
Unified Towns and Gores

Local Hazard Mitigation Plan



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in partnership with the

Unified Towns and Gores Board of Governors

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Unified Towns and Gores Local Hazard Mitigation Plan

Certificate of Local Adoption

Unified Towns & Gores

A Resolution Adopting the Local Hazard Mitigation Plan

WHEREAS, the town of Unified Towns & Gores has worked with the Northeastern Vermont Development Association to identify hazards, analyze past and potential future losses due to natural and human-caused disasters, and identify strategies for mitigating future losses; and

WHEREAS, the Unified Towns & Gores Local Hazard Mitigation Plan contains recommendations, potential actions and future projects to mitigate damage from disasters in the Town of Unified Towns & Gores; and

WHEREAS, a meeting was held by the Unified Towns & Gores Board of Governors to formally approve and adopt with the intent of implementing the Unified Towns & Gores Local Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Unified Towns & Gores Board of Governors adopts the Unified Towns & Gores Local Hazard Mitigation Plan.

Date

Board of Governors Chair

Board of Governors Member

Board of Governors Member

Board of Governors Member

Board of Governors Member

Attested to by Town Supervisor

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Section 1: Planning Process & Community Profile

1.1 Introduction and Purpose

This is a Local Hazard Mitigation Plan for the United Towns and Gores of Essex County, Vermont (UTG). The purpose of this plan is to assist the United Towns and Gores to identify all hazards facing the community and identify strategies to begin reducing risks from identified hazards.

The impact of expected, but unpredictable natural and human-caused events can be reduced through community planning. The goal of this plan is to provide all-hazards local mitigation strategies that make the communities in northeastern Vermont more disaster-resistant.

Hazard Mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. Based on the results of previous efforts, FEMA and state agencies have come to recognize that it is less expensive to prevent disasters than to get caught in a repetitive repair cycle after disaster have struck. This plan recognizes that communities have opportunities to identify mitigation strategies and measures during all of the other phases of Emergency Management – Preparedness, Response, and Recovery. Hazards cannot be eliminated, but it is possible to determine what they are, where they might be most severe and identify local actions that can be taken to reduce the severity of the hazards.

Hazard mitigation strategies and measures alter the hazard by eliminating or reducing the frequency of occurrence, avert the hazard by redirecting the impact by means of a structure or land treatment, adapt the hazard by modifying structures or standards or avoid the hazard by stopping or limiting development and could include projects such as:

- Flood proofing structures
- Tying down propane/fuel tanks in flood prone areas
- Elevating structures
- Identifying high accident locations
- Monitor and protect drinking water supplies
- Enlarge or upgrade culverts and road standards
- Proactive local planning
- Ensuring that critical facilities are safely located
- Providing public information

1.2 Public Process

The Town Supervisor and Assistant Town Supervisor collaborated to write the first draft of this Hazard Mitigation Plan in 2014, then used grant funds to hire the NorthWoods Stewardship Center (NWSC) to revise and complete it.

A public meeting was held on June 19th, 2014, attended by 8 people (Barb Nolan, Chair of the UTG Board of Governors; Craig Nolan, ex officio and a resident of Averill; Peter Rodin, a resident of Averill and Planning Commission member; Virginia Carr, a resident of Averill and Planning Commission member; Daniel Lepine, a Planning Commission member; Scott Wiggett, a resident of Averill and Planning Commission member; Shawnda O'Keefe, ex officio and resident of Ferdinand; and Gina Vigneault, Town Supervisor) to determine the potential hazards faced by the towns and gores. This public meeting was advertised in the News and Sentinel of Colebrook, NH as well as being posted at the Island Pond Post Office, the Lakeview Store in Averill, and at the UTG Town Office.

Another public Board of Governors meeting was held on June 13th, 2016, attended by the full Board of Governors; Craig Nolan, ex officio and a resident of Averill; and Meg Carter of the NorthWoods Stewardship Center to review the plan and update the Hazard Profiles.

Neighboring towns include Canaan, Lemington, Bloomfield, Brunswick, Maidstone, Granby, East Haven, Newark, Brighton, Morgan, Holland, and Norton. Selectboards from each of these neighboring communities have been provided with copies of a draft of this plan for review with comments submitted via email to the preparer of this plan. No comments have been received from neighboring communities as of 11/01/2016.

1.3 Unified Towns and Gores Profile

This is a unique section of the northeastern-most corner of Vermont. The UTG is a group of three towns and three gores which are collectively governed by a five-member Board of Governors elected by the residents. There is a part-time Town Supervisor and a part-time Assistant Town Supervisor; equivalent to the positions of Town Clerk and Treasurer in other towns. In Vermont, a gore is acreage which was unaccounted for in the original survey of the state which more modern surveys and mapping techniques show to be present. These areas have few, if any, town roads, limited access and infrastructure, and little or no population.

Within the UTG there are many seasonal camps for hunting, fishing, summer use, and winter use. Most of these camps are off the grid, with no electrical power or telephone service. Most of the land is now protected in the Current Use Program, a statewide program incentivizing the non-fragmentation of land which is currently active agriculture or forestland by reducing the tax

rate for enrolled acres. The overall tax rates for the UTG are \$1.508 per \$1,000 value for non-residential properties, and \$0.9726 per \$1,000 value for residential properties.

The Unified Towns and Gores consists of 163.24 mi² (103,831 acres) of land in Northeastern Vermont, almost all of which is forested. The UTG has over 100,000 acres of woodland and contains some of the largest contiguous tracts of forestland left in Vermont. Much of the land has been purchased using state, federal, and local funds to support a large conservation effort; the Silvio O. Conte National Fish and Wildlife Refuge. In the towns of Lewis and Ferdinand, the Refuge has 20,627 acres which include dirt roads and trails for hiking, hunting, and fishing. Also located within the UTG are the Wenlock and West Mountain Wildlife Management Areas. The Wenlock area is approximately 1,993 acres located in Ferdinand. The West Mountain area is a 22,971 acre parcel which is located in Maidstone, Ferdinand, and Brunswick. Almost all of both Warner's Grant and Warren Gore are within public conserved lands, the majority of which is the Kingdom State Forest, and the rest is the Bill Sladyk Wildlife Management Area. Part of Avery's Gore is also included in the Kingdom State Forest.

Currently, the area is almost entirely forested with a few camps scattered throughout the woods and along the lakes and streams. The entire estimated population for the six towns and gores in 2015 was 49 persons, many of them older and semi-retired. While the year-round resident population is low, there are 394 seasonal dwellings within the UTG, many of them hunting camps or lake houses which tend to be used in the summer months and during snowmobile season.

There are less than 10 miles of Vermont state highways through the UTG, including 4.8 miles of Route 114 in Warren Gore and 4.8 miles of Route 105 in Ferdinand with an active railroad line paralleling both of these state roads. While the state roads are paved, none of the town roads are, though many of them are plowed throughout the winter months.

Resource extraction is the traditional lifeblood of the area, although the UTG also contains numerous valuable non-timber resources including several miles of undeveloped lake and stream shoreline, many rare and endangered species and their habitats, moose habitat and large deer wintering areas. The area is a sportsman's paradise with hundreds of miles of snowmobile trails, excellent hunting and fishing, and numerous seasonal camps. The area also contains many resources which will be important to the health and prosperity of future generations, such as vast quantities of fresh drinking water, millions of trees to sequester carbon and help balance the increasing levels of greenhouse gases in the atmosphere, and large areas of undeveloped land for recreation and wildlife habitat. The maintenance and protection of these resources is considered a high priority to the residents of the UTG.

Fire and ambulance services which respond to emergencies within the UTG are based in the neighboring communities of Brighton and Beecher Falls. The residents and landowners of the UTG appreciate the quality law enforcement which has been provided over the years by the Vermont State Police and Essex County Sherriff's department. While crime has not historically been a significant issue in the UTG, as more people use the private lands for public recreation and enjoyment, the amount of crime has increased proportionately, possibly leading to a need for greater coverage by law enforcement agencies in the future.

Most of the school-aged children from the UTG attend local schools in adjacent communities in the North County Supervisory Union, if they are not home schooled. In 2014, there were 5 school-aged children.

The UTG is a member of the Vermont Electric Coop (VEC), a locally owned and controlled electric distribution utility. The VEC is a cooperative of 74 member towns and 8 counties in Vermont which was created in 1938 to bring electricity to rural Vermonters. Powerlines serve a very small percentage of the land area but, because of low demand from the dispersed and sparse community, current grid conditions are sufficient to meet the present and anticipated future needs of the UTG. Large transmission lines from Hydro Quebec in Canada traverse through the UTG from north to south.

