killington has an extensive network of ditches, the areas noted below either need new ditches or have ditches that need to be re-worked to bring them up to current municipal Road Standards.

ADDRESSED HAZARDS



Flooding

Lead Party

Town Manager

Type of Project

Structure and Infrastructure

COMMUNITY LIFELINES TARGETED



Safety & Security



Transportation
Primary Lifeline

Area of Impact

- 1) River Rd, Thundering Brook
- 2) Alpine Dr, Merrill Dr, George St
- 3) Tanglewood, Dean Hill, Bearly Hi Way
- 4) Cubs Concourse, Roundabout, Trailview
- 5) Trailside, Lombard Hill
- 6) Others as required by MRGP

FUNDING SOURCES

- Local funding
- VTrans Grant Programs

PARTNERSHIPS

- VTrans

BENEFIT SCORE = 6

PROJECT TIMELINE

- 1) 2023 construction season
- 2) 2024 construction season
- 3) 2025 construction season
- 4) 2026 construction season
- 5) 2027 construction season
- 6) See MRGP

Stabilize Culvert Outfalls: Erosion at culvert outlets is common and can cause structural failure with serious downstream consequences. Properly stabilized outfalls protect channel bank stability and reduce erosion. Killington has identified the following location where culvert outlet stabilization is needed.

ADDRESSED HAZARDS**Flooding****Lead Party**

Town Manager

Type of Project

Structure and Infrastructure

COMMUNITY LIFELINES TARGETED**Safety & Security****Transportation**
Primary Lifeline**Area of Impact**

- 1) O8123 – Killington Rd
- 2) Others as required by MRGP

FUNDING SOURCES

- Local funding
- VTrans Grant Programs
- FEMA/VEM Mitigation Grant

PARTNERSHIPS

- VTrans
- ANR Stream Engineer
- US Army Corps of Engineers

BENEFIT SCORE = 6**PROJECT TIMELINE**

- 1) 2024 construction season
- 2) See MRGP

Remove Hazard Trees in Road Right-of-Way (ROW): Hazard trees in the road ROW can contribute to power and communication outages as well as debris in the roadway during wind events and winter storms. This hazard is exacerbated by the possibility of an Emerald Ash Borer infestation. Killington will remove hazard trees within their road ROW and/or request removal by Green Mountain Power if also within the power line ROW in accordance with their Road ROW Vegetation Management Plan.

ADDRESSED HAZARDS**High Wind**
Primary Hazard**Winter Storm****Invasive Species****Lead Party**

Town Manager

Type of Project

Structure and Infrastructure

COMMUNITY LIFELINES TARGETED**Energy**
Primary Lifeline**Transportation****Communications****Area of Impact**

Town-wide

FUNDING SOURCES

- Local funding

PARTNERSHIPS

- Tree Warden
- Green Mountain Power

BENEFIT SCORE = 6**PROJECT TIMELINE**

See Road ROW Vegetation Management Plan

Remove Existing Structures from Flood-Prone Areas: Removing structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving the land subject to repetitive flooding is a highly recommended long-term flood mitigation measure. Killington has identified the following structure for removal.

ADDRESSED HAZARDS**Flooding****Lead Party**

Town Manager

Type of Project

Structure and Infrastructure

COMMUNITY LIFELINES TARGETED**Safety & Security****Area of Impact**

- 1) River Road Ext Properties

FUNDING SOURCES

- Local funding
- FEMA/VEM Mitigation Grant

PARTNERSHIPS

- Selectboard

BENEFIT SCORE = 6**PROJECT TIMELINE**

- 1) Complete buyouts in 2024

Adequately Size Drainage and Perennial Stream Culverts in Flood-Prone Areas: Undersized culverts can lead to road washouts and flooding. Killington has identified several locations where upsized culverts are needed (or may be needed). The culvert replacement schedule has been documented in a capital budget.

