

Swanton Town and Village, Vermont HAZARD MITIGATION PLAN 2020



**Approved by the Swanton Village Trustees and the Town of
Swanton, Selectboard***

Approved Pending Adoption: August 24, 2020

Adoption Date: February 22, 2021

FEMA Final Approval: March 19, 2021

***The plan will be final following adoption by Swanton Village Trustees and Swanton Town Selectboard and FEMA approval.**

Swanton Town and Village Hazard Mitigation Plan 2020

RESOLUTION

Whereas, natural and man-made disasters may occur at any time, we recognize that to lessen the impacts of these disasters we will save resources, property and lives in the Swanton Village and the Town of Swanton, Vermont;

And whereas, the creation of the Swanton Hazard Mitigation Plan is necessary for the development of a risk assessment and effective mitigation strategy;

And whereas, Swanton Village and the Town of Swanton is committed to the mitigation goals and measures as presented in this plan;

And whereas, the respective officials identified in the mitigation action plan are hereby directed to pursue implementation of the recommended actions assigned to them.

Therefore, the Swanton Village Trustees and the Town of Swanton Select Board hereby adopts the 2020 Swanton Hazard Mitigation Plan.

AUTHORIZING SIGNATURES

Date February 16, 2021


Selectboard Chair


Selectboard

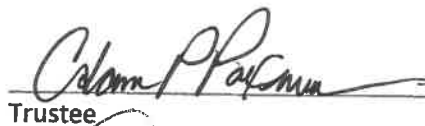

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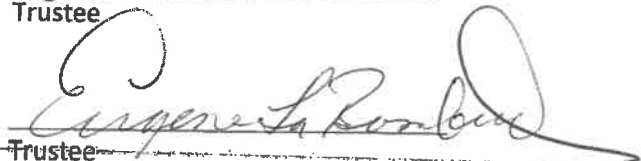

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Date Feb 22, 2021


Trustees Chair


Trustee


Trustee

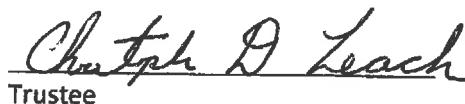

Trustee

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
1. INTRODUCTION	<u>1</u>
2. PLANNING PROCESS.....	<u>1</u>
3. COMMUNITY PROFILE	<u>2</u>
4. RISK ASSESSMENT	<u>12</u>
5. ASSESSING VULNERABILITY	<u>30</u>
6. MITIGATION STRATEGY	<u>37</u>
7. PLAN IMPLEMENTATION, MONITORING & EVALUATION	<u>41</u>

LIST OF ATTACHMENTS

A. Hazard Identification and Risk Assessment Matrix	45
B. Critical Facilities	46
c. Project Priority Scoring Matrix	48
D. Public Government Participants	49
E. References	50

ACKNOWLEDGEMENTS

Project Steering Committee:

David Jescavage, Town Administrator

Reg Beliveau, Jr. - Emergency Management Director/Village Manager

Leonard Stell – Swanton Police Chief

Dianne Day – Village Clerk

Tim Girard – Resident (former Fire Chief)

Project Coordinator:

Shaun Coleman – Northwest Regional Planning Commission

Project Participants:

Town of Swanton Select Board

Village of Swanton Trustees

Town of Swanton Highway Department

Northwest Regional Planning Commission

Local Emergency Planning Committee (Franklin County)

Swanton Fire Department

Missisquoi Valley Rescue

Vermont Agency of Transportation District 8

Vermont Emergency Management

Vermont Agency of Natural Resources

Northeast States Emergency Consortium

Federal Emergency Management Agency

National Weather Service

This plan should be considered a plan in work due to the continual changing environment in which hazards present themselves. This plan must also be reviewed and adjusted as growth in population, industry, and overall community demographics change.

1. INTRODUCTION

This is a multijurisdictional All Hazard Mitigation Plan for the Swanton Village and Town of Swanton.

The impact of expected, but unpredictable natural and human-caused events can be reduced through community planning. The goal of this plan is to provide an all-hazards local mitigation strategy that makes Swanton Village and Town of Swanton within Franklin County, 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 Project Impact efforts, FEMA and state agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This plan recognizes that communities have opportunities to identify mitigation strategies and measures during all of the other phases of Emergency Management – Preparedness, Response and Recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe and identify local actions that can be taken to reduce the severity of the hazard.

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

- Flood-proofing structures
- Tying down propane/fuel tanks in flood-prone areas
- Elevating furnaces and water heaters
- Identifying & modifying high traffic incident locations and routes
- Ensuring adequate water supply
- Elevating structures or utilities above flood levels
- Identifying & upgrading undersized culverts
- Proactive land use planning for floodplains and other flood-prone areas
- Proper road maintenance and construction
- Ensuring critical facilities are safely located
- Buyout & relocation of structures in harms way
- Establish & enforce appropriate building codes
- Public information

2. PLANNING PROCESS

Incorporation of Existing Plans, Studies, Reports and Technical Information

Mitigation plans from around the country, current State Mitigation Plans, FEMA planning standards, the FEMA Flood Mitigation Assistance Program requirements and the National Flood Insurance Program's Community Rating System were examined. Other materials examined consisted of community plans, including:

- Swanton Town and Village Municipal Plan 2015
- Swanton Town and Village Zoning Bylaws and Subdivision Regulations 2015
- State of Vermont Hazard Mitigation Plan 2018

- Swanton Town and Village Local Emergency Management Plan 2019
- Swanton Town, Vermont Flood Insurance Study, 1983
- Swanton Village Flood Insurance Study, 1983
- Town of Swanton Flood Insurance Rate Maps 1983
- Swanton Village Flood Insurance Rate Map 1983
- Northwest Regional Planning Commission Regional Plan 2014

A complete list of references may be found in Attachment G.

Swanton Village and Swanton Town held several planning meetings to discuss the development of a Hazard Mitigation Plan. All meetings were open to the public and some were held as Special Meetings. Public was invited but there were none in attendance at the meetings. All meetings were posted at locations in the municipality in compliance with the requirements of Vermont Open Meeting Law. All meetings were chaired by the Village Manager Reginal Beliveau, Jr. In attendance was (former) fire chief Tim Girard, Town Administrator David Jescavage, NRPC Senior Planner Shaun Coleman, Village Clerk Dianne Day, Police Chief Leonard Stell, (former) Selectboard Chair Dan Billado, Health Department Scott Carpenter.

The initial planning meeting to approve the Hazard Mitigation Plan (HMP) project on January 26, 2018. A sample plan was reviewed before the project of completing an HMP was approved. Additionally, criteria for the Vermont Emergency Relief Assistance Fund, Hazard Mitigation Grant and Flood Mitigation Assistance programs were reviewed. River corridor bylaws were mentioned and an overview of the Municipal Roads General Permit program was also discussed. The meeting was held as a Special Meeting following wide-spread flooding in the area. On March 8, 2018, mitigation actions and priorities were reviewed and a draft plan was discussed at another Special Meeting. A final committee meeting was held on September 20, 2018. The final draft was developed and a public comment period was also discussed and agreed upon. Meeting agendas were posted in accordance with Vermont Open Meeting Law. No public comments regarding the plan were received at these meetings.

The draft plan was made available to the public for comments at the Village Clerk's Office and Town Clerk's Office. Electronic copies of the draft were sent to the neighboring municipalities of Highgate, Sheldon, Fairfield and St. Albans Town and were invited to solicit comment and share with public. The public was invited to solicit comment from the NRPC, Town and Village websites between December 4 and December 18, 2018. This opportunity served to make the public aware where they can find hard copies to review or request either hard copies or digital format. A copy of the plan was also sent to the Vermont State Hazard Mitigation Officer for review. Instructions were also included to direct comments to Shaun Coleman, Senior Planner at Northwest Regional Planning Commission either by email, phone or fax. No public comments were received.

3. COMMUNITY PROFILE

Swanton Village and the Town of Swanton are located in the northwest part of Vermont in Franklin County (-73°07'W 44°56'N). The Town is bounded west by Lake Champlain, north and northeast by Highgate, east by Sheldon, southeast by Fairfield, and south by St. Albans Town. The total area of the town is approximately 39,478 acres or 61.68 square miles. The Missisquoi National Wildlife Refuge, a 6,000-acre wildlife preserve, is predominantly located in West Swanton. Much of Swanton is relatively flat with several wetland areas. The upland areas of Swanton converge to several valleys and tributaries feeding into the Lake Champlain Basin, while the southeastern area of Town contains hills and forests.

Much of the center of town remains in active farming. Swanton is a rural community relying heavily on its agricultural and manufacturing heritage and natural features including Lake Champlain, the Missisquoi National Wildlife Refuge and the Missisquoi River. The Town is the hub for transport of goods and services to Canada, New York, and other areas of Vermont.

Population

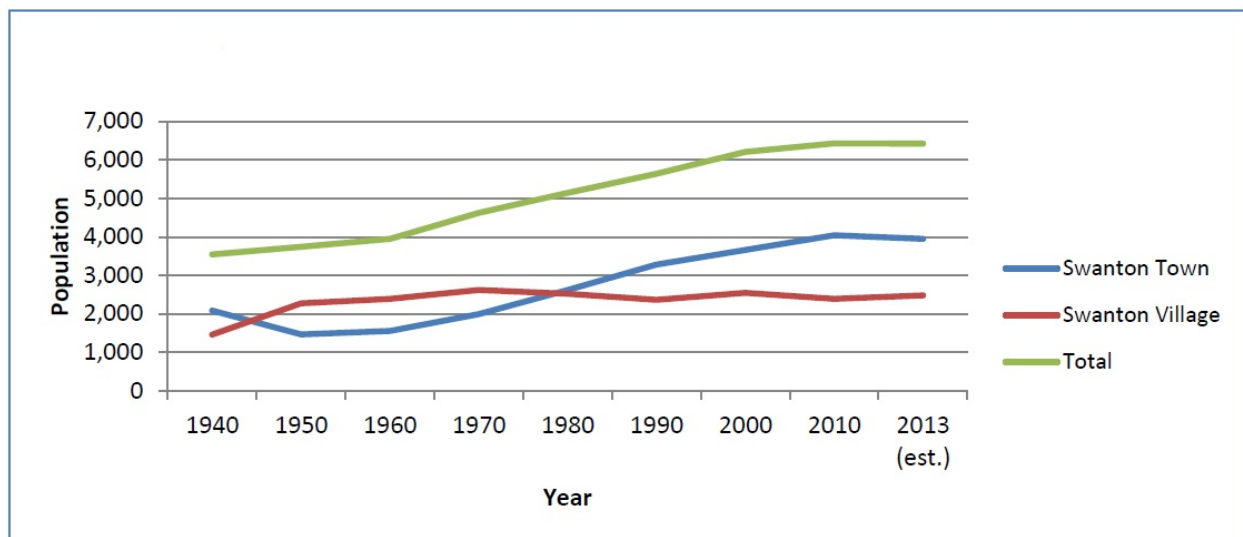
The US Census estimated that the population of Swanton Town and Village was 6,427 in 2010. In 2010, Swanton Town and Village had a total of 2,689 total housing units, of which 2,329 are occupied, 309 are mobile homes, 308 are seasonal, recreational or occasional use. Most homes are single-family structures (87%).

The median value of a home in the Town of Swanton is \$191,100 and in Swanton Village \$162,000 according to the 2010 Census¹.

Development Trend

The population in Swanton has doubled between 1940 and 2010. Swanton Village had fewer persons than the balance of the Town in 1940. Between 1940 and 1950, the Village annexed an area and associated population so that by 1950, the Village contained more persons than the balance of the Town. From 1950 to 1960, the Village and the balance of the Town grew by equal amounts. Beginning in 1960, Village growth began to level off, while Town growth started to steadily increase. Between 1980 and 2010 the Town increased by almost 1,400 people, while the Village population decreased. The growth in the Town as opposed to the Village might be attributed to several factors including the availability of land area in the Town to accommodate additional residential growth, the desire to have larger lots, and improved ability to commute to employment centers since the 1970s. Another factor slowing growth in the Village is the lack of undeveloped land.

Figure 3.1 Swanton Population Trends



During the summer months, Swanton sees an influx of seasonal residents. Although it is impossible to accurately estimate seasonal residents, the 2010 Census notes that there are 253 seasonal

¹ May not fully reflect current median home values. In the event of a hazard incident, a current home value data should be used to estimate losses.

housing units in the community used for seasonal, recreational, or occasional use. This influx of seasonal residents has a significant impact on Swanton's local economy. The town is more spread out compared to the village and has less concentrated infrastructure to accommodate the influx of summer travelers. There is a second home population, because of proximity and access to the lake. They have a low full-time population but a very high seasonal population. This ties up resources and mutual aid is called in if there is an emergency. They are considered to have similar resources as towns of their size in the region.

Swanton has not experienced the extreme growth spurts like some nearby towns in Franklin County. Growth spurts in the Region diminished between 2000 and 2010, yet there is continued, steady growth in Swanton and in Franklin County.

Land Use and Proposed Land Use

Swanton is a small community. Recent development has occurred primarily along major roads with a few rural neighborhoods on new roads. Recent residential development has occurred on both sides of the Village Corporate limits. The Village and Town encourage growth along existing roads and prefer to limit the addition of new roads and streets to their inventories.

Residents of Swanton are concerned about recent land use trends, especially those along Routes 7 and 78. There is a concern that the separation between Swanton Village and the City of St. Albans will be lost to strip development along the Route 7 corridor. Additionally, residents are concerned about the impacts of development on farming and agriculture. In the 1993 planning survey of Town and Village residents, 82 percent agreed that farming and agriculture are important elements of the Town's overall make-up. Residents also agreed that new development should be concentrated near the existing village rather than strung along outlying roads. Commercial and industrial development should be clustered near existing areas. Swanton has two industrial parks, the Swanton Industrial Park on Jonergin Drive and the Robin Hood Industrial Park on Robin Hood Drive. They have also rezoned a portion of the land north of Route 78 as light industrial/commercial. These areas are existing growth areas.

Swanton residents are interested in preserving the rural qualities of Swanton Town and Village by encouraging future development to be clustered near the existing Village. They want to live with respect for the land and preserve the Town's open lands for agricultural uses. With these primary goals in mind, Swanton plans to direct growth to appropriate areas of the Town and Village by establishing various land use areas.

The Proposed Land Use Plan was developed from several information sources including the 1988 Swanton Village and Town Municipal Plan, resource maps from the Vermont Center for Geographic Information, other pertinent documents and data, personal interviews of public officials, surveys of residents and many hours of deliberation by the Swanton Planning Commission.

The decisions leading to the Proposed Land Use Plan were based on existing land use patterns, traffic patterns, the intensity of proposed uses, physical constraints of the land, the resident's vision for the community, and several long-range planning goals and objectives. Traffic generation, the intensity of the proposed uses, and ability of the community to provide facilities and services were also considered in the establishment of the proposed land use districts. The following is a brief description of the land use areas depicted on the Proposed Land Use Plan.

Shoreland Recreation District (SR): The purpose of this District is to provide for the significant seasonal recreation industry that has evolved along the shoreline of Lake Champlain. This District is established mainly to encourage the seasonal recreation industry and to direct future growth of that sector in a manner that is environmentally sound and consistent with other goals and objectives of this Plan. The intensity of land uses should be such that man-made erosion of the Shoreline is minimized and that water quality (both surface and ground water) is not negatively impacted.

Three Shoreland Recreation Districts are shown: 1) Campbell Bay south to the centerline of Route 78 and west to Lake Champlain; 2) the shoreline properties along Maquam Shore Road from the water treatment plant south to the town line to include all properties on the lake shore and 600' from the centerline east of Route 36 (Maquam Shore Road); and 3) on Lakewood Drive for a distance 600' east of the centerline Lakewood Drive. The types of land uses allowed in this area are seasonal and year-round residential, agriculture, outdoor recreation including beaches, campgrounds, picnic areas, boat launch areas and marinas, and limited commercial uses associated with public and private recreation.

This District should have a maximum density of one dwelling unit per acre. In the instance of proposed travel trailer parks, the recommended density is 8-10 units per acre based on studies demonstrating that the land is capable of supporting this density. Future development must ensure that there is adequate land area for on-site septic disposal and on-site water supply, and that the design of the park minimizes adverse aesthetic impacts. Future parks should be limited to no more than 100 travel trailer sites. Development in these Districts should be clustered whenever possible, provided that adequate setbacks and environmental considerations are observed.