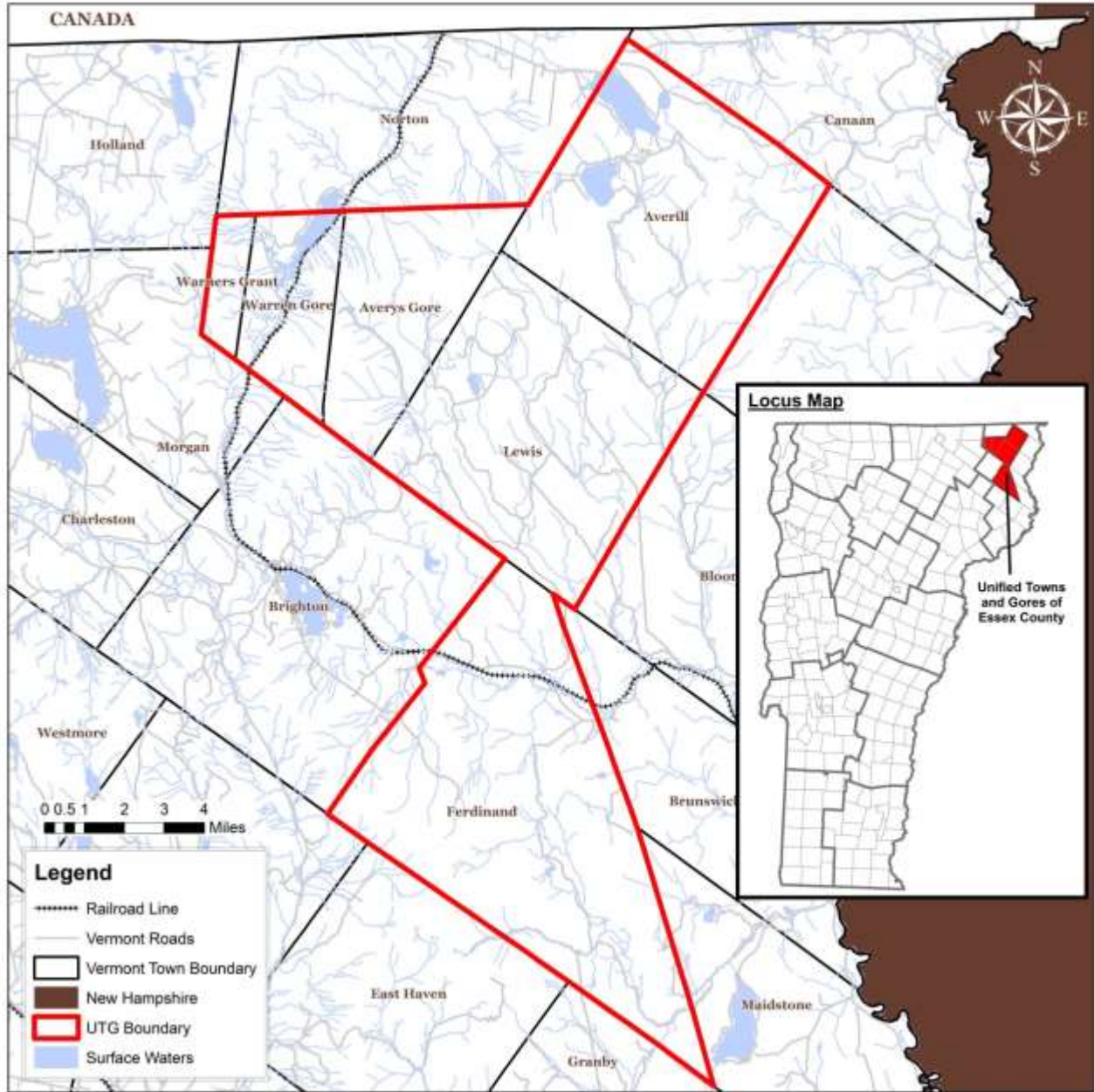


Figure 1 Map of the locations of the UTG within Vermont and the configuration of towns and gores which make up the UTG

Averill

Population: 20 (12 seasonal)
County: Essex County
Chartered: June 29th, 1762 (New Hampshire Grant)
Area: 24,365 acres/38.07 mi²
Coordinates (Geographic Center): 71°42'W
45°00'N
Population Density: 0.5 persons/mi²

Avery's Gore

Population: 0
County: Essex County
Chartered: January 27th, 1791 (Vermont Charter)
Area: 11,245 acres/17.57 mi²
Coordinates (Geographic Center): 71°49'W
45°55'N
Population Density: 0 persons/mi²

Ferdinand

Population: 25
County: Essex County
Chartered: October 12th, 1761 (New Hampshire Grant)
Area: 33,798 acres/52.81 mi²
Coordinates (Geographic Center): 71°45'W
44°42'N
Population Density: 0.47 persons/mi²

Lewis

Population: 0
County: Essex County
Chartered: June 29th, 1762 (New Hampshire Grant)
Area: 25,382 acres/39.66 mi²
Coordinates (Geographic Center): 71°45'W
44°52'N
Population Density: 0 persons/mi²

Warner's Grant

Population: 0
County: Essex County
Chartered: November 29th, 1791 (Vermont Charter)
Area: 2,016 acres/3.15 mi²
Coordinates (Geographic Center): 71°55'W
44°55'N
Population Density: 0 persons/mi²

Warren Gore

Population: 4
County: Essex County
Chartered: October 20th, 1789 (Vermont Charter)
Area: 7,277 acres/11.37 mi²
Coordinates (Geographic Center): 71°52'W
44°55'N
Population Density: 0.35 persons/mi²

1.4 FEMA-Declared Natural Disasters

Table 1 FEMA Declared Natural Disasters in the Unified Towns and Gores

Year	Disaster	Funds Received	Affected Area
2011 – Spring	Spring storm, flooding/fluvial erosion	\$15,000 total for year	
2011 – Irene	Tropical storm Irene, flooding/fluvial erosion	(see Irene Funds above)	
2012	Hurricane Sandy	(see 2013, 2014)	
2013	Hurricane Sandy repairs	\$31,942.70	Temporary Bridge on Canaan Hill
2014	Hurricane Sandy repairs	\$106,412.17	Canaan Hill Road/Forest Lake Road box culvert replacement

Section 2: Risk Assessment

2.1 Identifying Hazards

Local officials from the Unified Towns and Gores identified several hazards that are addressed in the following table. These were identified through interviewing the Supervisor and Chairperson of the Board of Governors, and through input from the rest of the Board of Governors and the public. Anecdotal and recorded evidence from past disasters was helpful in determining the greatest risks to the community in terms of future hazards. Some of the hazards in the following table were determined to be irrelevant to the UTG either geographically, economically, or in terms of population density and full profiles of these hazards are not included in this plan.

Table 2 A Comprehensive List of Potential Disasters That Could Strike the UTG, their Priority Ranking, and the Points of Vulnerability for the Municipality

Possible Hazard	Likelihood	Impact	Community Vulnerability	Most Vulnerable
Hazardous Materials Spill	High	High	Low	Roads, Railroad , Power Lines
Winter Storm/Ice	High	Medium	Low	Residences, Logging
High Wind	High	Medium	Low	Trees down, loss of power
Highway Incidents	High	Low	Low	Site specific. Moose incidents
Climate Change	Med/High	Medium	Med/Low	Changing weather patterns, increasing likelihood of extreme weather
Tornado	Med/High	Medium	Low	Wind Sheers
Invasive Species	Medium	Medium	Low	Damage to native ecosystem, outcompeting of native plants and animals, economic effect on ecotourism
Flash Flood	Medium	Medium	Low	Nulhegan Watershed, Norton Pond, Averill Lake Area
Water Supply Contamination	Medium	Medium	Low	No public water supply. Rivers, lakes, streams, bogs.
Wildfire/Forest Fire	Medium	Medium	Low	Timber, private property
Flood/Fluvial Erosion	Medium	Medium	Low	Especially lakefront properties on Little Averill Lake and town roads
Extreme Temperatures	Medium	Low	Med/Low	Extreme cold in winter
Radiological Incident	Medium	Low	Low	At border environmental impacts

Chemical or Biological Incident	Low/Med	Low	Low	Site specific. Railroad - 105/114
Terrorism	Low/Med	Low	Low	Border Crossing spin-off Residents, officials
Power Failure	Low/Med	Low ...	Low	Residences
Structure Fire	Low	Low	Low	Residences
Airplane crash	Low	Low	Low	Site specific. Power Line, Hydro
Hurricane/Tropical Storm	Low	Low	Low	Power lines, residences
Earthquake	Low	Low	Low	Site specific
Dam Failures	Low	Low	Low	Residences, businesses, infrastructure.
Drought	Low	Low	Low	Water is available in abundance
Landslide/Rockslide	Low	Low	Low	Site specific
School Safety Issues	n/a	Low	n/a	No schools within UTG

Likelihood, impact, and community vulnerability for potential future occurrences of these hazards are classified as being High, Med/High, Medium, Med/Low, and Low. Definitions of these terms for each of the different categories can be found in the following table.

Table 3 Defining Priority Rankings in the Table 2

Level	Likelihood	Impact	Community Vulnerability
High	Based on historical occurrences of this hazard, it is expected to occur again within 5 to 10 years.	Based on the effects of historical occurrences of this hazard, there is expected to be a financial toll greater than \$100,000 associated with a future occurrence of this hazard.	Based on the effects of historical occurrences of this hazard, future occurrences of this hazard are expected to directly impact almost the entire community
Medium	Based on historical occurrences of this hazard, it is expected to occur again within 10 to 25 years.	Based on the effects of historical occurrences of this hazard, there is expected to be a financial toll that is less than \$100,000 associated with a future occurrence of this hazard.	Based on the effects of historical occurrences of this hazard, future occurrences of this hazard are expect to directly impact less than half of the community.
Low	Based on historical occurrences of this hazard, it is not expected to occur again in the next 25 years.	Based on the effects of historical occurrences of this hazard, there is expected to be little to no financial toll	Based on the effects of historical occurrences of this hazard, future occurrences of this hazard are expected to

	associated with this hazard.	directly impact individuals within the community rather than the community at large.
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Hazards which are considered to be High or High/Med priority have the highest cost to benefit ratio for mitigation actions and are considered to be worth the cost of mitigation due to their likelihood and potential for causing damage. Medium priority hazards have a lower cost to benefit ratio and should be considered if there are time and resources available, but haven't been prioritized within the 5-year period of this plan. Med/Low and Low priority hazards pose little to no threat to the safety or infrastructure of the town and based on the low impact they will have on the community, are not recommended for any mitigation action by the town.

2.2 Vulnerability Overview

Based on historical and anticipated community vulnerability, local officials rated the following potential hazards as **High** or **Medium/High** likelihood: Hazardous Materials, Winter Storm/Ice, High Winds, Highway Incidents, Climate Change, and Tornadoes. Mitigation strategies for these highest priority hazards are identified in Section 3 of this Local Hazard Mitigation Plan. Flooding, although it is not considered to be of High or Medium/High likelihood, is discussed in the Mitigation Strategies because of its historical statewide impact and because the UTG has received FEMA funding for this hazard in the recent past. With the exception of flooding, the mitigation strategies and hazard profiles for hazards identified as Medium, Low/Medium, and Low likelihood are **not** addressed in greater detail through this planning process due to their low probability and the lack of community resources to address all hazards. See the VT State Hazard Mitigation Plan for additional information on hazards that impact Vermont.

2.3 Defining & Profiling Hazards

The following hazard profiles are for all of the abovementioned hazards whether or not they are considered to be significant and likely risks to the population and infrastructure of the UTG.

2.3.1 Hazardous Materials

Hazardous materials are any items or agents which have the potential to cause harm to humans, animals, or the environment, either independently or through interaction with other factors.