ADDRESSED HAZARDS



Flooding

Lead Party

Town Manager

Type of Project

Structure and Infrastructure

COMMUNITY LIFELINES TARGETED



Safety & Security



Transportation
Primary Lifeline

Area of Impact

- 1) Various – see capital budget
- 2) Others as required by MRGP

FUNDING SOURCES

- Local funding
- VTrans Grant Programs
- FEMA/VEM Mitigation Grant

PARTNERSHIPS

- VTrans
- ANR Stream Engineer
- US Army Corps of Engineers

BENEFIT SCORE = 6

PROJECT TIMELINE

- 1) See capital budget
- 2) See MRGP

Educate Residents about Severe Winter-related Hazards; Wildfire Risks; and Keep the Ditches Clean Campaign: Killington will undertake education and awareness efforts by publishing information on the Town website and community social media sites on 1) severe winter storm-related hazards (e.g., extreme cold, freezing pipes); 2) best practices for preventing wildfires; and 3) the importance of keeping the municipal ditches free of yard waste and other debris.

ADDRESSED HAZARDS



All Hazards

Lead Party

Town Manager

Type of Project

Education and Awareness

COMMUNITY LIFELINES



Safety & Security



Transportation
Primary Lifeline

Area of Impact

Town-wide

FUNDING SOURCES

- Local funding

PARTNERSHIPS

- Fire Warden
- Killington Fire and Rescue
- Mountain Times
- Ready.gov

BENEFIT SCORE = 6

PROJECT TIMELINE

Spring – Ditch Campaign
 Fall – Winter Preparedness
 Spring/Fall – Wildfire Awareness

Process for Incorporating Plan Requirements into Other Planning Mechanisms

For Killington to succeed in reducing long-term risks, the information and recommendations of the Local Hazard Mitigation Plan should be integrated throughout government operations.

The following are specific examples of how information and recommendations from the 2017 Plan update were incorporated into other plans, programs, and procedures:

- Killington Town Plan, readopted in Aug 2021
- Zoning Regulations, adopted in Nov 2020
- Local Road and Bridge Standards, adopted Sept 2019
- Local Emergency Management Plan, include a Vulnerable Populations Communication Protocol, adopted in March 2022
- Road Erosion Inventory Report, completed in Dec 2020
- Capital Budget, developed in 2012 and approved annually as part of the municipal budget

The following are specific examples of how the Town will incorporate the 2022 Plan update into other plans, programs, and procedures:

- The Selectboard will incorporate risk assessment and hazard mitigation goals into capital planning efforts and improvement programs.
- The Planning Commission will integrate the hazard mitigation goals for disaster resiliency and enhanced stormwater management into the goals and objectives of the next updates to the Town Plan and Land Use Bylaws and development of new subdivision regulations.
- The Public Works Foreman will implement several mitigation infrastructure projects (e.g., upsize perennial and drainage culverts in flood-prone areas, install/re-work roadside ditches, install green stormwater management practices, bridge maintenance/replacement) through existing plans (2020 Road Erosion Inventory and Report for hydrologically connected road segments, bridge inspection program).