Recreation/Conservation District (RC): The Recreation/Conservation District is established to protect and conserve the unique wetlands, floodplains, wildlife areas, and natural and archeological sensitive areas of Swanton. Provided the soil conditions allow, future uses in this District should include agriculture, forestry, and outdoor recreation, but additional development requiring structures should be discouraged or prohibited. All land uses should maintain proper setbacks and buffers to avoid erosion and/or negative impacts on water quality.

This District contains the Missisquoi National Wildlife Refuge and a large wetland located east of the Refuge, which extends to the Neighborhood Commercial District (on Route 78) and the Industrial District on Jonergin Drive. Along the Missisquoi River, the District fluctuates in width to include significant wetlands and other natural resources including prime agricultural soils and sensitive archeological areas. The Recreation/Conservation District also contains the Fairfield Swamp and Management Area (located on the southeast corner of Swanton Town).

A significant portion of the land area in this District is in public ownership. However, a portion along the Missisquoi River is in private ownership. Some of the privately owned areas are developed while portions near Highgate remain open. Land uses that are compatible with the existing such as farming, forestry, and outdoor recreation should be allowed.

Shoreland/River District (S2): The Shoreland Recreation District is intended to allow residential and seasonal recreational uses adjacent to the Lake Champlain shoreline in a manner that protects surface and ground water quality and shoreland vegetation, minimizes adverse impacts to the lakeshore environment, limits encroachments into public waters, and preserves both visual and physical access to and from the Lake. The District should have a maximum density of one dwelling per acre and a minimum lot size of one acre.

Agricultural Residential District (Low Density) (R1): Agriculture should be the dominant land use in this District. There are three large sections contained in this District: 1) the area east of the Wildlife Refuge and west of the Swanton Industrial Park; 2) the area between Maquam Shore Road and the R3 District along Route 7; and 3) the majority of the area east of I-89. This District contains large contiguous areas of primary agricultural soils and many active farms. Farming is a major component of Swanton's local economy and, in order to maintain and enhance this industry, residential development in these areas should be limited.

In this District, development has been occurring along existing rights-of-way. Due in part to the significant development pressures on Swanton's farm units, several farmers are no longer actively farming. One goal of the Plan is to relieve the pressures of development by encouraging growth to occur near the existing Village. The maximum density in this District should not exceed 1 acre.

Moderate Density Residential District (R3): To provide for greater densities and smaller lot sizes near the existing Village, several Moderate Density Residential Districts are proposed near the Village and along Route 7. In general, soils in these Districts are suitable for on-site septic, and the Districts have good access to services. The proposed density of these Districts is one dwelling unit per acre. Planned Residential Developments (PRDs) that cluster dwelling units should be allowed. The three R3 Districts are Northeast Route 78, North Route 7, East (Woods Hill Road), West (Route 36/Middle Road), West (Maquam Shore Road) and Tabors Point.

Residential District (High Density) (R5): The Residential Districts are proposed to contain relatively high densities of residential development. The proposed Residential Districts are characteristic of the compact neighborhoods that exist outside the Village Central Business District. To accommodate future residential development on smaller lots, two R5 Districts are proposed outside the Village corporate limits.

The first is located on the northern boundary of the Village east of the centerline of Route 7, extending north to the Highgate border, and east to the centerline of I-89. The second District is located on the southeast boundary of the Village corporate limits on both sides of Route 7.

The purpose of these Districts is to provide for greater densities near the existing Village with easy access to the Central Business District, municipal services, schools, and highways. Residential development should not exceed a density of one dwelling unit per acre unless served by municipal services whereby smaller 1/4 or 1/2 acre lots may be allowed.

Central Business District (CB): This District located in the Village includes a variety of municipal, professional, business, and retail uses. The Central Business District also includes much of the Village historic area and several historic structures that front Church Street, Farrar Street, Academy Street, Grand Avenue, and the Village Green. The Central Business District shall also include the block of First Street, York Street, Canada Street and back to Grand Avenue. New development should be in keeping with the historic qualities of the Village. Decisions to improve intersections or road improvements should also consider the impacts on the Village character. A mixture of business uses should be maintained and encouraged.

Neighborhood Commercial District (NC): The Neighborhood Commercial District is located on the outskirts of the Village just beyond the Swanton Industrial Park. The purpose of this District is to provide support services to the Swanton Industrial Park and to the travelers on Route 78. Appropriate uses in this District include automobile service stations, convenience stores, and small motor inns or hotels. The District is limited in size for a number of reasons including: 1) to reflect soil and slope limitations; 2) to encourage a

buffer between the Village built environment and the Missisquoi National Wildlife Refuge; and 3) to avoid adverse impacts to the existing businesses and services provided in the Village.

The Neighborhood Commercial District is located on the south side of Route 78 just northwest of the Swanton Industrial Park and extends for a distance of 1,700 feet along Route 78. The District is bounded on the south by the centerline of the Central Vermont Railroad and on the north by the centerline of Route 78. The minimum lot size in this area should be 1/2 acre. The number of driveway cuts should be limited and if possible, new development should front on minor roads.

Neighborhood Commercial Light District (NCL): In order to strengthen the area just east of the Village corporate limits on First Street/Route 78 and the area around the Village Complex, a Neighborhood Commercial Light District is proposed. The purpose of this District is to encourage uses that strengthen the area aesthetically and provide limited services to nearby neighborhoods. A future rescue building might be appropriate in this District. Professional offices, clinics, neighborhood parks, and small retail shops to service the nearby neighborhoods should be encouraged. This District might also include more dense residential development. Strip development and heavy industrial uses should be discouraged.

Industrial District (IND): Three Industrial Districts are proposed, two of which have existing industrial parks. The three Districts are located: A) outside the Village limits including the area of Jonergin Drive and the Village sewage treatment lagoons; B) the Depot Street area in the Village off Route 78; and C) an area south of the Village corporate limits, Route 7, and a proposed Residential 2 area surrounded by the Recreation/Conservation District that flanks the Missisquoi River.

These Districts should be serviced by municipal sewer and water. Lots should not be less than 1/2 acre. Appropriate setbacks to buffer industrial activities from residential uses, the Missisquoi River, and major rights-of-way should be observed.

Commercial/Light Industrial District (CLI): The Commercial/Light Industrial Districts are intended to serve as transition districts between the Industrial District and the nearby Residential Districts. The Commercial/Light District allows for a range of light industrial and commercial uses. These uses protect the quiet, residential character of the adjacent neighborhoods.

There are three areas designated commercial/light industrial. One is along Frontage Road bounded by Route 78, I-89, and the Highgate border. Another is located along the southwest end of Robin Hood Drive and includes the lands of the former Robin Hood Factory. A third is located on the east side of the Lamoille Valley Railroad bed just north of where it intersects Route 7.

Southern Growth District (SG): There is a vast amount of land surrounding Exit 20 of I-89 that borders Swanton and St. Albans. Classifying this area as a growth district will allow the town to develop it in a manner in which the specific use can be determined through the planning process over a period of several years. Land use in the Southern Growth District will be similar to the Neighborhood/Commercial Light District.

The proposed Southern Growth District would start at the intersection of Swanton/St. Albans Town line at Interstate 89 and then proceed north along the eastern boundary of I-89 approximately 4,400 ft and then east parallel to the Swanton/St. Albans Town line until the Rail Trail. The proposed District will then turn south and proceed until the Swanton/St. Albans Town line and then west along the Swanton St. Albans Town line to I 89.

Three electric utility companies serve the area: Swanton Village Electric, Central Vermont Public Service, and Vermont Electric

Co-op. Vermont Gas Systems, Inc. provides gas service to Swanton Town. According to the U.S. Census (2000), the major heating fuels consumed in Swanton are fuel oil or kerosene (56.0%), natural gas (24.9%), bottled, tank, or LP gas (11.5%), wood (4.3%), electricity (2.8%), and other (0.6%).

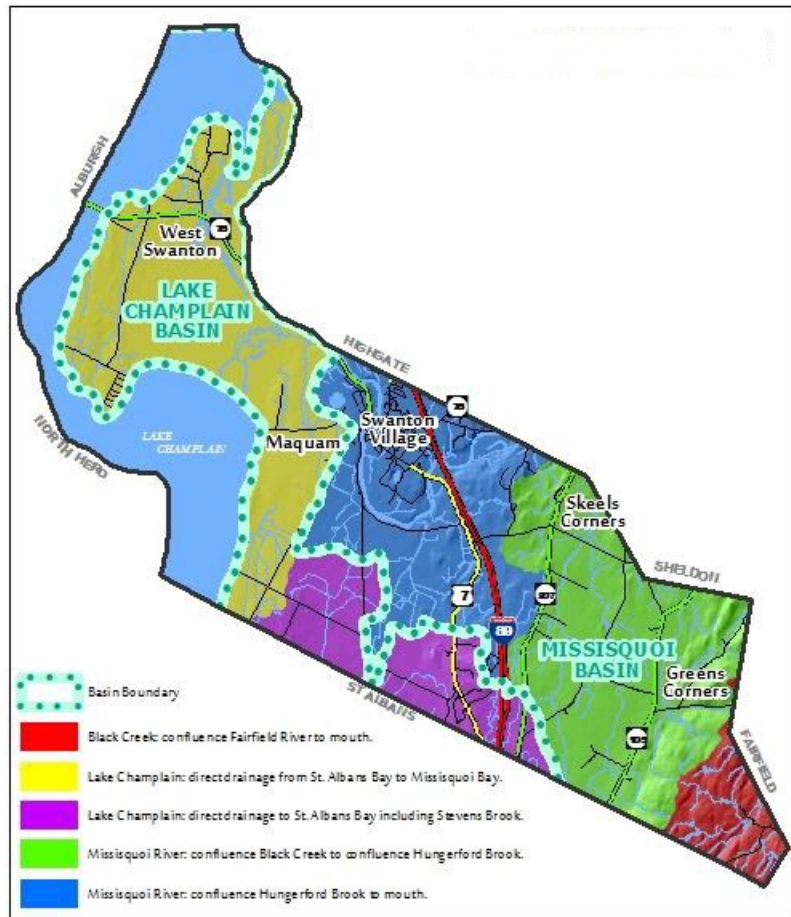
Emergency Services

Fire protection for the town is provided through a mutual aid agreement with the Swanton Village volunteer fire department. Swanton Volunteer Fire Department responded to an average of 118 calls per year.² The town participates annually in the Insurance Safety Office's community rating survey program. Improvements in equipment and personnel are ongoing. A HAZMAT decontamination trailer is stationed at the Fire Station and members of the department are trained in decontamination operations. The department is trained in operating under NIMS/ICS. Law enforcement is provided by the Vermont State Police with assistance from the Swanton Village Police Department and US Border Patrol.

The Village Police Department currently occupies a portion of the Village Municipal Complex located on First Street. The Department provides service to Swanton Village residents. Upon request, the Department also participates in mutual aid to surrounding towns, including Swanton outside of the Village. With the projected population growth over the next ten years, it will be necessary to replace equipment and add to personnel and equipment. The Police Department's office facilities are currently overcrowded and a larger facility should be provided in the near future.

Missisquoi Valley Rescue (MVR) serves Swanton and the surrounding areas. MVR is a non-profit organization based in Swanton Village. MVR members are trained in NIMS/ICS. Swanton residents are very satisfied with MVR's current services and, according to representatives of the MVR, they are able to provide excellent service for expected increased demands.

Figure 3.2 Swanton Watersheds



² State of Vermont, Division of Fire Safety, Report of the Fire Marshall. 2010 - 2017

Energy

Swanton Electric serves Swanton Town and Village, Highgate, and portions of St. Albans from facilities in the Village Office Complex. The power is generated from the newly expanded hydro dam located in Highgate and other sources such as the wood chip plant in Burlington. In general, Swanton Electric can accommodate a 300% increase in use and therefore has no plans to increase generating capacity. The utility is planning to implement an Energy Conservation Program in the near future.

The Swanton Electric Department, a publicly owned utility, has been providing electricity since 1884. The plant is located in Highgate and serves Swanton Town and Village, Highgate and portions of St. Albans. Swanton Electric serves the majority of Swanton residents. Central Vermont Public Service Corp. and Vermont Electric Co-op also service a small portion of Swanton residents. Swanton Electric has the ability to provide service for anticipated growth plus an increase in demand of up to 300%.

According to the 2010 Census, fuel oil and kerosene are the most popular heating fuels and were used by 1,304 housing unit (48%). Utility gas is the second most popular heating fuel with 579 units (22%). Bottled / tank / LP gas is the third most popular heating fuel with 267 units (10%) followed by wood with 99 units (4%), and electricity 66 units (2%) and other fuels at below 1%.

Public Water Supply

The Village has maintained a water treatment facility since 1978. The facility is located near Maquam Shore Road and services the Village and selected areas of the Town. A reservoir, located on the east side of Donaldson Road near the Highgate border, has a 1.5-million-gallon capacity. During extended dry periods, demand reaches and/or exceeds that capacity. To mitigate the problem of capacity during peak times, the Village installed water meters for all water customers in 1993. The metered system reduced demand to what it was 10 years prior, and the current capacity is adequate to serve current needs and moderate growth. However, a major new demand for municipal water may require an expansion of the system. A water study conducted in 1990, concluded that an upgrade to bring the capacity to 2 million gallons per day would cost \$1.4 to 1.7 million in 1990 dollars.

Public Wastewater Treatment Facility

The Village maintains a combined storm and sanitary sewer system that was constructed in 1990. The design capacity of this system is 1.35 million gallons per day, and the average flow is 0.57 million gallons per day. A study of the sewer system titled *Combined Sewer Overflow Study*, states that the infiltration of storm water accounts for approximately 75% of the plant's peak loading. At present, the sewer service is provided to portions of the Village and the Town. The areas of Town that are currently served by municipal sewer include Covey Drive from S. River Street, Jonergin Drive (Swanton Industrial Park), Jones Court, Ferris Street, Upper Ferris Road, Bushey Street and Abenaki Acres, and Route 78 to the Missisquoi Valley Union High School.

Transportation

Swanton is served by several regional routes including: Interstate 89, U.S. Route 7, and Vermont State Routes 36, 78, 207 and 105. The Town and Village maintain a number of Class 1, 2 and 3 highways. According to the Vermont Agency of Transportation data sources, the majority of the state highways in Swanton have an adjusted sufficiency rating of poor (rating between 40 and 60). Highways with sufficiency ratings in this range are candidates for repair.

In order to accommodate future growth in traffic, major roads and intersections will need improvement. Two intersections were identified in a 1992 study of the Route 78 corridor as having a level of service of F: 1) Merchants Row and Route 78, and 2) Routes 7 and 78 near the Library.

There is a need to re-route truck traffic around the center of Swanton Village. Local officials have identified the Beebe Road as a possible truck route to bypass the Village. In order to make this an effective truck route, a new road connecting Route 7 with Route 78 on the former Lamoille Valley Railroad rights-of-way would need to be constructed.

Bridges & Culverts

The Vermont Agency of Transportation provides sufficiency ratings for all state-owned bridge structures 20' and over in length. The sufficiency ratings are categorized by the State into three deficiency status categories: 1) not deficient (ND); 2) functionally deficient (FD); and 3) structurally deficient (SD). Four of the twelve listed structures in Swanton are functionally deficient and one, the Missisquoi Bay Bridge, is structurally deficient. Table 26 provides a summary of sufficiency ratings of all State-owned structures 20' and over in Swanton.