Routes 105 and 114 are rolling, narrow state highways paralleled by the St. Lawrence and Atlantic Railways. There are many types of hazardous materials transported via the railroad as well as tanker trucks on the highways, both of which act as major supply routes into Canada at the Norton border. The majority of hazardous materials incidents have been the result of railroad and highway

incidents, although one recorded incident was caused by a rotten fuel drum, as can be seen in the following table.

Table 4 Historical Incidents of Hazardous Materials Spills within the UTG

Town	Year	Nature of Accident	Material Spilled	Gallons
Ferdinand	1992	train derailment	Sodium hydroxide (caustic soda)	6000
Ferdinand	1980	sheen on river	unknown	5
Ferdinand	2016	tractor trailer vs moose accident	diesel, motor oil	10-15
Averill	2010	rotten fuel drum	kerosene	55
Averill	1977	truck accident	diesel	unknown
Warren Gore	1998	train derailment	fuel	unknown

Hazardous materials spills can have significant negative impacts on human and ecosystem health, so it is important that proper targeted action is taken in immediate response to this hazard. VT ANR’s Department of Environmental Conservation has a Spill Response Team which can be dispatched 24 hours a day to respond to spills. Any spill that is over 2 gallons, that poses a threat to human or environmental health, or that meets federal hazardous material release reporting requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, aka Superfund) must be reported to the VT DEC Spill Response Team. If the CERCLA requirements are met, the spill must be reported to the National Response Center. Since there are no sitting hazardous materials storage sites within the UTG, it is unlikely that there would be an incident requiring national response.

Likelihood: High

Impact: High

Community Vulnerability: Low

2.3.2 Winter Storm/Ice

The greatest impacts that winter storms, including ice storms, have on the UTG are the downed trees and power outages that are associated with them. The ice storm of 1998 caused damage to higher-elevation forests, although no power was lost to the region. The December 2014 ice storm caused millions of dollars of damage throughout the state in downed and destroyed utility poles and power lines. In other, smaller ice storms, members of the community have experienced power outages which can last for long periods of time. The Vermont Electric Coop is the power supplier for the area, with a little under 14 miles of power

distribution lines in the UTG, and prioritizes their resource distribution and repairs based on many factors including number and type of businesses in the area, number or presence of residents with medical devices or special needs, total number of residents affected, and the extent of the damage which is causing the power outage. The UTG tends to be low on this prioritization scheme due to low population and few businesses.

The Northeast Kingdom of Vermont regularly experiences severe winter storms, including the 2007 Valentine's Day Blizzard, which dropped an average 21.1 inches of snow, and the March 6th, 2011 blizzard, which dropped 20.3 inches of snow on the area. These storms can cause roadways to become temporarily impassible.

The remote area draws many snowmobiles and winter recreation enthusiasts to the region. When snowmobile incidents do occur, calling for help can be challenging or impossible as there is no cell service on Route 114 and 105 within the UTG.

Likelihood: High

Impact: Medium

Community Vulnerability: Low

2.3.3 High Winds/Wind Shears

High wind warning are issued in the event that there are sustained winds of 40 miles per hour or more lasting over an hour or winds gusting to 58 miles per hour or more for any duration. High winds can be accessory to hurricanes, severe thunderstorms, or tornadoes, but may also be the result of cold fronts moving through an area.

The UTG area tends to be affected by high wind shears, which are microscale meteorological events characterized by very high winds which effect small geographic areas. These have been known to occur in mountainous areas, and have been observed from Norton to the Canadian border bringing down trees and blocking roads. Since there are so few power lines and most structures are privately owned seasonal dwellings, there is not a lot of danger of extensive damage to town property or infrastructure. There is, however, a risk to drivers on town roads should a tree come down blocking traffic in either or both directions.

One area where wind shears could cause significant damage is a major DC power line running from Quebec Hydro that bisects the UTG from North to South. Protection of the line is necessary in order to prevent a major power outage on the East coast. This responsibility, however, is held by the power company, which maintains a cut buffer between the forest edge and the power line.

Another possible effect of high winds would be the destruction of large tracts of timber trees which are owned by Weyerhaeuser.

Historical wind speed data and specific dates and extents of historical occurrences of this hazard are not available for this hazard.

Likelihood: High

Impact: Medium

Community Vulnerability: Low

2.3.4 Highway Incidents

This hazard can be directly connected to the Hazardous Materials hazard profile, as the majority of Hazardous Materials which are in the UTG at any one time are in transit on a train or truck.

On either side of both highways running through the UTG, there is dense, continuous forest which is home to many large mammal species, including moose, black bear, and white-tailed deer. Animals can be seen crossing the road frequently, and have been known to cause collisions, which can be especially dangerous to cars and small trucks. While live animals pose a certain level of risk, there is additional danger involved when the carcass of a dead animal is not removed from the road. These lifeless obstacles can cause accidents as drivers either swerve to avoid them and lose control or collide with them. Large, fast-moving 18-wheel trucks with extra-large bumpers travel on these roads where moose are regularly present. As a result, there are several collisions annually between truck and animal which result in large carcasses on the road, and potentially dislodged truck parts which can become obstacles in the roads. Reporting potentially accident-causing roadkill to the local game warden can reduce the risk of escalating highway incidents. The game warden for Ferdinand is Trevor Szymanowski, and for the rest of the UTG is Randy Hazard. The local game warden can be reached by calling the nearest local state police dispatcher.

There is also a heavy logging road network found in the forests of the UTG, meaning that there are logging trucks, both loaded and unloaded, which frequently traverse not only state highways, but the gravel roads as well. Fully loaded log trucks can legally weigh up to 80,000 pounds (40 tons), and have the potential to cause hazardous road conditions if a load of logs is upended. Rapid response to these incidents is crucial.

Likelihood: High

Impact: Low

Community Vulnerability: Low

2.3.5 Climate Change

According to the State of Vermont Hazard Mitigation Plan (2013), the impacts of climate change will “affect the severity and frequency of natural hazards” into the future and that “it is critical that this recognition be incorporated into any planning process for preparing for and responding to weather-related emergencies and disasters”. Climate change, as we are seeing it today, is a gradual warming in the overall average temperature of the earth’s climate. Since the year 2000, the earth has experienced 9 of the 10 hottest years on record, and the average global temperature has increased 1.4°F since 1880. While warming and cooling trends are a natural part of the earth’s climate cycle, there is increasing and overwhelming evidence that the latest warming trend has been exacerbated by human activity.

The National Climate Assessment predicts that in the Northeast region, “heat waves, heavy downpours, and sea level rise pose growing challenges to many aspects of life” and that “[i]nfrastructure , agriculture, fisheries, and ecosystems will be increasingly compromised”. While the Northeast Kingdom is less densely populated than the majority of the Northeast Region, it provides a vital ecological role with a large capacity for buffering water systems, sequestering carbon, and providing critical habitat for many species whose habitats are dwindling.

While climate change is clearly an issue, Vermont has historically been one of the states with the lowest per capita emissions. This changed slightly with the December 2014 halt of operations in the Vermont Yankee Nuclear Power Plant, and now the majority of Vermont power comes from hydroelectric dams in New York and Canada. In an effort to meet the goal of achieving 25% of its energy from renewable sources by 2025, the state has been pushing forward with large-scale wind and solar projects and incentives for other renewable energy projects. Additionally, Vermont plans to decrease per capita energy use by 15% by 2025.

Likelihood: Medium/High

Impact: Medium

Community Vulnerability: Medium/Low

2.3.6 Tornado

There have been very few tornadoes that have touched down in the UTG historically, although the potential damage incurred can be quite large for the same reasons as the High Winds hazard.

No tornado which has touched down in the UTG has been estimated to be above an F0 on the Fujita Scale as no damage beyond some broken branches and windthrow has ever been reported. No specific wind speed data is available for this hazard.

In 1999, a downdraft hit in Averill, causing damage to trees in the area. A downdraft is when a high pressure region of the atmosphere attracts air from the surrounding area, which moves toward the center of the air mass and then sinks rapidly, creating a similar effect to tornadoes.

Likelihood: Medium/High

Impact: Medium

Community Vulnerability: Low

2.3.7 Invasive Species

The UTG is located near the headwaters of the Connecticut River Watershed, and is relatively pristine compared to many other subwatersheds of the Connecticut River which lie further south. Due to climate change, however, many of the invasive species which have developed damaging monocultures to the south are able to migrate north into the headwater region. As a result, populations of invasive species are finding footholds in previously untouched areas. In order to maintain any hope of eradicating or even controlling these explosive populations, early detection and rapid response are necessary. Terrestrial species such as Japanese Knotweed, Common Reed, Shrub Honeysuckle, and Purple Loosestrife are being found commonly along field edges and roadsides; invasive arboreal insects such as the Emerald Ash Borer, Hemlock Woolly Adelgid, and Asian Longhorn Beetle are all fast approaching the area if they are not already present; and aquatic invasives such as Eurasian Milfoil, Zebra Mussel, and Water Chestnut move from lake to lake and take over with frightening speed.

Likelihood: Medium

Impact: Medium

Community Vulnerability: Low

2.3.8 Water Supply Contamination

The UTG does not have a public water supply system, but relies on springs and wells to access groundwater on an individual household basis. Hazardous materials spills, pollution, biological contaminants, or radiological incidents could compromise the water sources that the residents of the UTG use if they occurred at a grand enough scale in close enough proximity to the UTG, although this is unlikely.

Flood waters that submerge wells could cause contaminants to enter the drinking water for individuals or groups of people. In the event of floods affecting the community, emergency response by the American Red Cross may provide clean drinking water, and residents who are affected by well contamination should be advised to not drink the water from their wells.

Likelihood: Medium

Impact: Medium

Community Vulnerability: Low

2.3.9 Wildfire/Forest Fire

A wildfire is a large fire which burns forests, grasslands, and brush in a way which is not under the control of humans or natural firebreaks. They tend to sweep through rural or wilderness areas, feeding on accumulated dry fuels. The Northeastern United States tends to have an infrequent forest fire schedule, meaning forest fires are uncommon and the relative humidity is high enough that fuels aren't in immediate danger of combustion. However, especially in drought years, wildfires have been known to occur. The State of Vermont has acknowledged that with the periods of warming that are being experienced due to climate change, the occurrence of wildfires may be increasing over time.