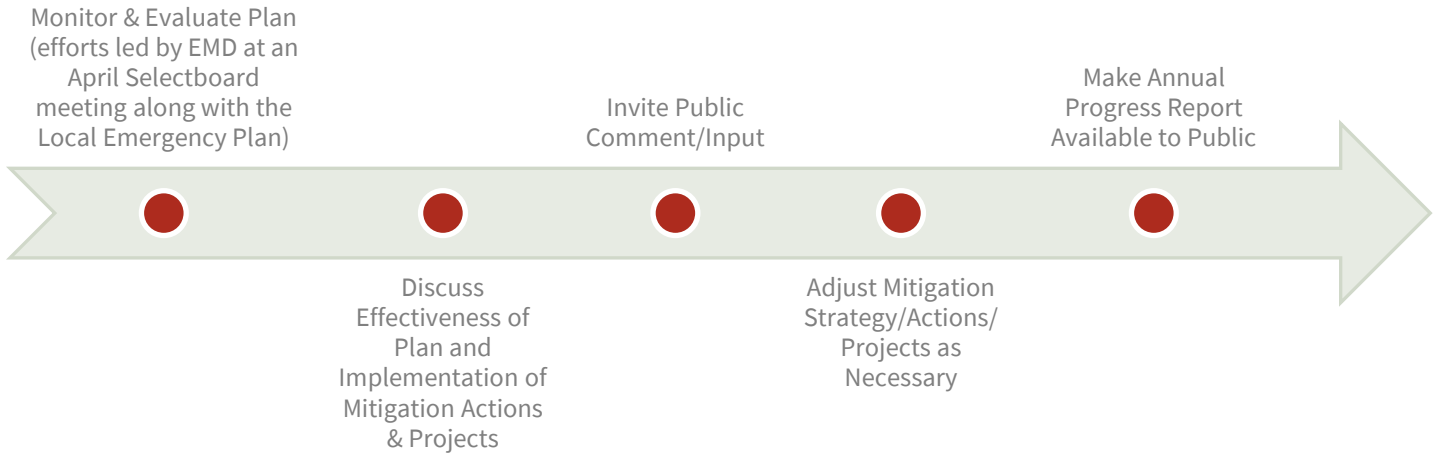
- Killington Fire and Rescue will work with the Town to map and assess vulnerability to wildfire. Information from this action will be used to develop a fuels management plan that compliments the Town's road right-of-way vegetation management plan.
- The Town Manager (or an appointed committee) will work with the Rutland Natural Resources Conservation District to identify opportunities to collaborate on implementing natural resources protection projects that meet the goals of this Plan.
- Sherburne Fire District #1 will incorporate elements of natural system protection and disaster resilience into the current update of the public sewer system operating procedures.

7 PLAN MAINTENANCE

This Plan is dynamic. To ensure the Plan remains current and relevant, it is important it be monitored, evaluated, and updated periodically.

Monitoring and Evaluation

This Plan will be monitored and evaluated annually starting in 2024 in accordance with the following process:



The status (e.g., in progress, complete) of each mitigation action should be recorded in **Table 7**. If the status is “in progress” note whether the action is on schedule. If not, describe any problems, delays, or adverse conditions that will impair the ability to complete the action.

Updating

This Plan will be updated at a minimum every five (5) years in accordance with the following process:

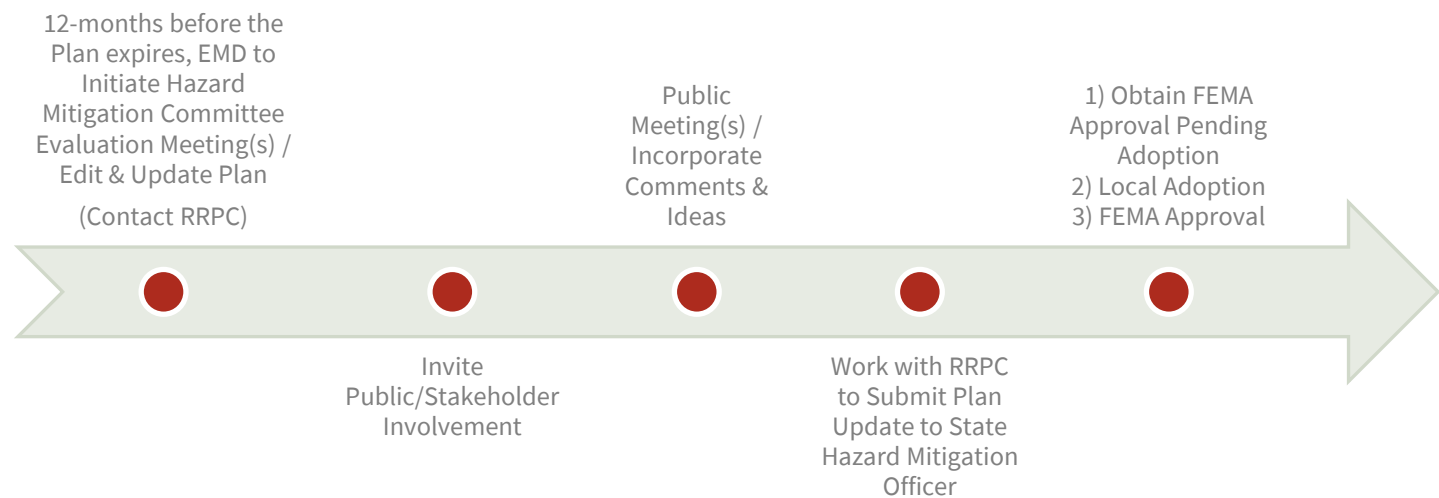


Table 7: Mitigation Action Status

Mitigation Action	2024	2025	2026	2027	2028
Local Plans and Regulations					
Plan for and Maintain Adequate Road and Debris Clearing Capabilities					
Update Road Erosion and Culvert Inventories					
Plan for Bridge Repairs					
Develop a Road Right-of-Way (ROW) Vegetation Management Plan					
Map and Assess Vulnerability to Wildfire					
Develop Wildfire Fuels Management Plan					
Structure and Infrastructure Projects					
Routinely Clean and Repair Stormwater Infrastructure					
Install/Re-work Roadside Ditches					
Stabilize Culvert Outfalls					
Remove Hazard Trees in Road Right-of-Way (ROW)					
Adequately Size Drainage and Perennial Stream Culverts in Flood-Prone Areas					
Remove Existing Structures from Flood-Prone Areas					
Education and Awareness Programs					
Severe Winter Storm Preparedness Outreach					
Wildfire Prevention Educational Outreach					
Keep the Ditches Clean Campaign					

CERTIFICATE OF ADOPTION
TOWN OF Killington, Vermont Selectboard
A RESOLUTION ADOPTING THE Killington, Vermont 2022 Local Hazard Mitigation Plan

WHEREAS, the Town of Killington has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **Killington, Vermont 2022 Local Hazard Mitigation Plan**, which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Killington has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **Killington, Vermont 2022 Local Hazard Mitigation Plan (Plan)** under the requirements of 44 CFR 201.6; and

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

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

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

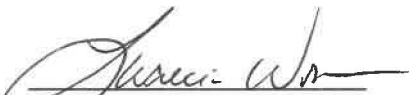
RESOLVED by Town of Killington Selectboard:

1. The **Killington, Vermont 2022 Local Hazard Mitigation Plan** is hereby adopted as an official plan of the Town of Killington;
2. The respective officials identified in the mitigation action plan of the **Plan** are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and **Plan** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and
4. An annual report on the process of the implementation elements of the Plan will be presented to the Selectboard by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Killington this 13th day of February 2023.