Figure 3.3 Transportation Network

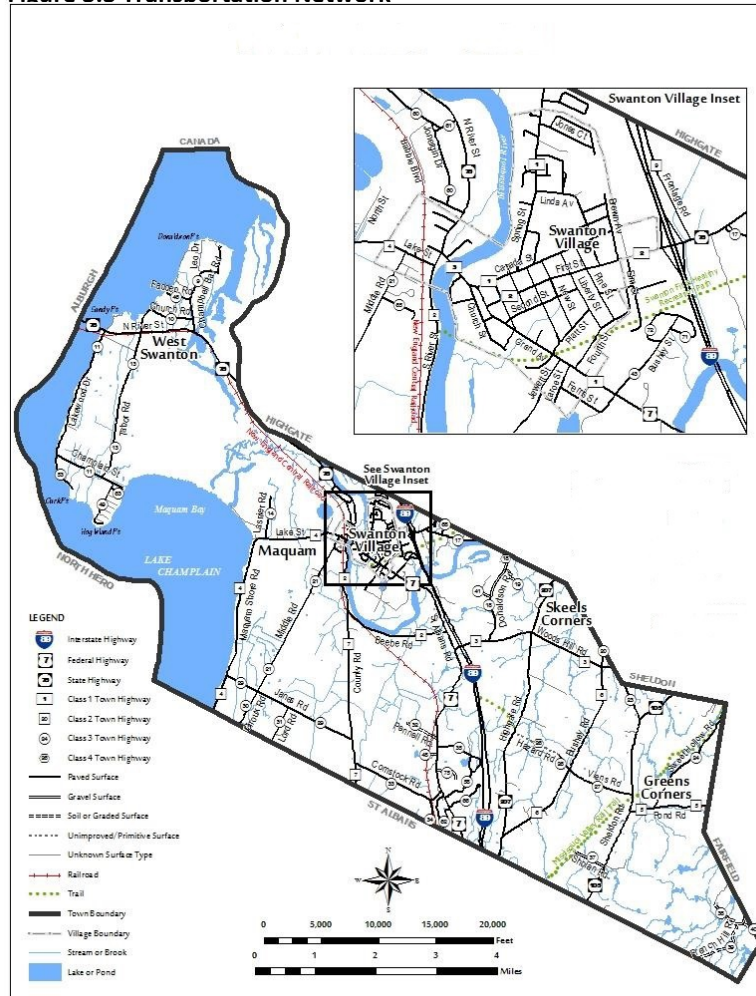


Table 3.1 Sufficiency Ratings of State Structures 20 ft and over in Swanton, 2001

Principle Route	Bridge Number	Location	Feature Crossed	Federal Sufficiency Rating	Deficiency Status
I-89	094N	3.2 mi. S. Exit 21	I-89 over TH 3	0898	ND
I-89	094S	3.1 mi. S. Exit 21	I-89 over TH 3	0919	ND

I-89	096N	0.6 mi. S. Exit 21	Missisquoi River	0762	ND
I-89	096S	0.6 mi. S. Exit 21	Missisquoi River	0762	ND
I-89	097N	0.3 mi. S. Exit 21	I-89 over LVRR	0713	FD
I-89	097S	0.3 mi. S. Exit 21	I-89 over TH 3	0718	FD
I-89	098N	I-89 Exit 21	I-89 over VT 78	0762	FD
I-89	098S	I-89 Exit 21	I-89 over VT 78	0762	FD
US7	0178	1.0 mi. S. Jct. VT78E	Missisquoi River	0902	ND
VT78	0002	3.0 mi. W. Jct. US7	Missisquoi Bay	0269	SD
VT78	0006	0.2 mi. W Jct. US7	Missisquoi River	0701	ND
C2003		0.5 mi. to Jct. W. CL2	Hungerford		
	0004	TH4	Bridge	0670	ND

Source: Vermont Agency of Transportation, 2001

Deficiency Status: ND=Not Deficient, FD=Functionally Deficient, and SD=Structurally Deficient

Rail

The main line of the New England Central Railway (NECR) parallels the Route 7 and 78 corridors through Swanton Town and bypasses the Village. The Amtrak passenger station is located in the City of St. Albans. NECR stops in Swanton to transport freight from an industrial area located near Upper Ferris Street. This site is accessed via the former Lamoille Valley Railroad. The former train stations in Swanton were located on Depot Street (relocated to South River Street) and in Fonda (formerly Swanton Junction).

Air

The Franklin County Airport is located just north of Swanton in Highgate. This general aviation airport currently provides charter passenger service. The current runway is 3,000 feet long. According to the Franklin County Airport Layout Plan, there are long-range plans to extend the runway to 3,700-4,000 feet. In order to improve navigation, there are plans to establish a non-directional beacon (NDB) approach and to upgrade lighting.

Long-range plans include two other projects: 1) an apron expansion, and 2) partial parallel taxiway. The airport is supportive of expanding services for a growing tourist industry and would allow private corporate hangars to be constructed.

4. RISK ASSESSMENT

Identifying hazards, profiling hazards, estimating losses and assessing vulnerability

The hazard mitigation planning committee collected data and compiled research on hazards including: severe winter storm /ice storm, flooding / fluvial erosion, thunderstorms (high winds, lightning, hail), loss of electrical service, structure fire, hazardous materials, drought, telecommunications systems failure, tornado, earthquake, major fire – wildland, civil disturbance, terrorism/WMD. Research materials came from local, state and federal agencies including FEMA, NOAA, NCDC and DOT. Research was also conducted by referencing historical local newspapers, texts, interviewing residents, and scientific documents. Internet references were widely utilized in historical research applications. Current mitigation activities, resources, programs, and potential action items from research materials and stakeholder interviews were also identified.

The information is based on surveys and interviews with local officials and the best available data sources found from federal, state, regional, and local agencies and departments. The risk and/or impact of several hazards were negligible and the state examination was considered sufficient in justifying the time spent on the analysis.

Hazard identification and risk estimation can be a highly complex, time consuming and very costly effort if sophisticated technical and engineering studies are undertaken. Swanton Village and the Town of Swanton do not have the resources to undertake hazard identification and risk assessment studies to this level of detail. The Village of Swanton and Town of Swanton and the Northwest Regional Planning Commission used a module of Mitigation 20/20 software which included a hazard profile matrix (Attachment A) that was used to develop a risk rating for each identified hazard. The matrix is intended to be completed by relying on hazard identification and risk evaluation information that is available as well as the knowledge and judgment of planning participants. Health and safety consequences, property damage, environmental damage and economic disruption are classified as consequences of occurrence of each hazard. The following is a description of the risk characteristics used to classify each hazard primarily based on Mitigation 20/20 program:

Frequency of Occurrence / Future Probability:

1. Rare: Unknown but likely to occur in the next 500 years
2. Unlikely: Unknown and unlikely to occur in the next 100 years
3. Possible: likely to occur in the next 100 years
4. Likely: Likely to occur in the next 25 years
5. Highly Likely: Likely to occur once a year or more

Magnitude or % Community Impacted:

0. Negligible: < 10% of properties damaged.
1. Limited: 10% to < 25% of properties damages/Loss of essential facilities/services for up to 7 days/few (<1% of population) injuries possible.
2. Critical: 25% to 50% of properties damaged/Loss of essential facilities/services for > 7 days < 14 days/Major (< 10% of population) injuries/few deaths possible.
3. Catastrophic: > 50% of properties damaged/ loss of essential facilities/services for > 14 days/Severe (> 10% of population) injuries/multiple deaths possible.

Health & Safety Impacts:

- 0. No health and safety impact
- 1. Few injuries or illnesses
- 2. Few fatalities but many injuries or illnesses
- 3. Numerous fatalities

Property Damage:

- 0. No property damaged
- 1. Few properties destroyed or damaged
- 2. Few destroyed but many damaged
- 3. Few damaged but many destroyed
- 4. Many properties destroyed and damaged

Environmental Damage:

- 0. Little or no environmental damage
- 1. Resources damaged with short term recovery practical
- 2. Resources damaged with long term recovery feasible
- 3. Resources destroyed beyond recovery

Economic:

- 0. No economic disruption
- 1. Low direct and/or indirect costs
- 2. High direct and low indirect costs
- 3. Low direct and high indirect costs
- 4. High direct and high indirect costs

The risk estimation matrix (See Attachment A) for the Town derives a “relative risk score” using a qualitative process in which to compile estimates of the likely **frequency** of occurrence, the **extent** of the community that would be impacted, and the likely **consequences** in terms of public safety, property damage, economic impacts and harm to environmental resources. The total is considered in this plan to constitute the relative risk score. The hazards with the highest risk score are flooding, severe winter storms, fluvial erosion/landslide and high winds/thunderstorm/lightning. It should be noted that the community’s overall risk rating is low (259 out of a possible high of 1,083).

Vulnerability Scores

Vulnerability assessments build on the identification of hazards in the community and the risk that the hazards pose to the community. The vulnerability assessment process examines more specifically how the facilities and systems of the Town would be damaged or disrupted by the identified hazard.

The combination of the impact of the hazard and the frequency was used to determine the community vulnerability (risk score) as HIGH, MODERATE or LOW. The vulnerability classifications based on risk scores are as follows:

- 0-24 LOW

- 25-49 MODERATE
- 50-75 HIGH

For example, a Flood event is *highly likely* (nearly 100% probability in the next year) in many communities within Franklin County but the degree of impact varies, so a *highly likely* flood with *critical* or *catastrophic* impact rates the community vulnerability as HIGH. A community with a *highly likely* or *likely* (at least one chance in the next 10 years) flood with a *limited* impact would receive a vulnerability rating of MODERATE. The vulnerability of a community having the occurrence of an event as *possible* or *unlikely* with *limited* or *negligible* impact would be LOW.

In order to determine estimated losses due to natural and man-made hazards in Swanton Town and Village, each hazard area was analyzed; results are shown below. Human losses were not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure.

A full summary of hazards and impacts is provided in Table 4.1.

Table 4.1 Summary of Hazards and Impacts for the Town of Swanton and Village of Swanton

Hazard Type	Frequency Of Occurrence	Impact / Magnitude	Risk	Estimated Potential Losses (Dollars)	Vulnerability
Severe Winter Storm / Ice Storm	Highly Likely	Limited to Catastrophic	Moderate to High	n/a	Roads, bridges, commercial and residential structures, seasonal homes, public buildings, (Town Office, PSB, PWB, Rec Center, Library, cemeteries), school, church, and utilities.
Flooding / Fluvial Erosion	Highly Likely	Limited to Catastrophic	Moderate to High	\$2,935,800	Loss of road access, power loss, telecommunications loss. Roads, bridges, commercial and residential structures, seasonal homes and utilities.
Severe Thunderstorm (High Winds, Lightning, Hail)	Highly Likely	Limited	Moderate	n/a	Falling limbs and/or trees, power loss, church, school, telecommunications loss, structural damage, crop damage. Commercial and residential structures, seasonal homes, public buildings (Town Office), utilities.
Loss of Electrical Service	Rare	Limited to Critical	Moderate	n/a	Public building (Town Office), church, utilities, residential and seasonal homes, commercial structures, including commercial farms.
Structure Fire	Unlikely	Limited	Low	\$489,300	All structure types especially those lacking early detection systems.
Hazardous Materials	Unlikely	Limited	Low	n/a	Residential and seasonal homes, commercial structures, public buildings including Town Office, Public Safety Building, Public Works Building/Garage, Recreation Center, Library Buildings, State Garage, church, school, utilities, and the environment.

Drought	Rare	Limited to Catastrophic	Low	n/a	Commercial structures – farms, livestock, private wells, public structures (water reservoir, water pumping station and wastewater treatment plant), residential and seasonal homes and vulnerable populations.
Loss of Water & Sewer Service	Rare	Limited	Low	n/a	Public Health, residential and seasonal homes, commercial structures, church, public structures (e.g. Water Reservoir and Wastewater Treatment Plant, Town Office, Public Safety Building).
Telecommunication Systems Failure	Rare	Limited	Low	n/a	Residential structures, seasonal homes, commercial, public buildings (e.g. Town Office) elementary school, utilities. Special needs populations.
Tornado*	Rare	Limited	Low	\$3,443,483	Falling limbs and/or trees, power loss, telecommunications loss. Structural damage to residential and seasonal homes, public buildings (Town Office, State Garage, Public Works Building/Garage, Public Safety Building, Recreation Center, State Garage, Water Pumping Station) commercial structures and utilities.
Earthquake	Rare	Limited to Catastrophic	Low	\$2,222,483	Infrastructure (roads, bridges), structural damage to residences, seasonal homes, commercial building, public buildings (Town Office, State Garage, Public Works Building/Garage, Public Safety Building, Rec Center, Water Pumping Station, Water Reservoir), utilities.
Major Fire – Wildland*	Rare	Limited	Low	n/a	Residential and seasonal homes, commercial structures, utility poles and lines, road closures, fires in rural areas lacking fire breaks.
Terrorism/WMD and Civil Disturbance*	Rare	Limited	Low	n/a	School, public building (Town Office, State Garage, Public Works Building/Garage, Public Safety Building, Rec Center, Water Pumping Station).
Extreme Temperatures*	Rare	Limited	Low	n/a	Fauna, public health.
Hurricane*	Rare	Limited	Low	n/a	Local and state transportation networks. Residences, businesses, Town Office, State Garage, Public Works Building/Garage, Public Safety Building, Rec Center, Water Pumping Station and Elementary School.
Infectious Disease Outbreak*	Rare	Limited	Low	n/a	Fauna, public health.
Invasive Species*	Rare	Limited	Low	n/a	Agricultural crops, forests.
Rock Cuts*	Rare	Limited	Low	n/a	State highway 242.
Nuclear Power Plant Failure*	Rare	Limited to Catastrophic	Low	n/a	All flora and fauna. Public health, Agriculture.
Rockslide/Landslide*	Rare	Limited	Low	n/a	State Highways 242 and 118.

*Has never occurred.

All the hazards identified in the state hazard mitigation plan were considered. Several of the hazards are summarized in table 5.1. The Committee decided it is not feasible to study each in depth again as many of the hazards were considered unlikely or rare. The hazards not profiled in this plan update are considered to be unlikely or rare in Swanton Village and Swanton Town and therefore will not be profiled in this plan update. Those hazards that are not considered in the local plan may have been profiled in the State Hazard Mitigation Plan. The hazards not addressed in this plan update along with the justification for not including them are outlined in the following table.

4.2 Hazards Not Profiled

Hazard Not Profiled	Justification
Loss of Electrical Service	Rarely occurs and typically a consequence of other hazards such as winter storm (ice storm). Utilities are privately owned and regulated by public safety board. Village has emergency power generators at public safety building, village offices, water and wastewater plant. Town has generators at Town office, town highway department.
Structure Fire	There are on average 8 structure fires in town each year according to Fire Department. The Fire Department has set response procedures they follow structure fires. New construction follows state fire marshal codes.
Hazardous Materials	There are no large-scale hazmat storage sites or manufacturing facilities in town. Hazardous materials are mostly propane and gasoline. The Town Fire Departments follows set hazmat response protocols should a spill occur.
Drought	Has not occurred in memory. Dry conditions occur briefly in late summer if they occur at all.
Loss of Water & Waste Water Service	Most of the Town relies on private wells. The village is served by Swanton Water and Waste Water. Interruptions are rare and usually involve flushing hydrants or line maintenance. None issue.
Telecommunications Systems Failure	Typically accompanies another hazard such as power loss, winter storm (ice storm). Telecommunications infrastructure that serves town is privately held.
Tornado	Has never occurred in the Village or Town. Generally profiled under high winds.
Earthquake	A moderate scale earthquake has never occurred in the Village or Town. The Village and Town do not lie near any fault zone. Refer to Vermont State Hazard Mitigation Plan for further information regarding earthquake risk.
Major Fire – Wildland	A Large wildland fire complex has never occurred in Town. There are no large open forested or grass areas in village. Small grass fire in spring and summer occur rarely and typically less than an acre in size. The Swanton Fire Department has response procedures and equipment to handle hazard.
Terrorism / WMD and Civil Disturbance	Has never occurred in the Village or Town. Swanton Village Police with support from Vermont State Police and US Customs and Border Patrol in nearby Highgate, VT would be primary response agency for any terrorist type incident.
Extreme Temperatures	The Committee agreed that extreme temperatures a non-issue because they are brief in duration if they occur at all. Hot spells in summer and cold snaps in winter are just part of life in Swanton Village and Town and not a concern.
Hurricane	The Village and Town is too far north from the Atlantic coast. Vermont does not have any coastline. Tropical storms are profiled under High Winds section.
Infectious Disease	Has not occurred in Town. Considered rare.

Outbreak	
Invasive Species	Considered rare. Town would rely on state to assist individuals and commercial ag producers in mitigation and response to invasive outbreak.
Rock Cuts	None in town.
Nuclear Power Plant Failure	Swanton Town and Village is approximately 200 miles northwest from the nearest nuclear power plant which is the recently decommissioned VT Yankee Nuclear Power Plant owned by Entergy Nuclear Vermont Yankee, LLC.
Rockslide/Landslide	Do not occur in the Village or Town. No areas where rockslides are an issue. Mentioned in landslide (fluvial erosion).

The community has identified and chosen to focus mitigation action items on the following hazards: Severe Winter Storm / Ice Storm, Flooding / Fluvial Erosion, and Severe Thunderstorms (High Wind, Lightning, and Hail). These are the hazards that are most likely to occur in Swanton Village and Swanton Town are the hazards developed mitigation actions around.