The period of greatest wildfire risk in Vermont is the spring, when dry, dead grasses and leaves are uncovered by the snow and present the opportunity for fires to catch and grow, or late summer and early fall when the current year's growth is dry. During drought years, this time of greatest danger is expanded, and occasionally statewide burning bans have been enacted, most recently in 1999.

While wildfires are possible, and have certainly occurred historically in Vermont, the climate, abundant vegetation, availability of water, and access to a fire department for the UTG make it unlikely that there will be much danger of a wildfire growing out of control in the area. Forest fire records for this area are spotty, even ones from recently. Many smaller fires are not reported to the state and sometimes those that are have incomplete information. The following table shows the records which do exist.

Table 5 Historical Incidents of Wildfires and Forest Fires within the UTG

Date of Fire	County	Town	Cause	Total Acres
May 5, 1913	Essex	Averill	from roadside	3.00
May 6, 1915	Essex	Ferdinand	brush burning	10.00
June 5, 1915	Essex	Ferdinand	GTRR	1650.00
May 23, 1922	Essex	Averill	railroad	1.50
April 19, 1927	Essex	Warren's Gore	railroad	10.00
September 8, 1927	Essex	Averill	camp fire	1.00
September 26, 1927	Essex	Averill	smokers	0.10
May 9, 1928	Essex	Warren's Gore	railroad	10.00
June 24, 1928	Essex	Averill	unknown	1.00
April 10, 1930	Essex	Avery's Gore	smokers	
May 7, 1930	Essex	Warren's Gore	smokers	1.00
May 9, 1930	Essex	Warren's Gore	railroad	
April 17, 1931	Essex	Warren's Gore	burning brush	1.00
May 12, 1932	Essex	Warren's Gore	burning brush	0.50
August 28, 1932	Essex	Averill	lightning	0.10
May 14, 1933	Essex	Ferdinand	railroad	5.00
May 15, 1977	Essex	Warren's Gore	campfire	0.25
April 1, 1986	Essex	Ferdinand	burning brush	0.10
July 30, 1990	Essex	Ferdinand	unknown	1.00
August 2, 1991	Essex	Ferdinand	lightning strike	
September 5, 1995	Essex	Averill	lightning strike	0.10
May 2, 2001	Essex	Ferdinand	unknown	0.13
March 20, 2012	Essex	Ferdinand	unpermitted burn	2.00

One historic forest fire which is not accounted for on the above table is one which reportedly burned in 1903, and was the cause of a lawsuit against the Grand Trunk Railroad Company by the Connecticut River Lumber Company. The fire was estimated to cover 12,000 acres in Lewis, Ferdinand, Brunswick, Bloomington, and Brighton. Austin Hawes, the very first VT State Forester wrote about this fire in his 1909 book, *Forest Fires in Vermont*. He speculates that the presence of fire laws in Vermont have resulted in the decreasing frequency of catastrophic fires. There is now much more educational material widely available and public awareness surrounding the issue of starting forest fires.

Mark Leonard is the current Forest Fire Warden for the UTG. He has been in this position since 2009. The position is appointed and has a 5 year term with unlimited reappointments.

Likelihood: Medium

Impact: Medium

Community Vulnerability: Low

2.3.10 Flood/Fluvial Erosion

While this is not one of the “High” or “Medium/High” hazards for the UTG specifically, it bears profiling and mitigation action because statewide flooding has historically been a major concern as far as cost in dollars, lives, and livelihoods. The flood of 1927 affected the entire state of Vermont, with average rainfall amounts between 4 and 9 inches over the course of three days in early November following a significantly wetter-than-usual October, up to 300% wetter than usual in some cases. The flooding caused by this three day storm destroyed 1285 bridges, many miles of roadways, and “countless homes and buildings” causing \$35 million in damage and 84 deaths. More recently, in 2011, the state was hit by Tropical Storm Irene, which killed 6 Vermonters and damaged or destroyed more than 500 roads, 200 bridges including some historical covered bridges, 1,000 culverts, and 3,500 homes. The cost of repairs to damage caused by Tropical Storm Irene is estimated to be in the hundreds of millions.

The UTG contains a large portion of the Nulhegan Basin, through which the Nulhegan River runs, flowing toward the upper Connecticut River to the East. The Nulhegan Basin is almost entirely forested, which can have the effect of tempering high volume rain or potential flooding events. The flooding risk in this particular area is fairly low and, in the event of its occurrence, very likely to be low impact.

The USGS river gauge at North Stratford, NH is the closest downstream gauge to the UTG. While it will also reflect water flow from the headwaters of the Upper Connecticut River Watershed, it is the best indicator for water levels within the UTG. Since 2010, there has been one 100-year flood level event and one 50-year flood level event (Figure 3). The 100-year flood event, a result of Tropical Storm Irene in 2011, caused approximately \$15,000 worth of damage to the town. The 50-year flood event, in 2013, caused \$138,354.87 worth of damage to the town. The majority of the damage caused during these events was due to insufficient or undersized bridges and culverts, which have since been upgraded. The UTG’s adoption of the state’s Highway Codes and Standards will help to mitigate damage caused by this hazard in the future.

Fluvial erosion can have a significant impact on unbuffered streams and lakes, roads with insufficient water control infrastructure, and areas with steep topography. Unforested areas with greater than 20% slope are at greater risk of fluvial erosion than slopes of the same grade and greater forestation.

Likelihood: Medium

Impact: Medium

Community Vulnerability: Low

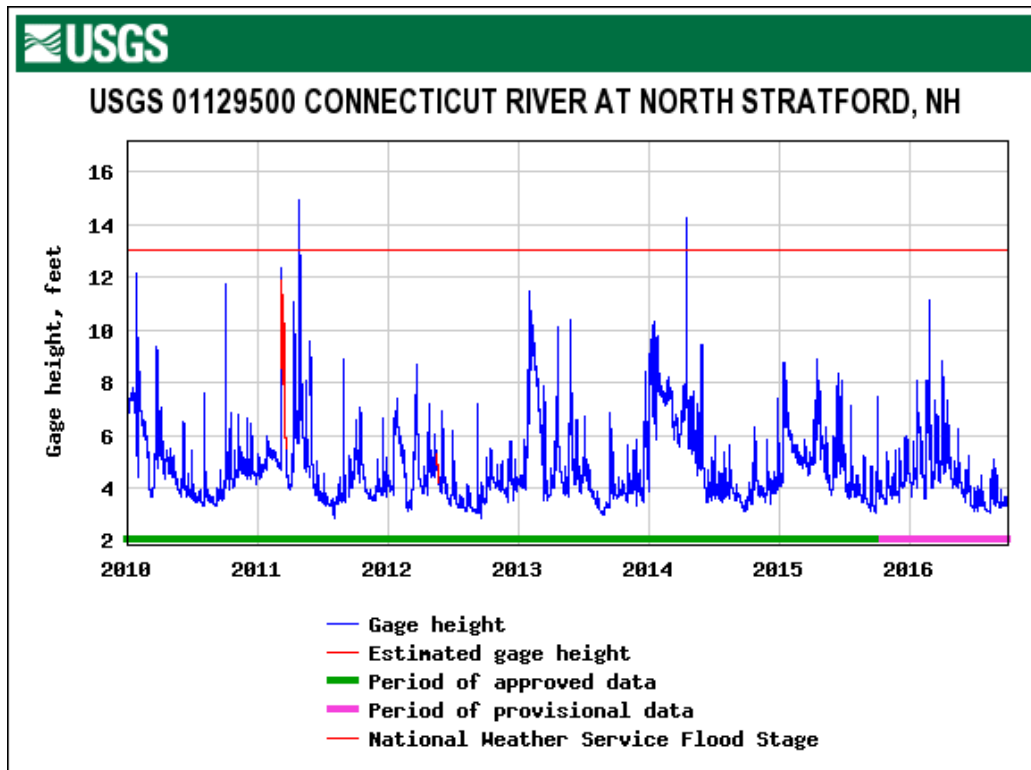


Figure 2: USGS Graph showing stream gauge height on the Connecticut River in North Stratford, NH between January of 2010 and October of 2016.

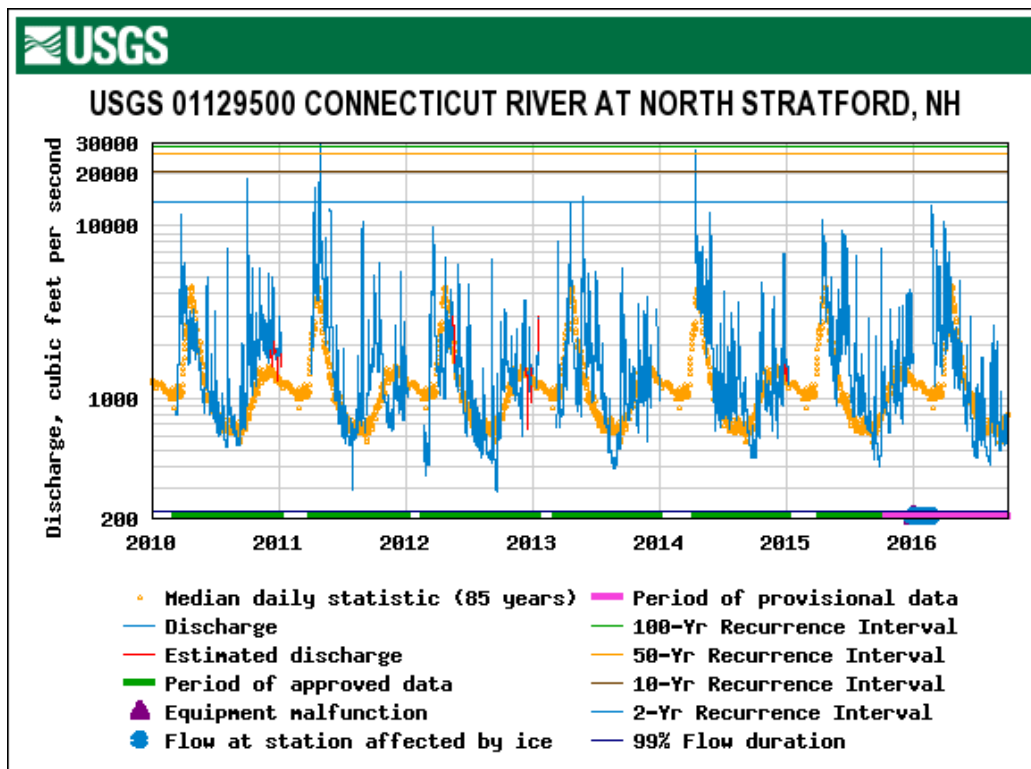


Figure 3: USGS Graph showing stream discharge in cubic feet per second on the Connecticut River in North Stratford, NH between January of 2010 and October of 2016

2.3.11 Extreme Temperatures

Extreme heat has not been a problem in northeastern Vermont, historically, and the hottest month (July) has an average high temperature of 79°F. The record high temperature for Vermont was 105°F in July of 1911. Many places in Vermont don't have air conditioners because extreme heat hasn't been an issue unlike many southern states with warmer climates.