Selectboard Chair

ATTEST


Town Clerk

Killington, Vermont: Local Natural Hazards and Vulnerabilities Map

Natural Hazards

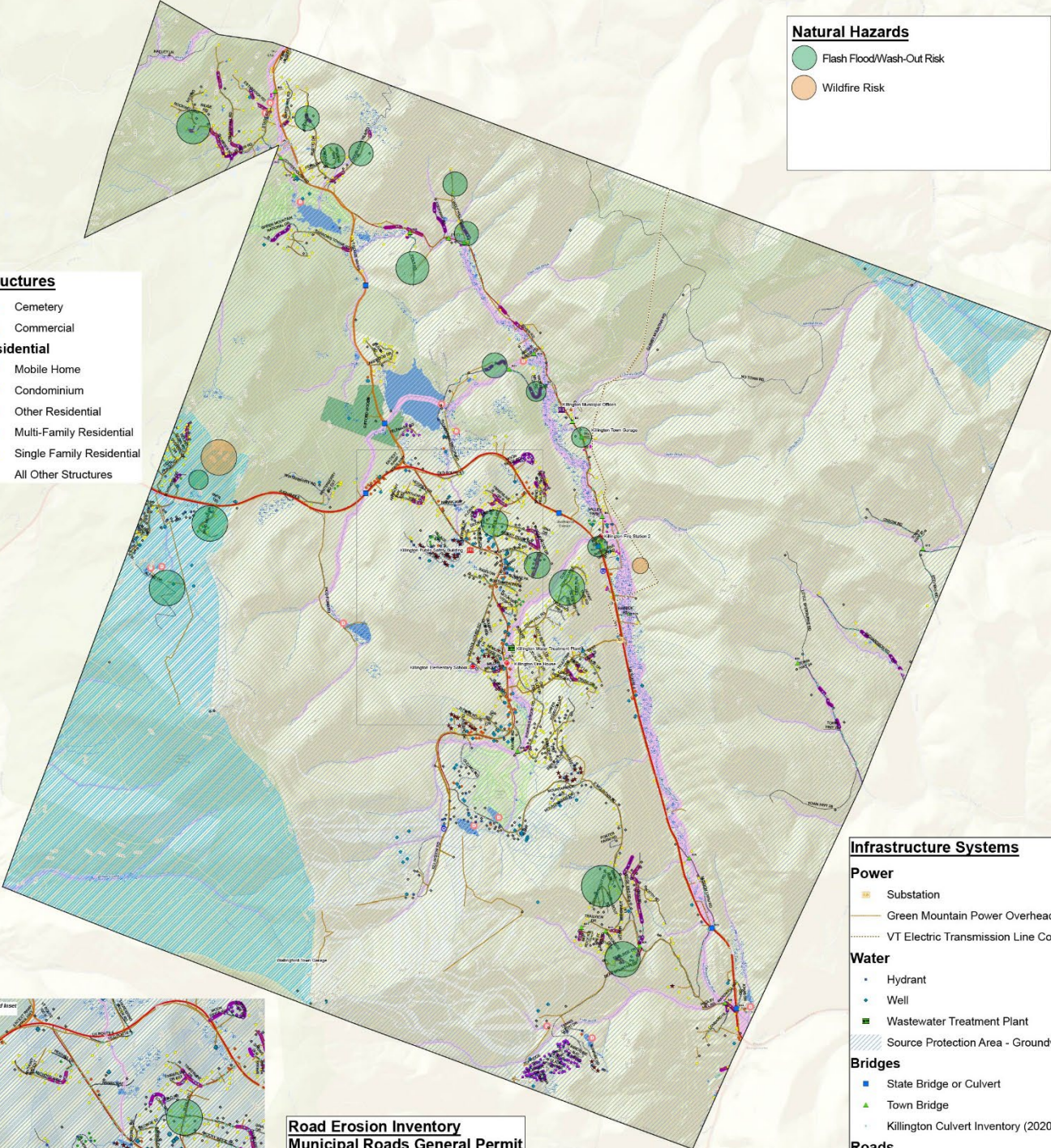
- Flash Flood/Wash-Out Risk
- Wildfire Risk

Structures

- Cemetery
- Commercial

Residential

- Mobile Home
- Condominium
- Other Residential
- Multi-Family Residential
- Single Family Residential
- All Other Structures



Infrastructure Systems

Power

- Substation
- Green Mountain Power Overhead Line
- VT Electric Transmission Line Corridors

Water

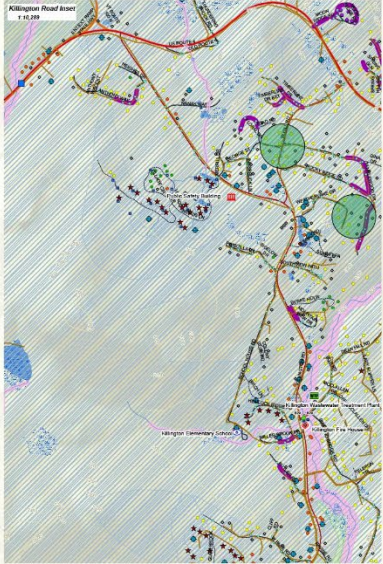
- Hydrant
- Well
- Wastewater Treatment Plant
- Source Protection Area - Groundwater

Bridges

- State Bridge or Culvert
- Town Bridge
- Killington Culvert Inventory (2020)

Roads

- US Highway
- State Highway
- Town Highway Class 1
- Town Highway Class 2
- Town Highway Class 3
- Town Highway Class 4
- Private



**Road Erosion Inventory
Municipal Roads General Permit**

Does Not Meet Standard (as of July 2020)

Critical Facilities

Emergency Shelter

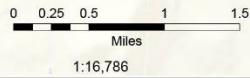
- Primary Shelter - Killington Elementary School: 686 School House Rd.