Severe Winter Storms / Ice Storm

Description

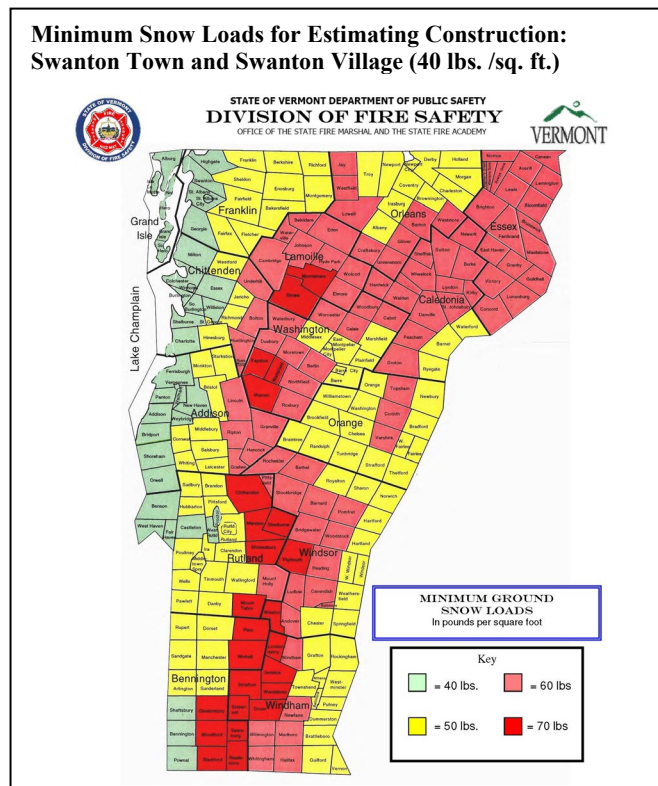
Winter storms are a regular occurrence in northwestern Vermont. The National Oceanographic and Atmospheric Agency (NOAA) reports that 137 snow and ice events occurred in Franklin County between 1993 and 2006. Severe winter storms can cause serious damage to infrastructure and pose threats of injury or death. During a particularly cold period in 1978,

**Table 4.3 Burlington, Vermont Top 10 Fall Snowfall Totals
September to November**

Highest			Lowest		
Rank	Snowfall	Year(s)	Rank	Snowfall	Year(s)
1	24.0"	1900	1	0	2009/1948/1937/1915
2	23.0"	1921	2	0.1"	2004
3	21.9"	1906	3	0.4"	2010/1953/1930
4	20.4"	2002	4	0.5"	2003/1946/1941/1934/1918
5	19.4"	1910	5	0.7"	1999/1960/1894
6	19.2"	1971	6	0.8"	1982
7	18.8"	1968	7	0.9"	1988/1929
8	16.1"	1997	8	1.0"	1931
9	16.0"	1977	9	1.3"	1964
10	15.6"	1969	10	1.4"	1939

Source: National Oceanic and Atmospheric Administration

Figure 4.1 Snow Loads in Vermont



with temperatures in the range of 30 degrees below zero, an electric transformer in Swanton failed. The resulting power outage required mobilization of town emergency crews who had to locate and transport particularly vulnerable members of the community to warm shelters.

Impact and Geographic Area of the Hazard

The primary impacts of a winter storms / ice storm typically include disruptions to transportation networks due to fallen limbs and trees, school closings and occasionally telecommunications and power outages. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice may cause extreme hazards along roadways.

Winter storms / ice storms affect the entire Town and generally cause disruptions to public and private services. Construction standards for snow load (see map below) indicate that structures in Swanton Village and Swanton Town should be built to withstand loads of 40 pounds per square foot. This would indicate an average depth of snow of 40 inches or 10 inches of ice on a square foot of roof surface. At that point, design standards would be exceeded and the structure runs the risk of collapse. Given this standard, a snowstorm which dumped 40 inches of snow or 10 inches of ice would likely result in a few collapsed roofs, especially on structures which are not built to these standards.

The primary impacts of an ice storm typically include disruption to transportation networks due to fallen limbs and trees, school closings and occasionally telecommunications and power outages.

Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice may cause extreme hazards along roadways.

Vulnerable populations, such as the elderly, those dependent on medical equipment and specialized health or physical care, are at risk to all types of winter storms. At risk are farms and livestock. Barns can collapse due to heavy snow and ice loads. Dairy cattle are susceptible to mastitis³ if they are unable to be milked. Many larger dairy farms have stationary or portable PTO driven generators as back-up power for automated milking equipment. People who use electric heat in their homes when associated power outages occur are also at risk.

Table 4.4 Burlington, Vermont Top 10 Winter Snowfall Totals

December to February					
Highest			Lowest		
Rank	Snowfall	Year(s)	Rank	Snowfall	Year(s)
1	103.4"	2007-08	1	18.4"	1912-13
2	97.9"	2010-11	2	20.4"	1979-80
3	96.9"	1970-71	3	21.9"	1928-29
4	90.1"	2009-10	4	23.6"	1936-37
5	81.7"	1965-66	5	24.0"	1898-99
6	80.7"	2003-04	6	25.0"	1904-05
7	80.0"	1957-58	7	25.6"	1940-41
8	79.4"	2008-09	8	26.3"	2011-12
9	78.6"	1946-47	9	27.0"	1900-01
10	75.7"	1969-70	10	27.4"	1960-61

Source: National Oceanic and Atmospheric Administration

Extent and Probability

The National Weather service defines a blizzard as "a storm which contains large amounts of snow or blowing snow, with winds in excess of 35 mph and visibilities of less than 1/4 mile for an extended period of time (at least 3 hours). When conditions are predicted, the National Weather Service issues warning ranging from a Winter Storm Warning (heavy snowstorm predicted within 24 hours) to Blizzard Warning (sustained wind and snow gusts up to 35 mph for at least 3 hours) to Heavy Snow Warning (accumulations of over 6 inches in a 24-hour period).

Table 4.5 Burlington, Vermont Top 10 Spring Snowfall Totals Match to May

Highest			Lowest		
Rank	Snowfall	Year(s)	Rank	Snowfall	Year(s)
1	52.7"	1933	1	0.1"	1945
2	47.8"	2001	2	1.0"	1903
3	45.7"	1971	3	2.0"	1910
4	37.7"	1974	4	2.7"	1927
5	36.4"	1916	5	3.1"	1934
6	36.1"	1997	6	3.2"	1991
7	34.4"	1994	7	3.9"	1946
8	33.9"	1983	8	4.0"	1905
9	31.0"	2007/1972	9	4.1"	1915
10	30.1"	2011	10	4.2"	1921

Source: National Oceanic and Atmospheric Administration

³ Mastitis is the inflammation of the mammary gland caused by microorganisms, usually bacteria that invade the udder, multiply and produce toxins that are harmful to the mammary gland.

Some of the worst historical storms in northwestern Vermont have left snow depths of 14" (March 2001), wind speeds up to 40 mph (January 1998), and ice accumulations of 2-4" (January 1998 and December 2013).

Winter storms / ice storms occur annually in Swanton Village and Swanton Town, typically in the form of a Nor'easter. Nor'easters occur most often in the winter and early spring, but also sometimes during the fall. These storms can leave inches of rain or several feet of snow on the region, and sometimes last for several days.

According to the National Climate Data Center, there have been 85 winter storms events affecting western Franklin County, Vermont including Swanton Town and Village since January 1, 1997 totaling approximately \$1,097,500 in property damages and no deaths in the region. Additionally, there were 3 severe ice storms in the region causing \$2,500,000 in property damages and no deaths.

The most serious winter storm event in many years was the ice storm of January 1998. The ice storm struck the region on January 8th, covering roads with ice and bringing down power lines. A state of emergency was declared on January 9th. On January 15th, President Clinton declared Franklin County, along with five other counties, as federal disaster areas eligible for federal disaster assistance. The initial declaration was for Emergency Protective Measures and Debris Removal, and Hazard Mitigation. On January 26th, this declaration was expanded to include Individual Assistance. (FEMA, 1998)

Past Occurrences:

Table 4.6 Swanton Town and Village Flood History with Disaster Declarations

Date	Location	Severity Remarks/ Description of Area Impacted
January 19, 1996	Addison, Chittenden, Franklin, Grand Isle, Lamoille, Orleans, Essex Counties	FEMA 1101-DR-VT Warming trend produced heavy rains causing rapid snow melt that led to flooding.
January 5, 1998	Addison, Chittenden, Franklin, Grand Isle, Lamoille, Orleans, Essex Counties	FEMA 1201-DR-VT "The Great Ice Storm of '98" intermittent freezing rain developed over northern New York and New England. The freezing rain and drizzle became steadier on January 7 and continued through January 9. In Swanton, intermittent freezing rain, freezing drizzle, rain, drizzle, and snow persisted during the 5-day period before skies cleared. On January 11 a drier cold front moved in.
March 5 th and 6 th 2001	Franklin and Grand Isle Counties	A major snow storm that resulted in 14" of snow in Swanton Town and Village and neighboring communities. The storm began early Monday morning with a brief burst of snow then transitioned during the midday hours to intermittent light snow, sleet, freezing rain and rain. The storm developed into a nor'easter during the afternoon and continued through the evening. Damage estimates for cleanup are unknown.
October 25, 2005	State-wide	A rare autumn Nor-easter struck New England. The Nor'easter was fed by the remnants of Hurricane Wilma. There were

		reported snowfall amounts in the County varied from 6 to 14 inches. Trees still laden with fall foliage, were downed due to the weight of heavy, wet snow. There were many reports of snapped power lines from downed trees and branches. Many homes serviced by Vermont Electric Cooperative were without power for several days.
February 14, 2007	State-wide	A winter storm blanketed most of New England. In Vermont, snow fell heavy at times from late morning through early evening before dissipating during the night. Snowfall rates of 2 to 4 inches per hour and brisk winds of 15 to 25 mph caused near whiteout conditions at times, along with considerable blowing and drifting snow, making roads nearly impassable. Temperatures in the single numbers combined with brisk winds created wind chill values of 10 degrees below zero or colder in Swanton Town and Village.
December 1-5, 2010	State wide	FEMA DR 1951. Vermont received a Presidential disaster declaration to supplement state and local recovery efforts in the areas struck by severe storms during the period. FEMA's public assistance funds were made available to affected counties including those in Franklin County.
December 20-26, 2013	Franklin, Grand Isle, Lamoille, Orleans and Essex Counties.	FEMA DR-4163 a wide-spread low-pressure system that brought snow and freezing rain through Ontario, Quebec, and Northern New England. These areas experienced an ice storm that brought wide-spread power outages. Many Towns throughout Franklin County, Vermont were affected by the ice storm. Vermont Electric Cooperative responded to over 60,000 customer outages during the week and estimated costs of restoring power at \$7,400,000. In Swanton Village and Swanton Town, road crews were active keeping roads open and removing ice damaged trees and limbs from local roads. Swanton Electric crews received support from mutual aid to restore lines that were damaged by ice. Several residents were without power for several days.
February 29, 2015	Addison, Caledonia, Chittenden, Essex, Franklin, Grand Isle, Lamoille, Orleans, Rutland Washington and Windsor Counties	Snow overspread Vermont around Midnight on December 29th and ended by mid to late afternoon, changing to sleet and freezing rain before ending. Snowfall amounts across the area was 3 to 7 inches with limited icing. A combination of snow and sleet accumulated 3 to 5 inches across Franklin county along with some light freezing rain at times.
February 12-13, 2017	Caledonia, Essex, Franklin, Grand Isle,	Snow began fell steadily through the evening hours before slowly tapering during the overnight hours. Widespread 6 to 12 inches of snow fell with some localized higher amounts fell

	Lamoille and Orleans Counties.	across Vermont. Impacts were largely travel delayed and nearly all school districts cancelled classes for February 13th. Widespread 8 to 15 inches of snowfall in Franklin County including 15 inches in Swanton.
January 4, 2018	Addison, Caledonia, Chittenden, Essex, Franklin, Grand Isle, Lamoille Rutland and Orleans Counties	Widespread snow moved across Vermont during the morning hours, becoming steadier/heavier for much of eastern VT during the 4th. Wraparound snowfall during the night of the 4th and the day of the 5th added snowfall to Vermont's northern peaks and western slope communities. Overall snowfall statewide was 3 to 7 inches with upwards of 8-12 inches along the northern western slopes of the Green Mountains.
January 13, 2018	Addison, Caledonia, Chittenden, Franklin, Lamoille, Orange, Rutland and Windsor Counties	Rapidly falling temperatures overnight into Saturday morning accounted for rain changing to freezing rain, sleet then snow. Significant sleet occurred in the Champlain Valley and much of central VT with 4 to 8 inches of snow as well across northwest VT. Sharply falling temperatures allowed for a flash freeze of area roads making for extremely hazardous travel. The main impacts of this storm were flooding from ice jams and are profiled under the flooding section below.
February 7, 2018	Caledonia, Essex, Franklin, Grand Isle, Lamoille and Orleans Counties.	A quick but potent system with duration of 6 to 8 hours and snowfall rates of an inch or more for several hours, which made for a hazardous evening commute. Snowfall accumulations of 5 to 10 inches were observed across much of Vermont. A widespread 5 to 10 inches of snow fell across Franklin county, with 11 inches in Swanton and 9 inches in St. Albans. Snowfall rates of 1 to 2 inches per hour was observed at times.
November 27-28, 2018	State-wide	Precipitation moved into the North Country on the afternoon of November 26th, falling as snow at elevations above 1500 feet and rain at lower elevations. By early morning of November 27th, the atmosphere cooled enough to allow for precipitation to changeover to snow. Highest snowfall totals at elevations above 1500 feet, where more than 12-15 inches fell. In Franklin county, snow accumulated 4 to 8 inches. The heavy wet snow accounted for more than 40,000 outages, effecting 100,000 customers without power due to snow loading on power lines.
January 8 – 10, 2019	Caledonia, Essex, Franklin, Grand Isle, Lamoille and Orleans Counties.	A long duration snow event with a wide range of snowfall amounts with the lowest in the valleys and highest totals along northwest faced higher terrain. Snowfall totals ranged from 6 to 20 inches with 20 inches in Fletcher, 10 inches in Enosburg Falls and 6 inches in Swanton.
February 12-13, 2019	Caledonia, Essex, Franklin,	Snow developed across the region during the afternoon and evening hours of the 12th and changed to freezing rain at times

	Grand Isle, Lamoille and Orleans Counties.	across southern Vermont before ending as snow on the 13th. A widespread 6 to 15 inches of snow occurred across Vermont with 7 to 14 inches of snow in Franklin county.
March 22, 2019	Caledonia, Essex, Franklin, Grand Isle, Lamoille and Orleans Counties.	Heavy wet snow fell across Franklin county with snowfall totals of 5 to 15 inches with the higher totals in the higher elevations, especially along the western slopes of the Green Mountains. Some specific totals include; 14 inches in eastern St. Albans, and 6 inches in Swanton.

The Town and Village have classified severe winter storms / ice storms to be highly likely each year. Every winter there is a winter event where Village and Town residents will have to address snow and ice build-up on personal property and the Village and Town's public works department will have to ensure the roads remain clear of snow and ice.

Flooding / Fluvial Erosion

Description:

Historically in Vermont, flooding has been the number one natural disaster in loss of life and property. Most flash flooding is caused by heavy rain from thunderstorms. Fluvial erosion is the destruction of riverbanks caused by the movement of rivers and streams. This occurs when the stream is unstable and has more energy than is needed to transport its sediment load, due to channel alterations or runoff events that increase water speed in the channel. Historic land uses along rivers and streams, including floodplain encroachments and removal of vegetation have increased the risk of fluvial erosion.

Impact and Geographic Area of the Hazard

The Missisquoi River, Charcoal Brook, Hungerford Brook and Dead Creek and their tributaries typically flood in the spring of each year, and during periods of concentrated rain events. Flood plains in Swanton follow along the brooks and creeks of undeveloped areas of forest lands and marshes and land that is in agricultural use. The town has an excellent history of road maintenance and inventory including culvert upgrades in addressing flooding problem areas.

Transportation facilities that parallel the Missisquoi River are subject to period flooding, such as the Central Vermont Railway which has tracks crossing the flood plain. There is one section of State Route 7 and several sections of State Route 78 that parallel the Missisquoi River and are subject to flooding. Small areas of underdeveloped farmland in the Town and several neighborhoods along the Missisquoi River in the Village of Swanton are subject to flooding by localized flooding sources. The typical impact for residences is water in the basement.

Flooding within the Missisquoi River is affected primarily by the intensity and duration of rainfall in areas further upstream. In addition to floods caused by rainfall mixed with snowmelt and ice jams or a combination of the three.