On the other hand, Vermont has experienced a great deal of extreme cold. The coldest recorded temperature in Vermont was -50°F in late December of 1933. The average low temperature in the coldest month (January) is 10°F, and there are many years when the temperatures will stay below 0°F for many days.

In 2000, New England, and especially the Northeast Kingdom of Vermont, was deeply affected by high heating oil prices because of a shortage in supply and weather conditions that made shipping in oil difficult. As nearly half of all Vermont residents rely on heating oil to heat their homes in the winter, the state is particularly vulnerable to these shortages. After the incident in 2000, the Northeast Home Heating Oil Reserve was developed under the Clinton Administration to prevent critical fuel availability problems in the future. Additionally, the State of Vermont has a home heating assistance program, which can help residents purchase fuel.

Likelihood: Medium

Impact: Low

Community Vulnerability: Low

2.3.12 Radiological Incident

Exposure to radiation has a cumulative effect; it builds up in the body at each exposure and if it reaches a high enough level, can cause serious illness or even death. Small amounts of radiation are common in several household items such as cell phones, microwaves, and televisions, and with careful use these sources of radiation can be harmless. Another larger household radioactive threat is radon, a naturally-occurring radioactive gas, which can accumulate in basements due to its density. Radon is released slowly by many types of rock, including granite, which is common in Vermont. Avoiding these everyday hazards are up to each individual, but there are greater radiological concerns that should be addressed on a community-wide level, including the meltdown of nuclear power plants. Since the Three Mile Island disaster in Pennsylvania in 1979, there has

been a greater mitigation effort of radiological incidents to prevent the endangerment of U.S. residents.

According to the Nuclear Regulatory Committee, in the event of a nuclear incident, the air within a 10 mile radius of the plant may become dangerous to breathe, and within a 50 mile radius, water and food supplies may become dangerous to eat or drink. The two closest U.S. nuclear power plants to the UTG are the Seabrook Station Nuclear Power Plant in Seabrook New Hampshire (140 miles away) and the Vermont Yankee Nuclear Power Plant in Vernon, Vermont (143 miles away). The closest nuclear plant geographically is the Gentilly-2 Nuclear Generating Station located in Bécancour, Quebec (105 miles away). While the Vermont Yankee Nuclear Power Plant has ceased operation as of December 2014, there are still radioactive materials onsite, and Vermont officials consider it prudent to maintain a plan of action in the event of an unforeseen radiological incident. The UTG is a reasonably safe distance away from all of these nuclear power plants, and no evacuation or emergency response plan is needed.

Likelihood: Medium

Impact: Low

Community Vulnerability: Low

2.3.13 Terrorism

Since the World Trade Center attacks on September 11th, 2001, mitigation of terrorism has been a major movement in the U.S. and the world. Terrorism can be any act of destruction aimed at coercing a group or groups of people to conform to the demands or objectives of the aggressors. It can be anything from bombing a building to contaminating a food supply to shooting civilians in a school or workplace. There have been many laws enacted and Presidential Directives made which are designed to ensure a rapid and effective response to domestic terrorist attacks.

While Vermont is not an outwardly high-profile target for terrorist attacks, there is still a need for caution and preparedness. Vermont shares a large international border with Canada, including three multinational lakes. With relatively unstrict border security, especially compared to New York, there is the potential to be used as a point of access to New England cities which are located only a few hours' drive away.

Many first responder agencies within the state of Vermont have undergone training on Incident Command Systems, which is a method of emergency management which provides a clear chain of command and allows multi-agency cooperation in the event of an emergency. The State of Vermont Emergency Operations Plan has an Annex entitled Vermont First Responder Guide to an Act of Terrorism which states that while a terrorist attack within Vermont is unlikely, being the target of such an attack would “quickly overwhelm a community’s or state’s emergency response resources”. One of the best mitigations for this type of hazard is to support a well-trained and well-equipped emergency response team.

Likelihood: Low/Medium

Impact: Low

Community Vulnerability: Low

2.3.14 Power Failure

Widespread and sustained power failure can cause shortages of important resources and services for residents, such as food, fresh water, and sanitary bathroom facilities. When the UTG loses power, it is often very low priority for the VT Electric Coop when it comes to reconnecting power because of the lack of businesses, people with special needs, and the relatively low population. Residents should be aware that power loss in this area may last for quite a while and should take care to be prepared with non-perishable food and stored drinking water.

Likelihood: Low/Medium

Impact: Low

Community Vulnerability: Low

2.3.15 Structure Fire

There are many causes for structure fires, including cooking or heating equipment, electrical wiring, smoking materials, appliances, open candle flames, and arson. One way to avoid death or injury due to house fires is to maintain smoke detectors throughout the residence with new batteries every year. Also, chimney maintenance and cleaning can help to reduce the risk of chimney fires, which is especially important in an area where many people heat with wood.

Due to low housing density, it is unlikely that any structure fire within the UTG will cause other residences or businesses to burn through exposure.

The Brighton Fire Department is contracted to respond to fires in Ferdinand, Lewis, and the Gores. There is one active volunteer from the UTG on the Brighton Fire Department. Beecher Falls Fire Department is contracted to respond to fires in Averill. Since 2010, there has been at least one structure fire responded to in the UTG.

Likelihood: Low

Impact: Low

Community Vulnerability: Low

2.3.16 Airplane Crash

The John H. Boylan State Airport (5B1) is a small, state-owned, public use airport located approximately 1.25 miles west of the Ferdinand border. Between November of 2011 and November of 2012, there were an average of 34 aircraft operations per month at this airport. The hangar at this airport housed 3 single-engine aircraft and 2 ultralight aircraft during this same period of time. Given the generally light traffic at this airport, a well maintained runway, lack of historical incident, and the low population density in the area, it is unlikely that an airplane crashing while in transit to or from this airport would cause damage. The asset which is most vulnerable to this hazard from 5B1 is the power line that runs parallel to the full length of the runway approximately 400 feet to the southwest, although these power lines are equipped with power line marking balls to increase their visibility to low-flying aircraft. There have been no accidents reported that are associated with this airport.

More liable to cause major damage and loss of life, but less likely to occur, are larger commercial planes flying internationally. There have only been two incidences of commercial flights going wrong in Vermont; one was simply caused by a pile of dirt on a runway, and neither of them resulted in more than minor injuries. Military flights carrying hazardous cargo are also a concern, as they have the capability of dealing damage not only with the plane, but also with any ordnance contained therein.

Historically, there have been several plane crashes in Vermont. In 1960, a US Air Force B-52 bomber on a training flight crashed in Barre, luckily not carrying an atomic bomb as they regularly did at the time to discourage Soviet aggression.

There have been several crashes into Lake Champlain, a few foggy-night crashes into mountains, and at least 6 midair collisions. The most common cause of these crashes has been pilot error, according to the National Transportation Safety Board (NTSB). There have been no accidents reported in the UTG, although there was one reported in Island Pond, which was a nonfatal hard landing where the landing gear collapsed, likely due to improper leveling off on the part of the pilot.

Likelihood: Low

Impact: Low

Community Vulnerability: Low

2.3.17 Hurricane/Tropical Storm

Hurricanes are rapidly rotating storm systems that can produce high winds, thunderstorms, and heavy rains. Vermont has been affected by several hurricanes, including Cindy in 1959, Floyd in 1999, Irene in 2011, and Sandy in 2012, although by the time they reached New England many of these had been downgraded to Tropical Storms. Vulnerable structures throughout the state were revealed through their own destruction, especially in the aftermath of Tropical Storm Irene. Throughout the country, Hurricane Irene caused \$16.5 billion dollars in damage. Almost every river and stream in Vermont flooded, and the statewide cost of repairing roads and bridges was more than \$700 million. Three people died and one was reported missing, many historical covered bridges were damaged or destroyed, and several people were stranded due to road and bridge washouts. Secondary effects associated with hurricanes and tropical storms are varied and can be deadly. These include high winds, heavy rains, flooding, contamination of drinking water, and many others.

The UTG was particularly impacted by Hurricanes Irene and Sandy, which caused all together approximately \$153,000 worth of damage within a 2-year period. Climate change will mean that large storms will occur more frequently, so mitigation of this hazard should include an element of combatting climate change as well as increasing town preparedness for such storms.