Emergency Operations Center

- Primary EOC - Public Safety Building: 800 Killington Rd.
- Alternate EOC - Killington Town Office: 2706 River Rd.

Town Facilities

- Fire Station
- Town Garage
- Killington Elementary School
- Health Clinic



Natural Resources

- Vermont Significant Wetland Inventory
- Rivers and Streams
- FEMA Special Flood Hazard Area
- River Corridor Small Streams(50 ft setback)
- Vermont River Corridor
- Lakes, Ponds, & Major Rivers

MITIGATION ACTIONS FROM 2016 PLAN

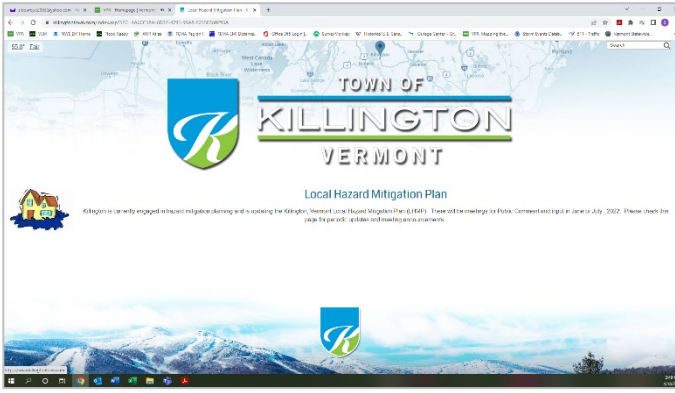
2022 Status	Hazards Mitigated	Mitigation Action	Local Leadership	Funding Resources	Target Start	Target End
Ongoing – town allocates 130 – 150K in annual budget for bridge and culvert replacement	Floods, Fluvial Erosion	Evaluation and funding plans for large culvert and bridge maintenance and replacement.	Highway Dept	Town Highway Structures Program, Town Budget	2013	2018
Complete (new public safety building)	Multiple Hazards	Risk assessment and upgrades of Fire Station/EOC to support emergency response.	Fire Dept	AFG, EOC Grant Program	2013	2017
Ongoing – remains a priority; not a natural hazard so no longer addressed in this Plan	Fire	Update of fire department’s pre-planning program with at-risk structures.	Fire Dept	Town Budget	2015	2017
Ongoing – done on an annual basis	Floods, Fluvial Erosion	Reshape and stabilize all drainage ditches and river banks.	Highway Dept	Town Budget, BBR	2013	2022
Ongoing – inventory complete but replacement is ongoing – town using 50 year standard	Floods, Fluvial Erosion	Inventory, survey, and resize all culverts (15-20 annually) to meet 25 year flood standard.	Highway Dept	HMGP, PDM, FMA, Town Highway Class 2 Roadway Program, Town Budget	2011	2031
Complete	Floods, Fluvial Erosion, Ice Jams	Complete acquisition of flood-destroyed homes.	Town Manager	CDBG, HMGP, PDM, FMA	2012	2014
Complete	Multiple Hazards	Continue to maintain Red Cross certified shelter and volunteers in town.	EMD	Red Cross, Town Budget	2012	2015
Complete	Winter Storms, Thunder Storms, Power Outages	Install a generator at the Town Garage.	Selectboard, Highway Dept	HMGP, PDM, Town Budget	2014	2017

2022 Status	Hazards Mitigated	Mitigation Action	Local Leadership	Funding Resources	Target Start	Target End
No longer being considered	Floods, Fluvial Erosion	Consider adopting flood hazard regulations to join NFIP.	Planning Commission, Selectboard	Town Budget	2013	2015
Complete	Fire	Continue installation of needed dry hydrants.	Fire Dept	Task Force grant from RC&D program	2015	2017
Not sure if this was done in 2015 update but we are embarking on a 2023 update and will do this	Multiple Hazards	Examine Town Plan and ensure hazards and mitigation strategies are addressed in 2015 update.	Planning Commission, Selectboard	Municipal Planning Grant, Town Budget	2015	2016
Incomplete – remains a priority; not a natural hazard so no longer addressed in this Plan. Road 4/ Killington Road intersection will be addressed as part of Killington Road project – lower grades add landing pad; have a VTrans TA Grant to address Route 100 from Route 4 to River Road for bike /ped safety	Highway Accidents	Advocate for improved traffic flow at intersections of VT 100 with US 4 and VT 100/US4 with Killington Road.	VTrans, Selectboard, Highway Dept	Highway Safety Improvement Program	2012	2020