Ice jams usually happen during the late winter or early spring but have occurred during the early winter months. Flooding on the Missisquoi River within the boundaries of the Missisquoi National Wildlife Refuge are controlled by the floodwaters of Lake Champlain. Since this area is primarily swampland, the water levels do not rise rapidly, but disperse in to a wide flood plain.

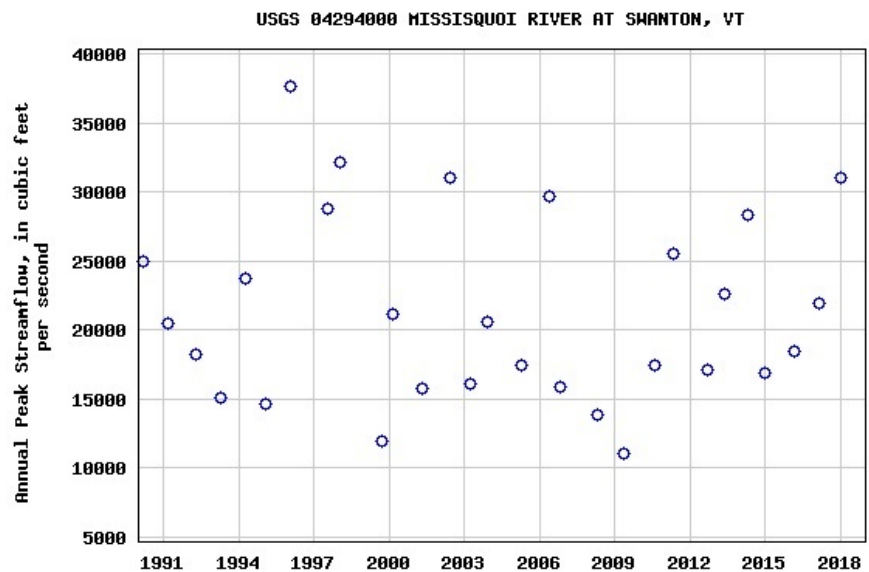
Fluvial erosion hazard mapping was released by the VT Agency of Natural Resources (ANR) in early December 2014. This mapping will assist municipalities in developing bylaws and effective mitigation strategies to regulate development within fluvial erosion hazard zones. Swanton Town and Village have been proactive in developing a river corridor bylaw, which is included with their zoning regulations. This bylaw is considered interim for the river corridor criteria set by Vermont Agency of Natural Resources and Vermont Division of Emergency Management and Homeland Security (DEMHS).

Flash floods typically occur in high elevation drainage areas as a result of summer thunderstorm activity. Flash flooding can also result from ice dams. The one location in town where ice jams do occur is along the Missisquoi River near VT78 Bridge and several miles downstream to the Missisquoi National Wildlife Area. The state-owned highway in this area is near the river according to VAOT engineers and cause ice jams tend to cause flooding along the VT78 area. Ice buildup and associated flooding are a threat to the 20 residences and small hotel in this area. This hazard area falls under the state's jurisdiction.

Several village residences lie near the floodplain but there is generally minimal damage when flooding conditions occur. Many buildings are built outside the floodplain for the most part, although many portions of private properties, mostly lawns, are in the floodplain and may be damaged. Neighbor hoods along South River Street, North River Street, and Gallup Court could be damaged to a severe flood but historically no severe damage has occurred. There has been considerable investment made in Swanton Village to flood proof properties against flooding.

A GIS based overlay analysis was conducted using FIRM data with the Vermont E-911 data of structure location. The results found that there are eighty-eight (88) structures within the 100 or 500-year flood plain in the Town of Swanton. There are forty-one (41) all-season single-family units, one (1) multi family unit, two (2) mobile homes, twelve (12) camps, fourteen (14) seasonal homes, twelve (12) accessory buildings, (2) commercial sites, one (1) commercial lodging, one (1) gated with building, one (1) government site and twelve (12) accessory buildings.

Figure 4.2 Missisquoi River at Swanton Stream Gauge. Annual Peak Stream flow.



Source:
Source: USGS

The median value of owner-occupied housing units in Swanton is \$191,100 and in Swanton Village and \$162,000 in Swanton Town. Estimating flood damage of the 10% of structures with 20% damage is \$2,935,800. Cost of repairing or replacing the utilities, roads, bridges, culverts, and contents of structures is not included.

Extent / Probability

Flash floods, rain storms and fluvial erosion occur annually. According to the National Climatic Data Center, there have been 14 recorded flash flood events and 28 flood events causing approximately \$9,605,000 and \$193,000 and 0 deaths respectively in eastern Franklin County between 1996 and 2016.

Table 4.7 Historic Crests of the Missisquoi River

Source : NOAA River Gauge Missisquoi River in Swanton

Date	Elevation
01/14/2018	13.14 ft
01/20/1996	9.50 ft
11/02/2019	9.49 ft
01/09/1998	8.64 ft
06/12/2002	8.46 ft
05/20/2006	8.24 ft
07/15/1997	8.05 ft
04/16/2014	7.99 ft
04/29/2011	7.51 ft
03/18/1990	7.40 ft

Flash floods typically occur during summer when a large thunderstorm or a series of rain storms result in high volumes of rain over a short period of time. Higher-elevation drainage areas and streams are particularly susceptible to flash floods. Flash floods are likely in Swanton Village and Swanton Town in limited area and potential damage to State transportation corridor VT78 could limit access to the Village and Town. Flooding and fluvial erosion are considered highly likely by the town.

There is a stream gauge on the Missisquoi River east of the Village. The highest recorded measurement was 13.14 feet, which was measured on January 14, 2018.

At this location Moderate Flood Stage is 9 ft. At 9 ft., water will cover Foundry Street and Marble Mill Park in Swanton Village. Downstream in West Swanton, Route 78 will be covered, and residences along the river will flood. Access roads and boat landings in the Missisquoi Wildlife Management area will be inundated. Upstream of Swanton, water will cover Waugh Farm Road. Further upstream near East Highgate, water will approach Route 78.

Flood Stage is 8 ft. Water will cover Foundry Street in Swanton Village, and enter Marble Mill Park. Water will cover one lane of Route 78 downstream in West Swanton, and surround seasonal camps and enter the back yards of homes along Route 78. In the Missisquoi Wildlife Management area, Louie's Landing will flood along with local access roads. Upstream of Swanton, Waugh Farm Road will become inundated. There will be widespread lowland and field flooding.

Extent for fluvial erosion: Following the Agency of Natural Resources geomorphic assessment data for fluvial erosion hazards, the Missisquoi River corridor in Swanton Village and Swanton Town was given a High-Risk rating. There are three residences and one commercial business that could be impacted by stream channel erosion in this area. There are 20 residences, 4 commercial sites that are at risk from fluvial erosion in this area. Extent information in terms of area measurements is unavailable even for the most significant areas where erosion is a concern.

Past Occurrences:

Floods of large magnitude occurred in Swanton Village and Swanton Town in 1888, 1895, 1927, 1973, 1976, 1983, 1997, 1998 and 2011.

The flood of November 3 and 4, 1927 caused damage to property along the Missisquoi and its' tributaries. The storm brought a total of 6.35 inches to the Village of Enosburg Falls which lies east within the Missisquoi River basin. The Swanton Village dam had 15 feet of water over the crest and on the west side, several houses were undermined due to the scouring effect of the flooding of the bank. The waters levels also reached the floor of the steel highway bridge.

The citizens of Swanton were able to stop prevent the bridge from being washed out. The old sawmill at the falls was destroyed. The penstock at the Swanton Village Power Plant was so badly damaged that power had to be supplied from the Remington Plant in the town of Swanton. Chevalier's hardware store and Lepell's Grist Mill and Storage room were washed away and Webster's Sawmill was also badly damaged by the water.

During the ice storm of January of 1998, the Missisquoi River jumped its' banks and flooded VT Route 78, cutting West Swanton off from the rest of the community. Flooding on VT Route 78 was severe, and for a few days only large military vehicles could pass along the road. The storm caused extensive damage to trees and powerlines, leaving many residences without power. All year-round customers had electric service restored within two weeks.

From June 14 - 17, 2008, a series of storms affected the entire state (DR 1778). Stronger storms on Monday June 16 produced up to 1-inch hail. These storms also produced heavy rainfall, but were moving more quickly. No flooding resulted. On Tuesday June 17th strong thunderstorms produced pea sized hail and heavy rain in the Missisquoi River basin in northern Vermont. Flash flooding occurred in the eastern parts of Franklin County.

The year 2011 was a record year for flooding in the state of Vermont. The first floods occurred over a two-week period in April and May of 2011 (DR 1995, 4043). These floods impacted the northern half of the state, including the counties of Addison, Chittenden, Essex, Franklin, Grand Isle, Lamoille, Orleans, Washington, and Windham. The damage totaled over \$1.8 million in FEMA assistance. In the spring, heavy rains in late March/early April on top of a deep late season snowpack resulted in riverine flooding and sent Lake Champlain well over the 500-year flood elevation breaking the 140-year-old peak stage elevation. Additional spring runoff events resulted in Lake Champlain being above base flood elevation for more than a month. High lake levels coupled with wind driven waves in excess of 3 feet resulted in major flood damages for shoreline communities.

Additionally, flooding and fluvial erosion caused by Tropical Storm Irene was catastrophic in many parts of southern and central Vermont, destroying property and taking lives, and again eliciting a disaster declaration (DR-4022). Fortunately, Swanton Village and Swanton Town only experienced heavy rainfall throughout the day and evening.

Flooding is a reminder to Swanton Village and Swanton Town residents of the power inherent in nature and is an urgent reminder of the need for proper management and appropriate use of critical floodplain areas. Development within floodplains poses significant risks and should generally be avoided. River channels and floodplains function as a single hydrologic unit, periodically transferring floodwaters and sediment from one to the other. Appropriate uses of floodplains are those that can accommodate this cycle. Examples of uses that are appropriate to floodplains include agriculture, open space, and recreation.

Severe Thunderstorms (High Winds, Lightning, Hail)

Description

Thunderstorms are caused by an updraft, which occurs when warm, moist air rises vertically into the atmosphere. The updraft creates a cumulus cloud, which will eventually be the thunderstorm cloud. Severe thunderstorm winds are brief in duration and bring gust in excess of 50 mph. Severe thunderstorms are capable of producing high winds, large hail, lightning, flooding, rains, and tornadoes.

Microbursts are downdrafts from thunderstorm that may reach speeds in excess of 80 mph. (State of Vermont Hazard Mitigation Plan 2018).

The National Weather Service (NWS) issues a wind advisory when winds are sustained at 31 to 39 mph for at least one hour or any gusts 46 to 57 mph. Winds of 58 mph or higher cause the NWS to issue a High Wind Warning. In Vermont, high winds are most often seen accompanying severe thunderstorms. In fact, straight-line winds are often responsible for most of the wind damage associated with a thunderstorm. These winds are often confused with tornadoes because of similar damage and wind speeds.

Impact and Geographic Area of the Hazard

The Town has experienced a variety of high winds from storm systems that develop along ridgelines. Typically, high winds accompany strong thunderstorms that often generate lightning and/or hail. Micro bursts with high wind speeds and high precipitation accumulations over brief periods often down trees and branches and power lines and can overwhelm local drainage networks for brief periods. There are rare instances where lightning has caused structure fires (barns) and grass fires during dry periods.

Table 4.8 Beaufort Wind Scale

Beaufort Number	Wind Speed Range (mph)	NOAA Terminology	Description
0	0	Calm	Smoke rises vertically.
1	1-3	Light air	Direction shown by smoke but not by wind vanes
2	4-7	Light breeze	Wind felt on exposed skin; leaves rustle.
3	8-12	Gentle breeze	Leaves and small twigs in constant motion; wind extends light flag.
4	13-18	Moderate breeze	Raises dust and loose paper; small branches are moved.
5	19-24	Fresh breeze	Small trees sway.
6	25-31	Strong breeze	Large branches in motion; umbrellas used with difficulty
7	32-38	Near gale	Whole trees in motion, inconvenience felt when walking against the wind.
8	39-46	Gale	Breaks twigs off trees. Cars veer on road. Generally impedes progress
9	47-54	Severe Gale	Light structural damage.
10	55-63	Storm	Trees uprooted. Considerable structural damage
11	64-73	Violent Storm	Widespread structural damage.
12	74-95	Hurricane	Considerable and widespread damage to structure

High winds track generally occur from weather systems that track west to east over the Champlain Valley. High winds are common along the Missisquoi River corridor in the eastern part of Town, as well as the shoreline areas of Lake Champlain to the west and north of Town.

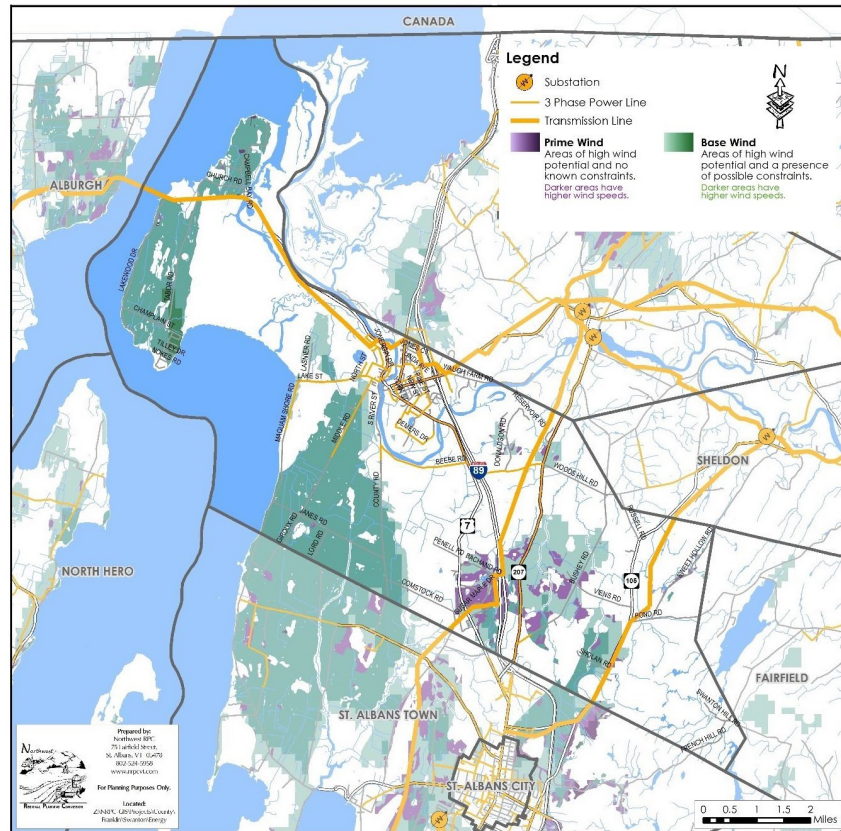
There are no loss estimates for lightning because it is extremely difficult to predict where the event will occur and the type of associated structural damage. Damages could come in the form of destroyed electrical appliances, structure fires, or wildland fires. Death or serious injury could occur to individuals exposed to lightning. Private properties in Swanton Town and Swanton Village have experienced lightning strikes. High elevations and areas around bodies of water such as lakes and ponds are more susceptible. Road crews are equipped with associated debris removal equipment.

High winds are a hazardous threat to the Village and Town and most commonly accompany other storm events. Violent windstorms are possible in both the Village and Town especially along the Lake Champlain shoreline. The Town and Village are far inland and is unlikely to receive a direct hit from a hurricane, however high winds and hail storms have occurred in Town and Village as weakened tropical storms track near the region. High winds associated with severe thunderstorms affect forested areas, utility lines and exposed property.

Extent / Probability

There have been 141 thunderstorm events in the region in the past 58 years according to the National Climatic Data Center. Of those, 77 are classified as severe thunderstorms with wind speeds of 50 kts. or greater. Severe thunderstorms can cause power outages, property damage, transportation interruptions, affect businesses and can cause loss of life. Micro bursts with high wind speeds and high precipitation accumulations over brief periods often down trees and branches and power lines and can overwhelm local drainage networks for brief periods. Micro bursts have occurred almost annually in the past 10 years according to project participants.

Figure 4.3 Areas of High Wind



Lightning strikes in western Franklin County average between 4-6 strikes per square mile each year based on data collected by NASA satellites between 1995 and 2002. Within the Swanton Village and Swanton Town, these numbers would average between 224 -340 lightning strikes per year. There is very little data on lightning strikes in northwestern Vermont. There are rare instances where lightning has caused barn fires and grass fires during dry periods. Damages from lightning could come in the form of destroyed electrical appliances, structure fires, or wildland fires. Private properties have experienced lightning strikes. Higher elevations and areas around the lake shore are more susceptible. The Town's Highway Department has appropriate debris removal equipment.