Likelihood: Low

Impact: Low

Community Vulnerability: Low

2.3.18 Earthquake

An earthquake is a sudden violent shaking of the ground, caused by movement of the earth’s crust or volcanic action. East of the Rockies, the best way to gauge the locations of future earthquakes is to see where past earthquakes have been as they tend to be centered in or around the same area. There have been several small earthquakes with magnitudes under 3 in the northern New England area throughout the recent past, some of which could be felt in Vermont, but few of them have originated in Essex County (Figure 4)

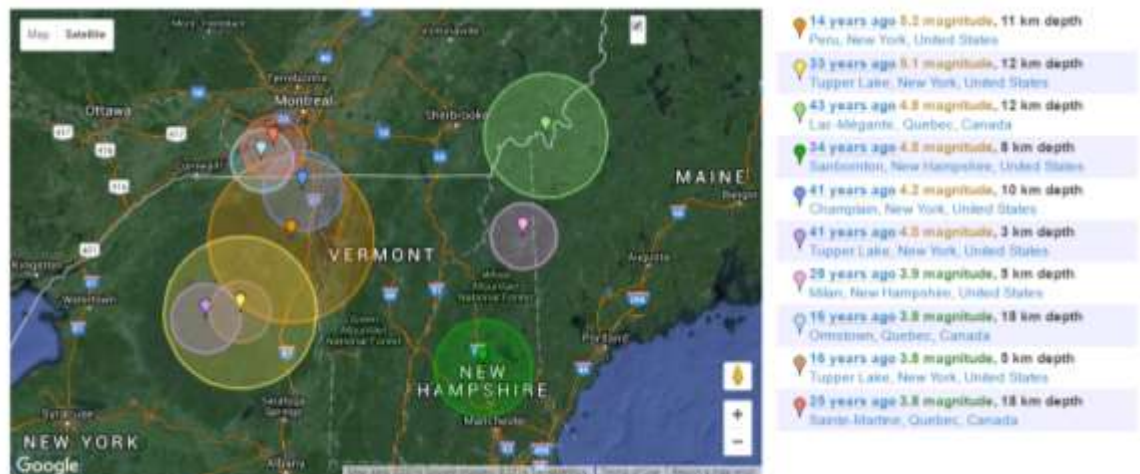


Figure 4 Highest Magnitude Earthquakes in the Vermont Region in the Past 50 Years

In 1973 there was an earthquake which was centered in western Maine, the effects of which were felt in Essex County. Plaster on walls reportedly cracked, chimneys pulled away from walls, and some road surfaces cracked. No significant damage to infrastructure or endangerment of lives has occurred in the UTG, and it can be expected that earthquakes will continue to not be a danger to the UTG or its residents.

Likelihood: Low

Impact: Low

Community Vulnerability: Low

2.3.19 Dam Failures

There is 1 active dam located within the UTG on the outlet of Little Averill Lake which is controlled by the Coaticook River Hydro out of Canada. Historically, this dam has been the cause of some flooding on the properties and in the camps

surrounding the lake due to infrequent releases of the water behind the dam. Recently, a 7 inch minimum flow water passage hole has been installed in the dam to prevent the outlet stream from drying up while the dam is closed and to mitigate flooding in the surrounding area.

State GIS layers show 7 additional dams within the UTG, however those dams are historical squirt dam sites used during the heavy logging days in the late 19th and early 20th century. The majority of these sites now contain only the ruins of these dams.

Likelihood: Low

Impact: Low

Community Vulnerability: Low

2.3.20 Drought

A drought is a period of prolonged abnormally low rainfall that results in a shortage of water. Droughts decrease the amount of water that is available to flow through the landscape, including that which makes up streams, rivers, and lakes. The decreased water availability lowers the levels of these water bodies, sometimes causing them to run dry, which can be damaging or devastating to aquatic plant and animal populations. Additionally, droughts can decrease the ability of an ecosystem to dilute the pollutants which make their way into the system from both human activities and natural processes. Vermont has a history of fairly dependable precipitation, although historical patterns have been being altered due to climate change. The longest-lasting drought in the last century in Vermont was during the span from 1960-1969 when precipitation was about 70% of what it had been in the previous decades. Drought years tend to also be years of higher than average temperatures, and many previous record high temperatures have been broken during droughts.

While there have been droughts in Vermont historically, the effects of drought are naturally mitigated by the climate, natural abundance of groundwater, and presence of expansive forests. It is unlikely that the UTG will encounter any significant damages or setbacks associated with drought.

Likelihood: Low

Impact: Low

Community Vulnerability: Low

2.3.21 Landslide/Rockslide

Landslides are the sliding of a mass of earth or rock down from a mountain or cliff. On steep slopes, generally those above 20%, loose earth and rocks have a tendency to migrate downhill in large quantities. One way to mitigate landslides is to maintain a good root system in areas with steep slopes. This can be done by planting or encouraging the growth of trees and shrubs in these areas. There are many hills with slopes greater than 20% in the UTG (Figure 5).

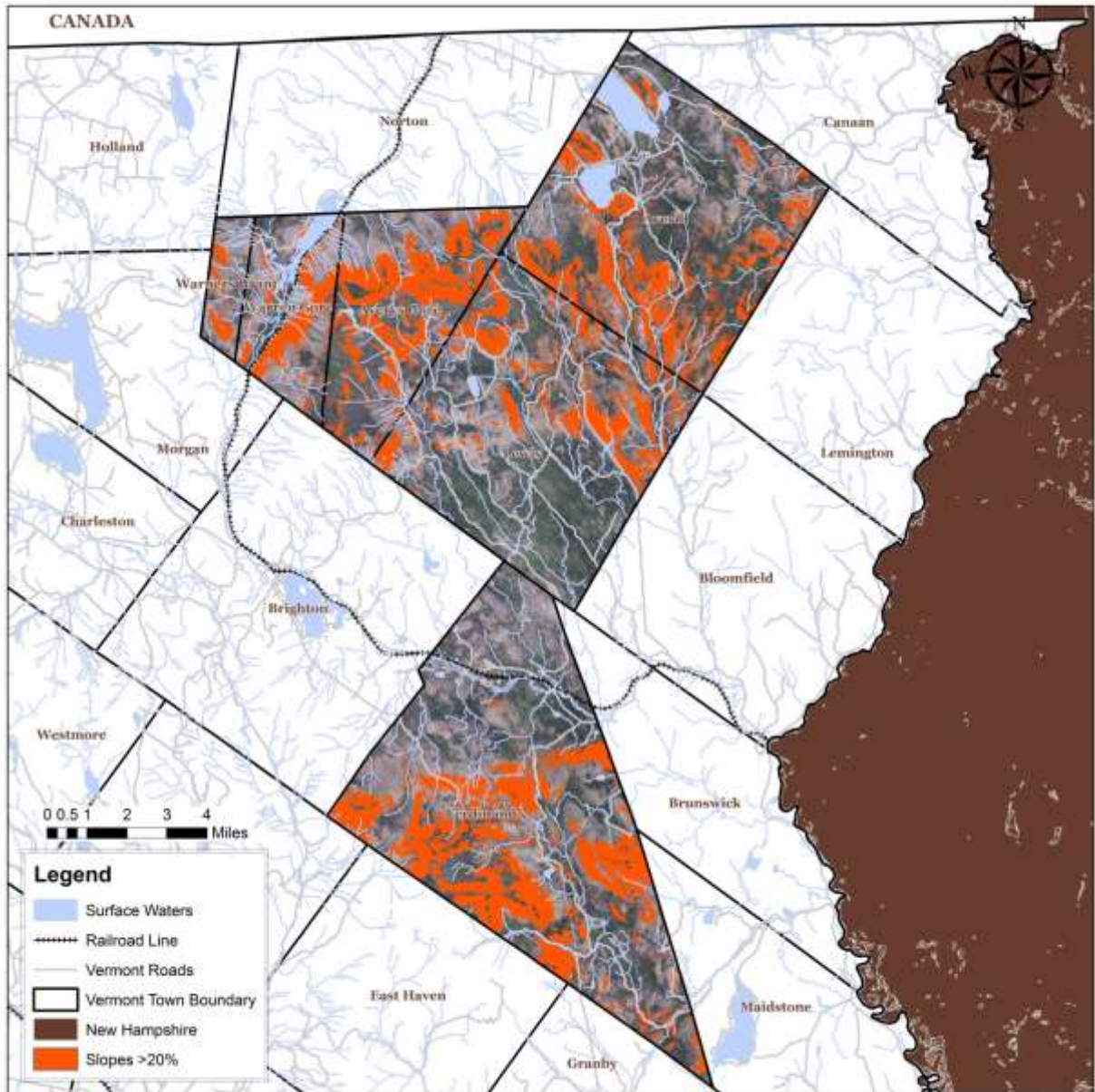


Figure 5: Slopes of 20% or greater in the UTG

There are no rock cuts located within the UTG, so rock slides are unlikely.

Likelihood: Low

Impact: Low

Community Vulnerability: Low

2.3.22 School Safety Issues

There are no schools located within the UTG.

Likelihood: Not Applicable

Impact: Low

Community Vulnerability: Not Applicable

2.4 Identifying At-Risk Structures

FIRM maps have been made for two of the six member towns and gores within the UTG; Ferdinand and Lewis. On these two maps, it is difficult to estimate the total number of structures within the 100-year flood limit of the FEMA identified floodplain due to the fact that the FIRM map lines do not follow the features which can be seen on up-to-date E911 maps. The FIRM maps are not compatible with the GIS maps containing contours, rivers, roads, and structures, and it is not possible to accurately estimate the amount of potential loss at this time.

Of the two towns with FIRM maps, Ferdinand is the only one that has a flood hazard area. Using educated guessing, it can be loosely estimated that there are approximately 40 structures falling within or near the flood area depicted on the FIRM map. None of these has been identified as a repetitive loss structure. It is recommended that any FIRM maps be redone using the Vermont Geographic Information System standards based on orthophoto mapping.

2.5 Estimating Potential Losses

The town of Averill in the Unified Towns and Gores has received repetitive damage that qualified for federal assistance in the last 16 years. The Equalized Value for all properties in the UTG in 2014 was \$68,308,300. If 1% of all properties in the UTG were damaged, the value would be assessed at \$683,083. During the 100-year flood event caused by Tropical Storm Irene, approximately \$15,000 worth of damage was incurred, which is .02% of the total value of all properties within the UTG. During the 50-year flood event that occurred during 2013, \$138,354.87 worth of damage was incurred, which is .2% of the total value of all properties within the UTG.

2.6 Analyzing Development Trends

The UTGs have zoning regulations in place to guard against future development in inappropriate locations such as flood prone areas. All development strategies are carefully reviewed by the Zoning Administrator and the Zoning Board of Adjustment. All buildings being improved in or near frequently flooded areas are required to be elevated or provide additional mitigation measures. The zoning requirements have the required flood hazard regulations to meet NFIP standards. Most new permit requests are for summer camps and not year round residential units.

The UTG is a shrinking community. The year-round resident population decrease for the six towns and gores between 2010 and 2015 was 11 people, as can be seen in the following table, which accounts for just over 18% of the population in 2010.