Acronyms

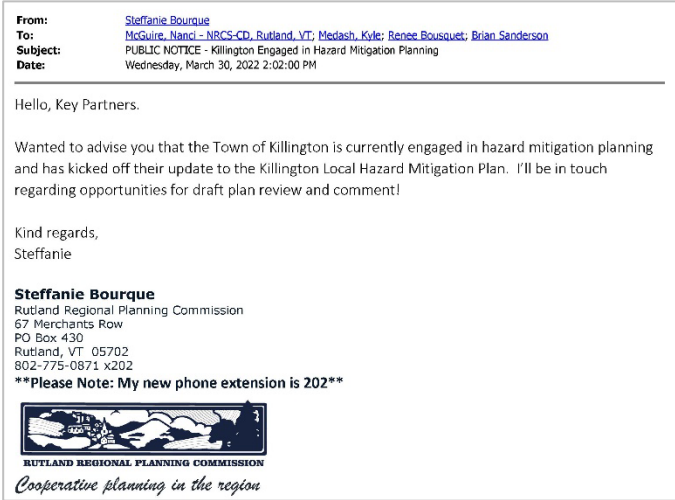
AFG	Assistance to Firefighters Grant
AOT	Vermont Agency of Transportation
BBR	Vermont Better Back Roads Program
CDBG	Community Development Block Grant
DEMHS	Vermont Division of Emergency Management & Homeland Security
EOC	Emergency Operations Center
FMA	Flood Mitigation Assistance Program
HMGP	Hazard Mitigation Grant Program
HRRR	High Risk Rural Roads Program
MPG	Municipal Planning Grant
PDM	Pre-Disaster Mitigation Program
RC&D	Resource Conservation and Development
USDA	United States Department of Agriculture

SUMMARY OF PUBLIC COMMENTS ON DRAFT PLAN



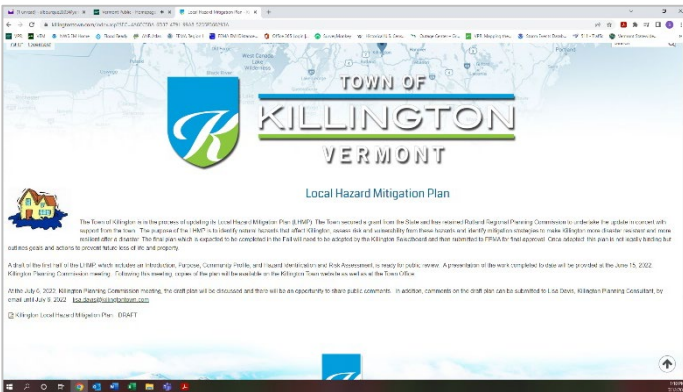
Example plan update kick-off public notice from Killington Town website.

No inquiries received in response to the kick-off notice.



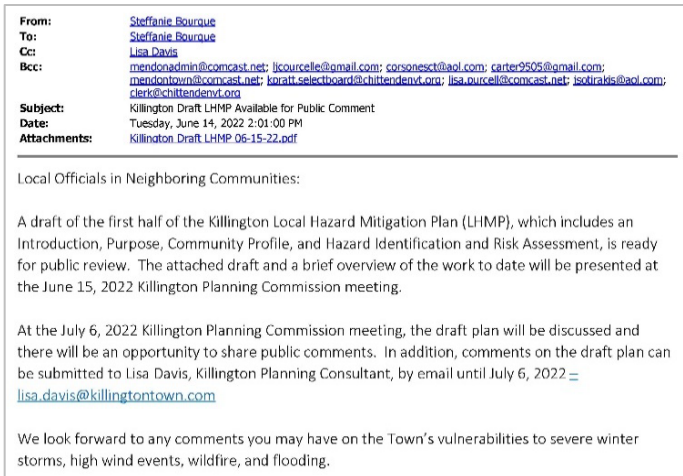
Email to Key Partners announcing LHMP update kick-off – dated March 30, 2022. Similar email sent to local officials in neighboring communities and Killington Mail Chimp Listserv.