Micro bursts with high wind speeds and high precipitation accumulations over brief periods have become more frequent during summer months in recent years. Micro bursts often down trees and branches and power lines and can overwhelm local drainage networks for brief periods.

Hailstorms usually occur in Vermont during the summer months and generally accompany passing thunderstorms. While local in nature, these storms are especially significant to area farmers, who can lose entire fields of crops in a single hailstorm. Large hail is also capable of property damage. There have been 64 recorded hail events in Franklin County between 1958 and 2015. Hail is considered a relatively infrequent occurrence. Those hail events that do occur tend to be highly localized and limited to a relatively small area and typically occur with thunderstorms.

There are no loss estimates for lightning because it is extremely difficult to predict where the event will occur and the type of associated structural damage. Damages could come in the form of destroyed electrical appliances, structure fires, or wildland fires. Death or serious injury could occur to individuals exposed to lightning. Private properties in Swanton have experienced lightning strikes. High elevations and areas around bodies of water such as lakes and ponds are more susceptible. Swanton's public works and highway crew are equipped with associated debris removal equipment.

It is extremely difficult to predict where the event will occur and the type of associated structural damage. The estimated damage from a severe thunderstorm event occurring to 10% of all structures in Town with 20% damage is \$14,673,776. The estimated cost does not include building contents, land values or damages to utilities. There are no known deaths that have occurred in Town due to severe thunderstorms.

Past Occurrences

Table 4. 9 Severe Thunderstorms in Swanton Village and Swanton Town: Source NCDC

Dates	Type	Description	Area	Magnitude	Property Damages
3/10/2002	High Wind s	A cold front moved across the area from Canada and brought strong winds. Trees were blown down around Swanton Town and Swanton Village.	Franklin County	54 kts.	\$5,000
5/30/2002	Thunderstorm / Hail	A cold front moved southeast from Canada and triggered late afternoon and evening thunderstorms. Dime size hail was reported in Swanton Town and Swanton Village.	Swanton	0.75 in.	\$0.00
6/9/2004	Thunderstorms High Wind	A cold front tracked slowly across northern New York and Vermont. This front was preceded and accompanied by thunderstorms with damaging winds. Trees and power lines were blown down in many towns including Swanton Town and Swanton Village.	Franklin County	50 kts.	\$5,000
7/5/2005	Thunderstorms / High Winds	Thunderstorms preceded a cold front that moved into Vermont from Canada. Thunderstorms were severe in Franklin County with dozens of trees blown down damaging cars. Winds were estimated between 58 and 72 mph (between 50 and 63 knots). Power outages were reported in the county.	Franklin County	55 kts.	\$100,000
6/19/2006	Thunderstorms High Winds	Thunderstorms intensified during the day as they moved into the Champlain Valley from Canada. These thunderstorms produced severe weather including downed trees.	County Wide	50 kts.	\$10,000
8/16/2007	Thunderstorms High Winds	A cold front moved across the region from Canada and was accompanied by high winds. Many trees were uprooted	State-wide	60 kts.	\$50,000

Swanton Village and Swanton Town Hazard Mitigation Plan 2020

6/10/2008	Thunderstorms, High Winds	A cold front brought severe thunderstorms to the area. Numerous trees were damaged, downed or uprooted which caused downed power lines and structural damage to numerous buildings and vehicles throughout the state. Tens of thousands of customers lost power due to the storms, with some outages that lasted several days. Numerous trees were down on secondary roads in Swanton Town. No one was injured.	Swanton	50 kts.	\$10,000
7/8/2008	Thunderstorms, High Winds.	DR1778. Several rounds of thunderstorms moved across northern Vermont during the afternoon of July 18th. A developing squall line across the Champlain Valley of New York moved into northwest Vermont by mid-afternoon and continued across the state. Widespread tree and structural damage occurred with this system in Grand Isle, Franklin, Lamoille and Orleans counties.	Northern Vermont	55 kts.	\$50,000
5/26/2011	Thunderstorms High Winds	DR4001. Unstable air mass travelled across northern Vermont from the west during the late afternoon producing widespread thunderstorms and damaging winds. Many customers were without power due to downed trees on utility lines.	County wide	50 kts.	\$20,000
6/18/2011	Thunderstorms / Hail	A cold front brought scattered thunderstorm activity across Franklin County. A few of the stronger storms produced large hail greater than an inch diameter,	Swanton	1.00 in.	\$0.00
7/6/2011	Thunderstorms / High Winds	A well-established squall line moved across the state during the afternoon with numerous reports of wind damage as well as lightning strikes. As a result of these storms, more than 15,000 customers in Vermont lost power.	State-wide	50 kts.	\$5,000
9/8/2012	Thunderstorms High Winds	A squall line of severe thunderstorms developed and pushed east into Vermont. There was isolated minor wind damage in the form of large tree branches knocking out powerlines across town.	County wide	50 kts.	\$25,000
10/29/2012	High Winds	Superstorm Sandy brought high winds along the western slopes of the Green Mountain. Much of the state experience 50 knot wind speeds. Strong east winds of 25 to 35 mph, enhanced by downslope from the Green Mountains caused frequent wind gusts in excess of 45 mph with isolated wind gusts to 60 mph along western slope communities. Scattered tree limbs, branches and small trees were toppled by these winds, which accounted for scattered power outages as well.	State-wide	50 kts.	\$10,000
6/1/2013	Thunderstorms High Winds	A weak disturbance, well ahead of a cold front forecast triggered a few scattered thunderstorms. Damaging winds occurred in Swanton Town and Swanton Village toppling trees. There were brief power interruptions.	County-wide	50 kts.	\$2,000
9/11/2013	Thunderstorms / Hail	A weak area of low pressure resulted in a series of thunderstorms that moved across Vermont during the late afternoon and evening. Some of	Swanton	1.00 in.	\$5,000

		these thunderstorms produced hail and damaging winds that downed trees and utility lines.			
9/11/2016	Thunderstorms / High Winds	A strong front moved into the area from the west generating damaging winds and lightning. Trees were blown down and parts of northern Franklin County were without power overnight.	County-wide	50kts	\$5,000
10/30/2017	High Winds	DR-4356. A strong front from the west generated dangerously high winds. Numerous trees were felled in western Franklin County and several towns were without power for several days	State-Wide	50kts	\$200,000

5. ASSESSING VULNERABILITY

Structures in the SFHA

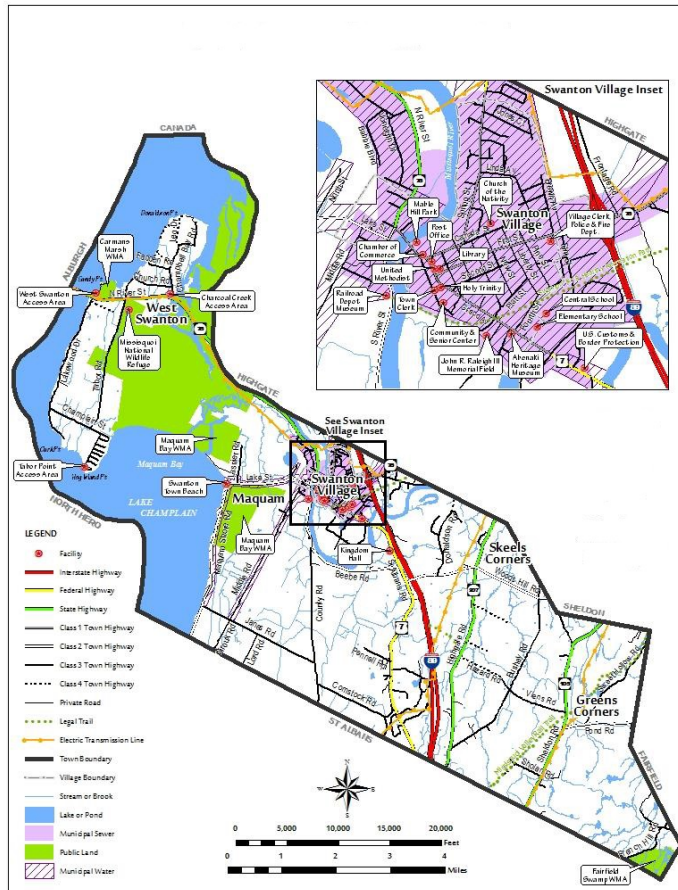
Swanton Town has approximately 162 buildings within FEMA-designated Special Flood Hazard Areas (SFHAs)⁴. The majority are single family dwellings and seasonal camps, one is a multi-family dwelling, one is lodging/B&Bs, one is a restaurant, two are commercial buildings and one is a commercial farm.

Swanton Village has approximately 16 buildings within FEMA-designated Special Flood Hazard Areas (SFHAs). The majority are single family dwellings.

FEMA is currently in the process of creating D-FIRMS for the Missisquoi River basin.

Properties within SFHAs, that have a mortgage, are required to purchase flood insurance. Swanton Town and Swanton Village's participation in the National Flood Insurance Program (NFIP) gives residents and business owners access to discount flood insurance through the National Flood Insurance Program. Flood insurance can still be purchased privately however it is more expensive. Development in SFHAs must meet additional construction standards as outlined in Swanton Village and Swanton Town's floodplain regulations.

Figure 5.1 Facilities and Utilities



⁴ Flood Hazard Summary Report for Swanton Village and Swanton Town, available on VT ANR's Floodready website <<https://anrweb.vt.gov/DEC/FoFReports/>>

Repetitive Loss Properties

According to FEMA Repetitive Losses/BCX Claims Report on June 26, 2018, Swanton Village and Swanton Town have no repetitive loss properties.

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended, 42 U.S.C. 4102a. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- (a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.⁵

Critical Facilities

A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the appropriate jurisdictions, or fulfills important public safety, emergency response, and/or disaster recovery functions. The current scope of this plan is to address these facilities and associated infrastructure. Once this plan is accepted, there is the possibility to expand the plan to cover other facilities and structures within the community.

The critical facilities identified in the Swanton Village and Swanton Town Multi-Jurisdictional Mitigation Plan include shelters; health care facilities; electric, and communication utilities; water treatment plants, pump stations and reservoirs; public safety facilities, government offices, hazardous materials storage sites; church and school.

Data from Swanton Town and Village Joint Planning Commission, Northwest Regional Planning Commission, Local Emergency Planning Committee and Swanton Town and Swanton Village Emergency Services were used to assist in the analysis of areas affected by various hazards. The results of the analysis are listed in Attachment B. The community hazard mitigation maps are included in Attachment. The community map depicts hazard areas, critical facilities, and vulnerable sites based on the best available data derived from local, regional, state and federal sources.

Market Values of Structures in Swanton Town and Swanton Village

Table 5.1 Swanton Town and Village Grand List		
Type	Number	Value Includes Land
Residential Homes	2,056	\$ 461,285,700
Seasonal Homes	186	\$ 39,126,800
		0
Mobile Homes - Unlanded	147	\$ 3,337,800
Mobile Homes - Landed	198	\$ 26,050,600

⁵ FEMA <<http://www.fema.gov/severe-repetitive-loss-program>>

		0
		0
Commercial	116	\$ 60,352,500
Commercial Apts.	24	\$ 10,983,500
Industrial	16	\$ 14,834,000
Farm	45	\$ 26,368,500
		0
Other (Utilities, Woodland, Miscellaneous)	529	\$ 91,329,400
Total	3,317	\$ 733,688,800
Source: 2017 Grand List		

Participation and Compliance with the National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP) is a voluntary program organized by the Federal Emergency Management Agency (FEMA) that includes participation from 20,000 communities nationwide and 247 Vermont towns and cities. Combined with floodplain mapping and floodplain management at the municipal level, the NFIP participation makes affordable flood insurance available to all homeowners, renters, and businesses, regardless of whether they are located in a floodplain.

FEMA conducted a flood hazard study for the Town of Swanton and Village of Swanton in 1983. Flood Insurance Rate Maps (FIRMs) were prepared by FEMA in 1983 and updated are currently being updated. Flood hazard areas were identified along the Missisquoi River and tributaries. The FIRMs and Study are available for review at the Village Office and Town Office and on-line at FEMA.gov.

Creation of the Flood Hazard District in the Village and Town's Joint Subdivision and Zoning bylaws enabled the Village and Town to be eligible for FEMA's National Flood Insurance Program (NFIP), which permits residents within the Flood Hazard District to purchase flood insurance. The purpose of the district is to prevent increases in flooding caused by development in flood hazard area, to minimize future public and private losses due to floods, and to promote the public health, safety and general welfare. The Town is committed to enforcing floodplain regulations and ordinances to be eligible to participate in the NFIP program and protect the people and property of Swanton by restricting development in flood prone areas. Swanton Village (CID 500060) and Swanton Town (CID 500220) are members in good standing with the NFIP.

According to FEMA's National Flood Insurance Program as of June 26, 2018, the Town of Swanton has 27 policies in force with \$5,159,100 total coverage and 40 claims made since 1978 totaling \$672,405. Swanton Village has 5 policies in force with \$1,099,000 total coverage and 2 claims made since 1978 totaling \$26,847.

The Village and Town work with the elected officials, the VT Agency of Natural Resources, the Northwest Regional Commission, Vermont and FEMA to correct existing compliance issues and prevent any further NFIP compliance issues through continuous communications, training and education.

NFIP

Areas susceptible to flooding present obvious hazards to life and property, and the continued protection of these areas from development is an important responsibility.

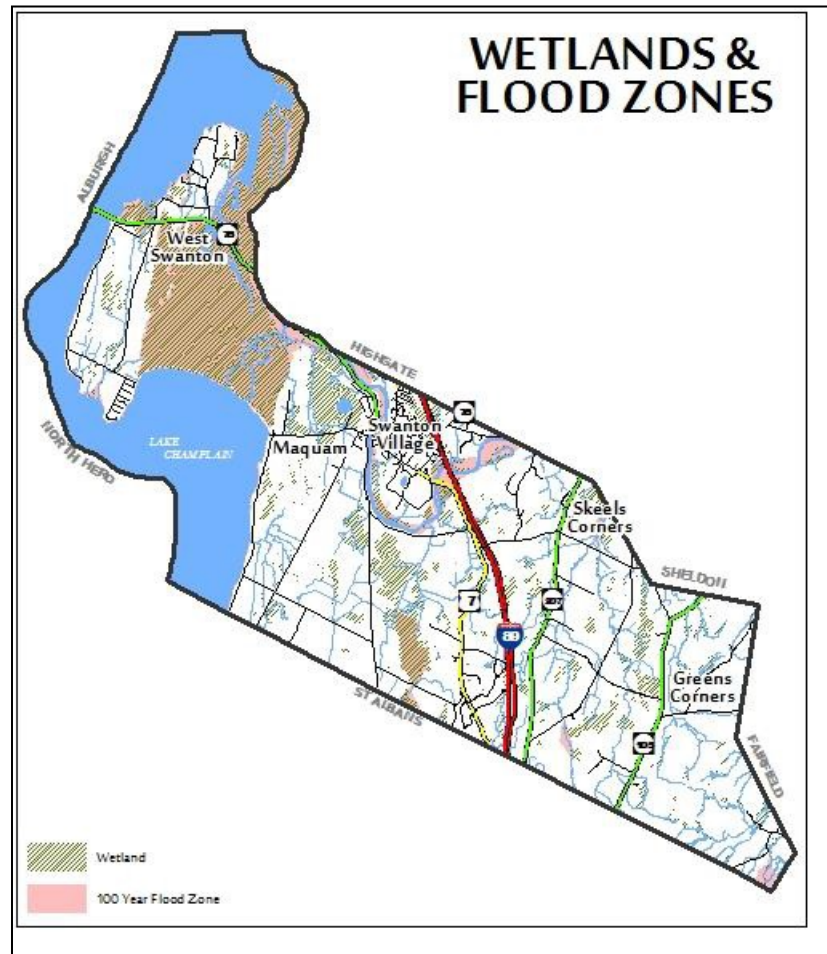
Swanton Town and Village participate in the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA). FEMA conducted a flood hazard study for Swanton Town and Village in 1983 and flood hazard areas were identified along the Missisquoi River, Charcoal Brook, Hungerford Brook, First Creek, Maquam Creek and Dead Creek and the Lake Champlain Shoreland. Flood Insurance Rate Maps (FIRM) were prepared by FEMA in 1983. They are available for review at the Swanton Town Office and Swanton Village Office.