Table 6 Changes in Population of Each of the Member Towns and Gores Between the 2010 Census and 2015

Town/Gore	2015 Estimated Population	2010 Census Population	Change in Population
Averill	20	24	-4
Avery's Gore	0	0	0
Ferdinand	25	32	-7
Lewis	0	0	0
Warner's Grant	0	0	0
Warren Gore	4	4	0
Total	49	60	-11

The Unified Towns and Gores are deep in the most economically depressed part of the state, and are in fact part of a federally recognized Rural Economic Area Partnership (REAP) Zone. REAP Zones generally have citizen-led initiatives that are designed to stimulate economic growth in an area by bringing in business, expanding economic capacity through enhanced tourism efforts, and build economic resilience within the community. The current poverty rate in the Northeast Kingdom is 13.5%, with a population that is relatively sparse.

The Northeastern Vermont Development Association is an organization dedicated to economic development within the Northeast Kingdom. They work with the 55 municipalities located in Northeastern Vermont to create strategic plans for building more economically resilient communities.

Section 3: Mitigation Strategy

Hazard Mitigation Strategies and Measures **avoid** the hazard by stopping or limiting new exposures in known hazard areas, **alter** the hazard by eliminating or reducing the frequency of occurrence, **avert** the hazard by redirecting the impact by means of a structure or land treatment, or **adapt to** the hazard by modifying structures or standards and could include tools or projects such as:

Town Plan - this document contains goals and objectives for community growth, health, safety and welfare for public and private interests. The Unified Towns and Gores has a Town Plan which was updated in October of 2014.

Zoning – zoning allows a community to control where and how development takes place. Examples of zoning as a mitigation tool is preventing development within flood zones, requiring buildings to meet certain codes of safety, and regulating development in areas which are prone to other non-flooding hazards. The Unified Towns and Gores has a set of zoning bylaws in place to manage development.

National Flood Insurance Program – “The National Flood Insurance Program [NFIP] is aimed at reducing the impact of flooding on private and public structures. This is achieved by providing affordable insurance for property owners and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socio-economic impact of disasters by promoting the purchase and retention of Risk Insurance in general, and National Flood Insurance in particular” (www.fema.gov)

The UTG has participated in the NFIP since October 14th, 2013 and has a total of zero individuals who have purchased flood insurance through the program. There are zero repetitive or severe repetitive loss structures or properties within the UTG.

Highway Codes and Standards – this is a set of minimum standards and recommendations for maintaining and repairing roads. Most Vermont communities have adopted the Vermont Transportation Agencies recommended Highway Codes and Standards. By adopting these codes, all maintenance and new construction on roads, highways, bridges and culverts must be enhanced to meet the new standards to withstand large flood events. Improved standards include increasing minimum road culvert size to 18”, slope and ditch management practices which reduce erosion and sedimentation, and requiring the use of specific water-controlling road maintenance and grading techniques.

American Red Cross of New Hampshire & Vermont – the American Red Cross is an organization which responds to and prepares for emergencies by providing shelter and supplies to those affected, stockpiling resources that will be needed in the event of an emergency, and providing support to communities that need help. The Unified Towns and Gores do not have a Red Cross approved shelter, but have access to a Red Cross-identified shelter nearby in Brighton. When a shelter is identified and approved by the Red Cross, local representatives are trained to open a shelter in the event of an emergency. This allows for a more efficient use of the American Red Cross services if and when needed.

Local Emergency Operations Plan (LEOP) – a Local Emergency Operations Plan provides critical information and steps to be followed in case of an emergency. The Unified Towns and Gores have adopted a new LEOP which has been updated to include responsible parties and emergency shelters for all types of hazards, as well as a checklist of necessary actions in the case of an emergency situation. This plan is based on the 2014 VT Department of Emergency Management and Homeland Security Local Emergency Operation Plan Template. The current LEOP will be updated regularly and will be informed by this Hazard Mitigation Plan.

Table 7 Presence and Absence of Mitigation Tools and Programs within Each of the Member Towns of the UTG

Town/Gore	Town Plan	Zoning	NFIP	Flood Regulations	Highway Codes & Standards	Culvert Inventory	VT Red Cross Shelter	FIRM Maps
Averill	Yes	Yes	Yes	No	Yes	Yes	No	Not Mapped
Avery's Gore	Yes	Yes	Yes	No	Yes	Yes	No	Not Mapped
Ferdinand	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Lewis	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Warner's Grant	Yes	Yes	Yes	No	Yes	Yes	No	Not Mapped
Warren Gore	Yes	Yes	Yes	No	Yes	Yes	No	Not Mapped

3.1 Regional Hazard Mitigation Goals

- A. Reduce injury and loss of life resulting from all hazards, and promote general resident safety.
- B. Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters.

- C. Reduce the damage to public infrastructure resulting from all hazards.
- D. Recognize the connections between land use, storm-water road design and maintenance and the effects from disasters.
- E. Ensure that mitigation measures are compatible with the natural features of rivers, streams and other surface waters; historic resources; character of neighborhoods; and the capacity of the community to implement them.
- F. Encourage all-hazard mitigation planning as a part of the municipal planning process.

3.2 Community Preparedness Goals

Overall, the UTG is working to decrease its risk to Hazardous Materials, High Winds, Highway Incidents, Tornadoes, and Flooding through proactive planning, policies, and mitigation actions. Other lesser risks are being addressed through the same procedures and policies, though to a lesser extent, as time and funding becomes available. The following are town goal associated with the highest priority risks:

- A. Review this Hazard Mitigation Plan with essential town government
- B. Review and study the need for additional capacity and training in neighboring emergency response departments (i.e. fire departments, police departments, ambulance services, etc.) to minimize the impact of all incidents requiring the dispatch of emergency response personnel.
- C. Ensure that all emergency response and management personnel receive HAZMAT awareness training at a minimum.
- D. Ensure that all UTG residents are aware of emergency protocols detailed in the UTG's Local Emergency Operation Plan to the level of their involvement.

3.3 Existing Hazard Mitigation Programs

The UTG has been proactive in planning its future as well as protecting its citizens from potential disasters. The Board of Governors' efforts to expand and improve these existing programs, policies, and resources will continue.

3.3.1 Emergency Operations Planning

The Unified Towns and Gores updates their Local Emergency Operations Plan annually in May and will continue to do so. The plan officially designating three emergency shelters, responsible agencies in the event of different types of emergency, and points of contact for townspeople in the event of an emergency. One of the three emergency shelters are located in the UTG, at the UTG town office building, and the other two are

located in Brighton, at the American Legion Building and the Brighton Elementary School. The Emergency Operations Center is also located in Brighton at the Brighton Fire Station

The escalation of damages in many types of hazards can be mitigated by the presence of well-trained and well-equipped emergency response teams. The contracted fire departments continue to actively seek funding through Homeland Security grants to upgrade their response equipment.

3.3.2 Codes and Standards

The UTG has adopted the recommended Highway Codes and Standards of the state which require regular upgrades on bridges, highways, ditches, and culverts to avoid flood damage. All undersized culverts have already been upgraded, and compliance with these Codes and Standards will be a goal in all future road and infrastructure building and maintenance projects.

3.3.3 Local Planning and Zoning

The UTG has adopted an updated Town Plan and Zoning regulations, and is also a member of the National Flood Insurance Program. All development in or near the identified flood areas must conform to zoning standards. The UTG can and will continue to update these documents and policies as updates become necessary.

3.3.4 Protection of Town Records

The town office houses a vault to protect public records from damage, theft, or vandalism. The vault is open and available for public access Mondays from 8 am to 4 pm and Tuesday through Friday from 8 am to 3 pm. Additionally, records are available for public access on the second Saturday of the month from 9 am to 12 pm. Other than these times, the vault is sealed to protect records.

3.3.5 School Drills

There are no schools within the UTG, but the contracted tuition schools which school-age children of the UTG attend practice regular evacuation drills. Ferdinand is included in the North Country Supervisory Union and is served by Brighton Elementary School, North Country Junior High School, and North Country Union High School. The remaining towns and gores, Warner's Grant, Warren Gore, Avery's Gore, Lewis, and Averill, are part of the Essex North Supervisory Union. There are 3 school-age children living in the UTG, and all of them either attend schools within the North Country Supervisory Union or are homeschooled.

3.3.6 Emergency Response

As there is no fire department within the UTG, fire departments from neighboring communities have been contracted to respond to emergencies in the UTG. While the departments are well trained, they all rely on volunteerism to supply their firefighters, and a declining volunteer population has reduced the ability of many departments to respond to emergencies.

Police services for the UTG are contracted to the Essex County Sheriff’s Department based in Guildhall. Ambulance services are contracted to Lyndon Rescue, which is based out of Lyndonville and Brighton.

3.4 Mitigation Actions

The UTG will implement the following actions to mitigate the impacts of hazards before they occur in accordance with the suggested timeline of implementation. Actions which are not taken within 2 years of their timeline date will require an amendment to the Hazard Mitigation Plan.