No inquiries received from neighboring communities or Key Partners.



Example notice of draft plan available for public comment from Killington Town website, including link to draft plan, posted prior to June 15, 2022 Killington Planning Commission meeting.

See below for summary of comments received on the June draft during public comment period.

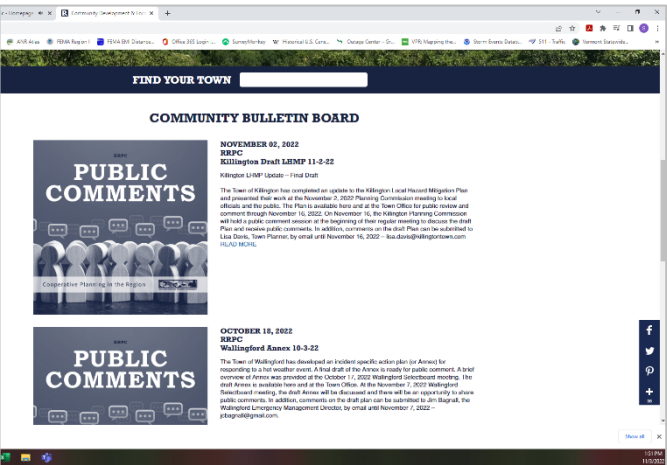


Email to local officials in neighboring communities announcing the draft plan available for public comment - dated June 14, 2022. Similar email sent to Key Partners and Killington Mail Chimp Listserv.

Response received from Chittenden Emergency Management Director that they are pleased to see Killington identified wildfire as one of the community's highest risk natural hazards as it is also one of Chittenden's and the towns have worked multiple wildfires together over the years.

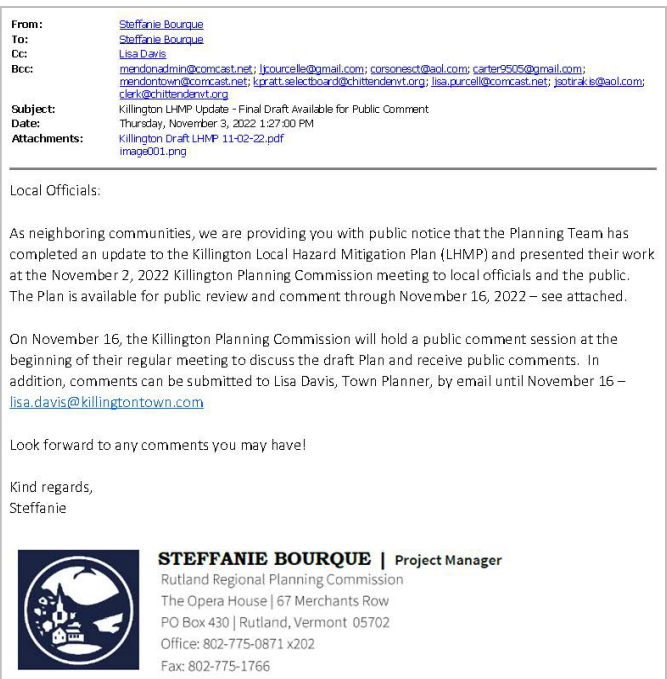


Article from the June 15, 2022 edition of the Mountain Times, a local Killington newspaper, regarding the draft plan available for public comment.



Example notice of draft plan available for public comment from RRPC website, including link to draft plan, posted November 3, 2022.

No comments received from local officials or the public.



Email to local officials in neighboring communities announcing the final draft plan available for public comment - dated November 3, 2022. Similar email sent to Key Partners and Killington Mail Chimp Listserv.

No comments received from neighboring communities, Key Partners, or Killington Mail Chimp listserv membership.



Article from the November 9, 2022 edition of the Mountain Times, a local Killington newspaper, regarding the draft plan available for public comment.