Swanton Town and Village have adopted floodplain regulations in order to protect the health, safety, and welfare of its residents and to allow the community to participate in the National Flood Hazard Insurance Program. The Town and Village Zoning Administrator is a shared position and is responsible for enforcing compliance within the NFIP. In 2006, the Town established an ordinance for special flood hazard areas. The purpose of the ordinance is to:

- Minimize and prevent the loss of life and property, the disruption of commerce, the impairment of the tax base, and the extraordinary public expenditures and demands on public services that result from flooding and other flood related hazards; and
- Ensure that the design and construction of development in flood and other hazard areas are accomplished in a manner that minimizes or eliminates the potential for flood and loss or damage to life and property; and
- Manage all flood hazard areas designated pursuant to 10 V.S.A. § 753; and
- Make the state, municipalities, and individuals eligible for federal flood insurance and other federal disaster recovery and hazard mitigation funds as may be available.

According to FEMA's National Flood Insurance Program as of March 31, 2014, the Town of Swanton has 28 policies in force with \$5,219,700 in insurance in-force and \$332,856 written premium in force.

Figure 5.2 Flood Zones & Wetlands



Swanton Village has 5 policies in force with \$912,90 in insurance in-force and \$25,847 written premium in force.

Existing Planning and Regulatory Capabilities

The Swanton Town Administrator and Swanton Village Manager positions handle numerous administrative functions ranging from dealing with concerns and inquiries, applying for and administering grants and loans, investigating and implementing cost control measures, reviewing and responding to Selectboard and Trustees correspondence, responding to state and federal requirements, reviewing expenditures and billings, and acting as liaison between town boards and citizens. The Town Administrator attends all Selectboard Meetings and Village Manager attend all Trustee meetings and both attend joint Board Meetings.

The Planning Coordinator serves the Planning Commission. This involves reviewing all development proposals, attending all meetings, preparing Planning Commission correspondence, working on plans and by-laws and any other tasks required by the Commission.

The Zoning Administrator is a shared position. The ZA handles all zoning related issues. This involves attending all meetings of the Zoning Board, reviewing permits, issuing permits, investigating complaints, and enforcement against violations.

The Town Clerk's Office and Village Clerk's Office have also experienced increases in workload over the past ten years. Deed and document recording and research, issuing various licenses, birth and death certificate recording, tax billing, concerns and general inquiries have all increased dramatically as the number of new houses, businesses and properties has increased. The change from a small rural village and town to a more robust municipality has resulted in a population more used to a higher level of services.

The Public Works Department's workload has increased from past years due in large part to the increased service expectations of year-round and seasonal residents. Residents now expect their roads to be plowed sooner, and expect road surfaces to be maintained at a higher level, than they did in past years.

Emergency response is a significant issue in the Swanton area because of the presence of several major industries, Interstate 89 and US Route 7 and VT78. During the past few years, the numbers of fire calls responded to by the department have increased significantly due to an increase in motor vehicle accidents. The department currently has a volunteer roster of 35 persons, which has remained stable within +/- 10% for the past several years and includes both long-term and new residents. This is a positive development, as many towns in the state are having trouble maintaining their volunteer forces. However, it is important to note that training and equipment costs have increased considerably in recent years, and that the larger workload have resulted in higher town expenditures. During the summer months an increase of the seasonal population and tourists, places an additional strain on first responders.

There are currently no large or small developments planned in Swanton Town and Village that would be considered in the floodplain or flood prone areas.

How this Plan Will be Integrated into Other Planning Mechanisms

As the Town and Village go through the update process for the planning and regulatory mechanisms outlined in the table below, the Town will look to the Hazard Mitigation Plan's Table of Actions and Risk and Vulnerability Assessments to help guide land use district decisions, and guide goals and policies for those districts. After Town Meeting every March, policies and action items in the Joint Village and Town Plan may be reviewed and integrated into hazard mitigation as needed. The Local Emergency Management Plan contact and resource lists should be updated after Town Meeting each year, including updates to at risk locations, as well as locations of vulnerable populations.

Updates to each of the planning mechanisms outlined Table 5.2 below are handled by the responsible party identified in the table. There is no timeframe for updating the referenced plans, agreements and regulations to better incorporate hazard mitigation, however, as each document is updated the hazard mitigation plan will be reviewed for incorporation. The goals of this hazard mitigation plan will be incorporated in the upcoming town plan update to ensure that emergency preparedness and mitigation planning efforts are included in the Village and Town Plan, with particular attention to the projects in the Mitigation Actions Table. This ensure the Mitigation Plan is utilized and project follow-through occurs.

The following authorities, policies, programs, and resources related to hazard mitigation are currently in place and/or being implemented in the Town and Village. In addition to the NFIP. These programs reduce the effects of hazards to existing, new, and future buildings, infrastructure, and critical facilities by preventing their location in identified hazard areas and ensuring that infrastructure and buildings are designed to minimize damage from hazard events. The Committee analyzed these programs for their effectiveness and noted any improvements that may be needed. Other mitigation/emergency planning related documents and their status are outlined in the below table

In a growing community, public facilities and services are often in transition. Existing facilities and services become inadequate. In Swanton Town and Village, it is apparent that both population growth and the increasing expectations of residents regarding community services will continue to result in facility and service expansions and improvements. While municipal budgets have not increased substantially, the prospect of future service and facility improvements, as well as need for new services, will undoubtedly have fiscal effects.

Table 5.2 Swanton Town and Village Policies and Plans

Existing Protection	Description	Effectiveness/Enforcement/Hazard that is addressed	Gaps in Existing Protection/Improvements Needed
Joint Village and Town Plan	Policies that provide protection and limited development in wellhead protection areas, wetlands, steep slopes, and shallow soils.	Policies and vision for future land use. Includes flood resiliency element. Adopted in 9/23/2015 Addresses: Flooding, fluvial erosion, structure fire, and overview of public safety	None found
Joint Zoning Bylaws and Flood Hazard Area Regulations.	Restrictions on development in potentially hazardous areas such as steep slopes, floodplains. Also regulates land	Land Use Regulation recently updated. New River Corridor Overlay approved by ANR. Adopted on 9/20/14 Enforced by Zoning Offices.	Stream Buffer or River Corridor Regulation could be considered.

	development in FEMA flood areas. Includes River Corridor Overlay District with associated Protection Measures.	Addresses: Addresses: Flooding, fluvial erosion/landslide, structure fire, HazMat, telecommunications, utility related	
Local Emergency Management Plan	Summary of emergency response and notification procedures, situation reports, ICS forms, Local Declaration forms, Local Situational Reports, Emergency Stream Protective Measures.	2019. Updated annually. Enforced by Village Manager and Fire/Police Chief Addresses All Hazards.	Does not identify local shelter manager. Does not contain Debris Management Annex.
Fire Mutual Aid	Assistance from county fire, rescue, municipal and public works departments.	Franklin County Mutual Aid Agreement, 2006. Enforced by Fire and Police Chiefs Addresses All Hazards. Updated in 2015.	None identified.
School Emergency Response	Responses by various types of emergency incidents at school.	Vermont School Crisis Guide. Enforced by Supervisory Union, School Board, Principal Addresses: Terrorism / WMD	Needs updating.
Solid Waste Implementation Plan	Transportation, resource recovery, recycling and disposal of solid waste.	Member of the Northwest Vermont Solid Waste Management District. Enforced by Health Officer Town and Health Officer Village. Addresses All Hazards (debris) and household solid waste.	None identified.
Maintenance Programs	Bridge and Culvert Inventory. Municipal Road Stormwater Erosion Inventory.	First established in 2002. Updated semiannually New State requirement that is part of municipal roads general permit program. Enforced by Road Commissioner, Public Works Director, Highway Foreman	Needs updating. None identified.

Through current plans, policies and mitigation actions, the Town and Village are working to decrease damages from severe winter storms (ice storms), floods/fluvial erosion and severe thunderstorms (high winds, hail and lightning). Other less hazardous risks are also being addressed.

Flooding and Development Regulations

The Village and Town have adopted floodplain regulations in order to protect the health, safety, and welfare of its residents and to allow the community to participate in the National Flood Insurance

Program (NFIP). In 1985 the Village and Town established an ordinance for special flood hazard areas. The purpose of this bylaw is:

- Minimize and prevent the loss of life and property, the disruption of commerce, the impairment of the tax base, and the extraordinary public expenditures and demands on public services that result from flooding and other flood related hazards; and
- Ensure that the design and construction of development in flood and other hazard areas are accomplished in a manner that minimizes or eliminates the potential for flood and loss or damage to life and property; and
- Manage all flood hazard areas designated pursuant to 10 V.S.A. § 753; and
- Make the state, municipalities, and individuals eligible for federal flood insurance and other federal disaster recovery and hazard mitigation funds as may be available.

The Zoning Administrator is a shared position and is responsible for monitoring compliance with the NFIP.

River Corridor Regulations

The Village and Town do not have River Corridor regulations. The communities are considering a river corridor bylaw.

6. MITIGATION STRATEGY

Hazard Mitigation Goals for Swanton Town and Village

- Prevent / reduce the loss of life and injury resulting from all-hazards events.
- Prevent / reduce the financial losses and infrastructure damage incurred by municipal, residential, agricultural and commercial establishments due to disasters.
- Include hazard mitigation planning in the municipal planning process including the Town Plan, Capital Improvement Plan and Local Emergency Operations Plan.
- Ensure the general public is part of the hazard mitigation planning process.

Swanton Village and Swanton Town Joint Municipal Plan (Adopted 9/23/2015) Goals, Policies & Objectives that support Hazard Mitigation

- To live with respect for the land; make wise and efficient use of it, and preserve the Town's working landscape.
- Encourage the type, location, and intensity of land uses to be compatible with the environmental, infrastructural, and economic capabilities of the community.
- To protect and maintain the important natural features of Swanton including: Lake Champlain, the Missisquoi River and its tributaries, the Missisquoi National Wildlife Refuge, archeological sites, and scenic areas.
- To provide public services and facilities adequate to meet the needs of present and future residents in an efficient and environmentally sound manner
- Ensure that the all municipal departments have the equipment necessary to provide adequate service and acceptable response times to the entire community.
- Ensure that adequate water for fire protection is available throughout the year in all parts of the community.
- Continue mutual aid and cooperation among all emergency service groups.

- Cooperate with and participate in the efforts of state and local groups to ensure that the water quality of Lake Champlain is protected.
- Promote the use of low impact development (LID) through educational programs to minimize the negative impacts of stormwater.
- To identify, maintain, and protect significant wetlands.
- To ensure that Swanton is a flood resilient community.
- Discourage development in identified flood hazard, fluvial erosion, and river corridor protection areas. If new development is to be built in such areas, it shall not exacerbate flooding and fluvial erosion.
- Protect and restore floodplains and upland forested areas that attenuate and moderate flooding and fluvial erosion
- Encourage flood emergency preparedness and response planning.

Severe Winter Storm (Ice Storm)

- Village and Town road crews have snow removal equipment.
- Public works and utility crews have response equipment to deal with downed trees and branches.
- National Weather Service watches and warnings actively posted to Town and Village social media sites.
- Actively encourage residents to sign-up for VT-Alert.
- Fixed emergency generators are located at the Water Plant and School which is also the primary emergency shelter. A mobile generator is available for other sites (PSB, Village Garage, Town Garage, Public Works, Electric Department and Water and Wastewater Pump Stations).

Flooding / Fluvial Erosion

- Sewer pump stations flood proofed
- Flood buy-out of 2 residential units on Waugh Farm Road in 2000.
- Conducting Road Erosion inventory along with Dept of Environmental Conservation and Northwest Regional Planning Commission to identify and prioritize stormwater erosion problem areas on municipally owned roads.
- The Village and Town have Zoning Bylaws which designates a Flood Hazard Area District and River Corridor District whose purpose is to minimize future public and private losses caused by development in flood hazard areas. The Town participates in the National Flood Insurance Program (NFIP).
- Flood Hazard Areas in Swanton Town and Village are identified on Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs) produced by FEMA. The purpose of these districts, which are located along the flood plains of rivers and streams throughout the Town, is to prevent increases in flooding caused by excessive development of lands within flood hazard areas. Swanton Town and Swanton Village has flood hazard development ordinances and is a member of the National Flood Insurance Program (NFIP).

Severe Thunderstorm (Lightning, High Winds, Hail)

- Public Works and Highway crews have response equipment to deal with downed trees and branches.
- Road crews monitor roadways for obstructions and flooding.
- Village and Town have installed some lightning protection on equipment operated at municipal facilities.

- Emergency backup generator exists for school (designated Red Cross shelter).
- On-going regularly scheduled road maintenance programs (cutting vegetation, ditch and culvert maintenance).

On Going Community Preparedness Activities

- Village and Town jointly approved Local Emergency Management Plan that is updated annually.
- Continue to identify and equip, as appropriate, emergency operations shelter and centers.
- Fire Department is member of Franklin County International Firefighters Association.
- Village and Town Departments are members for Franklin County Mutual Aid Agreement.
- Active membership in the Local Emergency Planning Committee serving Franklin County.
- Community participates in the Vermont Enhanced 911 System.
- School has updated State School Response Guide to handle variety of emergency situations.
- School Board proactive in addressing school safety issues.

Identified Hazard Mitigation Actions, Programs, and Activities

The following list documents the questions (criteria) considered in establishing an order of priority. Each of the following criteria was rated according to a numeric score of “1” (indicating Poor), “2” (indicating Average) and “3” (indicating Good). The highest possible score is 36. The full scoring matrix used is located at the end of this annex.

- 1) Does the action reduce damage?
- 2) Does the action contribute to community objectives?
- 3) Does the action meet existing regulations?
- 4) Does the action protect historic structures or structures critical to Town operations?
- 5) Can the action be implemented quickly?
- 6) Is the action socially acceptable?
- 7) Is the action technically feasible?
- 8) Is the action administratively possible?
- 9) Is the action politically acceptable?
- 10) Is the action legal?
- 11) Does the action offer reasonable benefits compared to its cost of implementation?
- 12) Is the action environmentally sound?

Mitigation actions are listed in terms of mitigating threat or risk to public health and safety, reduction of hazard to community assets, adherence to Town plan and local ordinances, cost, and feasibility. Actions are classified as either short - term or long - term activities. Short –term action items are activities which the municipality may be capable of implementing within one to two years. Long-term action items may require new or additional resources, funding or authorities. Ongoing action items occur at least once per year.

Recent disasters that have occurred have not caused a change in priorities. The projects have been prioritized as part of the Village and Town’s on-going comprehensive planning process following state land use law.

The following identified programs, projects and activities are future mitigation strategies for the Swanton Town and Swanton Village. These mitigation strategies have been chosen by the town as the most appropriate policies and programs to lessen the impacts of potential hazards.

Cost-Benefit Analysis

Each project will incorporate a full benefit-cost analysis (BCA) following FEMA's BCA methodology and latest software to ensure cost effectiveness and maximize savings.

There was a rough cost/benefit analysis done for each action listed in the table. The below cost and benefits tables address the priorities for the mitigation strategies that are stated in the Mitigation Actions Table.

Cost Estimates

High	=>\$100,000
Medium	= \$25,000 – 100,000
Low	=< \$25,000

Benefit Estimates

High	Public Safety
Medium	Infrastructure / Functionality
Low	Aesthetics / General Maintenance

Time Frame

Short term	6 months to one year
Medium term	1 – 3 years
Long term	4+ years

Implementation of the mitigation actions is summarized in the below table, as far as who, when and how they will be carried out. Scoring may be found in Attachment C.

Table 6.1 Swanton Town and Village Prioritized Mitigation Actions

Priority / Score	Hazard / Mitigation Action	Responsibility / Oversight	Time – Frame	Funding / Support	Cost / Benefit	Initial Implementation Steps
High 34	Inventory and Implementation to address severe stormwater/erosion sites Addresses: Flooding/Fluvial Road Erosion	Selectboard, Trustees, Road Foreman for Village and Town	Medium-term Start in 2020 and Complete by 2022	Local Funding, VT local Roads Program, HMGP.	High / High	Hydraulic study and permit needed.
High 34	Town-wide Bridge and Culvert Update Addresses: All Hazards	Selectboard, Trustees Road Foreman for Village and Town	Short – term Start in spring 2020 and complete by fall 2020	Local funding, VT Local Roads	Low / High	Secure funding. RFP for contractor to perform inventory.