Table 8 Recommended Mitigation Actions, the Hazards they Address, and the Suggested Timeline within Which to Implement These Actions

Mitigation Action	Hazards Addressed	Timeline of Implementation
Continue to participate in inventory programs to survey, replace and upsize culverts, bridges, eroded roads, and ditches when necessary.	Highway Incidents, Flooding	2017-2021
Update the municipal plan and relevant zoning bylaws as they come due to incorporate priorities and actions identified through the hazard mitigation process.	Flooding, Climate Change	Annually in May 2017-2021
Develop a landowner outreach program with annual pamphlets detailing mitigation and preparedness actions that can be taken on a home-by-home basis to encourage landowners to ready themselves and their property for any potential disasters. Some topics include establishing evacuation sites and plans, suggesting lists of emergency supplies for landowners to keep on-hand, winter weather safety tips, preventing home damage through tree pruning, etc.	Winter Storm/Ice, Tornado, Flood/Fluvial Erosion, Extreme Temperatures, Power Failure, Hurricane/Tropical Storm	Annually 2017-2021
Hold a meeting once every 3 years of all personnel who are relevant to emergency	All	January – December 2018,

operations in the event of a disaster to ensure a clarification of roles, efficiency of response, and identification of additional necessary information or equipment.		January – December 2021
Establish and update Flood Hazard Areas through the NFIP, seek information from NFIP on updated FIRM boundaries.	Flooding, Climate Change	2020-2021
Take advantage of Agency of Natural Resources River Corridor Mapping program to determine points of greatest danger within river corridors and flood zones.	Flooding, Climate Change	2017-2018
Continue to seek assistance from the state’s dry hydrant program to get dry hydrants installed in the UTG.	Wildfire/Forest Fire, Structure Fire	2017-2018
Promote telecommunications improvements within the UTG to enable citizen reporting and communication, during both personal and regional emergencies. This can be done by communicating and working with the Vermont League of Cities and Towns (VLCT) to express support for legislation which promotes the expansion of current telecommunication infrastructure such as the installation of cell towers and fiber optic internet cables.	All	2017-2021
Proactively seek additional funding from State and Federal sources to complete mitigation projects and implement public safety programs and legislation.	All	2017-2021
Continue to participate in the National Flood Insurance Program.	Flooding, Climate Change	2017-2021

3.5 Analysis of Mitigation Actions

Officials in the UTG have identified several mitigation actions to be included in the Hazard Mitigation Plan and prioritized these actions using the FEMA-approved STAPLE+E criteria. The STAPLE+E is a planning tool which is used to evaluate alternative actions by determining whether the action is feasible using the following criteria:

Social: A mitigation action is acceptable to the community if (A) it does not adversely affect a particular segment of the population, (B) does not cause relocation of lower

income people, and (C) if it is compatible with the community’s social and cultural views.

Technical: A mitigation action is technically most effective if it provides long-term reduction of losses and has minimal secondary adverse impacts.

Administrative: A mitigation action is easier to implement if the jurisdiction has the necessary staffing and funding.

Political: A mitigation action can be truly successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.

Legal: A mitigation action must be implementable and enforceable within the legal authority and jurisdiction of the implementing agency.

Economic: Budget constraints can significantly deter the implementation of a mitigation action. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost-benefit review, and whether it is possible to fund.

Environmental: A mitigation action must be sustainable in that they (A) must not have an adverse effect on the environment, (B) must comply with Federal, State, and local environmental regulations, (C) must be consistent with the community’s environmental goals, and (D) must have mitigation benefits while being environmentally sound.

3.6 Implementation of Mitigation Actions

All mitigation actions which are implemented by the UTG will need to be reviewed and approved by the Board of Governors before it can be implemented. Any action which is scheduled to be taken will be brought before the Board of Governors either at their scheduled meeting time at 6 pm on the second Monday of each month or by special request. These meetings must be publicly warned and open to public comment. The following table shows the abovementioned mitigation actions, their prioritization based on cost/benefit analysis, and the party or parties responsible for the implementation of each action.

Table 9 Recommended Mitigation Actions Stated in Table 7 Prioritized and Parties Responsible for their Implementation

Mitigation Action	Priority	Responsible Party	Potential Funding Sources
Continue to participate in inventory programs to survey, replace and upsize culverts, bridges, eroded roads, and	High	Town Supervisor, Board of Governors, Road Commissioner	Vermont Better Roads Program

ditches when necessary.			
Update the municipal plan and relevant zoning bylaws as they come due to incorporate priorities and actions identified through the hazard mitigation process.	High	Board of Governors, Town Supervisor	Municipal Planning Grants
Develop a landowner outreach program with annual pamphlets detailing mitigation and preparedness actions that can be taken on a home-by-home basis to encourage landowners to ready themselves and their property for any potential disasters. Some topics include establishing evacuation sites and plans, suggesting lists of emergency supplies for landowners to keep on-hand, winter weather safety tips, preventing home damage through tree pruning, etc.	High	Town Supervisor, Board of Governors	Town Budget, Vermont Community Foundation Grants
Hold a meeting once every 3 years of all personnel who are relevant to emergency operations in the event of a disaster to ensure a clarification of roles, efficiency of response, and identification of additional necessary information or equipment.	Medium	Board of Governors, Town Supervisor, Incident Command, Brighton Selectboard	Town Budget, Vermont Community Foundation Grants
Establish and update Flood Hazard Areas through the NFIP, seek information from NFIP on updated FIRM boundaries.	Medium	Board of Governors, Town Supervisor	FEMA’s Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and the Pre-Disaster Mitigation Program
Take advantage of Agency of Natural Resources River Corridor Mapping program to determine points of greatest danger within river corridors and flood zones.	Medium	Board of Governors, Town Supervisor	-
Seek assistance from the state’s dry hydrant program to get dry hydrants installed in the UTG.	Medium	Board of Governors, Town Supervisor	Rural Fire Protection Program
Promote telecommunications improvements within the UTG to enable citizen reporting and communication, during both personal and regional emergencies. This can be	High	Board of Governors, Town Supervisor	USDA Rural Development Grant, Vermont Community Development

done by communicating and working with the Vermont League of Cities and Towns (VLCT) to express support for legislation which promotes the expansion of current telecommunication infrastructure such as the installation of cell towers and fiber optic internet cables.			Program Grant
Proactively seek additional funding from State and Federal sources to complete mitigation projects and implement public safety programs and legislation.	High	Board of Governors, Town Supervisor	FEMA’s Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and the Pre-Disaster Mitigation Program
Continue to participate in the National Flood Insurance Program.	Medium	Board of Governors, Town Supervisor	-

3.7 Preparedness Actions

These differ from Mitigation Actions in that they are designed to be triggered reactively in the event of an emergency, rather than proactively to reduce the impacts of potential hazards. The following are recommended, but not required, by this plan.

- Update the UTG’s Local Emergency Operation Plan (LEOP) as it becomes necessary to ensure that the UTG’s reaction to emergency situations is effective and ensures the continued safety of the residents.
- Keep emergency communication and information systems (NOAA weather receivers, Emergency Alert System, 2-way radios, etc.) at the command center designated by the LEOP and train any probably emergency response personnel in their use and maintenance.
- Keep an updated map of critical facilities within the UTG, as well as those which serve the UTG in an easily accessible location for individuals who may be called to act in an official capacity during an emergency to reference. The large geographic area covered by the UTG and the sparse population makes precision of locations important for helping as many people as possible in an emergency situation. Such a map can also help officials to visualize areas of greatest concern and vulnerability as emergencies unfold.
- Contact local American Red Cross chapter to assist with community education programs. These can educate residents on how to prepare for and react to an emergency situation, and how to employ mitigation techniques on their own properties.

- Through annual appropriations, provide funding for the training of first responders that serve the UTG to promote rapid, effective response to emergency situations.
- Train officials to be efficiently reactive to emergency situations by attending professional training sessions and completing Incident Command Systems trainings. Any individual named in the LEOP should be familiar with the Incident Command System and other emergency response protocols. Free online courses are available at <http://training.fema.gov/is/>.

Section 4: Plan Maintenance Process

4.1 Initial Approval Process

This plan will be reviewed for factual accuracy and acceptable content by the UTG Board of Governors, or an appointed committee, before being submitted to FEMA for review. After FEMA has returned the document with comments, the required edits and adjustments will be made before the document is reviewed again by the Board of Governors. Pending their approval, the final draft of the plan will be submitted to FEMA. When FEMA approves the document, it will be adopted by the UTG Board of Governors.

4.2 Routine Plan Maintenance

It will be the responsibility of the Town Supervisor and the Board of Governors to ensure that these steps are taken when appropriate.

- A.** The Unified Towns and Gores Board of Governors will either act as the review committee or appoint a review committee.
- B.** The review committee will hold annual meetings, which will be open to the public, where they will update the mitigation actions that need to be taken based on any action that has already been taken, any new data that has come to light, any changes in the priorities of the UTG, and whether the goals set forth in this plan are being met. This public meeting will be advertised in accordance with open meeting laws. Any additions to this plan will be included as amendments until the plan is due to be updated, when relevant amendments can be incorporated into the updated plan.
- C.** During the year before the plan update comes due, the Board of Governors and the review committee (if not the same entity) will meet to discuss whether the evaluation criteria is still appropriate and whether changes to the mitigation strategies are needed based on changes since the most recent update. Data needs will be determined, data sources identified, and responsibility for collecting information will be assigned to members.
- D.** A draft report will be prepared based on the agreed-upon evaluation criteria and in conformance with the FEMA Region I Local Hazard Mitigation Plan Crosswalk document.
- E.** The Board of Governors will have the opportunity to review the draft report and consensus will be reached on changes that need to be made to the draft.
- F.** Agreed-upon changes will be incorporated into the document.
- G.** The plan will be reviewed by Division of Emergency Management and Homeland Security (DEMHS) staff and then FEMA Region I staff.

- H. DEMHS and FEMA comments will be incorporated into the plan.
- I. The Board of Governors will warn the plan for approval at its regular meeting and make the plan available both electronically on the town website and as a physical document at the town office. Comments will be accepted in writing either via email or post.
- J. The Board of Governors will review and incorporate into the plan any community comments that meet with Board approval.
- K. The Board of Governors will finalize and adopt the plan and make copies of it available to any interested persons.

4.3 Programs, Initiatives, and Project Review

Although the plan will be reviewed in its entirety every five years, pending ongoing financial resources, the town may review and update its programs, initiatives, and projects more often based on the above procedures as changing needs and priorities arise. The plan will be made available online, and any public input will be noted and discussed at the next update meeting.

4.4 Post-Disaster Review Procedures

Should a declared disaster occur, a special review will occur in accordance with the following procedures:

- A. Within 6 months, of a declared emergency event, the UTG will initiate a post-disaster review and assessment.
- B. This post-disaster review and assessment will document the facts of the event and assess whether existing Hazard Mitigation Plans effectively addressed the hazard.
- C. A draft After Action Report of the assessment will be distributed to the Review/Update Committee.
- D. A meeting of the Review/Update Committee will be convened by the Board of Governors to make a determination on whether or not the plan needs to be amended. If the committee determines that the plan does NOT need modification, no change needs to be made, and the After Action Report is made available to interested parties.
- E. If the committee determines that there **is** a need to introduce changes to the plan, the committee drafts an amended plan based on the recommendations in the report and forwards it to the Board of Governors for public input.

F. The Board of Governors reviews and adopts the amended plan.

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