High 32	Flood buyout for interested residences along Missisquoi River and VT78 Addresses: Flooding/Fluvial Erosion	Selectboard, Landowner, DEMHS, FEMA	Long-term Start in 2020 and Complete by 2025	FEMA Mitigation Program	High / High	Meet with landowners to discuss buyout option
High 36	Enhance Public Awareness of the Dangers of Severe Winter Weather Addresses: Severe Winter Storm / Ice Storm	Selectboard, Trustees, Fire Department	Short term Start in March 2020 and end October 2020	Local funding	Low / High	Identify and distribute educational materials on carbon monoxide poisoning and keeping wood stoves cleaned.
High 36	Support Power Utility Efforts to Protect Utility Corridors from Ice Addresses: Severe Winter Storm / Ice Storm	Village Trustees, Village Electric Department	On-Going Start in March 2020 and end in November 2025.	Local funding (if needed). Assist with identification of areas of concern.	Low / High	Support power utility standards of identifying utility corridors in need of pruning.
High 36	Protect critical facilities and infrastructure from lightning damage Addresses: Severe Thunderstorm	Selectboard, Trustees Public Works Director, Fire Department	Short term Start in May 2020 end December 2020.	Local Funding	Low / High	Install lightning protection and surge suppression protection on critical facility electronic equipment.

7. PLAN IMPLEMENTATION, MONITORING & EVALUATION

Monitoring and Updating the Plan – Yearly Review

Once the plan is approved by FEMA and locally adopted, the Swanton Emergency Management Director along with interested and appointed volunteers and stakeholders, will continue to work with the Emergency Planner at the Northwest Regional Commission to monitor, evaluate, and update the plan throughout the next 5-year cycle. The plan will be reviewed annually at the May Selectboard meeting along with the review of the town's Local Emergency Management Plan (LEMP). During the annual review, the Trustees and Selectboard at a joint meeting will evaluate the plan effectiveness at achieving its stated purpose and goals. This meeting will allow town officials and the public to discuss the town's progress in implementing mitigation actions and determine if the village and/or town is interested in applying for grant funding for projects that can help mitigate future hazardous events; e.g., bridge and culvert replacements, road replacements and grading, as well as buying out any repetitive loss structures that may be in the Special Flood Hazard Area, and revise the plan as needed. Northwest

Regional Commission's emergency planner will assist the Swanton Emergency Management Director with this review, as requested by the Town. Progress on actions will be kept track using a table the NRPC will provide to the Town EMD to update. There will be no changes to the plan, unless deemed necessary by the Village and Town. If so, the post disaster review procedure will be followed.

Plan Maintenance (5 Year Update and Evaluation Process)

The Hazard Mitigation Plan is dynamic and should not be static. To ensure that the plan remains current and relevant, it is important that it be updated periodically. The plan should be updated every five years in accordance with the following procedure:

1. The Swanton Town Administrator and Swanton Village Manager will appoint a team to convene a meeting of the hazard mitigation planning committee. The team will include the Swanton Emergency Management Director who will chair the meeting. Others members should include local officials such as Selectboard members, Trustee members, Town Administrator, Village Manager, Fire Chief, Zoning Administrator, Public Works Director, Road Commissioners, Health Officers and interested stakeholders. The Emergency Management Director will work with the Northwest Regional Planning Commission Emergency Planner and be the point person for the Town.
2. The NRPC Emergency Planner will guide the Committee through the update process. This update process will include several publicly warned meetings. At these meeting the Committee will use the existing pan and update as appropriately guided by the NRPC Emergency Planner to address:
 - a. Update of hazard events and data gathered since the last plan update.
 - b. Changes in community and government processes, which are hazard-related and have occurred since the last review
 - c. Changes in community growth and development trends and their effect on vulnerability.
 - d. Progress in implementation of plan initiatives and projects
 - e. Incorporation of new mitigation initiatives and projects.
 - f. Effectiveness of previously implemented initiatives and projects.
 - g. Evaluation of the plan for its effectiveness at achieving its state purpose and goals.
 - h. Evaluation of unanticipated challenges or opportunities that may have occurred between the date of adoption and the date of the report, and their effect on capabilities of the town.
 - i. Evaluation of hazard-related public policies, initiatives and projects.
 - j. How mitigation strategy has been incorporated into other planning mechanisms.
 - k. Review and discussion of the effectiveness of public and private sector coordination and cooperation.
3. From the information gathered at these meetings, along with data collected independently during research for the update, the NRPC Emergency Planner will prepare and updated draft in conformance with the FEMA *Local Hazard Mitigation Plan Review Crosswalk* document.
4. The Selectboard and Trustees will review the draft report. Consensus reached on changes to the draft. Emphasis in plan updates will be put on critically looking at how the plan can become more effective at achieving its stated purpose and goals.

5. The changes will be incorporated into the Plan by the NRPC Emergency Planner.
6. The Selectboard and Trustees will notify the public that the draft is available for public comment and review. The Village and Town will advertise and make available the draft plan for comments both electronically and in hard copy. The draft plan will be distributed electronically to the neighboring municipalities of St. Albans Town, Alburgh, Highgate, and Sheldon for review and comment.
7. Public comments will be incorporated by the NRPC Emergency Planner. The final draft will be provided to the plan development participants and town staff for final review and comment with review comments provided to the Emergency Management Director and incorporated into the plan.
8. The NRPC Emergency Planner will finalize the plan, with any remaining comments from the plan participants and town staff incorporated, and then submitted electronically to DEMHS State Hazard Mitigation Officer (SHMO) who will then submit to FEMA Region 1.
9. The Plan will be reviewed by the DEMHS SHMO and FEMA Region 1.
10. SHMO and FEMA comments will be addressed in the Plan by the NRPC Emergency Planner.
11. The Plan will be resubmitted as needed until the plan is approved pending adoption by FEMA Region 1. Once the plan is approved by FEMA, it will be ready for adoption.
12. The Trustees and Selectboard will adopt the plan and distribute to interested parties.
13. The final adopted plan will be submitted by the NRPC Emergency Planner to DEMHS and FEMA.
14. FEMA will issue final approval of the adopted plan.

Continued Public Involvement

The Swanton Village Trustees and Swanton Town Selectboard are dedicated to involving the public directly in the continual review and updates of the Hazard Mitigation Plan. Copies of the plan will be kept at the Town Office and Village Office. The existence and location of these copies will be publicized in the media (newspaper, web sites, Town and Village Annual Reports, etc.). The plan will also include the Selectboard Chair's and Trustee Chair's contact information to facilitate and track public comments. In addition, any proposed changes will be publicized in the media.

Programs, Initiatives and Projects Review

Although the plan should be reviewed in its entirety every five years as described above, the Village and Town may review and update its programs, initiatives and projects more often directly with the State Hazard Mitigation Officer (SHMO) based on changing local needs and priorities.

The Swanton Town and Village should incorporate elements of this plan, such as identified projects, into capital planning initiatives and annual budget reviews during Town Meeting.

Post-Disaster Review/Update Procedure

Should a declared disaster occur, a special review will occur amongst the Trustees, Selectboard, the Emergency Management Coordinator, the NRPC Emergency Planner, and those involved in the five-year update process described above. This review will occur in accordance with the following procedures:

1. Within six months of a declared emergency event, the Village Manager and Town Administrator will initiate a post disaster review and assessment. Members of the State Hazard Mitigation Committee will be notified that the assessment process has commenced.
2. This post disaster review and assessment will document the facts of the event and assess whether existing Hazard Mitigation projects effectively lowered community vulnerability/damages. New mitigation projects will be discussed, as needed.
3. A draft After Action Report of the review and assessment will be distributed to the hazard mitigation committee.
4. A meeting of the committee will be convened by the Trustees and Selectboard to make a determination of whether the plan needs to be amended. If the committee determines that NO modification of the plan is needed, then the report is distributed to local communities.
5. If the committee determines that modification of the plan IS needed, then the committee drafts an amended plan based on the recommendations and forwards to the Selectboard for public input.
6. The Trustees and Selectboard adopts the amended plan after receiving approval-pending-adoption notification from FEMA.

Attachment A

Hazard Identification and Risk Assessment

Swanton Town and Village

Hazard	Impacted Area	Probability Of Occurrence	Consequence of Occurrence				Total
			Health & Safety	Property	Environment	Economic	
Severe Winter Storm (Ice Storm)	4	5	1	1	1	3	50
Flooding/Fluvial Erosion	2	5	1	1	2	2	40
Severe Thunderstorm (Severe Wind, Lightning, Hail)	3	5	1	2	1	1	40
Structure Fire	1	5	1	1	1	2	30
Hazardous Materials	1	5	1	1	2	1	30
Major Fire – Wildland	1	4	1	1	1	1	20
Drought	3	1	1	1	2	2	9
Dam Failure	1	1	1	1	2	3	8
Tornado	1	1	1	1	1	2	6
Earthquake	1	1	1	1	1	2	6
Terrorism / WMD	1	1	1	1	0	2	6
Extreme Cold	1	0	0	1	0	0	2
Extreme Heat	1	0	0	0	0	0	1
Hurricane	1	0	0	0	0	0	1
Infectious Disease Outbreak	1	0	0	0	0	1	2
Invasive Species	1	1	0	1	1	1	5
Rock Cuts	1	0	0	0	0	0	1
Nuclear Power Plant Failure	1	0	0	0	0	0	1
Rockslide/Landslide	1	0	0	0	0	0	1
*Has never occurred							

Total Risk Rating 259

Attachment B**Critical Facilities, HazMat Storage Facilities, and Vulnerable Sites
Town and Village of Swanton**

Facility Name or Facility Designation	Facility Owner	Function	Street or Location
A.G. Anderson	A.G. Anderson	Hazardous Materials Facility	First Ave
Bob's One Stop		Hazardous Materials Facility	113 Canada St
Brown Foundry	Richard Brown	Hazardous Materials Facility	28 Lake St
Carrol Concrete Co.	Carrol Concrete	Hazardous Materials Facility	126 First St
Church of the Nativity	Father John Meagher	Religious Facility	65 Canada St
DeVost Enterprises		Hazardous Materials Facility	60 Jonergin Dr
Giordona Manor		Assisted Living Facility	Canada St
Grand Avenue Enterprises	Michael Begnoche	Hazardous Materials Storage Facility	126 Grand Ave
H. G. Berger & Son, Inc.	H.G. Berger	Government	16 Waugh Farm Rd
Little White Church by The Lake		Religious Facility	Church Rd
Holy Trinity Episcopal Church	Rev. Donald Morris	Religious Facility	38 Grand Ave
Mary Babcock Elementary School	Swanton Town and Village	Educational Facility	24 Fourth St
Missisquoi National Wildlife Refuge	U.S. Fish and Wildlife	Hazardous Materials Facility	371 North River St
Missisquoi River Charge Methodist Church		Religious Facility	Rice Hill
Missisquoi Valley Rescue	Dave St. Pierre	Emergency Services	First St
Mylan Technologies, Plant A	Mylan Pharmaceuticals, Inc	Hazardous Materials Facility	22 Jonergin Dr
New England Container		Hazardous Materials Facility	60 Jonergin Dr
North Country Bait and Tackle	S.B. Collins, Inc.	Hazardous Materials Facility	23 North River St
Nutrite Corporation	Dennis Ryan	Hazardous Materials Facility	50 Brooklyn St
Poulin Grain		Adult Living Housing Complex	24 Depot St
Short Stop (Shell)		Hazardous Materials Facility	Grand Ave
St. Marie's (Citgo)		Hazardous Materials Facility	31 Grand Ave
State Garage	Vermont Agency of Transportation	Hazardous Materials Facility	Fourth St
State Garage.	Vermont Agency of Transportation	Hazardous Materials Facility	VT78
Sunhill Food of Vermont	Edgar Maskell	Hazardous Materials Facility	14 Jonergin Dr
Swanton Central School	Swanton Town and Village	Educational Facility	Grand Ave
Swanton Christian Church		Religious Facility	Academy St
Swanton Dry Cleaners	John Bouchard	Hazardous Materials Facility	31 First St
Swanton Exxon		Hazardous Materials Facility	VT78/189
Swanton Fire Department	Swanton Town and Village	Emergency Services	First St
Swanton Fresh Water Treatment Facility	Village of Swanton	Water System	
Swanton Historical Society	Swanton Town and Village	Government Facility	First St
Swanton Mobil		Hazardous Materials Facility	
Swanton Municipal Complex	Village of Swanton	Government Facility	First St
Swanton Public Library	Swanton Town and Village	Library	Grand Ave
Swanton Short Stop	S. B. Collins	Hazardous Materials Facility	91 First St
Swanton Sunoco	J.W. Sandri, Inc.	Hazardous Materials Facility	Route 78/189

Swanton Village and Swanton Town Hazard Mitigation Plan 2020
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Swanton Sunoco	S.B. Abbot	Hazardous Materials Facility	166 First St
Swanton Texaco Short Stop	S.B. Collins	Hazardous Materials Facility	91 First St
Swanton Town Hall	Town of Swanton	Government Facility	Academy St
Swanton Village Electric	Swanton Village	Energy Facility	First St
Swanton Village Water Plant	Swanton Village	Government Facility	First St
Swanton Village WW Plant	Swanton Village	Wastewater Control Facility	First St
Swanton Village Police Department	Swanton Village	Emergency Services	First St
Tannenberger Veterinary Hospital	Tannenberger	Veterinary Clinic	128 Grand Ave
Texaco		Hazardous Materials Facility	Canada St
Trinity Presbyterian Church		Religious Facility	Grand Ave
U.S. Post Office	US Postal Service	Government Facility	Grand Ave
Verizon Central Office	Verizon	Hazardous Materials Facility	York St
Vermont Army National Guard Armory	VTANG	Hazardous Materials Storage Facility	Ferris St
Vermont Fastners Mfg.	Peter Casper	Hazardous Materials Facility	49 Jonergin Dr
Vermont Precision Tools	Monica Leduc	Hazardous Materials Facility	6 Brooklyn St
Webb's Getty	S.B. Collins, Inc.	Hazardous Materials Facility	North River St

Attachment C**Swanton Town and Village Project Priority Matrix**

Each of the following criteria was rated according to a numeric score of “1” (indicating Poor), “2” (indicating Average) and “3” (indicating Good).

1. Does the action reduce damage?
2. Does the action contribute to community objectives?
3. Does the action meet existing regulations?
4. Does the action protect historic structures or structures critical to Town operations?
5. Can the action be implemented quickly?
6. Is the action socially acceptable?
7. Is the action administratively possible?
8. Is it technically feasible?
9. Is the action politically acceptable?
10. Is the action legal?
11. Does the action offer reasonable benefits compared to its cost of implementation (cost-benefit)?
12. Is the action environmentally sound?

	Projects	Criteria												Total Score
		1	2	3	4	5	6	7	8	9	10	11	12	
Mitigation Action	Inventory and Implementation to address severe stormwater/erosion sites	3	3	3	2	2	3	3	3	3	3	3	3	34
	Town-wide Bridge and Culvert Update Addresses: All Hazards	3	3	3	2	2	3	3	3	3	3	3	3	34
	Flood buyout for interested residences along Missisquoi River and VT78	3	3	3	1	1	3	3	3	3	3	3	3	32
	Enhance Public Awareness of the Dangers of Severe Winter Weather	3	3	3	2	2	3	3	3	3	3	3	3	34
	Support Power Utility Efforts to Protect Utility Corridors from Ice	3	3	3	3	3	3	3	3	3	3	3	3	36
	Support Power Utility Efforts to Protect Utility Corridors (tree / branch removal).	3	3	3	3	3	3	3	3	3	3	3	3	36
	Protect critical facilities and infrastructure from lightning damage	3	3	3	3	3	3	3	3	3	3	3	3	36

Attachment D

Public Government Participation

Information in the Hazard Mitigation Plan is based on research from a variety of sources. It encompassed research using a historical perspective and future projections for the vulnerability assessment. The research methods and various contributions to the plan included but were not limited to:

- Town of Swanton Select Board
- Swanton Village Trustees
- Swanton Emergency Management
- Town of Swanton Highway Department
- Swanton Village Police Department
- Swanton Village Public Works
- Northwest Regional Planning Commission GIS
- Local Emergency Planning Committee #4 (Franklin County)
- Swanton Volunteer Fire Department
- Missisquoi Valley Rescue
- Northwest Regional Planning Commission
- Vermont Department of Transportation District 8
- Vermont Emergency Management
- Vermont Agency of Natural Resources
- Vermont Homeland Security Unit
- Vermont Fire Academy
- Northeast States Emergency Consortium
- Federal Emergency Management Agency
- National Weather Service
- National Oceanic Atmospheric Administration
- Vermont Geological Survey

Attachment E References

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